RECLAMATION
Managing Water in the West

Record of Decision

TransWest Express Transmission Project

LC-UC-16-17

Volume 2- Appendices

U.S. Department of the Interior
Bureau of Reclamation
Lower Colorado Region
Boulder City, Nevada

June 2017

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Appendix B Plan of Development

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Exhibit to Right-of-Use Authorization, Legal Descriptions

TWE Project

Right-of-Way for BOR-Administered Lands in Clark County, Nevada, and Duchesne County, Utah

600 kV Transmission Line Long-Term Right-of-Way:

Mount Diablo Meridian, Nevada

T. 21 S., R. 63 E.,

sec. 28, SE1/4NE1/4 and E1/2SE1/4;

sec. 34, lots 14, 23, and 27.

T. 22 S., R. 63 E.,

sec. 3, lots 7 and 8, S1/2NW1/4, N1/2SW1/4, and SE1/4SW1/4;

sec. 10, W1/2NE1/4, NE1/4NW1/4, N1/2SE1/4, and SE1/4SE1/4;

sec. 14, W1/2NW1/4, SE1/4NW1/4, N1/2SW1/4, and SE1/4SW1/4;

sec. 15, NE1/4NE1/4;

sec. 23, E1/2NW1/4;

sec. 35, NE1/4, SE1/4SW1/4, N1/2SE1/4, and SW1/4SE1/4.

T. 23 S., R. 63 E.,

sec. 2, lots 3 and 7.

The areas described aggregate 196.5 acres. The ROW is 250-feet wide by 6.5 miles in length.

Uintah Special Meridian, Utah

T. 3 S., R. 5 W.,

sec. 2, SW1/4SE1/4, SE1/4SE1/4

The areas described aggregate approximately 2.5 acres. The ROW is 250 feet wide by 0.08 miles in length.

Access Roads for 600 kV Transmission Line outside of Long-Term Right-of-Way:

Mount Diablo Meridian, Nevada

T. 21 S., R. 63 E.,

sec. 19, E1/2SW1/4;

sec. 28, SE1/4NE1/4, N1/2NW1/4, and E1/2SE1/4;

sec. 29, SE1/4NW1/4;

sec. 30, NE1/4NE1/4, S1/2NE1/4, and E1/2NW1/4;

sec. 34, lots 25 and 27.

T. 22 S., R. 63 E.,

sec. 3, lots 7 and 8, SW1/4NW1/4, SW1/4, NW1/4SE1/4, and S1/2SE1/4;

sec. 10, NW1/4NE1/4, S1/2NE1/4, NW1/4, NE1/4SW1/4, and SE1/4;

sec. 14, W1/2;

sec. 15, N1/2NE1/4 and SE1/4NE1/4;

sec. 22, SE1/4SE1/4;

sec. 23, E1/2NW1/4, NE1/4SW1/4, and S1/2SW1/4;

sec. 26, N1/2NW1/4, SE1/4NW1/4, and SE1/4SW1/4;

sec. 35, N1/2NE1/4, SW1/4NE1/4, NE1/4SW1/4, S1/2SW1/4, and SE1/4.

T. 23 S., R. 63 E.,

sec. 2, lots 3 and 7.

The areas described aggregate 107.0 acres. The ROW is 50-feet wide by 17.8 miles in length.

TWE Project

Right-of-Way for BOR-Administered Lands in Clark County, Nevada, and Duchesne County, Utah

Temporary Facilities related to 600 kV Transmission Line outside of Long-Term Right-of-Way:

Mount Diablo Meridian, Nevada

T. 21 S., R. 63 E.,

sec. 34, lot 16.

T. 22 S., R. 63 E.,

sec. 3, SW1/4;

sec. 35, SE1/4.

The areas described aggregate 7.7 acres.

All acreage and length calculations were completed in GIS. Acreage and length calculations are independent of one another; extrapolation of one to the other will not match exactly due to how project components intersect aliquot boundaries.

Legal description format is based on BLM specifications:

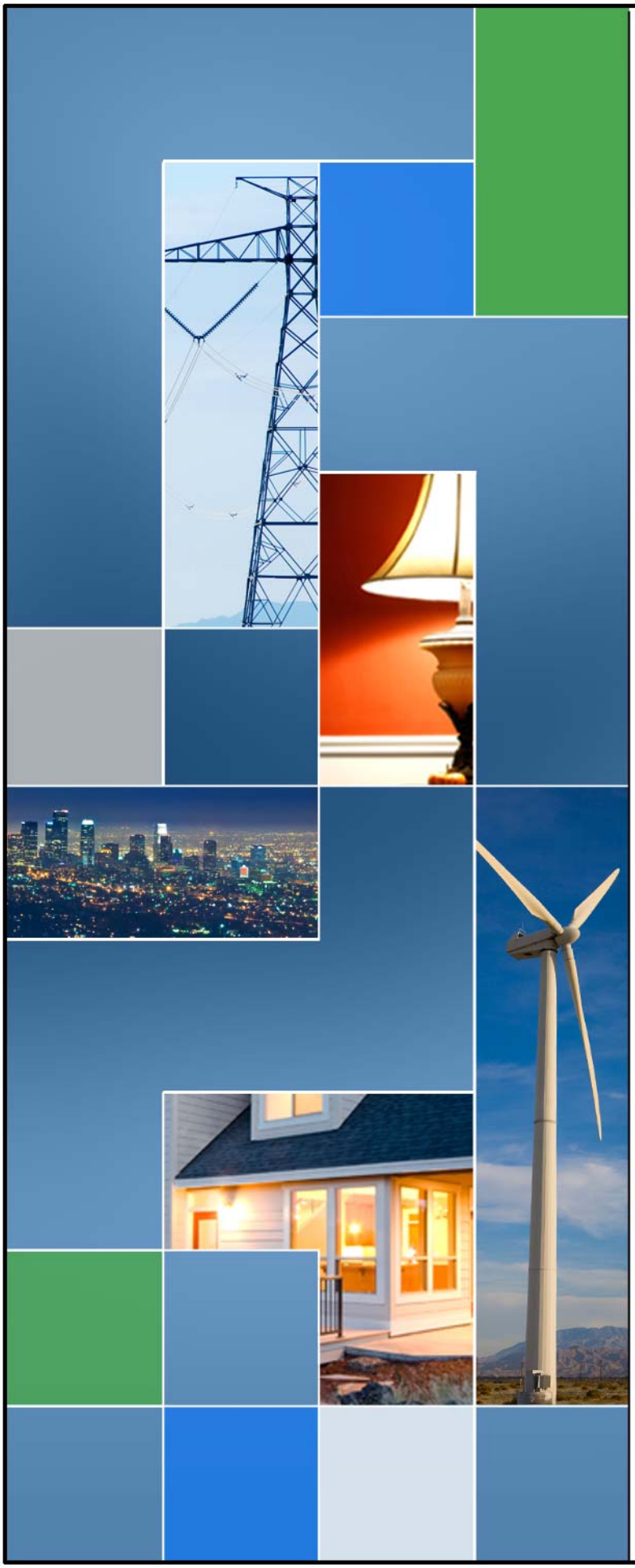
U.S. Department of the Interior, Bureau of Land Management Cadastral Survey. (Revised 2014). *Specifications for Descriptions of Land: For Use in Land Orders, Executive Orders, Proclamations, Federal Register Documents, and Land Description Databases*. Washington, DC: U.S. Department of the Interior.

Legal description was created using ArcGIS:

The legal description was generated in ArcGIS using TWE Project data files, land jurisdiction information received from AECOM on 6/10/2016, and the latest PLSS data available online from the BLM Cadastral Survey Program (http://www.geocommunicator.gov/Geocomm/lsis_home/home/index.htm). CadNSDI PLSS data with a last updated date of 4/11/2011 were downloaded from this website for the state of Nevada.

Appendix B

TransWest Express Project Plan of Development (November 2015)



TransWest Express Transmission Project

Preliminary Plan of Development, Amended from **March** 201**5**

Submitted by

TRANSWEST EXPRESS LLC

Submitted to

NATIONAL SYSTEM OF PUBLIC LANDS

Western AREA POWER ADMINISTRATION

November 2015

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
±	plus or minus
AC	alternating current
AC/DC	alternating current/direct current
ACC	Arizona Corporation Commission
ACSR	aluminum conductor steel reinforced
ACSR/TW	Aluminum Conductor Steel Reinforced/Trapezoidal Wire
AEG	Anschutz Entertainment Group
Anschutz	Anschutz Company
ANSI	American National Standards Institute
APLIC	Avian Power Line Interaction Committee
Applicant	TransWest Express LLC, also TransWest
ATV	all terrain vehicles
BA	Biological Assessment
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	Biological Opinion
CCR	Code of Colorado Regulations
CDOT	Colorado Department of Transportation
CEQ	Council on Environmental Quality
CFR Part	Code of Federal Regulations, and use Part before the number (e.g., 20 CFR Part 4)
CIC	Compliance Inspection Contractor
COM	Construction, Operation, and Maintenance
CRS	Colorado Revised Statutes
CWA	Clean Water Act
DC	direct current
DEIS	Draft Environmental Impact Statement
DEQ	Department of Environmental Quality
DOE	U.S. Department of Energy
DOT	Department of Transportation
E.O.	Executive Order
ECMP	Environmental Compliance and Monitoring Plan
EHV	extra high voltage
EIS	Environmental Impact Statement
EMF	electromagnetic field
EMM	Environmental Mitigation Measure
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
FLPMA	Federal Land Policy and Management Act of 1976
GHG	Greenhouse Gas
GIS	Geographic Information System
GWh/yr	gigawatt-hours per year
HVDC	high voltage direct current

IEEE	Institute of Electrical and Electronics Engineers
IPP	Intermountain Power Plant
IRA	Inventoried Roadless Areas
IVM	integrative vegetation management
kV	kilovolt
LADWP	Los Angeles Department of Water and Power
LWCF	Land and Water Conservation Fund Act
MW	megawatt
NAC	Nevada Administrative Code
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NDEP	Nevada Division of Environmental Protection
NEPA	National Environmental Policy Act of 1969
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NHPA	National Historic Preservation Act of 1966
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park System
NREL	National Renewable Energy Lab
NRS	Nevada Revised Statutes
NTP	Notice to Proceed
OPGW	optical ground wire
OSHA	Occupational Safety and Health Administration
OSLI	Office of State Lands and Investments
PA	Programmatic Agreement
PI	Points of Intersection/Inflection
PL	Public Land
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
PSC	Public Service Commission
PUC	Public Utility Commission
REC	renewable energy credit
Reclamation	U.S. Bureau of Reclamation
RES	Renewable Energy Standard
ROD	Record of Decision
ROW	right-of-way
RPS	Renewable Portfolio Standards
SB	Senate Bill
SCADA	Supervisory Control and Data Acquisition
SHPO	State Historic Preservation Office
SPCC	Spill Prevention, Containment and Countermeasure
STS	Southern Transmission System
SUA	Special Use Authorization
SWPPP	Stormwater Pollution Prevention Plan
TAC	The Anschutz Corporation
TIP	Transmission Infrastructure Program
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
U.S.C. §	U.S. Code and section number symbol
UCA	Utah Code Annotated
UDOT	Utah Department of Transportation

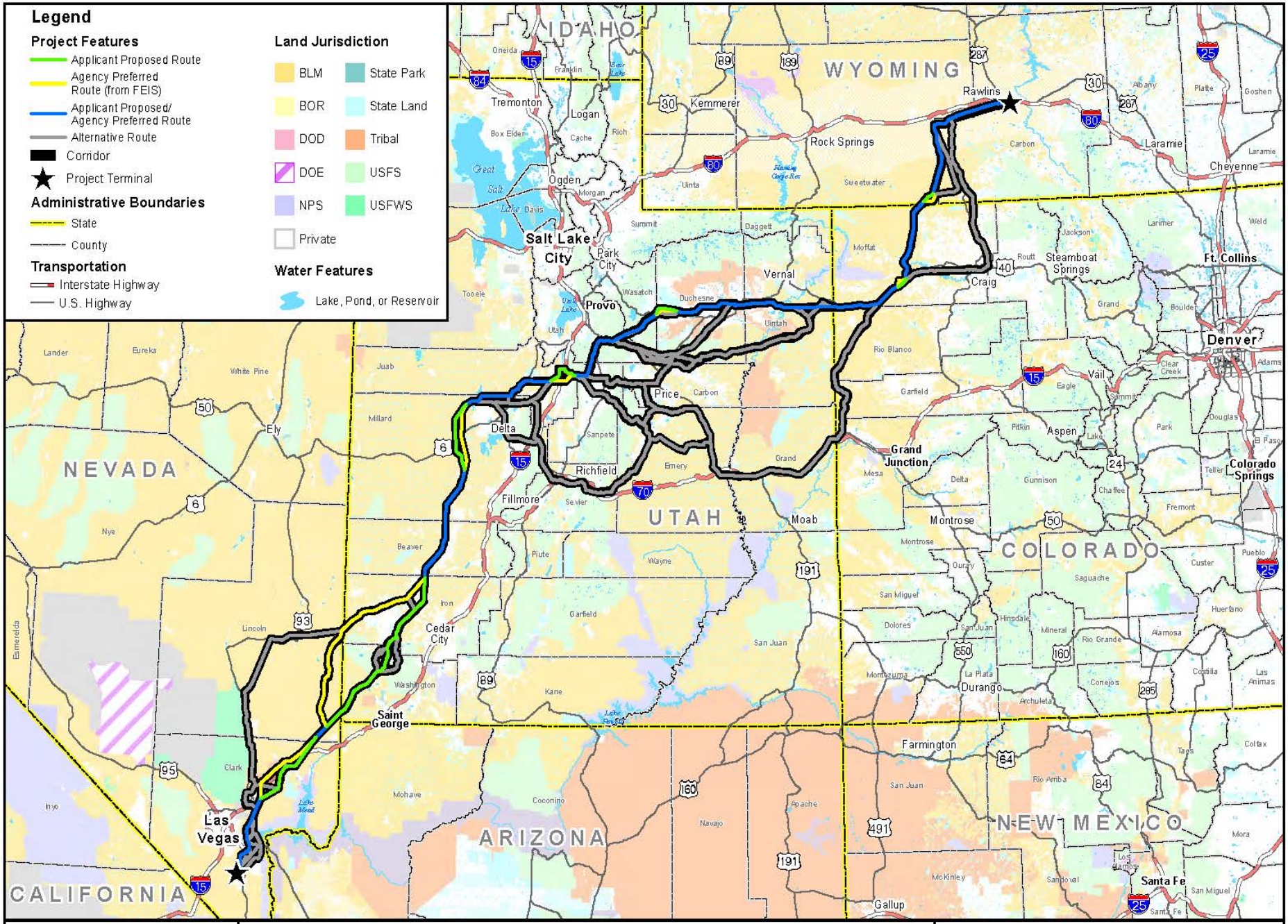
UHF	ultra-high frequency
USACE	U.S. Army Corps of Engineers
USDA	US Department of Agriculture
USDOI	U.S. Department of Interior
USDOT	U.S. Department of Transportation
USFS	United States Forest Service
USFWS	U.S. Fish and Wildlife Service
VHF	very high frequency
WECC	Western Electricity Coordinating Council
Western	Western Area Power Administration
WGA	Western Governors Association
WGFD	Wyoming Game and Fish Department
WSO	work stoppage order
WWEC	West-wide Energy Corridor

1.0 INTRODUCTION

1.1 Project Background

TransWest Express LLC (TransWest or Applicant) proposes to construct, operate and maintain the TransWest Express Transmission Project (TWE Project or Project). The TWE Project is an extra-high voltage (EHV) direct current (DC) transmission system extending from south-central Wyoming to southern Nevada. The TWE Project begins at a northern terminal near Sinclair, Wyoming and terminates at a southern terminal at the Marketplace Hub in the Eldorado Valley near Boulder City, Nevada (Map Exhibit 1). At each of the terminals, there will be an alternating current/direct current (AC/DC) converter station designed to convert the DC current carried by the TWE Project to AC current to be carried on the western United States AC electrical grid (the northern and southern terminals). The TWE Project is planned to interconnect into the 230 kV AC system in Wyoming and the Eldorado Substation, the McCullough Switching Station, the Marketplace Substation and the Mead Substation in Nevada. Western Area Power Administration (Western), a federal power marketing administration within the United Stated Department of Energy (DOE), has partnered with TransWest in the development of the TWE Project.

Because it is necessary for the TWE Project to cross federal lands, a right-of-way (ROW) application was filed with the Department of the Interior's (USDOI) Bureau of Land Management (BLM) in 2007. The application was amended by TransWest in 2008 and again in 2009, 2010, 2014 and 2015. To comply with the National Environmental Policy Act of 1969 (NEPA), the BLM and Western are preparing an Environmental Impact Statement (EIS). Public scoping was conducted in 2011. In July 2013, the BLM and Western published the Draft Environmental Impact Statement (DEIS) for the TWE Project. In April 2015, the BLM and Western published the Final Environmental Impact Statement (FEIS) for the TWE Project. The EIS analyzed approximately 2,600 miles of Alternatives.


Legend
Project Features
Applicant Proposed Route
Agency Preferred Route (from FEIS)
Applicant Proposed/ Agency Preferred Route
Alternative Route
Corridor
Project Terminal
Administrative Boundaries
State
County
Transportation
Interstate Highway
U.S. Highway
Land Jurisdiction
BLM
BOR
DOD
DOE
NPS
Private
State Park
State Land
Tribal
USFS
USFWS
Water Features
Lake, Pond, or Reservoir
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
CALIFORNIA
Salt Lake City
Provo
Ogden
Logan
Tremonton
Kemmerer
Rawlins
Rock Springs
Laramie
Cheyenne
Ft. Collins
Denver
Colorado Springs
Steamboat Springs
Craig
Vernal
Price
Delta
Fillmore
Richfield
Cedar City
Saint George
Las Vegas
Grand Junction
Moab
Montrose
Durango
Farmington
Gallup
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Aspen
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0 25 50
Miles
Map Exhibit 1
FEIS Routes, Regional Vicinity
TransWest Express Transmission Project | November 2015
POWER ENGINEERS
TRANSWEST EXPRESS LLC

1.2 Project Overview

The TWE Project will entail the construction, operation and maintenance of a ±600 kilovolt (kV) DC transmission line and two AC/DC converter stations - a Northern AC/DC Converter Station (Northern Terminal) to be located near Sinclair, Wyoming and a Southern AC/DC Converter Station (Southern Terminal) to be located at the Marketplace Hub in the Eldorado Valley, approximately 15 miles south of Boulder City, Clark County, Nevada. The ±600 kV DC transmission line will provide for a potential interconnection with the Intermountain Power Plant (IPP) transmission system in Millard County, Utah as well. The preliminary cost estimate for the construction of the TWE Project is $3.0 billion in 2014 dollars. This estimate is based on the Applicant Proposed Alternative and will need to be updated to reflect the Alternative ultimately selected through the NEPA compliance process and upon completion of final engineering design studies. Preliminary cost estimates for operation and maintenance of the TWE Project are on the order of $25 million per year. The life of the TWE Project is anticipated to be 50 years. Project facilities will be maintained to ensure the safe, reliable operation of the system.

The proposed TWE Project consists of the following components:

- A ±600 kV DC transmission line between south-central Wyoming and southern Nevada. A 250-foot-wide ROW will generally be required for the ±600 kV DC transmission line.

- Two terminals for the AC/DC converter stations and related substations, to be located at either end of the ±600 kV DC transmission line. The proposed TWE Project includes the Northern Terminal near Sinclair, Wyoming, and the Southern Terminal south of Boulder City, Nevada near the Marketplace Hub in the Eldorado Valley, with interconnections to the existing and planned regional alternating current (AC) transmission grid.

- Two independent communications systems, including a dedicated fiber optic network, for command and control of the transmission system. The fiber optic network will require regeneration sites at periodic distances along the ±600 kV DC transmission line. In most cases, the regeneration sites will be located within the transmission line ROW. The second communication system will use existing private networks. Microwave antennas may be located at the terminals to connect into these private systems.

- Two ground electrode systems, to be located within approximately 100 miles of the terminals. A low voltage overhead line will be needed to connect the ground electrode systems and AC/DC converter stations.

- Access roads to the TWE Project facilities. The TWE Project's proposed Access Road Plan entails making improvements to existing roads, constructing new roads, and using overland access methods for the construction, operation, and maintenance of the TWE Project. Existing roads will be used to the extent feasible

- Temporary work areas will be required during construction of the TWE Project including terminals; ground electrode systems; structures; staging areas; material storage areas; fly yards; pulling, tensioning, and splicing sites; communication and regeneration sites; and batch plants.

1.3 Purpose of the Plan of Development (POD)

A Plan of Development (POD) documents a federal ROW applicant's construction, operation, rehabilitation, and environmental protection plan. See 43 Code of Federal Regulations (CFR) Part 2804.25. The POD is a dynamic document updated as a project progresses through the NEPA review and

analysis process. The FEIS POD supported the analysis and publication of the BLM's Final Environmental Impact Statement (FEIS). The purpose of this version of the POD is to support the federal agencies Records of Decision (ROD) for the Project. The ROD POD provides a preliminary engineered design of the TWE Project based on the Agency Preferred Alternative, additional data provided by the agencies, available LIDAR data, and field engineering data. The ROD POD will support additional engineering, micro-siting, contracting and permitting of the project. Appendix AA provides the following map books:

1. **TWE Project Overview:** This map book shows the general location of the TWE Project transmission centerline based on the Agency Preferred Alternative with reference to existing towns, cities, major roads, etc. Section, Township and Range data are included to provide an additional location reference. It also shows the backbone access network and jurisdictional data. The overview map provides a visual representation of the overall TWE Project within each affected BLM Field Office and United States Forest Service (USFS) National Forest. Material storage yards, batch plants, etc. on federal and state lands are also shown. The overview map includes an index for the corresponding "TWE Project Constraints, Access Roads and Work Area Details" map book.

2. **TWE Project Constraints, Access Roads and Work Area Details:** This map book shows transmission project features that include transmission centerline, structure locations, structure work areas, pulling and tensioning and splicing sites, fly yards, etc. Material storage yards and batch plants on federal lands and state lands are also included. Backbone access network, roads requiring improvement and new roads for transmission line construction are shown. The map book provides a visual representation of the access layout and work area details within each affected BLM Field Office and USFS National Forest. Jurisdictional data and relevant resource constraints information are also included in the map book. Section, Township and Range provide the location reference.

The map books described above are based on a preliminary design reflecting the best currently available data. The final design shall be shown in the Notice to Proceed POD map books and will be based on final design data, field review, and the final agency stipulations and mitigation measures in the ROD.

It is anticipated that Project Notices to Proceed (NTPs) will be issued by jurisdiction to encompass the entire project. An updated and final POD will be issued with the NTPs. The NTP POD will include the final project description; final engineered alignment; access road layouts; construction plans; construction practices and procedures; processes and procedures for complying with the ROD and Environmental Compliance and Monitoring Plan (Appendix G); and will be based on field verified segment-specific construction plans including results of surveys. The TWE Project POD development approach is described in detail in the Project Design and Implementation Plan of Development Refinement Process provided in Appendix Y.

The POD for the TWE Project serves many purposes. For the Project, the POD will:

- Provide the Project description and technical information necessary for the federal agencies to conduct required environmental reviews of the Project, including compliance with the NEPA.

- Identify TransWest's construction plans and specifications, including federal agency stipulations, conditions of approval, environmental requirements and best management practices (BMPs).

- Support the federal agencies ROD for the Project.

- Meet all federal land management agency requirements for issuance of ROW grants or special use authorizations.

- Provide the basis for the federal land management agencies to issue NTPs for construction, operation, and maintenance of the Project. Multiple NTPs are anticipated, each to be issued on a construction segment and land jurisdiction basis.

- Balance Project design development with the extent of available siting opportunities and constraints data throughout the federal approval process.

The POD and its appendices will serve as the TWE Project's reference for new or amended permits, approvals, clearances and plans that may be issued during construction.

The USDOI defines mitigation to encompass the full suite of activities to avoid, minimize, and compensate for adverse impacts to particular resources or values (Clement et al. 2014). Twenty-four environmental protection plans that detail TransWest's commitment to avoid, minimize, and mitigate adverse impacts resulting from construction, operation, and maintenance of the TWE Project comprise Appendices A through X of the POD. Table 1 indicates the status of these environmental protection plans for the current and subsequent phases of the POD.

TABLE 1 STATUS OF ENVIRONMENTAL PROTECTION PLANS IN THE POD

PLAN	APPENDIX DESIGNATION	PLAN STATUS	POD ACTIONS	
			ROD	NTP
Access Road Siting and Management Plan	A	Framework plan	Updated based on Agency Preferred Alternative. Provides mapping of initial access road layout and initial layout of temporary work areas.	Update based on Selected Alternative. Provide final layout of access roads and temporary work areas defined in Section 5.2.2.
Avian Protection Plan	B	Final plan	Updated based on Agency Preferred Alternative and relevant mitigation measures to ensure regulatory compliance.	No action. Final
Blasting Plan	C	Framework plan	Updated based on Agency Preferred Alternative.	Update based on Selected Alternative. Include mapping of explosive storage locations and areas where blasting will occur, including identification of blasting within 0.25 mile of a known sensitive resource; as well as blasting in the vicinity of pipelines, and wells and springs that may be impacted.

PLAN	APPENDIX DESIGNATION	PLAN STATUS	POD ACTIONS	
			ROD	NTP
Cultural Resources Protection and Management Plan	D	Final plan	Finalized based on Agency Preferred Alternative and relevant mitigation measures based on	No action. Final
Dust Control and Air Quality Plan	E	Framework plan	Updated based on Agency Preferred Alternative and relevant mitigation measures to ensure regulation compliance.	Update based on Selected Alternative, final design and permit requirements.
Emergency Preparedness and Response Plan	F	Final plan	Updated with current available information.	No action. Final
Environmental Compliance and Monitoring Plan	G	Final plan	Include more specifically defined roles, responsibilities and procedures, if available.	No action. Final
Fire Protection Plan	H	Framework plan	Updated based on Agency Preferred Alternative and mitigation measures to ensure regulation compliance and safety.	Update based on Selected Alternative with restricted operations and notifications sections.
Flagging, Fencing and Signage Plan	I	Framework plan	Updated flagging, fencing and signage scheme (table) based on Agency Preferred Alternative.	Update based on Selected Alternative with final flagging, fencing and signage scheme.
Geotechnical Plan	J	Framework plan	Updated based on available information.	Update with results of pre-construction surveys as needed.
Greater-Sage Grouse Habitat Equivalency Analysis, Mitigation and Monitoring Plan	K	Framework plan based on FEIS Agency Preferred Alternative	Updated based on Agency Preferred Alternative.	Update as needed.
Hazardous Materials Management Plan	L	Framework plan	Include relevant mitigation measures to ensure regulation compliance and safety.	Update as needed.
Health and Safety Plan	M	Final plan	Include relevant mitigation measures to ensure regulation compliance and safety.	No action. Final.
Noxious Weed Management Plan	N	Framework plan	Updated plan based on Agency Preferred Alternative and relevant mitigation measures.	Update based on Selected Alternative and the final design and results of noxious weed pre-construction survey.
Operations and Maintenance Plan	O	Final plan	Updated environmental mitigation measures based on Agency Preferred Alternative. Complete seasonal wildlife restrictions table.	No action. Final.

PLAN	APPENDIX DESIGNATION	PLAN STATUS	POD ACTIONS	
			ROD	NTP
Paleontological Resources Management and Mitigation Plan	P	Framework plan	Updated based on Agency Preferred Alternative and relevant mitigation measures to ensure resource protection.	Update based on Selected Alternative and final design.
Reclamation Plan	Q	Framework plan	Updated based on Agency Preferred Alternative.	Update based on Selected Alternative and final design.
ROW Preparation and Vegetation Management Plan	R	Final plan	Updated based on Agency Preferred Alternative and relevant mitigation measures.	No action. Final
Spill Prevention and Response Plan	S	Framework plan	Include relevant mitigation measures to ensure regulation compliance and safety.	Update with appropriate emergency contacts.
Stormwater Pollution Prevention Plan	T	Framework plan	Updated based on Agency Preferred Alternative and location of identified BMPs to ensure compliance and for incorporation into Stormwater Pollution Prevention Plans (SWPPPs).	Prepare individual SWPPPs for each state based on Selected Alternative.
Traffic and Transportation Management Plan	U	Framework plan	Updated based on Agency Preferred Alternative and backbone access network.	Update based on Selected Alternative and final design.
Visual Resources Management Plan	V	Final plan	Updated based on Agency Preferred Alternative and visual resource mitigation measures.	No action. Final.
Water Resources Protection Plan	W	Framework plan	Updated based on Agency Preferred Alternative crossings of water bodies including 303(d) impaired waters.	Update based on Selected Alternative with identified impacts and a mitigation plan (if necessary) based on pre-construction surveys, and final design.
Wildlife and Plant Conservation Measures Plan	X	Framework plan	Updated based on Agency Preferred Alternative and mitigation measures.	Update based on Selected Alternative with identified impacts and a mitigation plan (if necessary) based on pre-construction surveys.

1.4 Organization of the ROD POD

The ROD POD describes the TWE Project according to the following topics:

Section 2 describes the TWE Project purpose and need including project objectives and needs, North American Electric Reliability Corporation (NERC) standards and Western Electricity Coordinating Council (WECC) criteria, and renewable energy and transmission.

Section 3 describes roles and responsibilities of each major Project entity including TransWest, Western, BLM, USFS, and other Federal agencies, compliance inspection contractor, and construction contractor(s).

Section 4 provides a description of TWE Project components which includes a description of all proposed facilities and temporary and permanent land disturbance estimates.

Section 5 describes the construction practices that would be performed for the TWE Project, including standard construction activities, schedules and equipment/manpower requirements, and special construction practices which will be used in selective or sensitive environments.

Section 6 discusses operation and maintenance practices for the TWE Project, including routine maintenance and vegetation management of the transmission line ROWs, emergency response, fire protection, and ROW safety requirements.

Section 7 discusses the design options for the TWE Project, including a description of Design Options 2 and 3 and the conditions under which each design option would meet the Project purpose and need.

Section 8 summarizes the TWE Project committed environmental mitigation measures, which are part of the proposed TWE Project Description and based on the Agency Preferred Alternative.

Section 9 contains a list of references for this document.

1.5 Relationship with Other Environmental Documents

This ROD POD has been prepared to support the federal agencies ROD. The FEIS was prepared by the BLM and Western, in compliance with the requirements and guidelines of the NEPA and the Federal Land Policy and Management Act of 1976 (FLPMA). This POD provides a preliminary engineered design of the TWE Project based on the Agency Preferred Alternative, additional data provided by the agencies, available LIDAR data, and field engineering data. The environmental protection plans have been updated based on the Agency Preferred Alternative and additional information obtained since the FEIS POD. This POD also incorporates Applicant committed mitigation measures, best management practices, BLM Field Office stipulations, and West-wide energy Corridor (WWEC) and USFS BMPs from the FEIS. The POD prepared in connection with TransWest's request for a NTP will be the final POD (the NTP POD). TransWest may file the NTP POD with multiple tiered construction work plans for the Project, each covering a separate construction spread or work management area, but for convenience all such plans are referred to herein collectively as the NTP POD.

1.6 Background on TransWest Express LLC

TransWest Express LLC is a limited liability company that was formed in July, 2008. TransWest is a wholly owned subsidiary of The Anschutz Corporation (TAC). In turn, TAC is a 100% owned subsidiary of Anschutz Company (Anschutz), a privately held multi-billion dollar diversified company based in Denver, Colorado. The principal offices of TransWest are located at 555 Seventeenth Street, Suite 2400, Denver, Colorado. TransWest was formed to hold and develop certain electric transmission assets for Anschutz.

TAC was formed in 1965 by Philip F. Anschutz, initially as an oil and gas drilling and exploration company. Today, Anschutz has worldwide investments in natural resources (oil and gas development and pipelines, ranching and agriculture), real estate, telecommunications, transportation, sports and entertainment, film production, movie theaters, and newspaper and internet publishing. TAC has successfully developed large and complex energy infrastructure projects. In the 1990s, TAC constructed a 130-mile intrastate common carrier crude oil pipeline to transport heavy crude from California's San Joaquin Valley to refineries and terminal facilities in the Los Angeles Basin.

In 1987, TAC built AREPI Pipeline to transport crude oil from its oil field on the Utah Wyoming border to refineries in Salt Lake City. At its peak, TAC's pipeline company operated over 3,100 miles of pipeline and 14 million barrels of crude oil storage capacity.

In the mid-1990s, TAC founded Qwest Communications which constructed the country's first transcontinental high-speed fiber-optic link between Los Angeles and Boston. The mammoth construction project originated on Southern Pacific/Union Pacific rights-of-way controlled by TAC and expanded onto rights-of-way acquired from federal, state, and local governments and private landowners. In all, Qwest developed a 25,500-mile North American fiber network connecting 250 cities and consisting of approximately 3.4 million fiber miles.

Through its wholly-owned subsidiary Anschutz Entertainment Group (AEG), Anschutz has successfully developed and constructed a number of sports, entertainment and real estate assets, investing several billion dollars. AEG played an integral role in the revitalization of downtown Los Angeles when it constructed the Staples Center, a 20,000 seat mixed use arena that is home to the LA Lakers, LA Clippers, LA Kings, and other professional sports teams. The arena hosts 250 events and nearly 4 million customers per year. AEG has also constructed a 4.4 million square foot mixed use entertainment district around the Staples Center that is anchored by a 7,100 seat theater and includes hotels, luxury condos, and restaurants. AEG also successfully constructed a number of other development projects including the Home Depot Center in Carson, California, the Sprint Center in Kansas City, the O2 Arena in London, and a 17,000 seat multi-purpose arena in Berlin.

TransWest is an extension of TAC's long and successful tradition of resource development and investment in the western United States. The TWE Project responds to the nation's demand for clean renewable energy while representing TAC's commitment to responsible development and delivery of natural resources. TAC's resources and commitment to developing the TWE Project are demonstrated by the substantial investment of capital and time already made by TAC. Since 2008, TAC has funded all of TransWest's extensive development activities – a period of over six years. This includes undertaking the highest level of environmental review in the United States. To date, TransWest has expended approximately $50 million dollars in developing the TWE Project – a significant capital investment by TransWest and TAC. To date, Western has reimbursed TransWest approximately $19 million dollars of this investment pursuant to the Development Agreement.

1.7 Federal, State, and Local Permits

TransWest will be responsible for the acquisition of all applicable federal, state, and local permits, licenses and agreements. A list of applicable permit requirements was provided through the NEPA process and incorporated into this POD for the TWE Project. The TWE Project will necessitate crossings of existing electrical transmission lines, U.S. and State Highways, and railroads. The proposed line crossings will be coordinated with the appropriate entity and TransWest will obtain all required licenses, permits, or agreements.

Table 2 is a list of the authorizations, permits, and reviews that may be needed in order for the Project to be constructed and are based on the Agency Preferred Alternative.

TABLE 2 SUMMARY OF POTENTIAL FEDERAL, STATE, AND LOCAL PERMITS AND ENVIRONMENTAL REVIEW REQUIREMENTS

ISSUE	ACTION REQUIRING PERMIT, APPROVAL, OR REVIEW	AGENCY	PERMIT, LICENSE, COMPLIANCE, OR REVIEW	RELEVANT LAWS AND REGULATIONS
FEDERAL				
National Environmental Policy Act of 1969 (NEPA) Compliance	Federal action: to grant right-of- way (ROW) across land under federal jurisdiction	Lead agencies (Bureau of Land Management [BLM] and Western Area Power Administration [Western]); Affected land-managing agencies; Cooperating agencies	Environmental Impact Statement (EIS) and Record of Decision (ROD)	NEPA (42 United States Code [U.S.C.] § 4321); Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] Parts 1500-1508); Department of Energy (DOE) NEPA implementing Regulations (10 CFR Part 1021)
ROW Across Land Under Federal Management	Preconstruction surveys including geotechnical surveys; construction, operation, maintenance, and abandonment	BLM	ROW grant and temporary use permit	Federal Land Policy and Management Act (FLPMA) of 1976 (PL 94-579); 43 U.S.C. §§1761-1771; 43 CFR Part 2800
		BLM	Short-Term ROW Grant	FLPMA (PL 94-579); 43 U.S.C. §§1761-1771; 43 CFR Part 2800
		BLM	Resource Management Plans	BLM requirements
		BLM	Plan of Development	BLM requirements
		BLM	Notice to Proceed	48 CFR
		BLM	Pesticide Use Proposal	Final Vegetation Treatments Using Herbicides Programmatic EIS (BLM 2007)
		U.S. Bureau of Reclamation (Reclamation)	License Agreement	Technology Transfer Act of 1986 (Public Law 99-502), Section 11
		Reclamation	Right of Use Authorization	Act of Congress of June 17, 1902 (32 Stat. 388), Act of Congress of August 4, 1939 (53 Stat. 1187), Section 10, and 43 CFR 429
		U.S. Department of Agriculture (USDA)	Coordination with the USDA's Farm Service Agency for crossing Conservation Reserve Program lands, if applicable	Title II, Subtitle B of the Food, Conservation, and Energy Act of 2008
		USDA	Coordination with the Natural Resources Conservation Service for crossing Wetland Reserve Program lands, if applicable	Title II, Subtitle C of the Food, Conservation, and Energy Act of 2008
		U.S. Forest Service (USFS)	Special use authorization permit or easement	36 CFR Part 251
		USFS	Operation and Maintenance Plan	USFS requirements
		USFS	Notice to Proceed	48 CFR

ISSUE	ACTION REQUIRING PERMIT, APPROVAL, OR REVIEW	AGENCY	PERMIT, LICENSE, COMPLIANCE, OR REVIEW	RELEVANT LAWS AND REGULATIONS
		USFS	Road Use Permit	16 U.S.C. §§ 535 and 537, National Forest Roads and Trails Act Sections 4 and 6
		USFS	Pesticide Use Proposal	FS Manual 2150
		Bureau of Indian Affairs (BIA), tribe	ROW grant across American Indian lands	25 CFR Part 169
		Utah Reclamation Mitigation and Conservation Commission	License Agreement to cross Federal Lands	Central Utah Completion Act, 43 CFR Part 1000
	Construction, operation, maintenance, and abandonment of transmission line across or within highway ROWs	Federal Highway Administration	Permits to cross Federal Aid Highway; 4 (f) compliance	U.S. Department of Transportation (USDOT) Act, 23 CFR Part 1.23 and 1.27; 23 U.S.C. §§ 109 and 315; 23 CFR Part 645; 23 CFR Part 771
Biological Resources	Grant ROW by Federal land-managing agency	USFWS	Endangered Species Act (ESA) compliance by Federal land- managing agency and lead agency	ESA of 1973 as amended (16 U.S.C. § 1531 et seq.)
	BLM issuance of a ROW grant covering USFWS fee lands within National Wildlife Refuges	USFWS	Compatibility Determination	National Wildlife Refuge System Administration Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd-668ee
	Protection of migratory birds	USFWS	Compliance	Migratory Bird Treaty Act of 1918, 16 U.S.C. § 703-712; 50 CFR
	Protection of bald and golden eagles	USFWS	Compliance	Bald and Golden Eagle Protection Act of 1972 (16 U.S.C. §668)
Ground Disturbance and Water Quality Degradation	Construction activities that disturb one or more acres of land	U.S. Environmental Protection Agency (EPA)	Section 402 National Pollutant Discharge Elimination System (NPDES) General Permit and accompanying Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP) for Storm Water Discharges from Construction Activities	Clean Water Act (33 U.S.C. §1342)
	Construction across water resources	U.S. Army Corps of Engineers (USACE)	General easement	10 U.S.C. §§ 2668 to 2669
	Construction in or modification of floodplains	Federal lead agency	Compliance	42 U.S.C. § 4321 Ex. Ord. No. 11988 Floodplains
	Construction in or modification of wetlands	Federal lead agency	Compliance	42 U.S.C. § 4321 Ex. Ord. No. 11990 Wetlands
	Potential discharge into waters of the state (including wetlands and washes)	USACE (and states); EPA on tribal lands	Section 401 Water Quality Certification	Clean Water Act (33 U.S.C. §1344)
	Discharge of dredged or fill material	USACE; EPA on tribal lands	Section 404 Permit, Individual or	Clean Water Act (33 U.S.C. §1344)

ISSUE	ACTION REQUIRING PERMIT, APPROVAL, OR REVIEW	AGENCY	PERMIT, LICENSE, COMPLIANCE, OR REVIEW	RELEVANT LAWS AND REGULATIONS
	into waters of the United States, including wetlands		Nationwide Permit	
	Placement of structures and construction work in or across navigable waters of the U.S.	USACE	Section 10 permit	Rivers and Harbors Act of 1899 (33 U.S.C. § 403)
	Protection of all rivers included in the National Wild and Scenic Rivers Systems	Affected land-managing agencies	Review by permitting agencies	Wild and Scenic Rivers Act (PL 90-542) (16 U.S.C. §§ 1271-1287)
	Potential pollutant discharge during construction, operation, and maintenance	EPA	Spill Prevention, Control, and Countermeasure (SPCC) Plan for oil-filled equipment	Oil Pollution Act of 1990 (40 CFR Part 112)
Cultural Resources	Disturbance of historic properties	Federal lead agency, State Historic Preservation Officers (SHPO), Advisory Council on Historic Preservation	Section 106 consultation and signed PA prior to Record of Decision	National Historic Preservation Act of 1966, (16 U.S.C. § 470) (36 CFR Part 800)
	Potential conflicts with freedom to practice traditional American Indian religions	Federal lead agency, Federal land-managing agency	Consultation with affected American Indians	American Indian Religious Freedom Act (42 U.S.C. § 1996)
	Disturbance of graves, associated funerary objects, sacred objects, and items of cultural patrimony	Federal land-managing agency	Consultation with affected Native American group regarding treatment of remains and objects	Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (25 U.S.C. §§ 3001-3002)
	Investigation of cultural and paleontological resources	Affected land-managing agencies	Permit for study of historical, archaeological, and paleontological resources	Antiquities Act of 1906 (16 U.S.C. §§ 432-433)
	Investigation of cultural resources; Excavation of archaeological resources	Affected land-managing agencies	Permits to excavate and remove archaeological resources on Federal lands; American Indian tribes with interests in resources must be consulted prior to issuance of permits	Archaeological Resources Protection Act of 1979 (16 U.S.C. §§ 470aa to 470ee) (43 CFR Part 7)
	Protection of segments, sites, and features related to national trails	Affected land-managing agencies	National Trails System Act compliance	National Trails System Act (PL 90-543) (16 U.S.C. §§ 1241 to 1249)
Paleontological Resources	Ground disturbance on Federal land or Federal aid project	BLM	Compliance with BLM mitigation and planning standards for Paleontological resources of public lands	FLPMA of 1976 (43 U.S.C. §§ 1701-1771); Antiquities Act of 1906 (16 U.S.C. §§ 431-433); Paleontological Resources Preservation Act (PRPA) of 2009.
Air Traffic	Location of towers in regards to airport facilities and airspace	Federal Aviation Administration (FAA)	A "Determination of No Hazard to Air Navigation" for structure heights and locations in proximity to public airports	Federal Aviation Act of 1958 (PL 85-726) (14 CFR Part 77)
			Section 1101 Air Space Permit for air space construction clearance	Federal Aviation Act of 1958 (PL 85-726) (14 CFR Part 77)
Rate Regulation	Sales for resale and transmission services	Federal Energy Regulatory Commission (FERC)	Federal Power Act compliance by power seller	Federal Power Act (16 U.S.C. §792)

ISSUE	ACTION REQUIRING PERMIT, APPROVAL, OR REVIEW	AGENCY	PERMIT, LICENSE, COMPLIANCE, OR REVIEW	RELEVANT LAWS AND REGULATIONS
TRIBAL				
PAIUTE				
ROW Encroachment	Encroachment onto Moapa River Indian Reservation Land	Paiute Indian Tribe-BIA Department of Energy and Minerals	ROW easement	25 CFR Part 169
WYOMING				
STATE				
Wildlife Resources	Permitting within sage-grouse core areas	All State Agencies	Compliance with Executive Order (EO) 2011-5	Sections 1 and 2 of Article V of the Michigan Constitution of 1963; Executive Order 2011-5
	Permitting within state wildlife habitat management areas	All State Agencies	Special Use Permit to cross Wildlife Habitat Management Areas	WS 23-1-302 (a)(iii)
Utility Siting	Primary permitting authority for transmission line siting, county level necessary	Public Service Commission (PSC)	Certificate of Public Convenience and Necessity	WS 37-2-101; PSC-R 202, 204, 205
	Construction of an industrial facility	Department of Environmental Quality (DEQ), Industrial Siting Division	Industrial Development Information and Siting Act Permit	WS 35-12
ROW Encroachment	Non-roadway easement across State Lands	State Board of Land Commissioners	ROW Easement	WS 36-2-107 and 36-9-118
	Encroachment into state roadway ROW	Wyoming Department of Transportation	ROW encroachment permit and accompanying traffic control plan	WS 1-26-813
Ground Disturbance and Water Quality Degradation	Construction sites with greater than one acre of land disturbed	DEQ	Wyoming Pollutant Discharge Elimination System Permit Section 401 Water Quality Certification NOI and SWPPP	WS 35-11-3 Clean Water Act, Section 401
Fish and Wildlife	Project impacts to fish and wildlife species and associated habitat	Wyoming Game and Fish Department (WGFD)	Compliance	WGFD requirements
Air Quality	Fugitive dust emissions generated during construction	DEQ, Air Quality Division	Construction Permit	40 CFR Part 63
Cultural Resources	Surveying and limited testing on state lands	State Historic Preservation Office (SHPO); Office of State Lands and Investments (OSLI)	Permit	Wyoming Antiquities Act of 1935; WS 36-1-114-116
	Archaeological data recovery or extensive testing on state lands	SHPO and OSLI	Permit	Same regulation as above
	Disturbance of cultural resources	SHPO	Potential permit	Wyoming Protocol Agreement
	Disturbance of cultural resources	BLM and SHPO	Section 106 Consultation	National Historic Preservation Act of 1966 (NHPA), (16 U.S.C. §470) (36 CFR Part 800)
Explosives	Storage and use of explosives	Varies	Explosives Permit	18 U.S.C. § 40
LOCAL				

ISSUE	ACTION REQUIRING PERMIT, APPROVAL, OR REVIEW	AGENCY	PERMIT, LICENSE, COMPLIANCE, OR REVIEW	RELEVANT LAWS AND REGULATIONS
Land Use	Construction and operation of Transmission Lines greater than 69 kV	Carbon County	Conditional Use Permit, if applicable	2011 Carbon County Zoning Resolution, Chapter IV, Sections 4.2(b)(5) and 4.8(b)(3)
			Building Permit	2011 Carbon County Zoning Resolution, Chapter VI, Section 6.2(a)(2)
Water Resources	Development in a special flood hazard area	Carbon County	Floodplain Development Permit, if applicable	2011 Carbon County Zoning Resolution, Chapter V, Section 5.1(f)
Land Use	Construction and operation of transmission lines	Sweetwater County	Conditional Use Permit, if applicable	2012 Sweetwater County Zoning Resolution, Section 5(A)(13)(d)(8)
Transportation / Access	Accessing work sites via county roads	Sweetwater County	County Road Crossings and Access Permits, County Road Maintenance Agreements	February 2012 Sweetwater County License Permit Application per Engineering Department
Water Resources	Discharging waste water	Sweetwater County	Small waste water permits	Water quality standards per Sweetwater County District Board of Health
Hazardous Materials	Storing hazardous materials	Sweetwater County	Recordation of Hazardous Material Storage	Sweetwater County Hazardous Chemical Inventory per Local Emergency Planning Committee
Hazardous Materials	Spraying herbicides	Sweetwater County	Noxious Weed Control	Weed control standards per Sweetwater County Weed and Pest Board
COLORADO				
STATE				
Utility Siting	Primary permitting authority for transmission line siting, county level necessary	Public Utility Commission (PUC)	Certificate of Public Convenience and Necessity	Colorado Revised Statutes (CRS) 40-5-101-106; 4 CCR 723-3
Air Quality	Land development	Department of Public Health and Environment, Air Pollution Control Division	Land Development Air Pollutant Emission Notice and Application for Construction Permit	5 CCR 1001-5
Pesticides	Applying pesticides	Department of Public Health and Environment, Water Quality Control Division	Pesticides General Permit	CRS 25-8-101
Hazardous Materials	Transporting hazardous materials on state roads	PUC	Hazardous Materials Transportation Permit	8 Code of Colorado Regulations (CCR) 1507-25
	Using explosives for excavation	Division of Public Safety	Type II Explosives Permit	Division of Public Safety regulations
Transportation / Access	Transporting oversized and overweight loads on state roads	Colorado Department of Transportation (CDOT)	Transport Permit for Movement of Extra-Legal Vehicles or Loads	2 CCR 601-4
	Accessing state roads	CDOT	Access Permit	State Highway Access Code
ROW Encroachment	ROW across State Lands	State Lands Trust	ROW Easement	State Land Board policies
	Encroachment into state road ROW	CDOT	Utility/Special use permit	CRS 9-1.5-103
Ground Disturbance and	Construction sites with greater than one acre of land disturbed	Department of Public Health and Environment, Water	General permit and accompanying SWPPP	5 CCR 1002-61 and CRS 25-8-101

ISSUE	ACTION REQUIRING PERMIT, APPROVAL, OR REVIEW	AGENCY	PERMIT, LICENSE, COMPLIANCE, OR REVIEW	RELEVANT LAWS AND REGULATIONS
Water Quality Degradation		Quality Control Division	General permit for construction dewatering	
Cultural and Archaeological Resources	Disturbance of cultural or archeological resources	Office of the State Archaeologist, Office of Archaeology and Historic Preservation	Potential permit	CRS 24-80-401-410
	Treatment of unmarked human graves	Office of the State Archaeologist, Office of Archaeology and Historic Preservation, County Coroner	Review	CRS 20-80-1301-1305
Biological Resources	Habitat modification in wetland or riparian areas	Division of Wildlife	Wildlife certification	CRS 33-5-101-105
LOCAL				
Land Use	Construction and operation of transmission lines	Moffat County	Conditional Use Permit, if applicable	Moffat County Zoning Resolution, Article IV
Transportation / Access	Maintaining county roads	Moffat County	Road Maintenance Permit for Private Entities	Moffat County Road Department Policies and Procedures
	Accessing work sites via county roads	Moffat County	ROW Access Permit	
	Transporting oversized and overweight loads on county roads	Moffat County	Transport Permit	Moffat County Resolution No. 2010-102
Utilities	Installing utilities in county road ROW	Moffat County	Utilities Installation Permit	Moffat County Road Department Policies and Procedures
UTAH				
STATE				
Permitting Process	Proposed transmission line facility	Resource Development Coordinating Committee	Expedites Review of Permitting Process for all State Agencies	Utah Code Annotated (UCA) 63-38d-501, UCA 63-38d-504
ROW Encroachment	Encroachment on, through or over state lands	Division of Forestry, Fire, and State Lands	Application approval	UCA Title 65A
	Encroachment into state roadway ROW	Utah Department of Transportation (UDOT)	ROW Encroachment Permit, Grant of Access Permit, and Traffic Impact Study	UCA 63-46b-3
Ground Surface Disturbance	Project construction	Public Service Commission	Certificate of Public Convenience and Necessity; Approve construction contracts	UCA 54-4-25, R 746-401
	Crossing state lands	Division of Forestry, Fire, and State Lands	Easement onto state lands. Bond may be required.	UCA 65A-7-8, R 652-40
Cultural, Paleontological, and Biological Resources	Crossing state lands	Division of Forestry, Fire, and State Lands	Provide a cultural and/or paleontological and/or biological survey and submit procedures for reasonable mitigation actions	R 652-40-500
Historical and	Impact on historical sites	Division of State History	Notification of Planning Stage and before	UCA 9-8-306

ISSUE	ACTION REQUIRING PERMIT, APPROVAL, OR REVIEW	AGENCY	PERMIT, LICENSE, COMPLIANCE, OR REVIEW	RELEVANT LAWS AND REGULATIONS
Cultural Review			Construction	
Archaeological Resources	Survey or excavation of archaeological resources on lands owned or controlled by the state	Governor's Public Lands Policy Coordinating Office	Permit to survey or excavate	UCA 9-8-305, R 694-1
Cultural Resources	Discovery of Native American grave on state or non-federal land	Antiquities Section, Division of State History	Notification	UCA R456-1-1-17
Air Quality	Construction and operation	Air Quality Board	Approval Order for construction activity and accompanying NOI	UCA 19-2-108
			Fugitive Dust Plan Permit	
Water Resources	Construction and operation	Water Quality Board	Utah Pollutant Discharge Elimination System General Permit for Construction Activities, NOI and SWPPP	UCA 19-5-107
	Alteration of bed or banks of a natural stream	Utah Department of Natural Resources, Division of Water Rights	Stream alteration permit	UCA 73-3-29, Administrative Rule R655-13
Wildlife	Modification of habitat	Division of Wildlife Resources	Easement for Use of State Wildlife Resource lands	UCA Title 23
LOCAL				
Land Use	Construction and operation of transmission lines	Uintah County	Conditional Use Permit, if applicable	2006 Uintah County Land Use Ordinance
			Building Permit	Uintah County Building Code, Chapter 14.16
Transportation / Access	Encroaching onto county road ROW	Uintah County	ROW Encroachment Permit	Uintah County Road Department requirements
Land Use	Construction and operation of transmission lines	Duchesne County	Conditional Use Permit, if applicable	2013 Duchesne County Code, Title 8
			Building Permit	
Transportation / Access	Constructing approaches to county roads	Duchesne County	Permit	2013 Duchesne County Code, Title 6
Utilities	Installing utilities in county road ROW	Duchesne County	Utility Easement	
Land Use	Construction and operation of transmission lines	Wasatch County	Conditional Use Permit, if applicable	2013 Wasatch County Land Use and Development Code, Chapter 16
			Building and Grading permits	
Transportation / Access	Encroaching onto county road ROW	Wasatch County	Driveway Encroachment Permit	2013 Wasatch County Land Use and Development Code, Chapter 14
Ground Disturbance and Water Quality Degradation	Ground-disturbing activities	Wasatch County	SWPPP and Erosion Control Permit	2013 Wasatch County Land Use and Development Code, Chapter 16
Water Resources	Development in a special flood hazard area	Wasatch County	Floodplain Development Permit	
Land Use	Construction and operation of transmission lines	Utah County	Conditional Use Approval, if applicable	2014 Utah County Land Use Ordinance
			Building Permit	

ISSUE	ACTION REQUIRING PERMIT, APPROVAL, OR REVIEW	AGENCY	PERMIT, LICENSE, COMPLIANCE, OR REVIEW	RELEVANT LAWS AND REGULATIONS
			Zoning Compliance Permit	
Transportation / Access	Accessing work sites via county roads	Utah County	Road Access Permit	Utah County Code, Chapter 17
	Installing utilities in county road ROW	Utah County	ROW Grant	
Utilities	Installing utilities	Utah County	Utility Installation Permit	2014 Utah County Land Use Ordinance
Land Use	Construction and operation of transmission lines	Juab County	Conditional Use Permit, if applicable	2007 Juab County Land Use Code, Section 12-1-15
			Building Permit	Buildings & Grounds Department requirements
Land Use	Construction and operation of transmission lines	Sanpete County	Conditional Use Permit, if applicable	2013 Sanpete County Land Use Ordinance, Chapter 14.68
			Building Permit	Sanpete County Building, Planning, and Zoning Department requirements
Transportation / Access	Accessing work sites via county roads	Sanpete County	Road Access (Approach) Disclosure Form	
Land Use	Construction and operation of transmission lines	Millard County	Conditional Use Permit, if applicable , General Plan Amendment, if applicable	2012 Millard County Code, Titles 7 and 10
			Building Permit	
			Development Permit for flood control	
Transportation / Access	Accessing work sites via county roads	Millard County	Access Permit	
	Construction activities in county road ROW	Millard County	Encroachment Permit	
Land Use	Construction and operation of transmission lines	Beaver County	Conditional Use Permit, if applicable	2010 Beaver County Zoning Ordinance, various chapters
		Beaver County	Building Permit	Beaver County Building Department requirements
Transportation / Access	Encroaching onto county road ROW	Beaver County	ROW Encroachment Permit	
Water Resources	Construction in a flood-related erosion-prone area	Beaver County	Flood Control Development Permit	2010 Beaver County Zoning Ordinance, Chapter 10.26
Land Use	Construction and operation of transmission lines	Iron County	Conditional Use Permit, if applicable	1994 Iron County Code, as amended, Titles 12, 15, and 17
			Building Permit	
Transportation / Access	Encroaching onto county road ROW	Iron County	ROW Encroachment Permit and accompanying ROW Encroachment Plan	
NEVADA				
STATE				
ROW Encroachment	Encroachment into state roadway ROW	Nevada Department of Transportation	Occupancy Permit for utilities in state ROW	NRS 408.423, 408.210
			ROW Encroachment Permit and accompanying Traffic Control Plan	

ISSUE	ACTION REQUIRING PERMIT, APPROVAL, OR REVIEW	AGENCY	PERMIT, LICENSE, COMPLIANCE, OR REVIEW	RELEVANT LAWS AND REGULATIONS
Ground Surface Disturbance	Project construction	Nevada Division of Environmental Protection (NDEP)	Registration certificate	Nevada Administrative Code (NAC) 445.704
		Division of Forestry	Timberland Conversion Certificate and accompanying Conversion Plan	NRS 528
			Logging Permit and accompanying Logging Plan	
	Construction of electric transmission line	Public Service Commission	Authority to construct and Certificate of Public Convenience and Necessity	NRS 704.330, NRS 704.820, NRS 704.701
Ground Disturbance and Water Quality Degradation	Construction in or near 100-year floodplains, streams and rivers, or waters of the state	NDEP	Floodplain use permits, Clean Water Act Section 401, 402, and 404 permits	Nevada State Statutes - State Water Quality Certification rules
	Pollutant discharge	NDEP	NPDES Construction Stormwater General Permit, NOI, SWPPP, and SPCC Plan	
Cultural and Paleontological Resources	Crossing state lands	Division of State Lands	Easement onto state lands	NRS 321.001
	Investigation of Paleontological, archaeological, and historic sites	Nevada State Museum	Permit to investigate antiquities	Nevada Antiquities Law (NRS 381.195 to 381.227)
	Disturbance of American Indian burial sites on state and private lands	Nevada SHPO	Notification of discoveries, consultation with affiliated groups	Nevada Protection of Indian Burial Sites (NRS 383.150) (NRS 383.190)
Air Quality	Construction and operation	NDEP	Authority to construct, permit to operate	NRS 445
			Surface Area Disturbance Permit for non-agricultural activities of more than 5 acres	
Biological Resources	Modification of sensitive plant species habitat	Division of Forestry	Compliance to survey for identification of plant species	NRS 527.270, NRS 527.050
	Controlling pests	Department of Agriculture	License to engage in pest control	NRS 555.280
	Disturbance of special status plant species	Division of Forestry	Permit for lawful take of protected plant	NRS 527.250
	Construction and operation in areas of rare and endangered animal species	Division of Wildlife	Compliance	NRS 501, NAC 503
	Modification of habitat of threatened and endangered species	Division of Wildlife	Special permit	NAC 5-4.510 through 4.550
LOCAL				
Land Use	Construction and operation of transmission lines	Lincoln County	Special Use Permit, if applicable	Lincoln County Code, Title 13, Chapters 6 and 8
			Airport Zoning Permit	Lincoln County Code, Title 9, Chapter 2
			Building Permit	Lincoln County Code, Title 11, Chapter 2

ISSUE	ACTION REQUIRING PERMIT, APPROVAL, OR REVIEW	AGENCY	PERMIT, LICENSE, COMPLIANCE, OR REVIEW	RELEVANT LAWS AND REGULATIONS
Air Quality	Construction activities	Clark County Department of Air Quality	Dust Control Permit	Clark County Department of Air Quality requirements
Biological Resources	Construction activities	Clark County	Desert Tortoise Assist	Clark County Desert Conservation Program requirements
Land Use	Construction and operation of transmission lines	Clark County	Conditional Use and Special Use Permits	Clark County Code, Title 30, Chapter 44
			Building and Grading Permits	Clark County Code, Title 30, Chapter 32
			Drainage Compliance Report	Clark County Department of Building
			Geotechnical Report	
Transportation / Access	Encroaching onto county road ROW	Clark County	Encroachment Permit	Clark County Code, Title 30, Chapter 32
	Accessing work sites via county roads	Clark County	Traffic Control Plan	Clark County Department of Public Works requirements
Ground Disturbance and Water Quality Degradation	Construction activities	Clark County	Stormwater Pollution Prevention documentation	Clark County Department of Building requirements

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2.0 PURPOSE AND NEED

2.1 TWE Project Objectives and Needs

TransWest's primary goal is to provide the transmission infrastructure and capacity necessary to reliably and cost-effectively transmit up to 3,000 megawatts (MW) of electric power from Wyoming to the Desert Southwest. TransWest's objectives for the Project are to:

- Allow consumers access to renewable energy sources and contribute to meeting national, regional, and state energy and environmental policies, including state-mandated renewable energy portfolio and greenhouse gas reduction targets;
- Meet increasing customer demand with improved electrical system reliability;
- Allow consumers access to domestic energy sources and contribute to complying with national energy policy;
- Provide system flexibility and increased access to the grid for third-party transmission users;
- Expand regional economic development through increased employment and enlargement of the property tax base; and
- Maintain the standard of living associated with highly reliable electricity service.

While meeting these broad objectives, TransWest would work within the following Project-specific objectives:

- Provide for the efficient, cost-effective, and economically feasible transmission of approximately 20,000 gigawatt hours per year (GWh/yr) of clean and sustainable electric energy from Wyoming to markets in the Desert Southwest region. This estimate is based on 8,760 hours per year of 3,000-MW transmission capacity.
- Meet NERC Reliability Standards and WECC planning criteria and line separation requirements.
- Maximize the use of designated federal utility corridors and existing access roads to the extent practicable to minimize adverse effects of the Project.
- Maximize co-location of the Project with existing linear infrastructure generally and, in particular, existing transmission infrastructure to the extent practicable to minimize adverse effects of the Project.
- Provide these benefits in a timely manner to the Desert Southwest region and the broader Western U.S. to meet the region's pressing environmental and energy needs. TransWest has identified a need for the Project by the expected in-service date of 2015 or as soon as the regulatory reviews can be completed.
- Provide for flexibility and maximize the use of infrastructure to increase future transmission capacity by configuring the Project to allow for future interconnection with the IPP transmission system near Delta, Utah.

2.2 NERC Standards and WECC Criteria

The Reliability Standards used within the electric utility industry for the bulk power electrical grid are developed by the NERC. The WECC develops Regional Criteria that supplement the NERC Standards. The West-Wide Energy Corridor (WWEC) Final Programmatic Environmental Impact Statement includes a comprehensive overview of this subject in Chapter 2, Section 2.6.3, *What Steps Are Being Taken To Ensure The Reliability of Bulk Electricity Transmission* (DOE et al. 2008). The overview includes a description of how NERC and WECC regulate the industry through a wide series of standards that address all facets of the bulk electricity transmission grid, including design, planning, operations, infrastructure and cyber security, communication, coordination and operational safety.

These reliability standards affect the technical aspects of the TWE Project in several ways. Reliability standards limit the operational capacity of any single transmission system element based on a complex contingency analysis that considers the impact to grid operations following various events (e.g., equipment failures, line outages).

Reliability standards affect the TWE Project ROW requirements and separation requirements from other high voltage lines. As a single transmission system element, the TWE Project is effectively limited in capacity to approximately 3,000 MW.

The contingency analysis required for new transmission projects such as the TWE Project involves examining several types of events including the loss of "Adjacent Transmission Circuits" and the loss of multiple transmission lines within a corridor.

WECC's Regional Criteria addresses separation distances based upon the location of a project from Adjacent Transmission Circuits. WECC requires a minimum separation distance between high voltage transmission lines. The WECC Regional Criteria specifies that to avoid being rated as Adjacent Transmission Circuits, or common transmission system elements, circuits must be separated by "at least 250 feet between the transmission circuits" (WECC 2012). The applicability of this portion of the Regional Criteria is for circuits greater than or equal to 300 kV. The loss of multiple lines within a corridor involves analyzing impacts after a line outage of the TWE Project transmission line and any other transmission line(s) within the corridor. The most likely event would be the loss of the TWE Project and an adjacent transmission line.

The likelihood of having a line outage of two transmission lines is even higher at places where transmission lines cross one another. The mechanical failure of the top line would typically cause the line below to also fail. The practicality of needing transmission lines to cross is recognized in the standards; however, the number of crossings needs to be minimized to reduce the likelihood of such an event.

Reliability analysis examining the scenario where multiple lines are lost including the TWE Project has shown this loss will have a significant impact on transmission grid performance, including local and widespread transmission grid blackouts. This reliability analysis has found that the higher the capacity of the line lost along with the TWE Project, the more severe the transmission grid performance consequences. The reliability analysis also demonstrated that it is not feasible for the TWE Project and another transmission project to use common structures for any portion of the route.

TransWest has developed minimum line separation requirements based on the "tower height" dimensions adopted by WECC in 2012. This tower height dimension takes into consideration both the height and width of typical transmission line structures and is meant to prevent a tower failure of one line from impacting the adjacent line. Application of the NERC and WECC reliability standards and

preliminary transmission system contingency analyses indicate that the proposed Project transmission line centerline should be optimally no closer than 250 feet from parallel transmission line centerlines rated 230 kV and above. The 250 foot separation criteria will allow for safe and reliable operation of the Project, as well as more efficient use of designated and existing utility corridors and will reduce the extent of the disturbance associated with access roads and other potential impacts caused by construction in a new transmission corridor.

2.3 Renewable Energy and Transmission

The TWE Project will provide the transmission infrastructure and capacity necessary to reliably and cost-effectively deliver approximately 20,000 GWh/yr of clean and sustainable electric power generated primarily from renewable wind energy resources in Wyoming to the Desert Southwest. Another major benefit of the TWE Project is to facilitate the states of the Desert Southwest in their ability to meet their renewable energy needs and Renewable Portfolio Standards.

Wind and solar have been cited in numerous studies as the most economic large scale resources that can be used to meet the Nation's demand for renewable and clean energy. However, developable solar and wind resources are typically found in remote areas located far from urban centers where the demand is the greatest. Thus, transmission infrastructure is required to enable renewable energy development that will meet both the demand for energy and environmental policy objectives.

In its July 2008 report entitled "20% Wind Energy by 2030, Increasing Wind Energy's Contribution to U.S. Electricity Supply" (DOE 2008), the DOE recognized the challenge of bringing wind energy to market. According to the DOE report:

> "If the considerable wind resources of the United States are to be utilized, a significant amount of new transmission will be required. Transmission must be recognized as a critical infrastructure element needed to enable regional delivery and trade of energy resources, much like the interstate highway system supports the nation's transportation needs…Significant expansion of the transmission grid will be required under any future electric industry scenario. Expanded transmission will increase reliability, reduce costly congestion and line losses, and supply access to low-cost remote resources, including renewables."

In discussing required improvements to the nation's transmission infrastructure necessary to achieve 20% wind energy by 2030, the DOE report concludes:

> "The 20% Wind Scenario would require widespread recognition that there is national interest in ensuring adequate transmission. Expanding the country's transmission infrastructure would support the reliability of the power system; enable open, fair, and competitive wholesale power markets; and grant owners and operators access to low-cost resources. Although built to enable access to wind energy, the new transmission infrastructure would also increase energy security, reduce GHG emissions, and enhance price stability through fuel diversity."

The electrical demand for the Desert Southwest region is also expected to increase over the next ten to twenty years. According to the U.S. Census Bureau, the western United States has experienced a population growth of approximately 10 percent from 2000 to 2006. The Bureau expects the growth in population to increase by 33 percent between 2006 and 2030. The Bureau's latest projection of population growth between 2000 and 2030 for the combined area of Arizona, California, and Nevada is nearly 50 percent (U.S. Census Bureau 2005). Arizona and Nevada were identified as the fastest growing states during this period (U.S. Census Bureau 2005a).

Population increase is a key driver in the projected increase in electrical demand, although it is not the only factor. The amount of electricity used per person is also expected to increase as the scope and expectation for the uses of electricity increases. The per capita increase is due to the continued electrification of day to day life, including the expanded deployment of air conditioning, computers, high-definition televisions, and potentially, electric powered automobiles. While this upward tendency on per capita electricity usage is countered by conservation efforts in the form of energy efficiency standards, utility programs, and individual responsibility, overall per capita electricity usage is still expected to increase (Global Environment Fund 2008). Therefore, even accounting for conservation programs, the electricity demand is expected to increase on the order of two percent per year in the Desert Southwest region (ICF International 2009).

The increase in overall forecasted electric demand in the Desert Southwest region will require the addition of 55,000 GWh/yr of renewable energy by 2020 to satisfy projected Renewable Portfolio Standards (RPS) requirements. Even with significant gains in energy efficiency and/or slower than expected growth, the need to access new renewable resources remains. For instance, if overall demand for electricity is 15 percent below the forecasted levels for 2020, the estimated requirements for additional renewable energy would only change from 55,000 GWh/yr to 45,000 GWh/yr (ICF International 2009).

2.3.1 Relevant State Laws and Regulations – Renewable Energy Resources and Standards

Arizona, California, Nevada, and Utah have adopted renewable energy standards, commonly referred to as RPS. These states have enacted legislation that requires utilities to meet a portion of the overall customer energy supply with renewable energy resources by specific dates. Each state has adopted programs that vary in the portion of overall renewable energy required, the deadlines, and the type of resources that can be utilized. A brief summary of each state's RPS requirements follows.

California. California's RPS was initially established by the State of California legislature in 2002. In 2011, the State of California legislature enacted Senate Bill 2 that codified a 33% Renewable Portfolio Standard by 2020 that would apply to all utilities, including publicly-owned municipal utilities. In 2015, the State of California legislature enacted Senate Bill 350 that codified a 50% Renewable Portfolio Standard by 2030 that applies to all utilities.

Arizona. In November 2006, the Arizona Corporation Commission (ACC) adopted final rules to expand the state's Renewable Energy Standard (RES) to 15% by 2025. In June 2007, the state attorney general certified the rule as constitutional, allowing the new rules to go forward and they took effect 60 days later. Investor-owned utilities serving retail customers in Arizona are subject to the standard.

Utilities subject to the RES must obtain renewable energy credits (RECs) from eligible renewable resources to meet 15% of their retail electric load by 2025 and thereafter. Of this percentage, 30% (i.e., 4.5% of total retail sales in 2025) must come from distributed renewable resources by 2012 and thereafter.

Nevada. Nevada established a RPS as part of its 1997 restructuring legislation. Under the standard, NV Energy (parent company of Nevada Power, Sierra Pacific Power, and Sierra Pacific Resources) must use eligible renewable energy resources to supply a minimum percentage of the total electricity it sells. In 2001, the state increased the minimum requirement by two percent every two years, culminating in a 15% requirement by 2013. The portfolio requirement has been subsequently revised, most recently by Senate Bill (SB) 358 of 2009, which increased the requirement to 25% by 2025. In

addition to solar, qualifying renewable energy resources include biomass, geothermal energy, wind, certain hydropower, and waste tires (using microwave reduction).

2.3.2 Greenhouse Gas Reduction Goals

In addition to RPS mandates, states and the federal government are also considering various Greenhouse Gas (GHG) reduction policies. Several western governors, including the governors of California, Arizona, and Utah, formed the Western Climate Action Initiative in 2007 to jointly reduce regional GHG levels. A regional goal has been established by the members of the Initiative and details of the economy-wide (e.g., electricity, transportation, industry) program is being developed. GHG reduction policies are also being considered at the federal level. This need for additional renewable energy could be greater depending on how GHG reduction is implemented by utilities (DOE 2008; ICF International 2009).

2.3.3 Wyoming's Abundant and Cost Effective Resources

According to the National Renewable Energy Lab (NREL), Wyoming has one of the densest concentrations of high class wind energy potential in the country (NREL 2006, 2008). NREL data shows that over 50 percent of the best quality (Class 6 and 7) wind capacity in the continental United States is located in Wyoming. This Class 6 and 7 wind resource has an energy potential of 235,000 GWh/yr. Wyoming's Class 4 and above wind resource has a potential of 944,000 GWh/yr. Wind and other energy developers have been very active in Wyoming.

The existing transmission capacity available to export electric energy from Wyoming is fully committed. These constraints led to the recommendations for transmission expansion along similar routes as the TWE Project from the Western Governors Association (WGA), the Rocky Mountain Area Transmission Study (2004), and the Clean and Diversified Energy Advisory Committee (WGA 2006). In addition to wind resources, Wyoming has a number of other natural energy resources that could also be developed for production of electricity and transmitted on the infrastructure to be constructed pursuant to the TWE Project to the growing markets in the Desert Southwest region. The WGA and DOE have identified over 14,000 MW of high quality developable wind resources within Wyoming (WGA and DOE 2009).

Two recent studies, one by the Western Electricity Industry Leaders, have looked specifically at regional renewable energy alternatives, including remote resources supplied through new transmission infrastructure, to meet the needs of the Desert Southwest region. Wyoming wind resources were identified as one of the most economic alternatives to meet a portion of the overall needs (NREL 2006, 2008). The TWE Project will cost effectively provide up to 20,000 GWh/yr of the estimated 55,000 GWh/yr need for renewable energy need in the Desert Southwest region.

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3.0 ROLES AND RESPONSIBILITIES

The following section describes the roles and responsibilities of each major Project entity. If other parties become engaged in the Project as additional participants, they would be responsible to function and abide by the roles and responsibilities outlined in this section and their reporting relationships would be case-specific according to their jurisdiction, expertise, and/or nature of their input. The information in this section summarizes information from the Environmental Compliance and Monitoring Plan (ECMP; Appendix G). In the event that the information in this section conflicts with the information in the ECMP (Appendix G), the ECMP will control.

3.1 TransWest

TransWest as the Applicant will be responsible for the administration of the ROW and coordination with the Construction Contractor(s). TransWest and its Construction Contractor(s) will be responsible for all activities associated with the construction, operation, and maintenance of the transmission line and ancillary facilities in a manner that complies with the conditions outlined in the ROW grants, special use authorizations, and other permits listed in Table 2 in Section 1 of this POD. TransWest will be the ultimate authority for its contractors; however, for execution purposes of this document, it will refer specifically to the Construction Contractor(s) when needed to define their activities. To help ensure construction activities are conducted in a manner that complies with all federal, state, and local regulations, TransWest or the Construction Contractor(s) will contract with or employ a multi-disciplinary team of environmental inspectors and monitors to work jointly and cooperatively with the third party Compliance Inspection Contractor (CIC). TransWest will also maintain regular and consistent communication with the Construction Contractor(s) to track the success of environmental protection, mitigation, and compliance efforts before, during, and after construction.

3.2 Western

Under the Hoover Act, as amended by Section 402 of the Recovery Act, Western was granted authority to borrow funds from the U.S. Treasury to (among other things) construct, finance, facilitate, plan, operate, maintain, and/or study construction of new or upgraded transmission facilities that facilitate the delivery of renewable energy. Prior to committing funds, Western must certify that a project is in the public interest; a project will not adversely impact system reliability, system operations, or other statutory obligations; and it is reasonable to expect the proceeds from the project will be adequate to make repayment of the loan.

Western created the Transmission Infrastructure Program (TIP) to administer the use of borrowing authority and on March 4, 2009 solicited interest in proposed transmission projects that promote the delivery of clean, renewable power. This resulted in the submission of Statements of Interest, including one for this Project. Western is considering whether to participate in the Project as a joint owner with TransWest as part of Western's TIP and in order for Western to participate, the Project must satisfy Western's TIP requirements. As with the BLM's decision, Western's decision is informed by the required NEPA analysis and disclosure in the EIS.

Should Western decide to participate in the Project as a joint owner with TransWest, the decision would be managed through agreements that would include defining the respective rights and obligations associated with the ownership of the Project which include financing, ownership structure, operations, maintenance, marketing and acquisition of ROWs for the Project on private lands. As a federal agency, Western would need to comply with all applicable laws and policies for the joint ownership of transmission projects, and comply with the stipulations included within the Record(s) of Decision and other similar authorizations made by the respective federal land management agencies.

3.3 BLM, USFS, and Other Federal Land Management Agencies

The role of the BLM, USFS, and other federal agencies is to ensure that all stipulations and requirements of the ROW grants, special use authorizations, and the POD are implemented and complied with during the construction, operation, and maintenance of the Project on the lands they administer. Oversight will be provided by both federal Authorized Officers and by federal Project Managers for each involved federal agency. Authorized Officers will have ultimate authority and be the decision makers for issues pertaining to ROW grants and authorizations. The Authorized Officers will supervise the federal Project Managers to verify that environmental compliance is meeting the requirements of all applicable laws, permits, regulations, and agreements. The Authorized Officers, in coordination with others, will determine if noncompliance events for which TransWest is accountable qualify as violations to the terms and conditions of any ROW grant or authorization. Only the Authorized Officers, in accordance with 43 CFR Part 2807 and 36 CFR Part 251.60, will have the authority to suspend or terminate a ROW grant or authorization if TransWest and/or its Construction Contractor(s) do not comply with the stipulations, conditions, or with other applicable laws and regulations. The Authorized Officers will be the primary federal agent to issue decisions unless otherwise delegated to a federal Project Manager.

Federal Project Managers will be primarily responsible for ensuring stipulations and mitigation measures in the POD are adhered to during Project construction, operation, and maintenance. They will ensure that compliance during construction is done in a manner which facilitates timely and efficient construction while protecting the public interest and the environment. They will also be responsible for ensuring that environmental impacts do not exceed those analyzed in the Final EIS and will manage the CIC. Federal Project Managers will coordinate with agency resource specialists for their technical expertise and input when needed. Federal Project Managers will be responsible for notifying TransWest of any grant or authorization violations due to noncompliance, issue Notices to Proceed, issue work stoppage orders (WSO) if needed, issue resume work orders and resolving any conflicts that arise relating to the Project on lands they administer.

As described in the Environmental Compliance and Monitoring Plan (ECMP) (Appendix G), Level 2 variance requests will require approval by the appropriate federal Project Manager and Level 3 variance requests will require approval by the appropriate federal Project Manager and Authorized Officer.

3.4 Compliance Inspection Contractor (CIC)

TransWest and the federal agencies have agreed to use a third-party CIC to act on the BLM and other federal land management agencies' behalf to ensure adequate oversight during the construction and reclamation phases of the Project. The CIC will be hired by TransWest prior to issuance of any NTP to allow adequate time for the CIC to review documents and develop on-the-ground familiarity with the Project. The CIC will report directly to each federal Project Manager and will be authorized to enforce the POD, stipulations of the ROW grant and authorizations. It is not the role of the CIC to direct the work of either TransWest or its Construction Contractor(s). Rather the CIC's primary role is to observe work activities and bring noncompliant situations to the attention of the appropriate party and offer recommendations on how to prevent noncompliance. Additional responsibilities of the CIC are discussed in the ECMP (Appendix G).

The CIC will deploy an adequate number of field personnel to work with the environmental inspectors and monitors to sufficiently monitor all constructions activities and fulfill the responsibilities listed above. It is important to note that it is not the role of the CIC to direct work of either TransWest or the Construction Contractor(s) and the CIC will take no direction from them with respect to times, places, or manner of conducting compliance monitoring. The CIC shall have access

to inspect all Project work areas. Access to work areas will not be unreasonably withheld provided that the CIC and their field personnel have received all required safety training necessary to enter the work area.

3.5 Construction Contractor(s)

The Construction Contractor(s) will be contractually bound to comply with all laws, regulations, and permit requirements, including the implementation of mitigation measures, environmental mitigation measures (EMMs), and other specific stipulations and methods set forth in the ROW grants, special use authorizations, permits, POD, FEIS, ROD, and NTPs throughout all construction phases of the Project. All construction personnel and employees entering the ROW will be required to participate in environmental training before entering the ROW. Construction crews will also be required to cooperate and support the work of the environmental inspectors, monitors, and CIC to build the Project safely and in compliance with all Project terms and conditions; federal, state, and local laws and regulations; and all landowner agreements. If a noncompliance event occurs during construction, it will be the responsibility of the Construction Contractor(s) to notify TransWest and the CIC and to cooperate fully in developing and implementing a solution as soon as possible to resolve the noncompliance. The Construction Contractor(s) will also be responsible for the removal of noncompliant personnel, as necessary. The Construction Contractor will be expected to involve the CIC in key project management meetings and the project safety program.

3.6 Communication Procedures

Effective communication and the sharing of information between all parties will be critical to achieving and maintaining environmental compliance throughout the construction of the Project. It is especially important for construction crews to communicate daily with environmental monitors concerning work schedules and locations. The Construction Contractors(s) will be responsible for assuring that field crews have the ability to communicate effectively and will implement solutions if communication problems arise.

Given the scope and complexity of the Project, it is critical that all communications involving key decisions, safety, approvals, noncompliance, or variances be documented in writing. Oral communication will not substitute for written approvals. Additional information concerning communication procedures can be found in the ECMP (Appendix G) and in the Traffic and Transportation Management Plan (Appendix U).

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4.0 PROJECT COMPONENTS

Sections 4.1 through 4.4 describe the typical design characteristics for the proposed TWE Project facilities and associated permanent and temporary land disturbance estimates:

- Section 4.1 – the TWE Project transmission line, including structure designs and foundations, conductors, insulators and associated hardware, overhead shield (ground) wires, grounding rods, minor hardware, system interconnection lines and access roads.
- Section 4.2 – the TWE Project Northern and Southern Terminals, including the AC/DC converter stations, substation equipment.
- Section 4.3 – the TWE Project ground electrode systems, including the ground electrode facilities and low voltage electrode connector line(s).
- Section 4.4 – the TWE communication system for command control of the transmission system.

4.1 Transmission Line Design Characteristics

The TWE Project proposed ±600 kV DC transmission line will be approximately 750 miles long, located in a ROW 250 feet wide. The design characteristics of the ±600 kV DC transmission line are summarized in Table 3 and are described in this section.[1]

TransWest has determined that a ROW width of 250 feet is sufficient for the long-term maintenance and operation of the transmission line and will accommodate the proposed transmission structure design (guyed steel lattice) or any of the alternate structure designs that may be selected by TransWest based on setting and design criteria. Increased ROW width may be required in a small number of site specific locations to accommodate unusually long spans. These exceptions will be identified and addressed on a case-by-case basis during final design and engineering of the transmission line. ROW width for the TWE Project is based upon engineering studies that considered:

- Structure configuration (horizontal vs. vertical configurations), pole spacing, and insulator configuration (I-string vs. V-string insulator configurations);
- Operating voltage, elevation and clearance criteria (National Electrical Safety Code [NESC] and project-specific);
- Conductor size, weight, number and configuration of conductors in the bundle, tensions, and sag;
- Span length between structures and conductor blowout (conductor movement envelope under pre-defined wind conditions);
- Structure footprint (guyed vs. self-supported), terrain and maintenance access (space requirements for maintenance equipment at each structure site);

[1] Short segments of 500 kV AC and 230 kV AC transmission lines will be required near the Northern and Southern Terminals to connect to the existing and planned regional transmission grid. The design characteristics of these transmission structures are described in Section 4.1.1.

- Audible noise levels at the edge of the ROW; and

- Potential co-location with buried underground high pressure natural gas and other petroleum pipelines within the same corridor. The DC transmission line can be located in its ROW adjacent to the ROW for such pipelines.

TABLE 3 TYPICAL ±600 KV DC TRANSMISSION LINE DESIGN CHARACTERISTICS

FEATURE	DESCRIPTION
	Physical Properties
Line Length	Miles per route segment depending on selected alternative.
Structure Type	Proposed Tangent Structure: guyed steel lattice. Alternate Tangent Structures: self-supporting steel lattice and tubular steel poles used in limited characteristic settings as determined by TransWest during final design based upon engineering considerations. Proposed Dead-end and Angle Structure: self-supporting steel lattice. Alternate Dead-end and Angle Structure: tubular steel poles used in extremely unusual and very limited circumstances to address site-specific engineering constraints).
Structure Height	Guyed steel lattice -120 to 180 feet; self-supporting steel lattice -120 to 180 feet; tubular steel poles - 100 to 150 feet (special crossing structures may be in excess of 200 ft.)
Span Length	Guyed lattice - 900 to 1,500 feet; self-supporting steel lattice - 900 to 1,500 feet; tubular steel poles - 700 to 1,200 feet
Number of Structures per Mile	Four to eight - depending on structure type, terrain, and other factors to be identified through detailed design studies Steel Lattice (guyed or self-supporting) – 3.75 to 5 Tubular Steel Poles – 5 to 8
ROW Width	250 feet; Increased ROW may be required in a small number of site specific locations to accommodate unusually long spans
	Land Temporarily Disturbed
Structure Work Area	ROW width (250 ft) x 200 feet per structure
Wire-Pulling and Tensioning Sites	ROW width (250 ft) x 500 feet for dead-end structure (two sites at all dead-end structures); ROW width (250 ft) x 500 feet for mid-span conductor and shield wire (approximately every 9,000 feet); 100 x 500 feet for fiber optic cable set-up sites (approximately every 18,000 feet)
Material Storage Yards	Located approximately every 30 miles of transmission line Typical material storage yard area: approximately 20 acres
Staging Areas / Fly Yards	Located approximately every 5 miles of transmission line Typical fly yards/staging areas: approximately 7 acres
Batch Plant Sites	Located approximately every 15 miles of transmission line Stand-alone temporary batch plants, estimated size: approximately 5 acres
Guard Structures	100 x 100 feet at road and existing overhead electrical line crossings
	Land Permanently Disturbed
Structure Base[1]	Guyed lattice (tangent) - 500 square feet (100 square feet mast foundation + 4 x 100 square feet for anchors) Self-Supporting Lattice (tangent) - 900 square feet (30 x 30 feet tower base) Self-Supporting Lattice (angle) - 1,225 square feet (35 x 35 feet tower base) Self-Supporting Lattice (dead-end) - 1,600 square feet (40 x 40 feet tower base) Tubular Steel Pole (tangent) - 40 square feet (7-foot diameter foundation) Tubular Steel Pole (dead-end/angle) - 100 square feet (two poles x eight-foot

FEATURE	DESCRIPTION
	diameter foundations) – only used in extremely unusual and very limited circumstances.
Regeneration Sites	Located approximately every 50 miles of transmission line, most located on the transmission line ROW and each approximately 10,000 square feet (100 x 100 feet).
	Access Roads
Existing Paved Roads[2]	Existing paved roads are typically highways and state routes that will be used for travel to existing and new dirt roads to access the ROW.
Existing Dirt and Gravel Roads (no improvement)[2]	Existing dirt and gravel roads with wide (at least 14 feet), well graded or graveled surfaces that do not require improvement beyond regular maintenance, which could include, but not be limited to, blading of the road surface, placing gravel in low spots and repair of drainage structures within the previously disturbed area of road.
Existing Dirt Road (with improvements)	Existing dirt roads that may require improvement. The bladed road surface may need to be widened to 14 - 24 feet depending on terrain. Total disturbance, including that for drainage, cut and fill, may extend beyond the bladed road surface especially in steep terrain where the maximum total disturbance width will typically not exceed 52 feet, but will be determined in consultation with the land management agency or landowner on a case-by-case basis. Surface disturbance outside of the bladed road surface will be limited to the smallest area necessary while still providing a safe work area.
New Dirt Access Road (bladed)	Typically constructed with a 14 foot wide bladed surface with two or three foot berms or ditches on either side, but can be wider in steep and mountainous terrain because of cut and fill requirements according to ground slope. Based on the terrain and grade of the road, new bladed access roads to be constructed with an inslope or outslope design with water dips, water breaks and wings in the berm as necessary to manage water flow and mitigate erosion. Total disturbance, including that for drainage, cut and fill, may extend beyond the bladed road surface especially in steep terrain where the maximum total disturbance width will typically not exceed 52 feet, but will be determined in consultation with the land management agency or landowner on a case-by-case basis. Surface disturbance outside of the bladed road surface will be limited to the smallest area necessary while still providing a safe work area.
Overland Access	Overland access (“drive and crush”) where terrain and soil conditions are suitable. No blading or grading required. Some areas may require taller vegetation to be removed while still leaving the root systems intact, as well as, rocks to be removed and placed outside the travel surface in order to utilize overland access. Access surface will typically not exceed 14 feet in width but will be determined in consultation with the land management agency or landowner on a case-by-case basis. Overland Access generally only feasible for guyed lattice or for foundations not requiring poured concrete.
	Electrical Properties
Nominal Voltage	±600 kV DC
Nominal Capacity	3,000 MW (as measured at the Southern Terminal)
Circuit Configuration	DC Bi-Pole Bundled
Conductor Size	Approximately 1.5 inch diameter aluminum conductor steel reinforced (ACSR) conductor bundled with three or four sub-conductors per pole.
Ground Clearance of Conductor	37 feet minimum at a conductor temperature of 176 degrees Fahrenheit (°F)

Notes: [1] Structure types to be used in site-specific settings will be determined by TransWest during final engineering and design of the TWE Project. Tangent self-supporting lattice structures were used to calculate permanent disturbance since this structure type would result in greater disturbances per structure than the proposed guyed lattice structure.

[2] Existing paved, gravel, and dirt public and private roads that can be used to access the TWE Project transmission line corridor are part of the Backbone Access Road Network shown on the TWE Project Overview, Constraints, Access Roads and Area Details map books in Appendix AA.

4.1.1 Structure Types

There are three main structure types for the TWE Project transmission line: (1) tangent structures; (2) angle structures; and (3) dead end structures. Tangent structures are used in straight line segments and are the most common type of structure and make up the vast majority of the structures on a line; often 80 to 90 percent. Angle structures are used when a transmission line changes direction up to a specified threshold line angle (commonly 30 degrees). Dead-end or strain structures are typically needed for extremely long spans, when the line angle exceeds the threshold of an angle structure, in highly varied terrain which can create uplift conditions, or when there is a need for a failure containment structure. Dead-end structures are structures where the conductors are separated and connected together (electrically) by a jumper. Angle and dead-end structures must resist much larger loads and therefor are much stronger/heavier and require much larger diameter and deeper foundations than do tangent structures.

The TWE Project transmission line will be constructed primarily with guyed lattice tangent structures (Figure 1) and self-supporting steel lattice angle and dead-end structures. The guyed lattice structure shown on Figure 1 was selected as the proposed tangent design for most locations due to its smaller disturbance area, constructability and overall cost considerations. Self-supporting steel lattice and single shaft tubular steel poles (Figures 2 and 3) would be used in limited tangent structure locations where the setting and design criteria determine that the guyed lattice steel structure is not appropriate. Table 4 indicates the general applicability of the tangent transmission structure designs by characteristic settings. Figure 4 shows each structure design within a typical 250 foot-wide ROW.

In addition to tangent structure configurations, angle and dead-end structures will be engineered wherever the line must change direction or special conditions must be addressed. In almost all locations, the angle and dead-end structures will be constructed with self-supporting lattice structures. In extremely unusual and very limited circumstance a very small number of special tubular steel angle and/or dead-end structures are anticipated to address site-specific engineering constraints, e.g. size or height limitations. Each angle and dead-end structure will be individually designed, taking into consideration both the degree of the angle, site-specific constraints and site-specific geologic conditions, to withstand the increased lateral stress of conductors pulling in two different directions.

The TWE Project will be designed in accordance with guidelines established by the Avian Power Line Interaction Committee (APLIC 1994, 2006, 2012). Appendix B provides the Avian Protection Plan for the TWE Project.

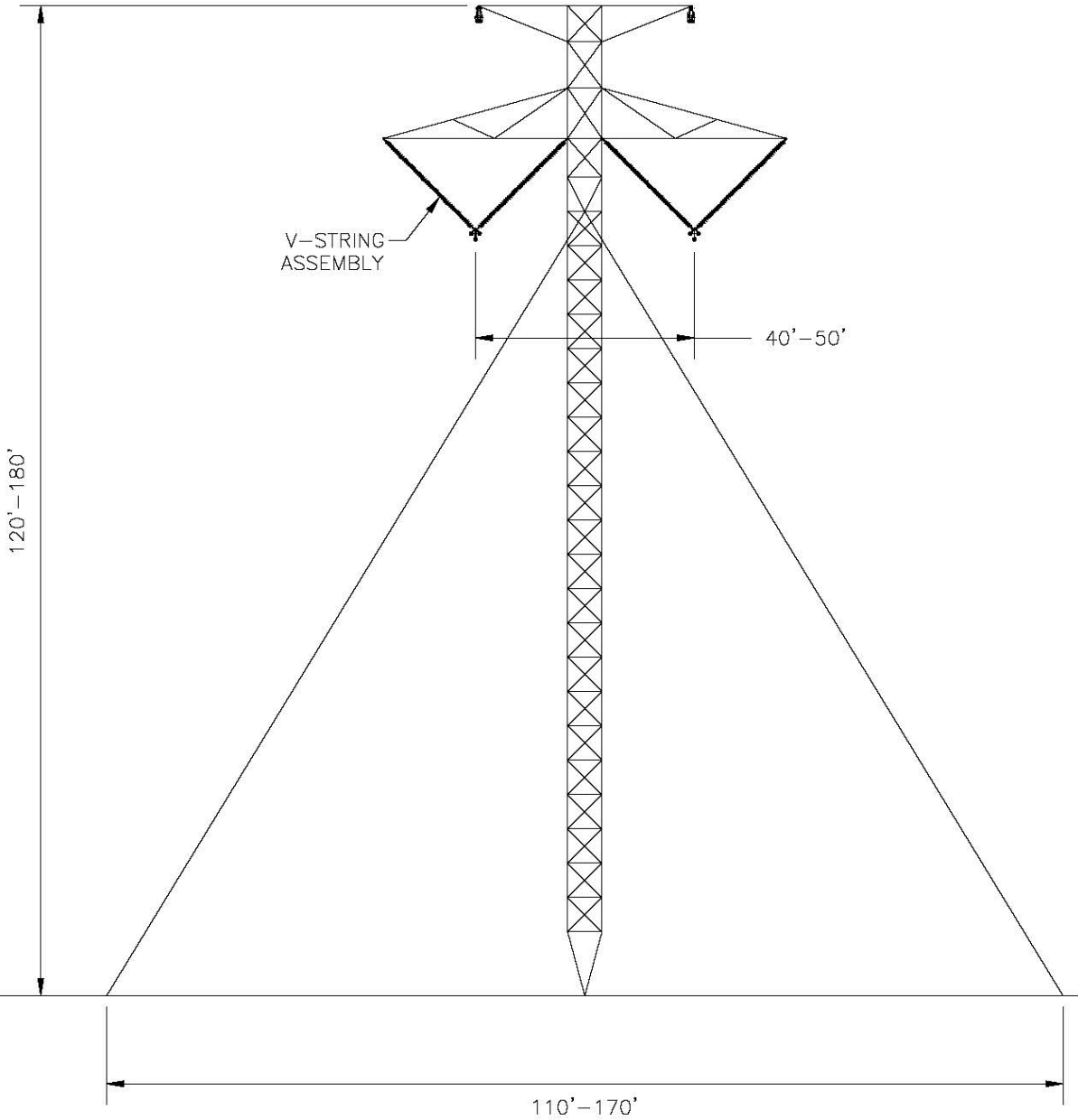
During detailed engineering and design of the selected Alternative, a series of structure types will be designed to meet the project-specific design criteria. These project-specific design criteria address industry standards and guides, legislated requirements, anticipated environmental conditions, terrain, applications (settings) and land use. In addition to the common or standard structure types designed and to be used across the project, a small number of unique and special structures will be designed to address site-specific conditions such as long spans due to terrain or sub-regional conditions such as weak sandy soils, landslide areas or highly corrosive soils.

TABLE 4 ±600 KV DC TRANSMISSION TANGENT STRUCTURE DESIGN ALTERNATIVES POTENTIALLY USED IN CHARACTERISTIC SETTINGS

CHARACTERISTIC SETTING	GUYED STEEL LATTICE	SELF SUPPORTING STEEL LATTICE	TUBULAR STEEL POLE
Flat to Rolling Terrain	X		
Steep to Mountainous Terrain and Steep Side Slopes	*	X	X
Open Lands	X		

CHARACTERISTIC SETTING	GUYED STEEL LATTICE	SELF SUPPORTING STEEL LATTICE	TUBULAR STEEL POLE
Agricultural Fields, Urban Areas		X	X
Highly constrained ROW			X
Line Angle 1°	X		
Heavier Line Angles and Dead-end Strain Structures		X	X

* Should helicopter erection of structures be preferred or required, guyed lattice steel structures or self-supporting steel lattice structures may be utilized as determined by TransWest during final engineering and design. In steep to mountainous terrain with excessively steep side slopes, self-supporting lattice structures will likely be required.



NOTES

1. DIMENSIONS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.
2. TOWER OUTLINE AND BRACINGS ARE INDICATIVE ONLY.
3. I STRING MAY BE IN USED IN PLACE OF V–STRINGS.

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FIGURE 1

TYPICAL ±600kV DC
GUYED V–STRING
LATTICE STRUCTURE

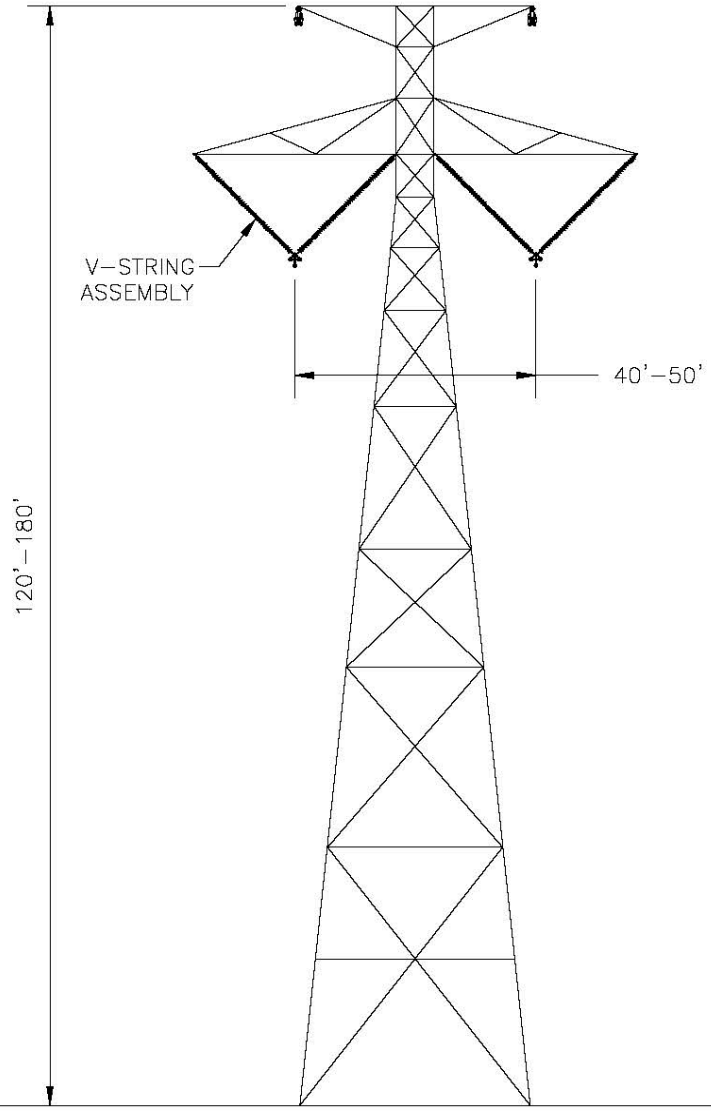

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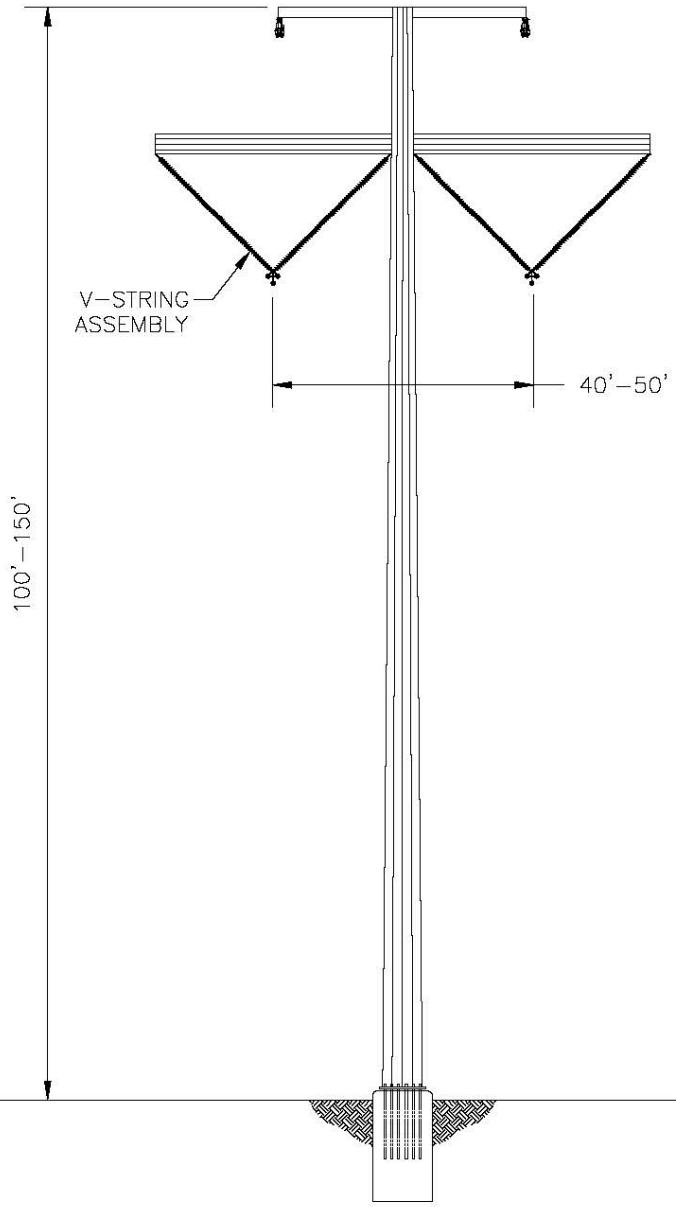
FIGURE 2

TYPICAL ±600kV DC
SELF SUPPORTING LATTICE
V–STRING STRUCTURE



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3. I STRING MAY BE IN USED IN PLACE OF V–STRINGS.

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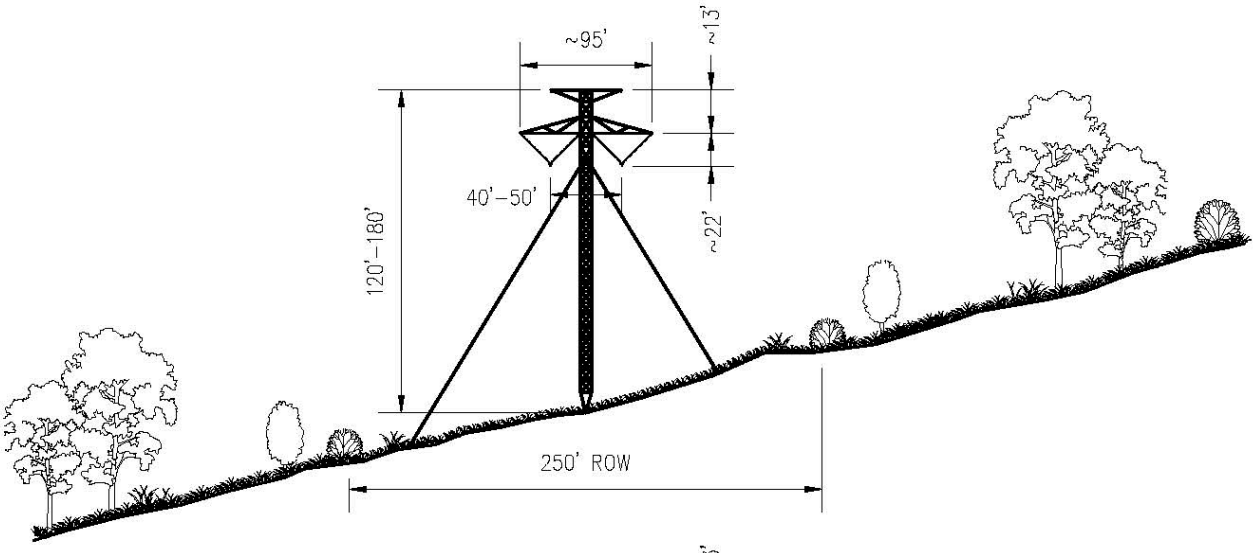
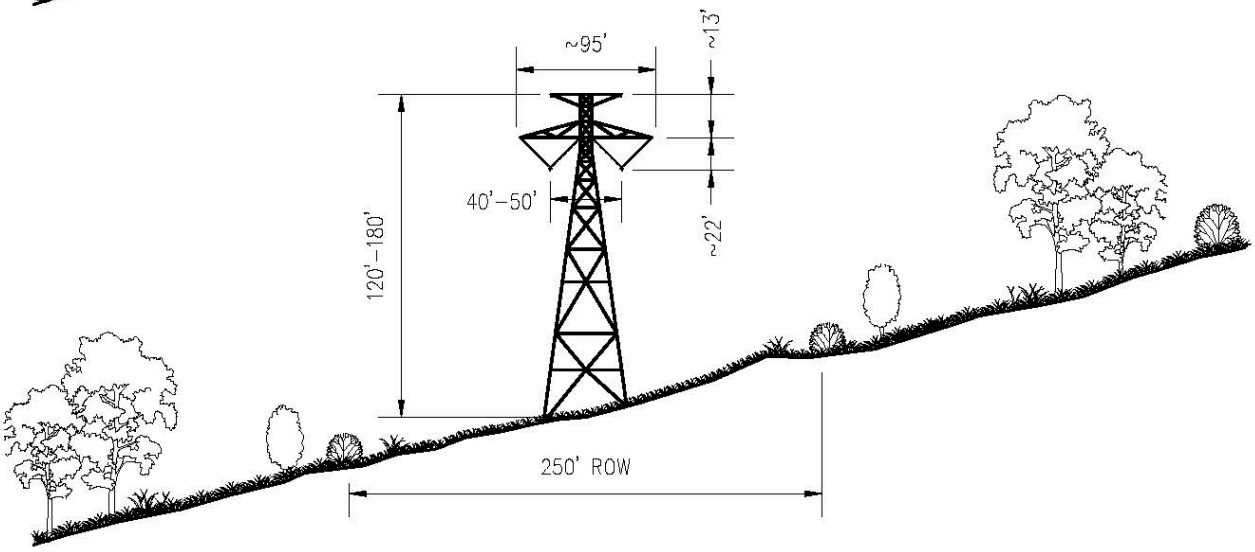
FIGURE 3

TYPICAL ±600kV DC
TUBULAR STEEL POLE
V–STRING STRUCTURE





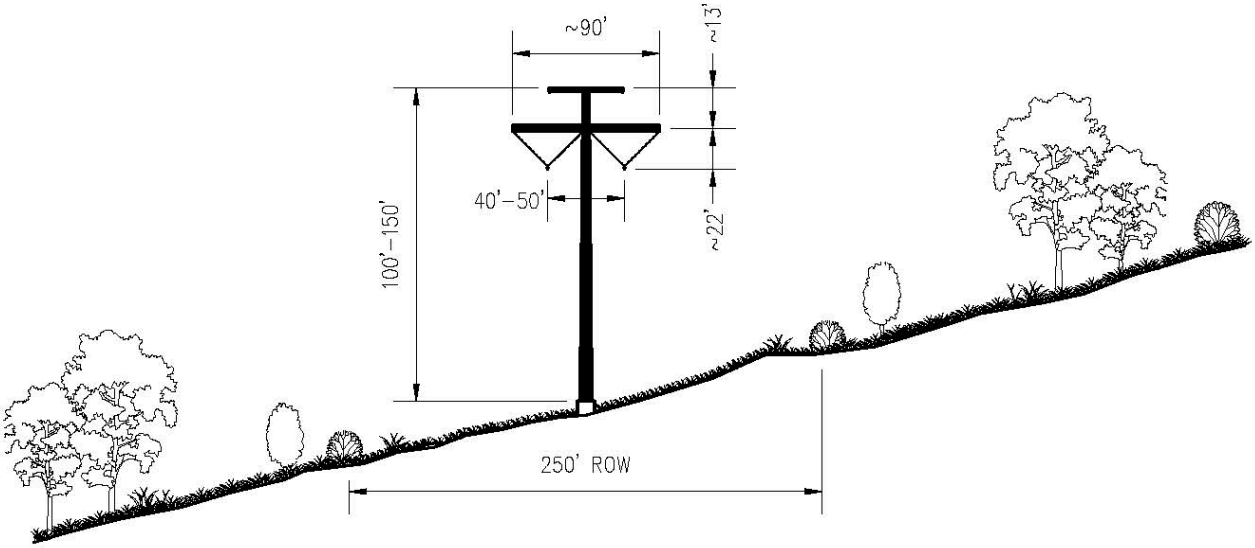


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FIGURE 4

TYPICAL ROW CROSS SECTIONS
BY STRUCTURE TYPE

4.1.2 Structure Foundations

The guyed steel lattice towers will generally require one precast concrete support pedestal for the tower base and four anchors for guy cables. The typical precast concrete support pedestal will be three to six feet in diameter and four to six feet in depth. Precast concrete support pedestals are manufactured off-site and trucked to the structure locations. Rarely, some guyed steel lattice tower foundations may require a special foundation (cast-in-place reinforced concrete support pedestal or a pedestal supported by micro-piles) due to site-specific characteristics such as extremely weak soils or rock. The anchors for attachment of the guy cables will be anchors designed for soil/rock conditions at each site. It is likely that a number of different types of anchors will be employed including plate anchors, screw anchors, screw piles, grouted anchors, or rock anchors.
Hauling of concrete to the tower installation site is eliminated since precast concrete support pedestals are manufactured off-site and trucked to the structure locations. In addition, the excavation necessary for installation of the support pedestal and guy wires is minimal. Spoil material (surplus non-topsoil excavated material) from foundation installation is minimal (0 to 2 cubic yards per site) and often may be distributed on-site.

Self-supporting lattice towers will require four foundations with one foundation on each of the four corners (legs) of the lattice towers. The foundation diameter and depth will be determined during final design and are dependent on the type of soil or rock present at each specific site. Typically, the foundation for each leg of the structure will be a reinforced cast-in-place concrete drilled pier, with the typical self-supporting tangent structure foundation having a diameter of three to four feet and a depth of approximately 12 to 25 feet. Total concrete necessary for the four leg foundations of each tangent self-supporting lattice tower is estimated at 28 cubic yards per tower. The resulting spoils would total 25 to 30 cubic yards per structures would will likely be disposed of off-site.

Foundations for dead-end and angles structures will be larger, typically ranging from five to eight feet in diameter and 20 to 50 feet in depth.

Tubular steel pole tangent structures will require one cast-in-place concrete foundation per steel pole. These tubular steel structures will be installed on a single reinforced concrete pier with anchor-bolts connecting the tubular pole base plate to the foundation. The foundation diameter and depth will be determined during final design and are dependent on the type of soil or rock present at each specific site. Foundations for these structures will typically be six to ten feet in diameter and 20 to 60 feet in depth. Total concrete necessary for the foundation of each tubular steel pole is estimated at 60 cubic yards per pole with approximately 55 to 60 cubic yards per pole of spoils requiring off-site disposal.

In a limited number of locations, specialized foundations (for any structure type) may be required to address shallow rock, landslide prone areas, unstable soils, corrosive soils, weak sandy soils, shallow water table, etc. These site specific or sub-region specific foundation designs may include micro-pile, helical pile, grouted, epoxy, grillage, driven pile, vibratory pile and/or steel caisson type designs. All specialized foundations will be determined during final design.

4.1.3 Conductors

Design Characteristics

The proposed conductor for the TWE Project transmission line is an ACSR/TW (Aluminum Conductor Steel Reinforced/Trapezoidal Wire) conductor approximately 1.5 inches in diameter. Each

pole of the ±600 kV bipole[2] line will be composed of three or four subconductors in a triple-bundle or quad-bundle configuration. The individual conductors will be bundled in either a triangular configuration (triple-bundle) or a diamond configuration (quad-bundle) with spacing of approximately 18 inches between subconductors. The bundled configuration is proposed to provide adequate current carrying capacity and to provide a reduction in audible noise and radio interference as compared to a single large-diameter conductor. Each ±600 kV subconductor will have a non-specular finish[3].

Ground Clearance Requirements and Guidelines

Conductor phase-to-phase and phase-to-ground clearance parameters are determined in accordance with the NESC, ANSI C2, produced by the American National Standards Institute (ANSI). The NESC provides for minimum distances between the conductors and ground, crossing points of other lines and the transmission support structure and other conductors, and minimum working clearances for personnel during energized operation and maintenance activities. The clearance requirements for conductor heights above ground are based on the current and potential use of the land being crossed.

The minimum ground clearance for the TWE Project ±600 kV DC conductor is 37 feet at a conductor temperature of 176°F. For a ±600 kV DC transmission line, the minimum conductor heights will typically range from 37 feet for range lands to 50 feet or more above railroad tracks. Clearances above highways would typically be 40 to 50 feet. Lands with center pivot irrigation or lands that are aerially sprayed would typically use a minimum ground clearance of 37 feet. The exact clearance criteria for each type of land use and each type of facility being crossed will be determined during detailed design.

The clearance requirements for vertical separation at crossings over existing transmission lines are also governed by NESC 2012 Rule 233. In addition to the minimum NESC requirements, additional clearances or buffers are added to account for additional safety, construction tolerances, wire movements, differential wire temperatures, and utility specific requirements. The vertical separation typically ranges from approximately 25 feet for distribution and lower voltage lines to approximately 50 feet or more for 500 kV EHV or high voltage direct current (HVDC) lines. The exact clearance criteria for each voltage class being crossed will be determined during detailed design.

Standard industry practice suggests that the higher voltage line would cross over the lower voltage line. This standard would be followed at the line crossing locations in coordination with each facility owner or manager. To optimize the crossing structure heights, the line crossing locations are typically at mid-spans of the lines being crossed and at right angles to each other. Depending on the terrain and heights of the facility being crossed, taller structures for the TWE Project transmission line may be required at the line crossing locations. Guard structures will be installed, if required, to protect underlying wires and structures during wire stringing operations. These guard structures intercept the wire should it drop below a conventional stringing height, preventing damage to underlying wires and structures. In addition to guard structures, during construction, the Contractor for the TWE Project will be required to coordinate with the owner or operator of the line being crossed to comply with outage and other utility-specific requirements.

Due to the static nature of DC electrical and magnetic fields, the proposed transmission line will not induce any current in oil and gas well heads. The transmission line will be sited such that oil or gas

[2] A bipole HVDC transmission line consists of two poles – positive and negative. A pole may consist of one conductor or multiple conductors (i.e., sub-conductors) bundled together.
[3] Non-specular finish refers to a “dull” finish rather than a “shiny” finish.

wellheads, and associated above ground facilities at the wellhead, will not be located on the transmission ROW. Additionally, a 250-foot buffer from oil and gas wellheads will be used as a siting criteria for locating the final centerline of the ±600 kV DC transmission line. Section 6.2.2 of this POD provides additional details concerning siting a DC or AC transmission line in proximity to pipelines.

4.1.4 Insulators and Associated Hardware

As shown in Figures 1, 2, and 3, insulator assemblies for ±600 kV DC tangent structures will consist of two strings of insulators normally in the form of a "V." These insulator strings are used to suspend each conductor bundle (pole) from the structure, maintaining the appropriate electrical clearance between the conductors, the ground, and the structure. The V-shaped configuration of the ±600 kV DC insulators also restrains the conductor so that it will not swing into contact with the structure in high winds. Dead-end insulator assemblies for ±600 kV DC transmission lines will use an I-shaped configuration, which consists of insulators connected horizontally from either a tower dead-end arm or a dead-end pole in the form of an "I." Individual insulators for both suspension and dead-end applications will be composed of a single unit polymer (non-ceramic insulators).

4.1.5 Overhead Shield (Ground) Wires

Design Characteristics

To protect the ±600 kV DC transmission line from direct lightning strikes, two lightning protection shield wires, also referred to as ground wires, will be installed on the peaks or top arms of each structure. Electrical current from lightning strikes will be transferred through the shield wires and structures into the ground.

Standard Configuration

In the standard configuration (all of the transmission line with the exception of short sections near the terminals where the overhead electrode line connecting the AC/DC converter station to the ground electrode facility is carried in the shield wire position), the shield wires will be composed of two wire types. Neither of these two wire types will have a non-specular finish.

One of the shield wires will be composed of extra high strength steel wire approximately 0.5 inch in diameter. The second shield wire will be an optical ground wire (OPGW) constructed of aluminum and steel, which will carry 36 to 48 glass fibers within its core. The OPGW wire will have a diameter of approximately 0.65 inch. The glass fibers inside the OPGW will facilitate data transfer between the two AC/DC converter stations at the Northern and Southern Terminals. The data will be used for system control and monitoring.

Electrode Line Configuration

In short sections of the transmission line, near the terminals, both shield wires will also serve as the overhead electrode line connecting the AC/DC converter station to the ground electrode facility. The proposed conductor for the overhead electrode line in the shield wire position is a high temperature, low sag conductor approximately 1.0 inches in diameter. The OPGW, described above, will be carried on the structures at a lower elevation between the shield wires and the conductors

4.1.6 Ground Rods

A grounding system, which is distinct from the ground electrode system, will be installed at the base of each transmission tower and will consist of copper ground rods embedded in the ground in immediate proximity to the tower foundation, and connected to the tower by a buried copper lead. After the ground rods have been installed, the grounding will be tested to determine the resistance to

ground. If the resistance to ground for a transmission tower is excessive, then counterpoise will be installed to lower the resistance. Counterpoise consists of a bare copper-clad or galvanized-steel cable buried a minimum of 12 inches deep, extending from one or more legs of a tower for approximately 100 feet within the ROW.

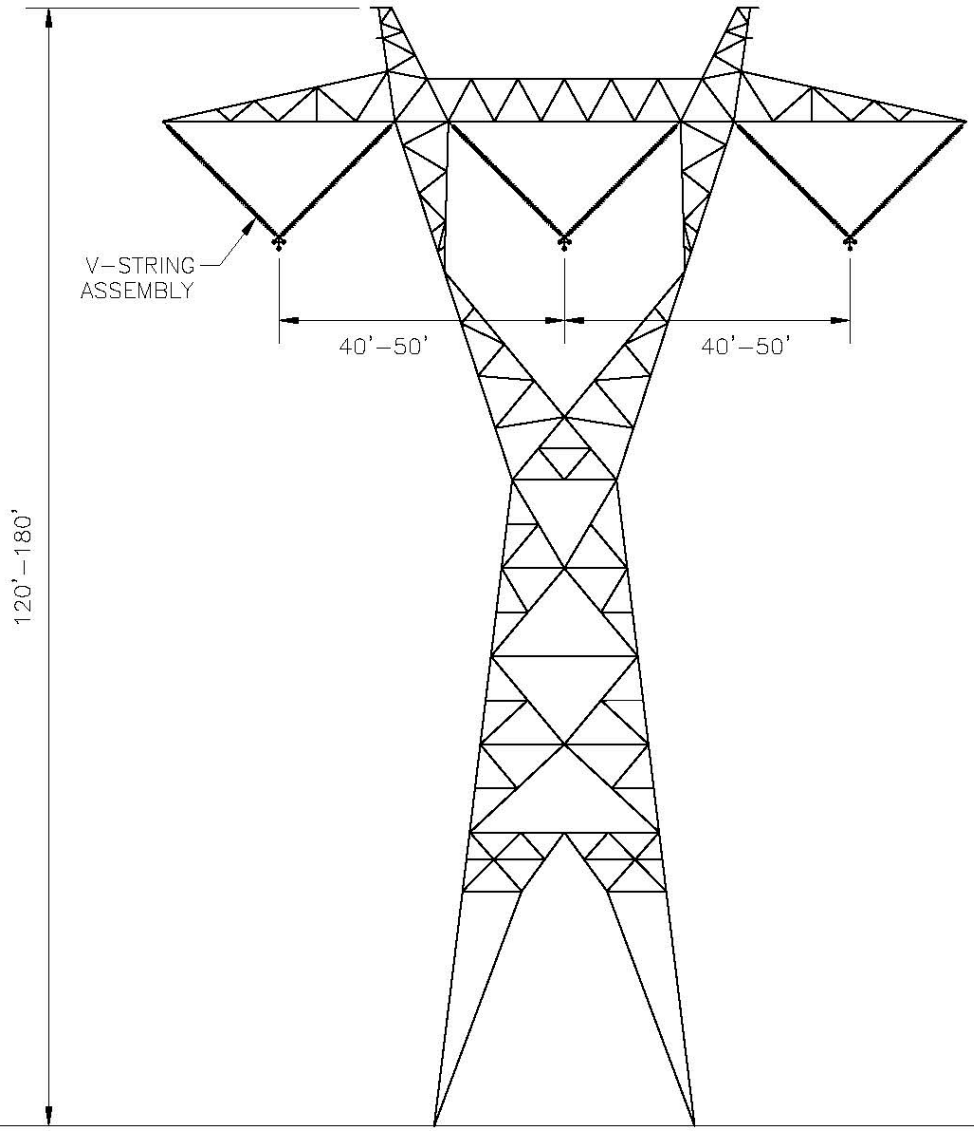
4.1.7 Minor Additional Hardware

In addition to the conductors, insulators, and overhead shield wires, other associated hardware will be installed on the structures as part of the insulator assembly to support the conductors and shield wires. This hardware will include clamps, shackles, links, plates, and various other pieces composed of galvanized steel and aluminum.

Other hardware not associated with the transmission of electricity may be installed as part of the Project. This hardware may include aerial marker spheres or aircraft warning lighting as required for the conductors or structures per FAA regulations (FAA 2000, 2007). Tower proximity to airports and tower height are the determinants of whether FAA regulations would apply based on an assessment of wire/tower strike risk. The Applicant does not anticipate that tower lighting will be required because proposed towers will be less than 200 feet tall and will be located to the greatest extent to avoid airport impacts. However, if special circumstances (e.g., a tall crossing) require structures taller than 200 feet, FAA regulations regarding lighting and marking will be followed.

4.1.8 Grid Interconnections

The TWE Project will need to connect to planned or existing 500 kV and 230 kV transmission grids in Wyoming and to existing 500 kV transmission grids in Nevada, near each terminal. Specific structure types are not known at this time and will be determined during final engineering and design. A typical self-supporting lattice structure, used for a single circuit 500 kV AC line connection, is shown on Figure 5. Typical single circuit and double circuit 230 kV AC single pole structures are shown on Figure 6. The components for the 500 kV and 230 kV structures including foundations, conductors, insulators, and associated hardware, overhead shield (ground) wires, and grounding rods, are similar to those described for the ±600 kV DC transmission line.



NOTES

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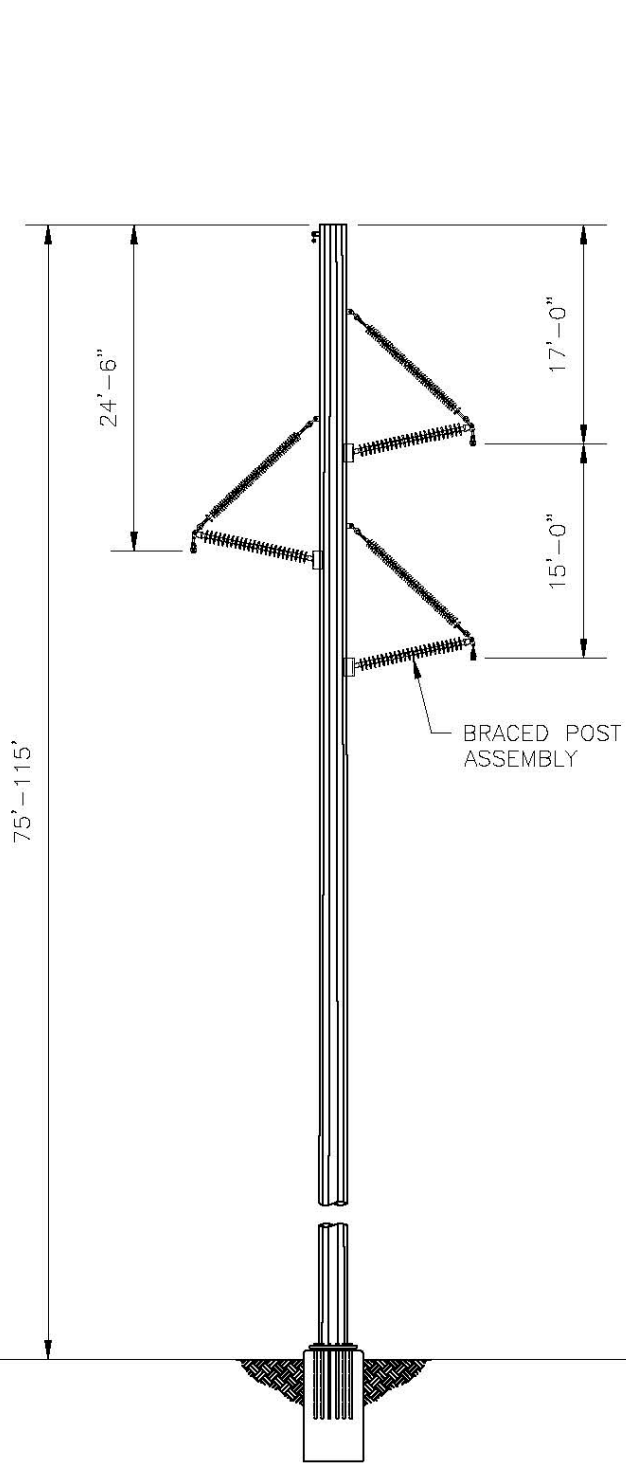
FIGURE 5

TYPICAL 500kV AC SINGLE CIRCUIT
SELF SUPPORTING
LATTICE STRUCTURE



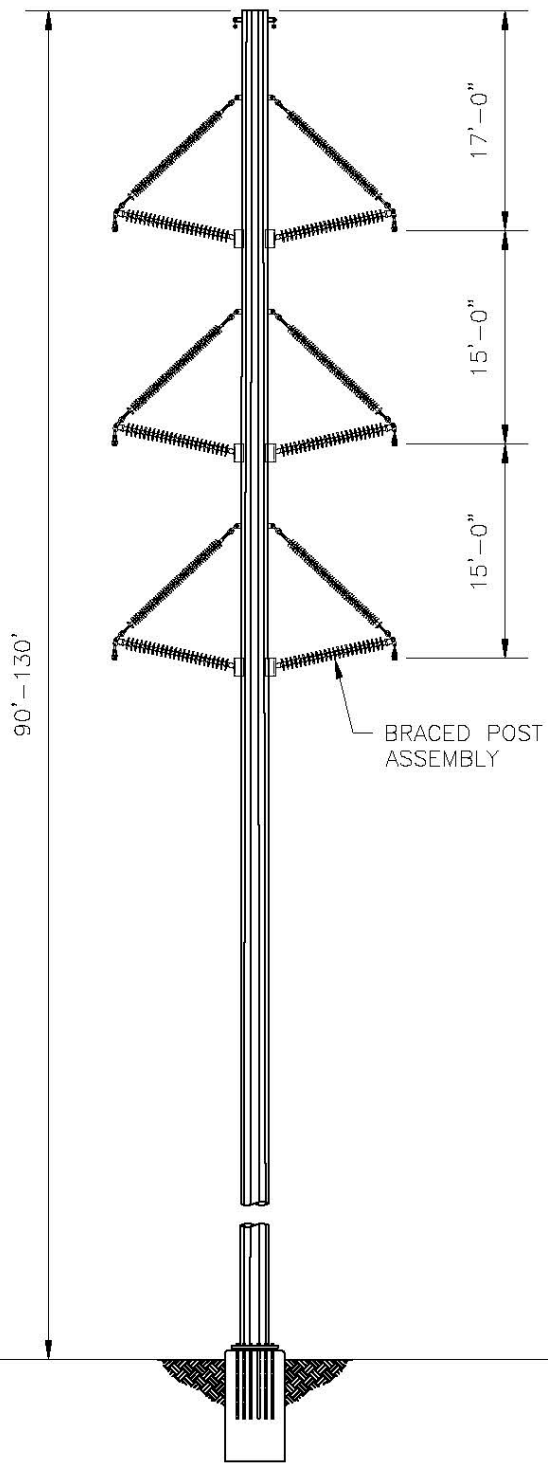


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FIGURE 6

TYPICAL 230kV AC SINGLE & DOUBLE CIRCUIT POLE STRUCTURE

4.2 Northern and Southern Terminals

The terminal stations will be designed to include the AC/DC converter station and an adjacent AC substation. The AC/DC converter station will include a ±600 kV DC switchyard, AC/DC conversion equipment, transformers, and multiple equipment, control, maintenance and administrative buildings. There will be two buildings to house the AC/DC conversion equipment, each approximately 200 feet long by 80 feet wide by 60 to 80 feet high. Additionally, there will be smaller buildings to house the control room, control and protection equipment, auxiliary equipment, and cooling equipment. The AC substations will be either a 500/230 kV substation (Northern Terminal) or a 500 kV substation (Southern Terminal). The AC substations will include a switchyard, transformers, control equipment, and control buildings. Figure 7 is a photograph of a representative AC/DC terminal (converter station and adjacent AC substation).

FIGURE 7 TYPICAL AC/DC CONVERTER STATION

Table 5 summarizes the general design characteristics of the terminals.

TABLE 5 DESIGN CHARACTERISTICS OF TERMINALS

DESCRIPTION OF TERMINALS	
Northern Terminal	Six 500 kV AC line positions, two 500/230 kV transformer banks, twelve 230 kV line positions, two AC filter bank line positions, two reactive support device positions, two DC line positions with transformers, converter building(s), and AC and DC filter yards. The reactive support equipment will require other structures and building development within the proposed complex. Maintenance and storage facilities will be developed as required and as appropriate for this remote location. Certain assigned shift operators, maintenance staff, and site security staff may be on-site at all times, although no permanent residence(s) will be established. On-site fire protection and emergency/security staff will support operations and maintenance staff at the facility in accordance with state, county, and federal requirements.
Southern Terminal	Six 500 kV AC line positions, two 500 kV AC filter line positions, two DC line positions with transformers, converter building(s), and AC and DC filter yards. Maintenance and storage facilities will be developed as required and as appropriate for this remote location. Certain assigned shift operators, maintenance staff, and site security staff may be on site at all times, although no permanent residence(s) will be established. On site fire protection and emergency/security staff will support operations and maintenance staff at the facility in accordance with state, county, and federal requirements.
Physical Properties of Interconnection Lines	
Line Length	Miles per interconnection line
Structure Type	Self supporting lattice for 500 kV line Single pole tubular steel for 230 kV line
Number of Structures per Mile	Approximately six (230 kV structure) and four (500 kV structure)
ROW Width	125 feet for 230 kV line 250 feet for 500 kV line
Land Temporarily Disturbed	
Storage and Concrete Batch Plant	7.5 acres
Structure Work Areas for Interconnection Lines	200 x 200 feet per 230 kV structure; approximately 6 per mile of line (Northern Terminal only) 250 x 200 feet per 500 kV structure; approximately 4 per mile of line
Wire-Pulling, Tensioning and Splicing Sites for Interconnection Lines	ROW width x 500 feet – mid-span conductor and shield wire sites every 9,000 feet and fiber optic set-up sites every 18,000 feet
Land Permanently Disturbed	
Converter Station and Substations	205 acres (N. Terminal), 140 acres (S. Terminal)
Structure Base 500 kV Interconnection Line	Self supporting lattice (tangent) – 1,225 sq. feet (35 x 35 feet tower base) Self supporting lattice (angle) – 1,600 sq. feet (40 x 40 feet tower base) Self supporting lattice (dead-end) – 2,025 sq. feet (45 x 45 feet tower base)
Structure Base 230 kV Interconnection Line	Single pole tubular (tangent) – 40 sq. feet Single pole tubular (angle) – 45 sq. feet Single pole tubular (dead-end) – 50 sq. feet
New Access Roads	See Section 5.2.1: Access Road Construction and Appendix Z Revised Access Road Methodology for FEIS Memorandum (February 2014)

4.2.1 Northern Terminal

The Northern Terminal will consist of an AC/DC converter station (a ±600 kV DC switchyard and a converter building containing power electronics and control equipment), a 500/230 kV AC substation,

and a 230 kV AC substation. The facilities will be located on private lands in Carbon County, Wyoming, approximately 2.5 miles southwest of the town of Sinclair, Wyoming. The Northern Terminal will connect to the existing Platte – Point of Rocks 230 kV line located within a mile of the terminal. The Northern Terminal will also connect to the planned Energy Gateway West and Gateway South 500 kV transmission lines being developed by PacifiCorp.

The Northern Terminal will require the following components:

- An AC/DC converter station approximately 30 acres in size.
- A 500/230 kV AC substation approximately 135 acres in size.
- A 230 kV AC substation approximately 40 acres in size.
- An electrical connection from the AC/DC converter station to the ±600 kV DC transmission line connecting to the Southern Terminal. All facilities for this connection are incorporated into the ±600 kV DC transmission line.
- Two electrical connections from the proposed single circuit Energy Gateway West 500 kV transmission line to the 500/230 kV substation. These connections will connect the Northern Terminal to both the Aeolus and Anticline substations via the Energy Gateway West 500 kV transmission line. These two connections may require 500 kV transmission facilities, assumed to be four miles total or less in length, to connect the 500/230 kV substation to the route of the Energy Gateway West 500 kV transmission line. Figure 5 shows a typical structure design for the 500 kV transmission line connections.
- Two electrical connections from the proposed single circuit Energy Gateway South 500 kV transmission line to the 500/230 kV Substation. These connections will connect the Northern AC/DC converter station to both the Aeolus and Mona Substations via the Energy Gateway South 500 kV transmission line. These two connections may require 500 kV transmission facilities, assumed to be four miles total or less in length, to connect the 500/230 kV substation to the route of the Energy Gateway West 500 kV transmission line. Figure 5 shows a typical structure design for the 500 kV transmission line connections.
- Two electrical interconnections to the existing Platte – Point of Rocks 230 kV line, which will be rerouted into and out of the 230 kV substation. This 230 kV connection is assumed to require four miles or less of double circuit 230 kV transmission line. Figure 6 shows a typical structure design for the 230 kV transmission line connections.
- Up to six electrical interconnections from proposed and planned generation facilities by 230 kV transmission lines. Figure 6 shows a typical structure design for the 230 kV transmission line connections.

Construction of the Northern Terminal is estimated to require approximately 520 acres. Approximately 250 acres of this area or less will be permanently dedicated for the AC/DC converter station and substations, terminal access road, transmission line structures, and interconnection line access roads. Approximately 205 acres will be fenced for the Northern Terminal. Approximately 275 acres are estimated to be temporarily disturbed for construction work areas, including land for storage and a concrete batch plant, transmission line structure work areas, and pulling, tensioning and splicing sites.

The general planned locations for the Northern Terminal and grid interconnections are shown on Map Exhibit 2. The location for the Northern Terminal site is proposed to be within the siting area shown. The final site location will be determined during final engineering and design. The criteria used in selecting the siting area and the final site location are:

- Land Ownership - use of private lands over public lands is preferable.
- Land Use - other current and planned land uses in the area, in particular other infrastructure that is being planned and permitted.
- Environmental Constraints - avoidance of sensitive resources, including sensitive wildlife habitats, cultural resource sites, wetlands, and major drainages.
- Topography - use of level dry land over more rugged terrain is preferable.
- Access to the TWE Project transmission line corridors coordinated with other existing and planned infrastructure and which minimize line crossings.
- Interconnections with existing, planned, and potential transmission lines such that line crossings are minimized, and conflicts with other existing and planned infrastructure are avoided.

Map Exhibit 2 illustrates a conceptual layout of the Northern Terminal and associated 230 kV and 500 kV connections to existing and planned facilities. The location of the Northern Terminal and the alignments of the 230 kV and 500 kV transmission line connections will be located within the proposed terminal siting area and will be determined during final design.[4]

Based on final ownership/operating agreements and interconnection contracts, it is possible that the 500/230 kV AC substation and/or the 230 kV AC substation could each be broken into two separate facilities. The total required acreage of the separate 500/230 kV AC substation(s) and the 230 kV AC substation(s) would not be greater than the 175 acres (135 plus 40) described above. The total fenced acreage for the Northern Terminal would be 205 acres in either one contiguous facility or 70 acres in one location and an additional 135 acres in a remote location. Land outside of this area would be used for access roads. Terminal access will require an estimated 10 acres of permanent disturbance. With the exception of the associated interconnection lines, no other permanent development outside of the fenced area for this facility is anticipated.

[4] The three major components of the Northern Terminal (AC/DC converter station, 500/230 kV AC substation, and 230 kV AC substation) are planned to be co-located and contiguous. Although each of these three components are stand-alone facilities and could be located on separate parcels connected together by short "transmission" lines, it is common practice and preferable for the AC/DC converter station and 500/230 kV AC substation(s) to be located adjacent to each other. Although it is also preferable to locate the 230 kV AC substation next to the 500 kV AC substation, depending on the availability of space and other constraints in this area, these stand-alone facilities could be separated by a distance of up to two miles.

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- TWE Project Transmission Centerline Corridor
- Terminal Siting Area
- Conceptual Terminal Site

Land Jurisdiction

- BLM
- Private
- State of Wyoming

Transportation

- Interstate Highway
- Railroad

Existing Transmission

- 230 kV Line

Administrative Boundaries

- Section Line

Note: Terminal site consists of an AC/DC Converter Station, 500 kV AC Substation & a 230 kV AC Substation

Platte-Point of Rocks 230 kV

230 kV Connections

500 kV Connections

600 kV TWE Project Line

500 kV Connections

230 kV Connections

0 0.1 0.2 0.3 0.4 0.5
Miles

Map Exhibit 2
Northern Terminal & Grid Interconnections
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4.2.2 Southern Terminal

The Southern Terminal will consist of an AC/DC converter station (a ±600 kV DC switchyard and a converter building containing power electronics and control equipment) and a 500 kV AC substation. The facilities will be located in the Eldorado Valley on private land, approximately 15 miles south of Boulder City, in Clark County, Nevada. The Southern Terminal will connect to all four of the existing 500 kV substations located at the Marketplace Hub. These four substations are the Mead, Eldorado, Marketplace, and McCullough substations.

The Southern Terminal will require the following components:

- An AC/DC converter station approximately 30 acres in size.
- A 500 kV AC substation approximately 110 acres in size.
- An electrical connection from the AC/DC converter station to the ±600 kV DC transmission line connecting to the Southern Terminal. All facilities for this connection are incorporated into the ±600 kV DC transmission line.
- Two electrical connections from the existing Mead – Marketplace 500 kV transmission line to the new 500 kV AC substation. These connections will connect the Southern Terminal to both the Mead and Marketplace substations via the existing Mead – Marketplace 500 kV transmission line. These two connections may require 500 kV transmission facilities, assumed to be five miles total or less in length, to connect the new 500 kV AC substation to the existing Mead – Marketplace 500 kV transmission line. Figure 5 shows a typical structure design for the 500 kV transmission line connections.
- Construction of a 500 kV transmission line from the new 500 kV AC substation to the Eldorado Substation. This single circuit 500 kV transmission line is estimated to be five miles in length or less. Figure 5 shows a typical structure design for the 500 kV transmission line connections.
- Construction of a 500 kV transmission line from the new 500 kV AC substation to the McCullough Substation. This single circuit 500 kV transmission line is estimated to be five miles in length or less. Figure 5 shows a typical structure design for the 500 kV transmission line connections.
- Although not anticipated at this time, one or more of the existing 138/230 kV lines within the Proposed Terminal Siting Area may need to be re-routed/re-configured to accommodate the Southern Terminal due to congestion within the area. If necessary, this reroute or reconfiguration of 138/230 kV transmission line facilities is not anticipated to impact more than a total of five miles of line. Figure 6 shows a typical structure design for the 230 kV transmission line connections.

Construction of the Southern Terminal on private land is estimated to require approximately 555 acres. Approximately 230 to 260 acres of this area will be permanently dedicated for the AC/DC converter station and switchyards, terminal access road, transmission line structures, and interconnection line access roads. Approximately 140 acres will be fenced for the Southern Terminal. Approximately 335 acres of the Southern Terminal site is estimated to be temporarily disturbed for construction work areas, including land for storage and a concrete batch plant, transmission line structure work areas, and pulling, tensioning and splicing sites.

The general planned location for the Southern Terminal and grid interconnections are shown on Map Exhibit 3, which illustrates a conceptual layout of the Southern Terminal and associated 500 kV connections to existing substations. The location of the Southern Terminal and the alignments of the 500 kV transmission line connections will be located within the terminal siting area and will be determined during engineering and design.[5]

Terminal access on the Southern Terminal site will require an estimated 15 acres of permanent disturbance. With the exception of the associated interconnection lines, no other permanent development outside of the fenced area for this facility is anticipated.

4.3 Ground Electrode Facilities

Two ground electrode facilities are proposed, one connecting to the Northern Terminal and one connecting to the Southern Terminal. Table 6 provides the design characteristics of the ground electrode facilities. The proposed site for the northern ground electrode facility is termed 'Bolten Ranch' and shown on Map Exhibit 4. The proposed site for the southern ground electrode facility is termed 'Mormon Mesa-Carp Elgin Road' and shown on Map Exhibit 5.[6]

The proposed ground electrode sites were selected based on feasibility studies that considered surface and deep earth geology, proximity to the alternative routes, proximity to underground infrastructure (oil, gas and water wells, pipelines, etc.), environmental constraints, and topography. Major factors in selecting the alternative sites were:

1. Geology and ground resistivity of the area. The primary need is for deep sedimentary basins with large volumes of sediment having a low resistivity. Locations with potentially high resistance geologic formations that could potentially interfere with the current path are generally avoided.

2. Distance from grounded metallic infrastructure that might be negatively impacted by DC ground currents. In general, this consideration results in the electrode site being a few miles or more from power plants, electrical substations, underground pipelines, and active oil or gas wells. The ground electrodes cannot be located within two miles of major pipelines due to the risk of having a corrosive impact on nearby metallic structures. Ground electrodes located within 2 to 10 miles of major pipelines may require additional or modified corrosion protection systems.

3. Environmental constraints such as special federal and state management areas, sensitive resources (e.g., wetlands), and special status species (e.g., sage-grouse). Secondary consideration was given to topography as it would be impractical to drill the ground wells in mountainous topography.

More detailed information will be required during final engineering and design to make a final determination of the location of the proposed ground electrode sites including: a) availability of public lands or private lands; b) detailed measurements of ground resistivity; c) chemical and thermal

[5] The two major components of the Southern Terminal (AC/DC converter station and the 500 kV AC substation) are planned to be co-located and contiguous. Although these two components are stand-alone facilities and could be located on separate parcels connected together by short "transmission" lines, it is common practice and preferable for the AC/DC converter station and 500 kV AC substation to be located adjacent to each other.

[6] Map Exhibits 4 and 5 show both the proposed ground electrode sites and siting areas.

characteristics of the soil at the site; and d) a detailed analysis of grounded metallic infrastructures in the area.

TABLE 6 GROUND ELECTRODE FACILITIES DESIGN CHARACTERISTICS

FEATURE	DESCRIPTION
Physical Properties of Overhead Electrode Lines	
Line Length	Miles per electrode line
Structure Type	Wood / wood pole equivalent for low voltage electrode line (similar to 34.5 kV line)
Number of Structures per Mile	18
ROW Width	50 feet
Land Temporarily Disturbed	
Ground Electrode Site	65 acres
Material Storage Yards	10 acres per electrode site
Structure Work Areas for 34.5 kV Line	ROW (50 ft) x 100 feet
Wire-Pulling, Tensioning and Splicing Sites for Interconnection Lines	75 x 150 feet – two at every dead-end 75 x 100 feet – mid-span conductor site every 9,000 feet
Land Permanently Disturbed	
Ground Electrode Site	0.5 acres
Well Access	5 acres
Structure Base Electrode Line (similar to 34.5 kV line)	Wood / wood pole equivalent (tangent) – 16 sq. feet Wood / wood pole equivalent (angle) – 25 sq. feet plus 25 sq. feet per anchor (2 per structure location) Wood / wood pole equivalent (dead-end) – 36 sq. feet plus 25 sq. feet per anchor (4 per structure location)
New Access Roads	See Section 5.2.1: Access Road Construction and Appendix Z Revised Access Road Methodology for FEIS Memorandum (February 2014)

Once construction is completed, approximately 0.5 of an acre, or less, near the center of the electrode containing the control house will be fenced. Agricultural land uses outside the fenced area such as grazing and cultivated crops would be permissible.

These two ground electrode facilities will be built, each within approximately 100 miles or less of the Northern and Southern Terminals, to establish and maintain electrical current continuity during normal operations and immediately following an unexpected outage of one of the two poles (or circuits) of the ±600 kV DC terminal or converter station equipment.
Each ground electrode facility will consist of a network of approximately 60 deep-earth electrode wells arranged along the perimeter of a circle expected to be about 3,000 feet in diameter. All wells at a site will be electrically interconnected and wired to a small control building via low voltage underground cables. A typical site plan for a ground electrode system is shown in Figure 8 and a photograph of a typical above ground facility is provided in Figure 9.

A low voltage electrode line will be required to connect the ground electrode facilities to the AC/DC converter stations (at the Northern and Southern Terminals). To the extent practical, the overhead electrode line will be co-located on the ±600 kV DC structures in the overhead shield wire position. The overhead electrode line (connecting the terminal to the ground electrode facility) will occupy both shield wire positions from the Southern Terminal to the location where the electrode lines leaves

the ±600 kV DC transmission line. Figure 10 shows a typical structure with the electrode line in the shield wire position with the fiber optic line (OPGW) located between the shield wires and the DC conductors. Where the electrode line diverges from the ±600 kV DC transmission line, it will be located on single pole structures, similar to those used for a modified 34.5 kV subtransmission line, built within a separate 50-foot-wide ROW. The electrode line will consist of two, high temperature, high capacity conductors. Figure 11 shows a typical single pole structure design that would be used for the overhead electrode line.

During a DC transmission disturbance where one pole (or "circuit") becomes inoperable, the ground electrodes will carry a short-term large current that was previously flowing in the inoperable pole. The electrodes will be sized and designed to disperse this current into the ground at levels which are safe for people and animals in the vicinity. Such contingency conditions that result in high ground electrode currents are most often the result of an unexpected outage on the transmission line or equipment in the AC/DC converter station. The high current operation of the ground electrode facilities and the use of the earth as a return path is limited to unexpected emergency conditions and typically only operated for 10 minutes to less than an hour following the loss of a pole. For planning and preliminary engineering purposes, 12 to 16 unexpected disturbances resulting in the loss of a pole are anticipated on a yearly basis. Although the ground electrode facilities will be designed to operate at high current levels for up to 200 hours per year, typical yearly use at high currents is expected to be less than 30 hours per year.

The use of these ground electrode facilities allows system operators to maintain a portion of the TWE Project's power transmission capacity to support power network reliability. This feature will allow critical time for network operators to determine the extent of the electrical disturbance and reconfigure the transmission and generation systems into a more stable configuration that minimizes disruption of customer loads.

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- TWE Project Transmission Centerline Corridor
- Terminal Siting Area
- Conceptual Terminal Site

Land Jurisdiction

- BLM
- Private

Transportation

- Interstate Highway
- U.S. Highway

Existing Transmission

- 500 kV Line
- 500 kV DC Line
- 345 kV Line
- 287 kV Line
- 230 kV Line
- Substation

Administrative Boundaries

- Section Line

Note: Terminal site consists of an AC/DC Converter Station & a 500 kV AC Substation

600 kV TWE Project Line

500 kV Connections

Marketplace

McCullough

Eldorado

Nevada Solar One

Merchant

95

0 0.25 0.5 0.75 1 1.25

Miles

Map Exhibit 3

Southern Terminal & Grid Interconnections

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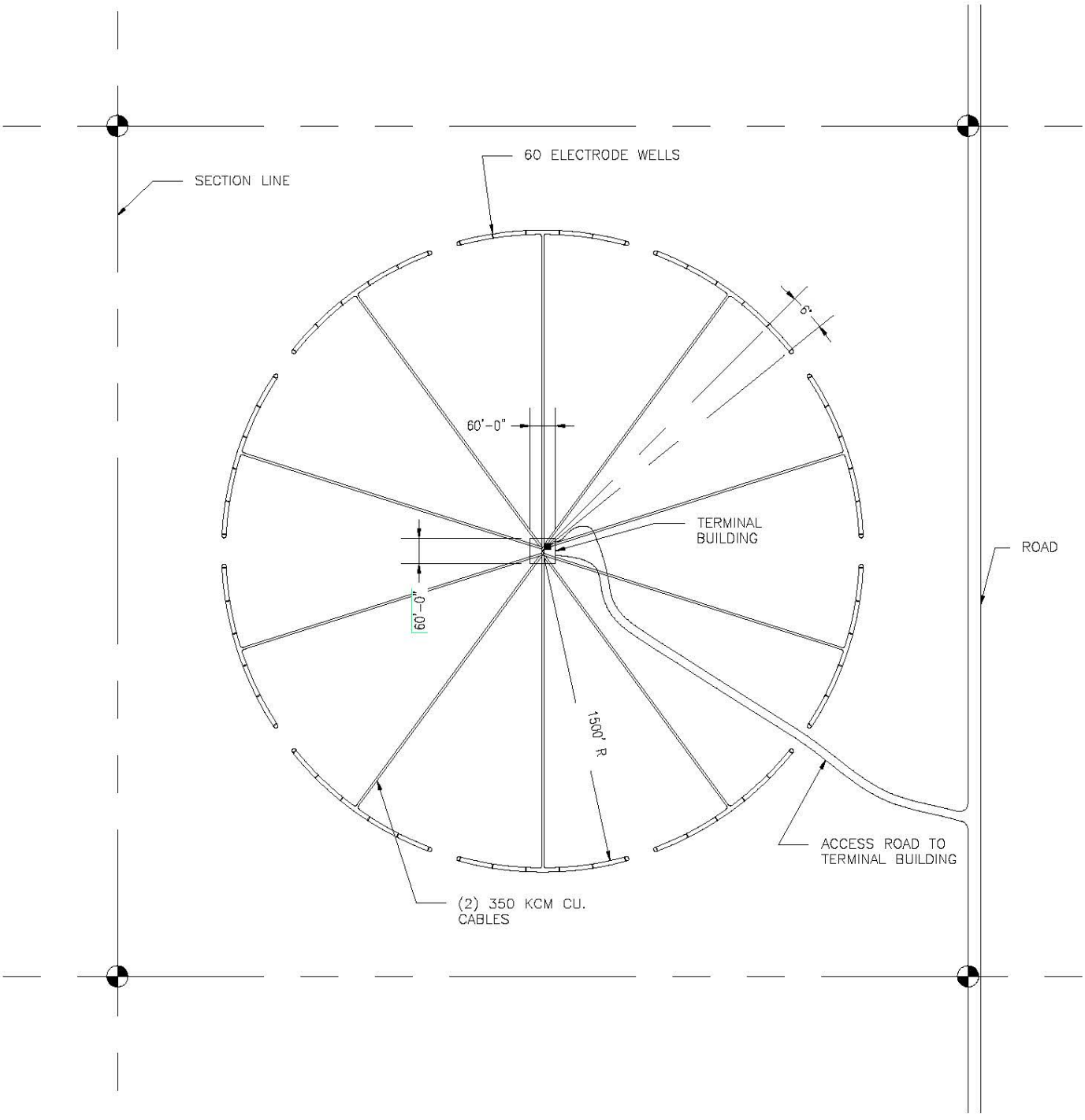

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FIGURE 8

TYPICAL SITE PLAN FOR GROUND ELECTRODE SYSTEM

FIGURE 9 TYPICAL ABOVE GROUND CONSTRUCTION AT THE GROUND ELECTRODE FACILITY

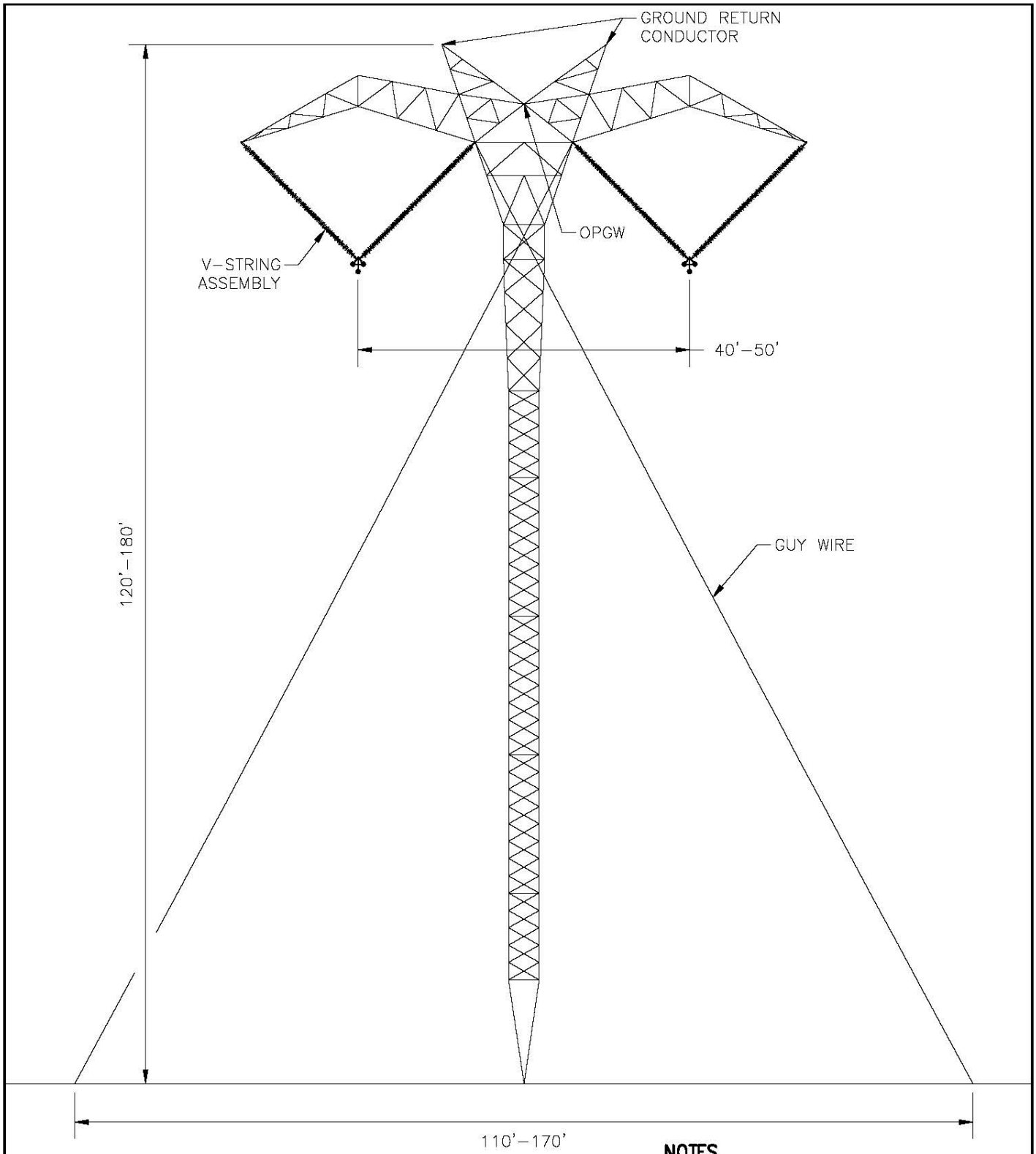

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FIGURE 10

CO-LOCATED GROUND ELECTRODE LINE ON GUYED LATTICE STRUCTURE

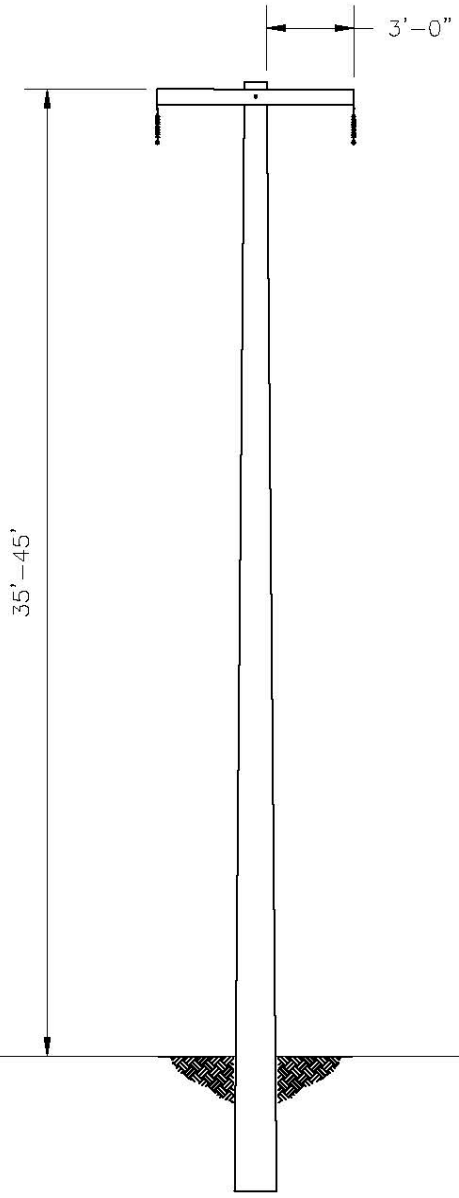

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FIGURE 11

TYPICAL POLE STRUCTURE FOR OVERHEAD ELECTRODE LINE

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline

Electrode Sites & Siting Areas

- Proposed Site
- Electrode Line

Proposed Northern Terminal

- Siting Area

Water Features

- Lake or Reservoir

Administrative Boundaries

- State
- County
- Municipal

Transportation

- Interstate Highway
- U.S. Highway
- Railroad

Existing Transmission

- 500 kV Line
- 345 kV Line
- 230 kV Line
- Substation

Land Jurisdiction

- BLM
- Private
- State
- BOR
- USFS
- USFWS

287

80

Rawlins

Platte

Northern Terminal Area

Bolten Ranch (Proposed Site)

N

0 0.9 1.8 2.7 3.6 4.5

Miles

Map Exhibit 4

Northern Terminal and Ground Electrode Facility - Proposed Site and Siting Area

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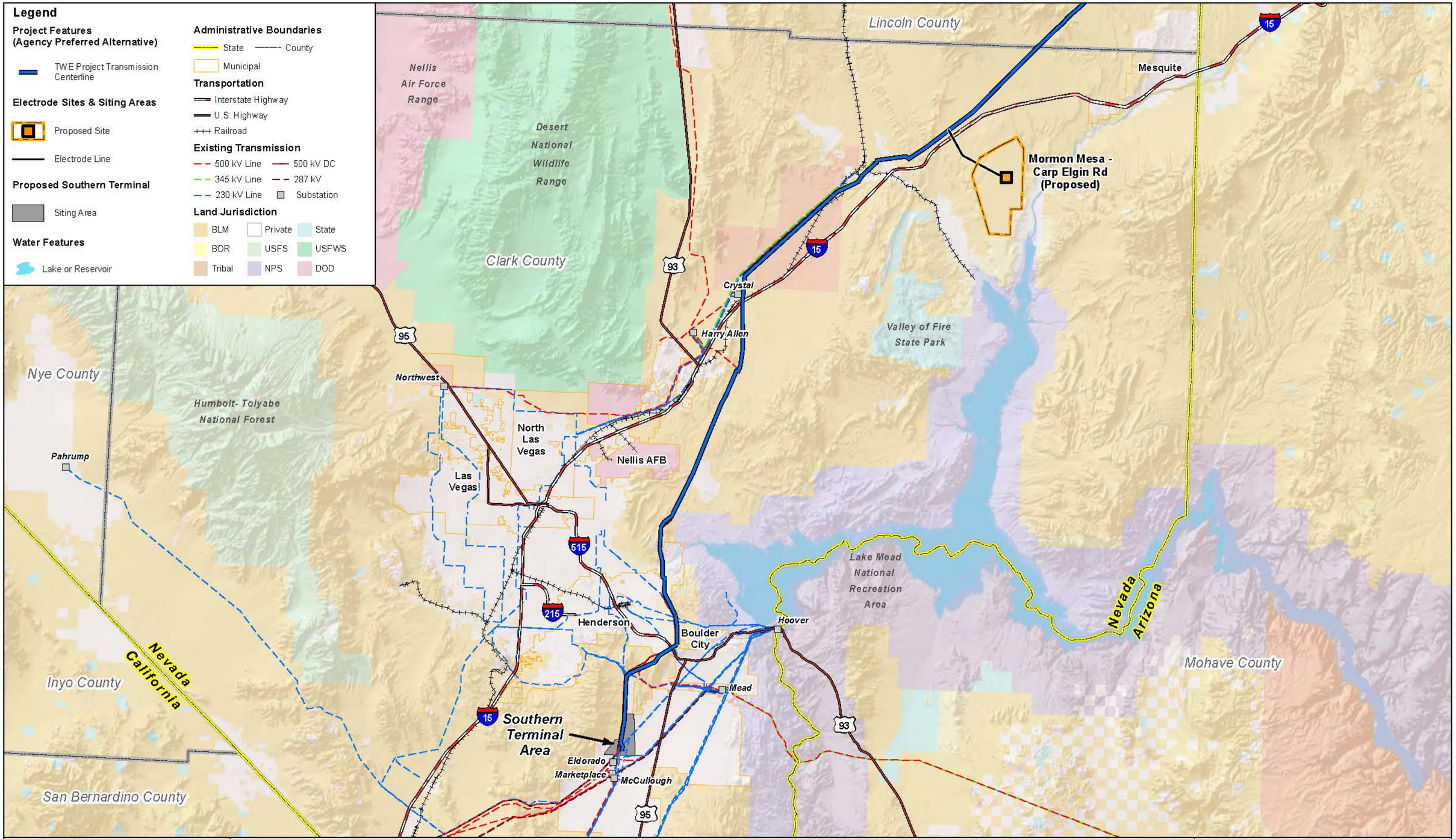

Map Exhibit 5
Southern Terminal and Ground Electrode Facility- Proposed Site and Siting Area
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4.4 Communications Systems

The TWE Project will require a number of critical telecommunications support subsystems. These systems will be configured and designed to support the overall availability and reliability requirements for the operation of the HVDC terminal facilities and supporting substations. To provide secure and reliable communications for the control system real-time requirements, protection and day-to-day operations and maintenance needs, a mix of telecommunications systems will be used. The primary communications for protection and control will be provided via the one OPGW installed in the shield wire position on the transmission line. For redundancy purposes, a secondary communications path will be provided via existing or expanded/upgraded microwave systems or existing alternate buried fiber paths in the TWE Project region.

In addition to protection and control, the communications system will be used for Supervisory Control and Data Acquisition (SCADA). The SCADA system is a computer system for gathering and analyzing real time data which is used to monitor and control the substation (e.g., transformers and transmission lines), and auxiliary (e.g., pumps and cooling systems) equipment. A SCADA system gathers information, such as the status of a transmission line, transfers the information back to a central site, alerting the central site that the line has opened, carrying out necessary analysis and control, such as determining if outage of the line is critical, and displaying the information in a logical and organized fashion.

The primary communications will be an all-digital fiber system with repeater/regeneration facilities utilizing the OPGW located on the transmission line structures. The optical data signal degrades with distance as it travels through the optical fiber cable. Consequently, signal regeneration sites are required to amplify the signals if the distance between stations or regeneration sites exceeds approximately 50 miles. In total, approximately 15 to 20 regeneration sites will be required for the proposed TWE Project. In most cases, the regeneration communication sites will be located within the transmission line ROW and will typically be 100 feet by 100 feet or less in size. Figure 12 shows a typical communications regeneration site.

The secondary communications path for the TWE Project will be provided either by a private Project microwave system or purchasing/leasing capacity on existing utility dedicated communication networks within the TWE Project region.

If required, a private microwave system will be structured to utilize existing developed communications sites, access roads and utility held sites to the maximum extent possible. A small number of new microwave sites may be required for the TWE Project. As a microwave system requires line-of-site communications, the number and location of microwave sites, if needed, will be determined during final design and engineering. A typical microwave communication site is less than 100 feet by 100 feet, and consists of a fenced enclosure that contains a small building for the communications equipment and a tower for mounting the microwave antenna(s). The microwave tower may be 50 feet to 150 feet high to meet the line-of-site communications requirement. In addition, multiple antennas may be mounted on the microwave tower depending upon the communications needs. In some cases, such as very remote locations with limited access to a reliable power supply, a small back-up generator may be required.

To facilitate mobile communications along the transmission line route for transmission line patrol, inspection, routine maintenance and emergency operations, a mobile ultra-high frequency (UHF)/very high frequency (VHF) radio communications system will be implemented. For planning purposes, UHF/VHF radio equipment, towers, antennae and repeaters are assumed to be installed at each regeneration station.

FIGURE 12 COMMUNICATION REGENERATION SITE

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5.0 CONSTRUCTION

This section describes the construction practices that will be used for the TWE Project, including the ±600 kV DC transmission line; terminals; ground electrode facilities; and communication systems. Construction activities are described in the following sections:

- Section 5.1 – Pre-construction activities to be completed prior to construction commencing.
- Section 5.2 – Construction activities for the ±600 kV DC transmission line and associated access roads.
- Section 5.3 – Construction activities for the northern and southern terminals.
- Section 5.4 – Construction activities for the ground electrodes.
- Section 5.5 – Construction activities for the communications system.
- Section 5.6 – Post-construction clean up and restoration.
- Section 5.7 – Special construction methods to be used in specific sensitive locations, including blasting and helicopter construction techniques; roadless construction methods in IRAs; construction techniques applicable to sensitive water resource areas; and water use during construction.
- Section 5.8 – TWE Project construction schedules, manpower, and equipment requirements.

Construction of the TWE Project will require surface access to all structures and work areas during construction and operation of the Project to allow construction vehicles and equipment to access the location of each transmission structure or Project facility. In most cases, existing public roads (identified as the backbone access network) would be used to transport construction labor, equipment and materials to the approved work areas.

Based upon the Applicant's proposed structure types (guyed lattice tangents and self-supporting angle and dead-end structures), the number of construction vehicles needed for the Project is not expected to substantially increase traffic volumes; however, the delivery of large pieces of equipment or material as part of the construction process may slow or interrupt traffic on state or county roads on a short-term basis. The duration of these types of traffic disruption are typically very short, a few minutes or less while the delivery truck passes down a roadway or turns a corner. The limited number of large pieces of equipment or material that are delivered to any one portion of the Project tends to make traffic disruptions infrequent and generally unnoticed by the motoring public. Additionally, short-term traffic diversions and brief road closures (if needed) may be required to complete wire stringing activities. All traffic impacts resulting from any construction activities including short-term traffic diversions, traffic congestion, traffic warning systems and brief road closures (if needed) will comply with the Traffic and Transportation Management Plan (Appendix U).

5.1 Pre-Construction Activities

Prior to construction, the Applicant will obtain all applicable federal, state, and local permits; acquire easements and ROW grants for the TWE Project facilities; conduct geotechnical surveys and testing; and conduct pre-construction engineering and environmental surveys.

5.1.1 Permitting

The Applicant will acquire all federal, state, and local permits, licenses and agreements. A list of potential applicable permit requirements has been provided through the NEPA process and incorporated into this POD (see Section 1). The TWE Project will necessitate crossings of existing electrical transmission lines, U.S. and State Highways, and railroads. The proposed line crossings will be coordinated with the appropriate entity and TransWest will obtain all required licenses, permits, or agreements.

5.1.2 ROW and Property Rights Acquisition

The acquisition of ROW or properties necessary to construct, operate, and maintain the TWE Project will be completed by Western or the Applicant conditioned on Western's continued involvement in the TWE Project. New ROW will be acquired for the transmission line(s) through a combination of ROW grants and easements with various federal, state, and local governments; other companies (e.g., utilities and railroads); and private landowners.

Property owners affected by the TWE Project would initially be contacted by a realty agent who would explain the steps involved in site selection, property rights acquisition, and construction. A realty agent would request permission (for workers or Contractors) to enter the property to conduct engineering and environmental surveys and studies. Landowners will be contacted early in the process to obtain right-of-entry for surveys. Each landowner along the final centerline route will be contacted to explain the Project and to secure right-of-entry and access to the ROW.

Studies will be conducted to select structure sites, based on engineering design criteria, terrain, geologic investigations, and property owner input regarding land use and how to minimize potential impacts to properties. Geotechnical drilling will be required at some sites. Property owners will be compensated for damages to crops, fences, and other property caused by surveys and studies.

Property rights, in the form of perpetual easements or ROW, will be needed to construct, operate, and maintain the transmission line. Land for the terminals, substations, series compensation (as may be required for Design Options 2 and 3; see Section 7.0), and communication regeneration stations will be obtained in fee simple where located on private land. Easements and fee simple properties will be purchased through negotiations with landowners based on independent appraisals. Independent appraisals are used to determine the fair market value of the easement or property. Every effort will be made to acquire easements and properties through landowner negotiations to obtain an agreement, which is fair and reasonable to both parties. For transmission line easements, the landowner will retain title to the land and may continue to use the property in ways that are compatible with the transmission line.

To the extent that Western acquires land for the TWE Project, Western will do so in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

Federal and state laws enable public agencies, and in some cases private parties, to acquire property rights for facilities to be built in the public interest. If a negotiated agreement cannot be reached, easements can be acquired through eminent domain (condemnation) proceedings. Through the eminent domain process, a court determines the compensation to be paid to the property owner(s).

5.1.3 Geotechnical Surveys and Testing

Prior to construction of the TWE Project, ground-based land surveys will be required at soil boring locations required for geotechnical investigations. These ground-based land surveys will include

staking of the boring location and layout and staking (as needed) of access roads to the boring locations.

A desktop study will initially be conducted to identify geologic hazards. Specifically, the desktop study will research available published data related to soils, expansive soils, mapped bedrock, surficial geology, corrosivity, faulting and folding, seismicity and earthquakes, surface and groundwater, flood areas and hazards, landslides, rock fall hazards, subsidence, liquefiable soils and wells. The desktop study will be used for preliminary engineering designs.

Field geological and geotechnical studies will reference the desktop study to prepare the appropriate exploration programs given the planned structure locations, foundation loading, access, and geologic setting. The proposed studies will be performed to evaluate potential geologic and geotechnical hazards and to determine specific requirements (soil/rock types, depth to rock, depth to groundwater, soil strength properties, etc.) for foundation design and construction. These studies will be used for final engineering designs necessary for construction.

Geological evaluation will occur at generally the same time as geotechnical investigations, and will be a part of the final Geotechnical Plan. The framework Geotechnical Plan is provided in Appendix J. For this activity, an engineering geologist will evaluate fault lines, landslide prone areas, steep slopes, and unstable soils to identify potential hazards, primarily at structure sites. Geologic review and evaluation will also be performed in the immediate vicinity of structure sites, and for access roads crossing steep slopes and unstable soils. The primary purpose of the geologic evaluation is to identify potential hazards with sufficient lead time to evaluate options for avoiding or mitigating potential hazards. The Project geotechnical engineer and geologist will prepare a report including recommendations for any necessary relocation of structure sites or access roads in potentially hazardous areas. In the event that a structure site cannot be relocated, the Geotechnical Plan will also specify construction methods designed to stabilize the site as well as any adjacent areas that might pose a hazard to the main site. Final recommendations will be incorporated into the NTP POD, including construction details for grading, drainage, and specialized slope treatments. The Construction Contractor will implement the plan. All geologic/geotechnical field studies required will be coordinated with the appropriate land management agencies or private landowner and the appropriate permits will be obtained by the Applicant.

To determine foundation design requirements, geotechnical investigations will be performed in the field to evaluate site conditions and determine the soil/rock type, strength and design properties. This study will entail a geotechnical drilling program at select structure locations along the selected Alternative. At sampling sites, borings will be performed from which soil and/or bedrock material samples will be taken for laboratory testing and analysis. Soil borings are typically six to eight inches in diameter and as much as 70 feet deep and they will be advanced with continuous flight hollow-stem auger, mud rotary, or ODEX drilling techniques. Where bedrock is encountered, standard rock coring techniques will be used. Soil borings are commonly taken at structure site locations at intervals of approximately one mile and at PIs (Points of Intersection/Inflection).

Soil borings will be performed with rubber tired, track or low impact drill rigs using approved access routes and methods in accordance with the appropriate land management agency or private landowner requirements with applicable mitigation measures applied. Equipment typically used for geotechnical evaluations includes a drill rig, water truck, and 4-wheel drive support vehicles. The average estimated drilling time at each site is approximately one-half day. Work areas are typically 40 feet by 40 feet in size (1,600 square feet/0.037 acre) with the disturbed area contained approximately within a 5 feet diameter circle.
Small surface disturbances may occur at the structure site drill locations caused by parking, use of equipment, and associated field crew activities in the work area. Water may be used during the

drilling process and a very small amount of water may exit the drill holes. Following the completion of drilling and before leaving each site, the soil boring will be backfilled with the cuttings removed from it during drilling per the appropriate federal agency requirements. Excess spoils not backfilled into the bore hole will be removed from the site and disposed of in accordance with the appropriate land management agency or private landowner requirements with applicable mitigation measures applied. No open holes will be left unattended, and all holes will be fully backfilled before moving to the next boring.

Ground disturbance from geotechnical investigations would occur within the structure work areas and would not cause additional disturbance. Access roads used for geotechnical investigations would be the same as those used to access structures for construction. Although none is anticipated, any additional ground disturbance from geotechnical investigations on federal lands prior to the issuance of the TWE Project ROW grants may require additional authorizations. The Applicant will apply for and obtain all necessary federal, state, and local authorizations.

5.1.4 Pre-Construction Surveys

Pre-construction engineering surveys will be conducted to identify the transmission line ROW centerline and width, structure sites, vegetation clearance boundaries, property boundaries, ground profiles, access routes, temporary work areas, and stream crossings. Access for engineering surveys will be with 4-wheel drive and all terrain vehicle (ATV) type vehicles using existing roads. All off-road access will be by low-impact rubber-tired ATV or on foot depending upon terrain and vegetation and in accordance with the appropriate land management agency or private landowner requirements with applicable mitigation measures applied.

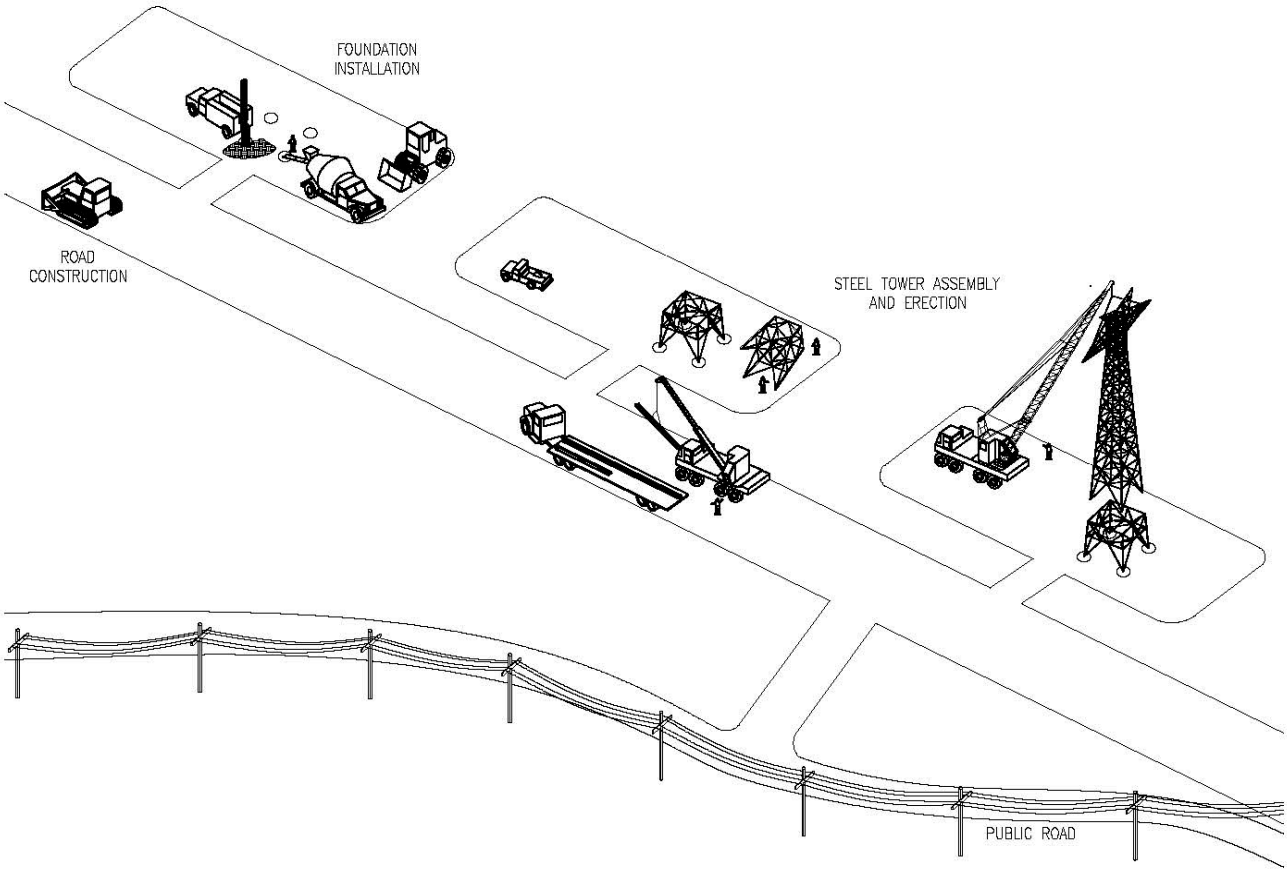
Pre-construction environmental surveys will be conducted, as required by permitting agencies, for the identification, flagging, and avoidance of sensitive resources. The timing of pre-construction surveys will vary depending upon the resource being surveyed. Requirements for environmental pre-construction surveys will be documented in the regulatory agencies' decision documents and stipulations. Documents currently under development which may identify additional biological and cultural pre-construction surveys include the Biological Assessment/Biological Opinion (BA/BO) and the PA, respectively. Pre-construction environmental surveys may include, but are not limited to: (1) migratory bird and raptor nest surveys; (2) special status wildlife and botanical species, including those protected by USFWS, BLM, USFS, and respective state resource management agencies; (3) noxious weed identification; (4) cultural resource surveys; (5) paleontological resource survey, and (6) wetlands delineations in accordance with requirements of the Clean Water Act (CWA) Section 404 permit.

The following appendices in this POD provide details of required pre-construction surveys:

- Avian Protection Plan (Appendix B);
- Cultural Resources Protection and Management Measures Plan (Appendix D);
- Noxious Weed Management Plan (Appendix N);
- Paleontological Resources Management and Mitigation Plan (Appendix P);
- Water Resources Protection Plan (Appendix W); and
- Wildlife and Plant Conservation Measures Plan (Appendix X).

5.2 Transmission Line Construction

The following sections detail the transmission line construction activities associated with the proposed ±600 kV DC transmission line and access roads. The general sequence of transmission line construction includes: construction of access roads; clearing of ROW and temporary work areas; installation of foundations; assembly and erection of structures; installing ground rods/counterpoise; installing shield wires and conductors; and site cleanup and reclamation. Typical transmission line construction activities and sequencing are depicted in Figures 13 and 14. Various construction activities will occur during the construction process, with several construction crews operating simultaneously at different locations. Section 5.8.3 summarizes the types and quantities of equipment to be used for the transmission line construction.



TYPICAL TRANSMISSION LINE CONSTRUCTION ACTIVITIES

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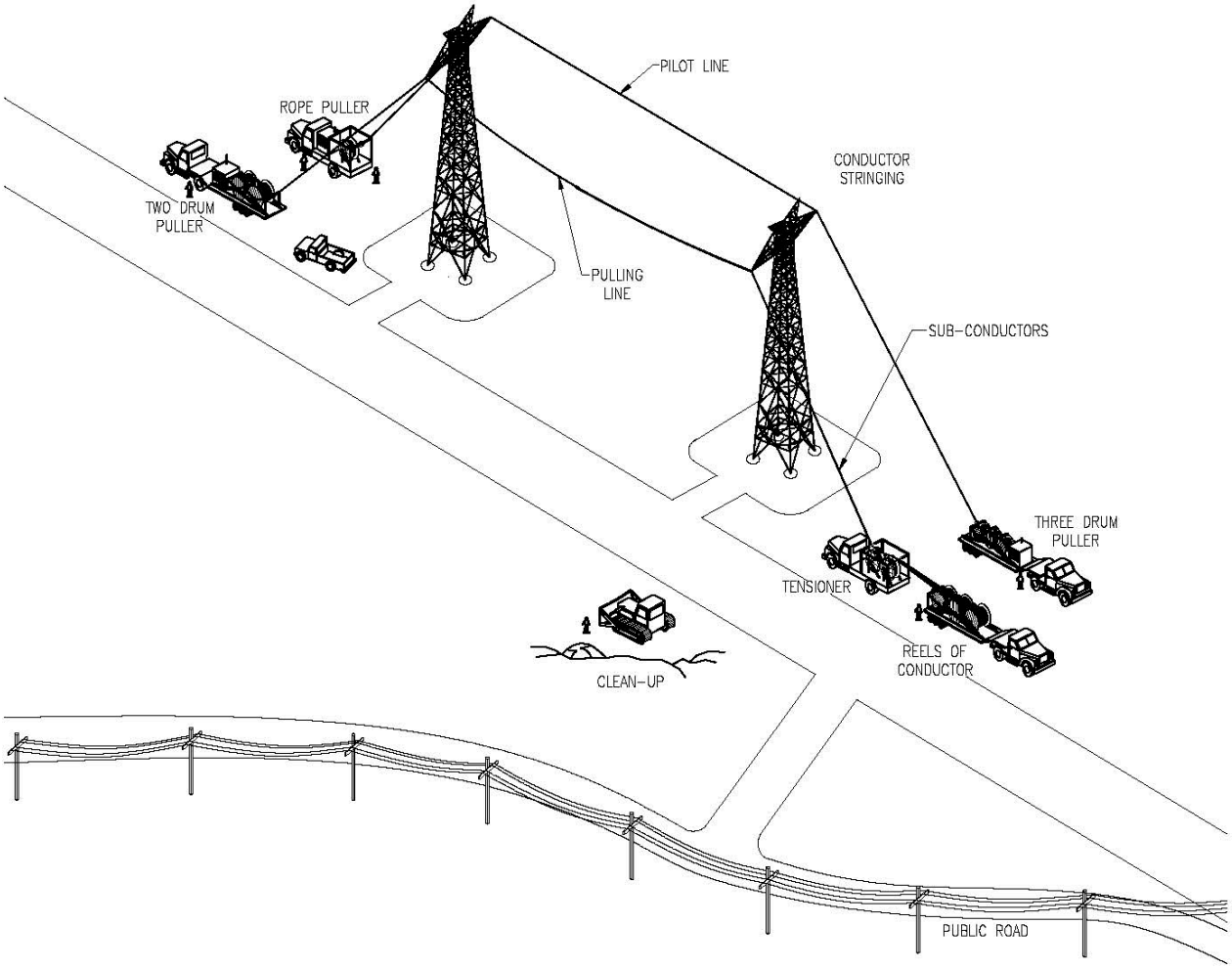
FIGURE 13
STRUCTURE FOUNDATION INSTALLATION,
TOWER ASSEMBLY, &
ERECTION ACTIVITIES



BASIC WIRE HANDLING EQUIPMENT
SINGLE CIRCUIT TOWER

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FIGURE 14
CONDUCTOR STRINGING ACTIVITIES

5.2.1 Access Road Construction

Access roads are an essential part of the construction and operation of the TWE Project. As such, the TWE Project will require surface access to all structures and work areas during construction and operation to allow construction vehicles and equipment to access the location of each transmission structure and Project facility. Access roads constructed as part of the Project but not required for operations will be restored to their original condition or left as-is per the appropriate land management agency or private landowner requirements. Access in Inventoried Roadless Areas (IRAs) is discussed in Section 5.7.3 Roadless Construction. The TWE Project has been designed to utilize existing access roads wherever practicable in order to minimize environmental impacts associated with new road construction.

Table 7 summarizes typical road requirements for construction and routine and non-routine operations.

TABLE 7 TYPICAL ROAD REQUIREMENTS FOR TRANSMISSION LINE SYSTEM

ROAD TYPE	ACCESS ROADS FOR CONSTRUCTION	ACCESS ROADS FOR ROUTINE OPERATIONS	ACCESS ROADS FOR NON-ROUTINE OPERATIONS USE
Existing Improved Roads	No change	No change	No change
Existing Roads Requiring Improvement	Unsurfaced - use as-is with improvements as needed throughout construction	For routine activities, an 8-foot portion of the road will be used and vehicles will drive over the vegetation ("two-track").	For non-routine maintenance requiring access by larger vehicles, the full width of the access road may be used. Roads will be repaired, as necessary, but will not be routinely graded. In order to preserve the ability to enter rapidly, the road structure (cuts and fills) will be left in place.
New roads	Unsurfaced – "drive and crush", "clear and cut" or bladed roads as required by terrain, use, local conditions, regulatory requirements, etc.	For routine activities, an 8-foot portion of the road will be used and vehicles will drive over the vegetation ("two-track").	
Temporary Roads (roads constructed to access temporary work areas)	Unsurfaced – similar treatment to new roads	None—contours will be restored, and the road will be ripped and seeded.	None

Existing roads will be used to access work areas whenever practicable. Two types of existing roads are "Existing Improved Roads" and "Existing Roads Needing Improvement". "Existing Improved Roads" are roads that appear to either be hard-surfaced roads or have well maintained surfaces. No improvement or maintenance of "Existing Improved Roads" is anticipated as a result of TWE Project construction. "Existing Roads Needing Improvement" will have varied conditions across the Project and include trails, two-track roads, and non-maintained dirt roads. It is anticipated that the Contractor may need to perform some level of improvement to provide the safe travel way required for construction. Based on the Contractor's construction plan and the construction techniques employed, it is anticipated that sections of the access roads classified as "Existing Roads Needing Improvement" will receive one of the following treatments.

- The existing road will be sufficient and provide a safe travel way throughout the duration of Project construction.

- The existing road will be sufficient and provide a safe travel way during a portion of the line construction period. Weather events, progressive damage due to heavy use and larger heavier equipment needed are examples of reasons that an existing road would need some level of construction at one or more intermediate points during line construction.

- The existing road at project initiation needs more extensive construction, including blading, prior to the start of line construction.

- Portions of these roads will involve "clear and cut", or "drive and crush".

The construction of new access roads will be required only as necessary to access structure sites lacking direct access from existing roads, or where topographic conditions (e.g., steep terrain, rocky outcrops, and drainages) prohibit safe overland access to the site. Figure 15 illustrates typical access road cross-sections in the various topographic conditions. A new access road refers to implementing all activities required to establish a travel-way that allows vehicular access from an existing road to the required work location and does not imply construction of a new road with a ditch and raised shoulder. Where terrain and soil conditions are suitable, non-graded overland access ("drive and crush") will be utilized. New access roads will be located within the ROW whenever practical and will be sited to minimize potential environmental impacts. The number of new access roads will be held to a minimum, consistent with their intended use (e.g., access to structure work areas or wire-pulling and tensioning sites).

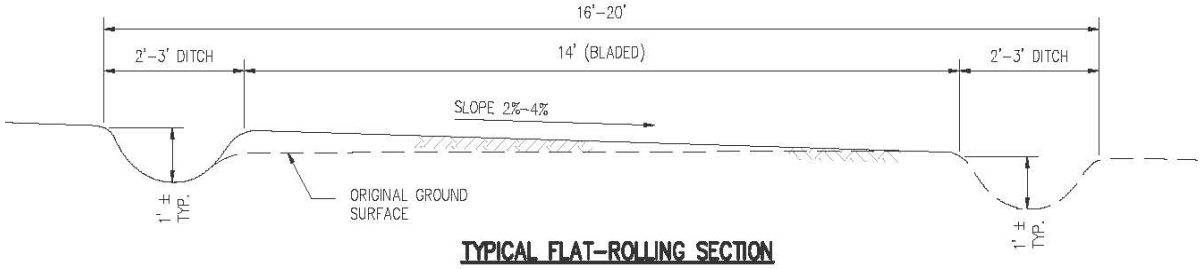
Where new roads are required or where improvements to existing roads are required, access roads will be designed in accordance with standards and guidelines for Non-constructed Roads and Routes as described in "The Gold Book – Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development" (AASHTO 2006). Portions of the access road network requiring design and construction to a more stringent standard will be identified in the Access Road Siting and Management Plan submitted with the NTP POD.

An Access Road Siting and Management Plan will be developed for the selected Alternative during final engineering and design, which will define site-specific access to each structure and work area. A framework Access Road Siting and Management Plan is provided in Appendix A. The initial layout of access roads by road type to each structure location for the Agency Preferred Alternative is provided on the TWE Project Constraints, Access Roads and Work Area Details map book in Appendix AA. Detailed mapping of existing improved roads, existing roads requiring improvement, and new roads are provided.

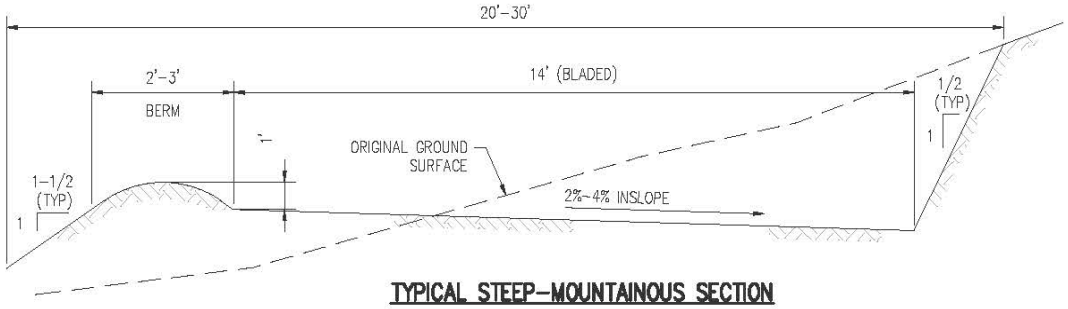
TABLE 8 OMITTED

Construction of new access roads will begin with vegetation removal to the extent required for new road development. Vegetation management is described in Appendix R, ROW Preparation and Vegetation Management Plan. For bladed roads and where appropriate, topsoil will be removed and salvaged from the road construction area as required by the appropriate land management agency or private landowner. Topsoil will be stored adjacent to the road or in a nearby workspace. Based on terrain and grade of the road, new bladed access roads will be constructed with an inslope or outslope design with water dips, water bars, water breaks and wings in the berm as necessary to manage water flow on the road and mitigate erosion. Figure 16 illustrates typical water bar cross-sections to be used to manage water flow on access roads in areas of steep terrain. Appropriate erosion control devices will be installed to prevent erosion or loss of the topsoil, including measures to prevent wind erosion and fugitive dust, and silt fencing to prevent sediment runoff. As needed, the structure site construction pads and access roads will be bladed/graded to allow for safe access and construction. The blading/grading may include cut and fill as needed to achieve a safe, workable surface.

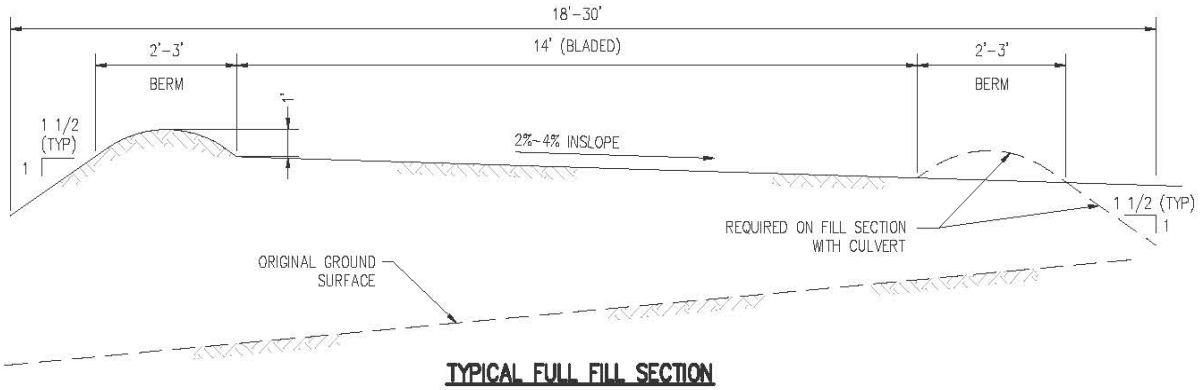
Access road construction may employ heavy equipment including bulldozers, front-end loaders, dump trucks, backhoes, excavators - both tracked and rubber-tired, and graders. Other specialized equipment including boom trucks to install culverts in some areas will be used where needed.



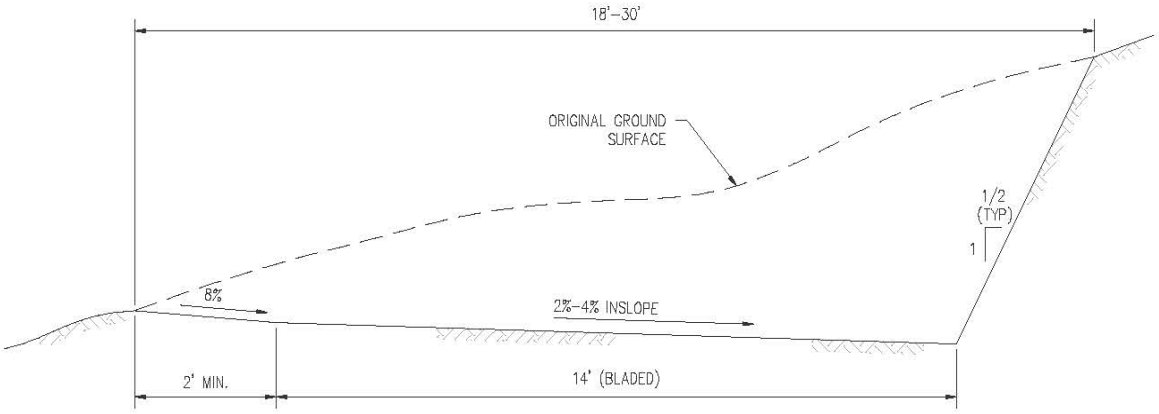
TYPICAL FLAT–ROLLING SECTION



TYPICAL STEEP–MOUNTAINOUS SECTION



TYPICAL FULL FILL SECTION



TYPICAL FULL CUT SECTION

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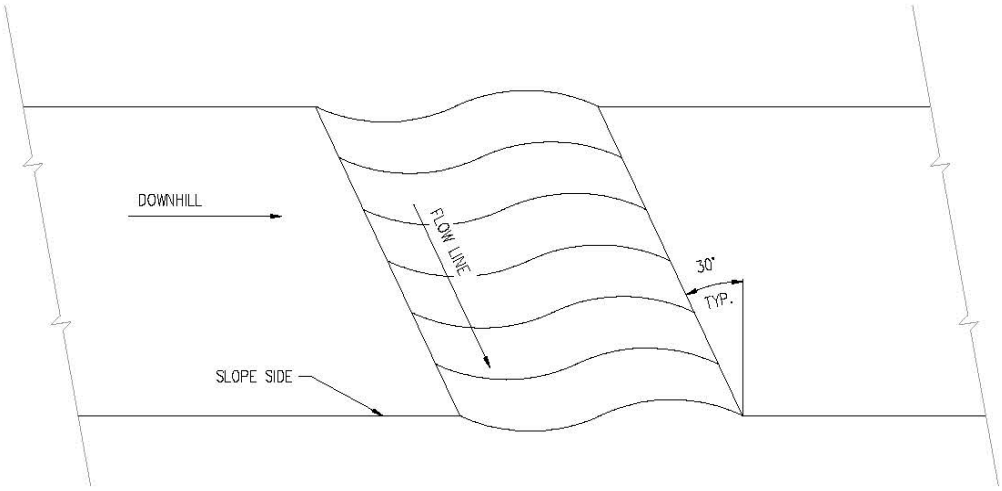
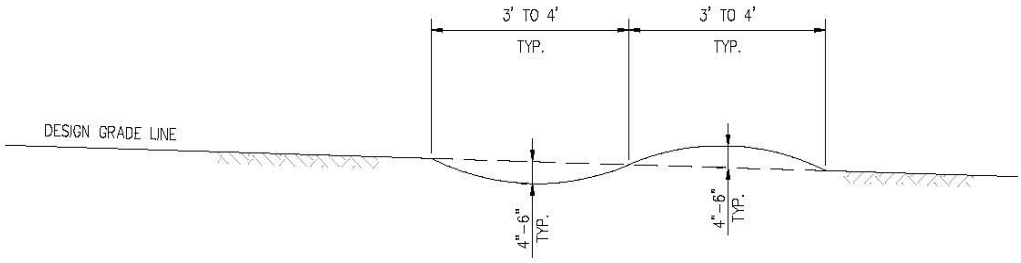
FIGURE 15
TYPICAL ACCESS ROAD CROSS–SECTIONS BY TERRAIN TYPE

WATER BARS





TYPICAL PROFILE

DISTANCE BETWEEN WATER BARS

ROAD GRADE PERCENT	SPACING FEET
2	250
5	135
10	80
15	60
20	45

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FIGURE 16
TYPICAL ROADS – WATER BARS

5.2.2 Clearing of Transmission ROW and Temporary Work Areas

Vegetation within the ROW will be cleared in accordance with the ROW Preparation and Vegetation Management Plan in Appendix R. Figure 17 provides a plan view of typical transmission ROW and temporary work areas.

Temporary work areas will be cleared of vegetation or flagged, as needed, prior to construction. Temporary work areas will include staging areas; material storage yards; fly yards; pulling, tensioning and spicing sites; work areas at each structure site; batch plant sites; and guard structures. Table 9 summarizes the temporary land disturbance that would be required for Project construction including the typical size and spacing required for the TWE Project facilities and activities.

TABLE 9 SUMMARY OF TEMPORARY LAND DISTURBANCE FOR WORK AREAS

TEMPORARY WORK AREA	DIMENSIONS/ SIZE	LOCATION AND NUMBER OF FREQUENCY NEEDED
TWE Project Transmission Line		
Staging Areas / Fly Yards	Average size: 7 acres	Approximately every 5 miles
Material Storage Yards	Average size: 20 acres	Approximately every 30 miles
Wire Pulling, Tensioning and Splicing Sites	ROW width x 500 feet for dead-end structure	Two sites at every dead-end structure
	ROW width x 500 feet for mid-span conductor and shield wire	Approximately every 9,000 feet
	100 x 500 feet for fiber optic cable set-up sites	Approximately every 18,000 feet
Structure Work Areas	ROW width x 200 feet per structure	All structure sites, average 4 per mile
Batch Plants	Average size: 5 acres	Approximately every 15 miles
TWE Project Northern and Southern Terminals		
Storage and Concrete Batch Plant	7.5 acres	On-site
Interconnection Line Structure Work Areas	200 feet x 200 feet (230 kV structures)* ROW width x 200 feet (500 kV structures)	All structure sites Approximately 6 per mile for 230 kV* Approximately 4 per mile for 500 kV
Interconnection Line Wire Pulling, Tensioning, Splicing Sites	ROW width x 500 feet	Mid-span conductor and shield wire sites – every 9,000 feet
	(230 kV ROW width – 100 feet)*	Fiber optic cable set-up sites – every 18,000 feet
	(500 kV ROW width – 250 feet)	Splicing sites typically at the same locations as the pulling/tensioning sites per common construction practices
TWE Project Northern and Southern Ground Electrode Systems		
Ground Electrode Site	65 acres	On-site
Overhead Electrode Line, Structure Work Areas	ROW width x 100 feet (34.5 kV ROW width – 50 feet)	All structure sites, average 18 per mile
Overhead Electrode Line, Pulling, Tensioning, and Splicing Sites	75 feet x 100 feet	Mid-span conductor sites – every 9,000 feet
	75 feet x 150 feet	All dead-end structure sites – two sites each
Material Storage Yards	10 acres	One at each ground electrode site (total of two)

Notes: *Only applies to Northern Terminal. Temporary work areas are shown on the TWE Project Constraints, Access Roads and Work Area Details map book in Appendix AA.

The following is a summary of the purpose and use of structure work areas; wire-pulling, tensioning and splicing sites; construction staging areas/fly yards; concrete batch plants; and equipment staging and refueling sites.

Structure Work Areas

Individual structure sites will be cleared to install the transmission line structures and facilitate access for future transmission line and structure maintenance. At each structure location (±600 kV DC and 500 kV), an area up to approximately 250 by 200 feet, will be needed for construction laydown, structure assembly, and erection at each structure site. This temporary disturbance will occur within the ROW. To the extent necessary, the work area will be cleared of vegetation and bladed to create a safe working area for placing equipment, vehicles, and materials. After line construction, all areas not needed for normal transmission line maintenance, including fire and personnel safety clearance areas, will be graded to blend as near as possible with the natural contours, then revegetated as required.

Additional equipment may be required if solid rock is encountered at a structure location. Rock-hauling, hammering, or blasting may be required to remove the rock. Excess rock that is too large in size or volume to be spread at the individual structure sites will be hauled away and disposed of at approved landfills or at a location specified by the appropriate agency or landowner. See *Excavating and Installing Foundations* below for additional information on blasting activities.

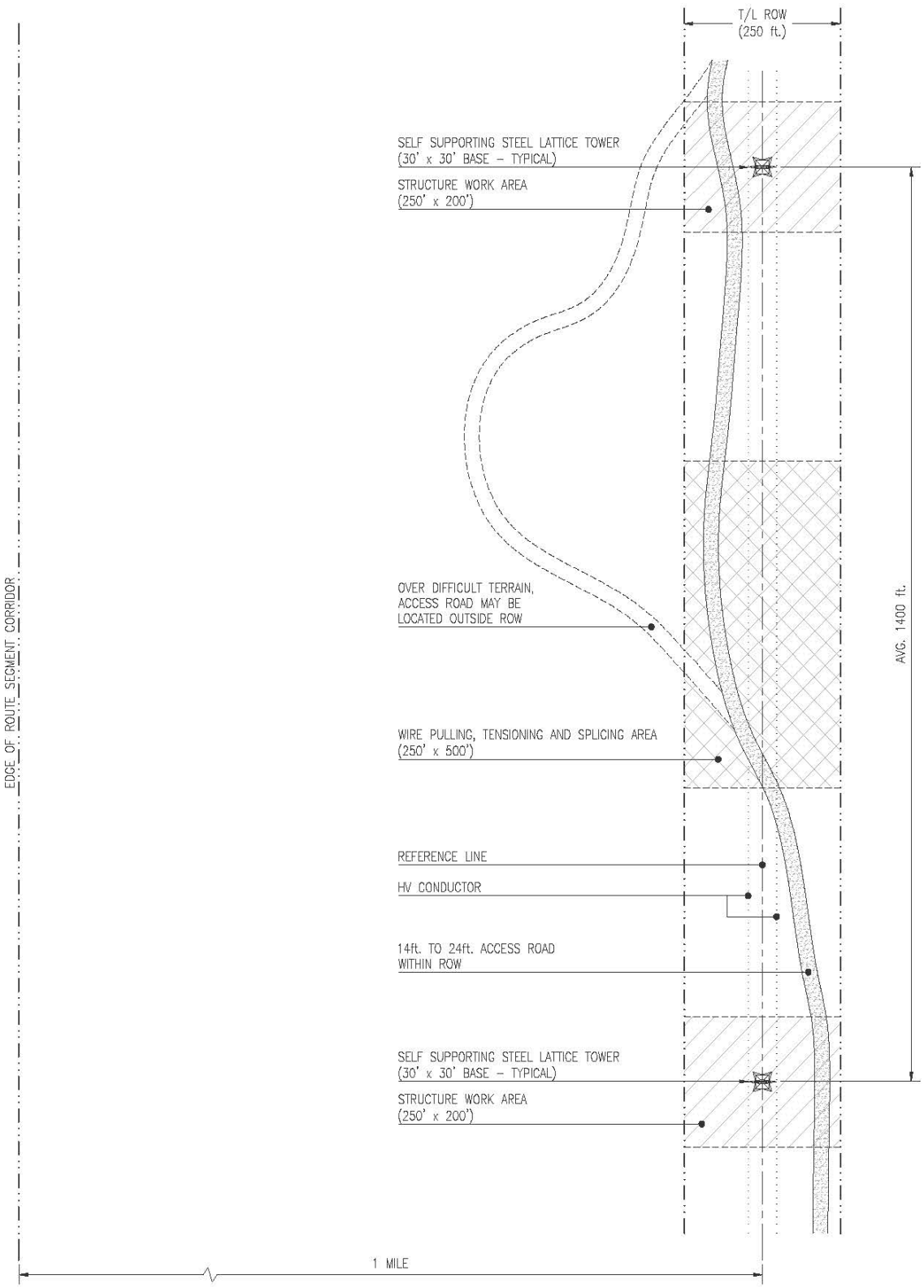

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FIGURE 17

PLAN VIEW OF TYPICAL TRANSMISSION ROW & CONSTRUCTION WORK AREAS

Wire Pulling, Tensioning, and Splicing Sites

Wire pulling, tensioning and splicing sites will be cleared and bladed as necessary to perform safe wire installation construction activities. During planning for wire installation activities wire pulling, tensioning, and splicing sites will be selected to minimize clearing and blading to the extent practical such that actual disturbance areas will not exceed those described in Table 9. After line construction, all areas disturbed for wire pulling, tensioning and splicing sites will be restored as described in Appendix Q, ROW Preparation and Vegetation Management Plan.

Construction Staging Areas/Fly Yards

The staging areas will be located in previously disturbed sites or in areas of minimal vegetative cover where possible. The staging areas will serve as field offices; reporting locations for workers; parking space for vehicles and equipment; and sites for material storage, fabrication assembly, concrete batch plants, and stations for equipment maintenance. Staging area dimensions and disturbance areas are summarized in Table 9. Additionally, fly yards for helicopter operations will be located approximately every five miles along the route where helicopter construction is planned, and will occupy approximately seven acres.

Depending upon location, use, type of material or equipment stored, adjacent land use or agency or landowner requirements, the Contractor may be required to provide necessary security arrangements at staging areas such as fencing and/or security guards. Staging area locations will be finalized following discussion with the land management agency or negotiations with landowners. In some areas, the staging area may need to be scraped by a bulldozer and a temporary layer of rock laid to provide an all-weather surface. Unless otherwise directed by the landowner, the rock will be removed from the staging area upon completion of construction and the area will be restored.

Concrete Batch Plant Sites

Concrete for use in the structure foundations will be dispensed from portable concrete batch plants located at approximately 15-mile intervals along the ROW, most located at staging areas adjacent to or near hard surface roadways. Initial site selection will be identified in the ROD POD with final sites identified in the NTP POD. Equipment typically required at a batch plant site includes generators, concrete trucks, front-end loaders, Bobcat loaders, dump trucks, transport trucks and trailers, water tanks, concrete storage tanks, scales, and job site trailers. Rubber-tired trucks and flatbed trailers will be used to assist in relocating the portable plant along the ROW. Commercial ready-mix concrete may be used when access to structure construction sites is economically feasible.

Equipment Staging and Refueling Sites

Staging of equipment will be located at staging areas, pulling and tensioning sites, or other temporary work areas previously described. These areas will be used to temporarily lay out equipment to be used for work on specific TWE Project activities at nearby locations.

During construction, the Contractor will implement standard refueling procedures for heavy equipment that is left on the ROW for long periods of time such as cranes, blades, dozers, drill rigs, etc. This equipment will be refueled in place. As a rule, no personal or light-duty vehicles will be allowed to refuel on the ROW. Procedures and precautions similar to those used for helicopter refueling (discussed below) will be utilized.

Staging areas and helicopter fly yards where helicopters are parked or refueled may be fenced with security guards stationed as needed.

5.2.3 Excavation and Installation of Foundations and Anchors

Foundations for guyed steel lattice towers will typically be small precast or cast-in-place concrete pedestals. The precast pedestals will be hauled to the tower site on a flatbed truck and set in a small excavation dug by a backhoe or digger. Although not anticipated, site-specific foundation design other than the concrete pedestals could be warranted depending on subsurface conditions. The single shaft tubular steel poles and self-supporting steel lattice towers will typically be supported by cast-in-place drilled concrete pier foundations. For these structure types, vertical excavations for foundations will be made with power drilling equipment. Where soils permit, truck-or track-mounted augers of various sizes, depending on the diameter and depth requirements of the hole to be drilled, will be used.

- The required spoil removal and hauling in of concrete for the proposed and alternate tangent structure types are described as follows:

- Guyed Steel Lattice (proposed structure type) – Spoil removal of approximately 2 cubic yards per tower would require only one dump truck trip. No concrete would be required for the pedestal type foundation.

- Self-Supporting Lattice –Spoil material from foundation installation averages 25 to 30 cubic yards per tower. This material will likely be disposed of off-site necessitating four to five dump truck trips per tower. Total concrete necessary for the four leg foundations of each self-supporting tangent lattice tower is estimated at 28 cubic yards per tower, necessitating four to five concrete truck trips per tower.

- Tubular Steel Pole –Spoil material from foundation installation averages 55 to 60 cubic yards per tubular pole. This material will likely be disposed of off-site necessitating eight to nine dump truck trips per structure. Total concrete necessary for the foundation is estimated at 60 cubic yards per structure, necessitating eight to nine concrete truck trips per tower.

In rocky areas, the foundation holes may be excavated by drilling or blasting methods, or installing special rock anchor or micro-pile type foundations. The rock anchoring or micro-pile system will be used in areas where site access is limited, or adjacent structures could be damaged as a result of blasting or rock hauling activities. If hard rock is encountered within the planned drilling depth of tower foundations, blasting may be required to loosen or fracture rock. Potential areas requiring blasting will be identified based on geological setting of the proposed alignment. A Blasting Plan (Appendix C) is being prepared as part of the POD. It details the general concepts proposed to achieve the desired excavations, proposed methods for blasting warning, use of non-electrical blasting systems, provisions for controlling fly rock, vibrations, and air blast damage. Blasting is described in detail in Section 5.7.1.

In environmentally sensitive areas with very soft soils, a HydroVac, which uses water pressure and a vacuum, may be used to excavate material into a storage tank. Alternatively, a temporary casing may be used during drilling to hold the excavation open, and then the casing is withdrawn as the concrete is placed in the hole. In areas where it is not possible to operate large drilling equipment due to access or environmental constraints, hand-digging may be required.

In areas where single shaft tubular steel pole structures are used, increased volumes of excavated subsoil spoils, based on foundation size and depth are anticipated. These excess subsoil spoils will be disposed of in locations and methods as previously agreed upon by the Applicant and the appropriate land management agency or private landowner.

Methods and locations of disposal of material excavated from any type of foundation will consider hauling offsite to an approved disposal area, spreading within the general disturbance area to maintain grades and runoff, and to facilitate restoration (in these instances, topsoil will be salvaged and set aside to be placed over the subsoil material during restoration) and using spoil material as backfill for fill areas or to maintain graded access roads. Each of these disposal options will be mitigated on a case-by-case basis as agreed upon by the Applicant and the appropriate land management agency or private landowner.

Foundation or anchor holes left open or unguarded will be covered to protect the public and wildlife. If practical, fencing may be used. All safeguards associated with using explosives (e.g., blasting mats) will be employed. Blasting activities will be coordinated with the appropriate agencies, particularly for purposes of safety and protection of sensitive areas and biological resources (see Appendix C Blasting Plan). In extremely sandy areas, water or an appropriate land management agencies' approved gelling agent may be used to stabilize the soil before and during excavation.

Reinforced-steel anchor bolt cages will be installed after excavation and prior to structure installation. These cages are designed to increase the structural integrity of the foundations, will be assembled at the nearest laydown yard or staging area, and delivered to the tower site via flatbed truck. These cages will be inserted in the holes prior to pouring concrete. The excavated holes containing the reinforcing anchor bolt cages will be filled with concrete.

Typically, and because of the remote location of much of the transmission line route, concrete will be provided from portable batch plant areas as described above. Concrete will be delivered directly to the site in concrete trucks with a capacity of up to ten cubic yards. In the more developed areas along the route, the Contractor may use local concrete providers to deliver concrete to the site when available and economically feasible. Concrete trucks will be washed in designated areas within the ROW more than 100 feet from streams and wetlands. The hardened waste concrete will be removed from the site and properly recycled or disposed of.

Guyed lattice structures require the installation of anchors and guy wires to support the structure. Depending upon the soil type and engineering strength requirements, anchors will be either excavated plate anchors, drilled and epoxy, or grouted anchors.

Drilled anchors will require a small truck or track mounted drilling equipment that will drill a hole four to eight inches in diameter, 20 to 40 feet or more in depth. The anchor rod is inserted into the open bore and secured to the soil or rock either with epoxy or grout.

Plate anchors are installed in a three to four foot diameter excavation, 10 to 20 feet in depth, drilled by a small truck or track mounted drilling rig. The anchor rod is attached to the plate anchor, placed in the hole and the excavation is backfilled and compacted.

5.2.4 Erection of Transmission Structures

Bundles of steel members (all types of lattice structures) and associated hardware (insulators, hardware, and stringing sheaves) will be transported to each structure site by truck. Wood blocking will be hauled to each location and laid out; the tower steel bundles will be opened and laid out for assembly by sections and assembled into subsections of convenient size and weight. Typically, the leg extensions for the towers will be assembled and erected by separate crews with smaller cranes to make ready for setting of the main tower assembly. The assembled subsections will then be hoisted into place by means of a large crane and fastened together to form a complete tower. A follow-up crew will then tighten all the bolts in the required joints. Refer to Figure 13 for a general illustration

of this procedure. The use of helicopters for structure erection is described in Section 5.7.2 Helicopter Construction.

The steps in the erection of the tubular steel pole structures is substantially the same as any of the steel lattice structure types with the exception of hauling to the site and assembly. The tubular steel poles have significantly fewer components and generally require more care (fewer, yet larger and heavier pieces) in transporting to the site yet once at the site take less time and manpower to assemble. For helicopter erection, a significant number of additional lifts are required to assemble and set the tubular steel pole structures. At high elevations, the tubular steel poles may become impractical due to the reduced lift capacity of helicopters, requiring the tubular steel pole to be assembled and erected in many smaller (lighter) pieces.

5.2.5 Stringing of Conductors, Shield Wire, and Fiber Optic Ground Wire

Insulators, hardware, and stringing sheaves will be delivered to each tower site. The towers will be rigged with insulator strings and stringing sheaves at each shield (ground) wire and conductor position.

Interruption of road traffic on all types of roads (county, state, federal, interstate) is not anticipated during conductor stringing and tensioning activities unless required under the terms and conditions of a specific road or highway crossing permit. As described below, pilot lines will be pulled from tower to tower by either a helicopter (most commonly) or land operated equipment. The use of a helicopter to pull the pilot lines is commonly used so that impacts to road traffic are minimized or avoided. For safety and efficiency reasons, wire stringing and tensioning activities are typically performed during daylight hours and are scheduled to coincide to the extent practical with periods of least road traffic in order to minimize traffic disruptions.

Railroad crossing operations and procedures are controlled by and permitted through the railroad company operating the affected rail line (see the Union Pacific Railroad website for Overhead Wire Crossings as an example). Terms and conditions to be followed are specified in the crossing permit. Typically, stoppage of railroad traffic is not required during construction or conductor stringing and tensioning activities. Crossing activities are similar to those for road crossings and typically involve the use of guard structures as discussed below. Stringing and tensioning activities will be performed in coordination with the appropriate railroad authorities. For safety and efficiency, stringing and tensioning activities are performed during daylight periods and scheduled to coincide with times of least railroad traffic. The railroad will typically provide a switchman who is present at all times when work is being performed near or over any railroad line.

For protection of the public during stringing activities, temporary guard structures will be erected at road crossing locations where necessary. Guard structures will typically consist of H-frame wood poles placed on either side of the road to prevent ground wires, conductors, or equipment from falling on underlying facilities and disrupting road traffic. Typically, guard structures are installed just outside of the road ROW. Although the preference is for access to each of these guard structures to be located outside the road ROW, it may be necessary for access to be within the road ROW depending on topography and access restrictions imposed by the regulatory agency (i.e., USDOT, county road and bridge department). Access use within the road ROW will be performed in compliance with the stipulations of the crossing permit and regulatory agency requirements.

Site specific road crossing locations with excessive widths (generally greater than 200 to 300 feet) such as may occur on interstate highways would require installation of temporary guard structures in medians between opposite traffic flow lanes. Although the Applicant does not currently anticipate needing guard structures in medians, as final engineering design progresses, locations requiring center

median guard structures may be identified. The erection and dismantling of these temporary guard structures may require short-term traffic diversions.

All traffic impacts resulting from wire stringing including short-term traffic diversions, traffic congestion and brief road closures (if needed) will comply with the Traffic and Transportation Management Plan (Appendix U). Short-term traffic diversions, which may last from a few hours to a day, are most commonly a short duration closure of the shoulder of the road or in more congested locations might consist of the closure of one lane of traffic. Complete closure of one direction of traffic is not anticipated. Temporary traffic diversion signs, signals, markers, barriers and traffic control personnel, if required by the State Department of Transportation (DOT), will be employed. These activities would be coordinated with the appropriate State DOTs. Traffic disruptions will be kept to a minimum and the Applicant will comply with crossing permit requirements which typically limit durations of traffic interruptions.

In urban locations or for extremely high volume roadways (such as interstate highways), the State DOTs may require the installation of protective steel netting above the roadway for the duration of wire stringing and tensioning operations (generally ranging from a few days to two to three weeks). The installation of protective steel netting requires a brief closure of the roadway while the netting is pulled across the roadway and hoisted onto the temporary support structures. This process is repeated when the netting is removed. Because of the heavy traffic volume and the impact of stopping traffic, netting is typically installed during the lowest traffic period (normally 3 a.m. to 5 a.m. on a Sunday morning) per the requirements of the State DOT. Although not anticipated, any road stoppage will employ all appropriate State DOT traffic safety requirements (signage, flagmen, lighting, signals, temporary barriers, law enforcement, etc.).

Equipment for erecting guard structures will include augers, backhoes, line trucks, boom trucks, pole trailers, and cranes. Guard structures may not be required for small roads. In such cases, other safety measures such as barriers, flagmen, or other traffic controls will be used. Following stringing and tensioning of all ground wires and conductors, the guard structures will be removed and the area restored.

Pilot lines will be pulled (strung) from tower to tower by either a helicopter or land operated equipment, and threaded through the stringing sheaves at each tower. Following pilot lines, a stronger, larger diameter line will be attached to conductors to pull them onto towers. This process will be repeated until the shield wire, optical ground wire, and conductor is pulled through all sheaves.

Shield wires, fiber optic cable, and conductors will be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end of a conductor segment. Site dimensions for pulling and tensioning equipment are provided in Table 9. These sites may differ in size and dimensions, however, depending on the structure's purpose (e.g., mid-span or dead-end), site-specific topography, and whether anchoring of the shield wire or conductor will be located at these sites. The tensioner, in concert with the puller, will maintain tension on the ground wires or conductor while they are fastened to the towers. Once each type of wire has been pulled in, the tension and sag will be adjusted, stringing sheaves will be removed, and the conductors will be permanently attached to the insulators.

Caution will be exercised during construction to avoid scratching or nicking the conductor surface, which may provide points for corona to occur. Refer to Figure 13 for a general illustration of this procedure.

At tangent and small-angle towers, the conductors will be attached to the insulators using clamps while at the larger angle dead-end structures the conductors are cut and attached to the insulator assemblies by "dead-ending" the conductors, either with a compression fitting or an implosive type fitting. Both are industry-recognized methods. When utilizing the implosive type fitting, pertinent land management agencies, private landowners, and public safety organizations will be notified before proceeding with this method.

Part of standard construction practices prior to conductor installation will involve measuring the resistance of the ground to electrical current near the towers. If the measurements indicate a high resistance, counterpoise will be installed, which will consist of trenching in-ground wire to a depth of 12 inches in non-cultivated land and 18 inches in cultivated land, with a ground rod driven at the end. The counterpoise will be contained within the limits of the ROW and may be altered or doubled back and forth to meet the requirements of the TWE Project. Typical equipment used for installing ground rods includes line trucks, backhoes, and trenchers.

5.3 Terminal and Substation Construction

Terminal construction activities will occur at the Northern and Southern Terminals. Section 5.8.3 summarizes the types of construction equipment to be used at each terminal, substation or series compensation station.[1]

Construction of the AC/DC converter stations, substations or series compensation stations will initially consist of survey work, geotechnical sample drillings approximately 20 to 50 feet deep, and soil resistivity measurements that will be used in the final design phases of the station. Once the final design of the station has been completed, a Contractor will mobilize to perform site development work, including grubbing and then reshaping the general grade to form a relatively (one percent slope) flat working surface. This effort also will include the construction of permanent all-weather access roads. An eight-foot-tall chain link fence will be erected around the perimeter of the terminal, substation or series compensation station to prevent unauthorized personnel from accessing the construction and staging areas. The perimeter fence will be a permanent feature to protect the public from accessing the facility. The excavated and fill areas will be compacted to the required densities to allow structural foundation installations. Oil containment structures required to prevent oil from transformers, reactors, circuit breakers, etc., from getting into the ground or water bodies in the event of rupture or leak, will be installed.

Following the foundation installation, underground electrical raceways and copper ground grid installation will take place, followed by steel structure erection and area lighting. The steel structure erection will overlap with the installation of the insulators and bus bar, as well as the installation of the various high-voltage apparatus typical of an electrical substation. The converter valve hall and ancillary buildings will be erected. The installation of the high-voltage transformers will require special high-capacity cranes and crews (as recommended by the manufacturer) to be mobilized for the unloading, setting into place, and final assembly of the transformers. While the above mentioned activities are taking place, the enclosures that contain the control and protection equipment for the terminal, substation and series compensation station will be constructed, equipped, and wired. A final crushed rock surface will be placed on the subgrade to make for a stable driving and access platform for the maintenance of the equipment. After the equipment has been installed, testing of the various

[1] Terminal construction for the proposed Project includes the adjacent substations. Separate substations and/or series compensation stations are required for Design Options 2 and 3. Descriptions of the construction for the substations and series compensation station for Design Options 2 and 3 are included within this section for convenience and completeness.

systems will take place, followed by electrical energization of the facility. The energization of the facility generally is timed to take place with the completion of the transmission line work and other required facilities.

Soil Borings

Typically, soil borings will be made on 600-foot grid spacing within the terminal, substation or series compensation station, particularly at the approximate location of large structures and equipment such as substation dead-ends and transformers, to determine the engineering properties of the soil for foundation design. Borings will be made with truck- or track-mounted equipment. The borings will be approximately four inches in diameter, range from 20 to 50 feet deep, and be backfilled with the excavated material upon completion of soil sampling.

Clearing and Grading

The Contractor will mobilize to perform site development work including grubbing, grading and construction of an all-weather access road (gravel). Clearing of all vegetation will be required for the entire terminal, substation or series compensation station area, including a distance of approximately eight to ten feet outside the fence.

Once the vegetation is cleared, the entire site will be graded essentially flat, with enough slope to provide for runoff of precipitation. The site will be graded to use existing drainage patterns to the extent possible. Depending upon the size of the site a more complex drainage design may be required to handle larger volumes of runoff. Drainage design for large sites may require drainage zones, retention basins, and drainage structures such as ditches or culverts. Discharge of stormwater during construction will require State specific Stormwater Pollution Prevention Plans. A framework Stormwater Pollution Prevention Plan is provided in Appendix T. After grading, the entire site will be treated with a soil sterilizer to prevent vegetation growth to minimize future maintenance. Clearing and grading material will be disposed of in compliance with local ordinances. Material from off-site will be obtained at existing borrow or commercial sites and will be trucked to the site using existing roads and the site access road.

Once installation of foundations, underground electrical raceways and copper ground grid are completed, a four to six inch layer of crushed rock will be applied to the finished surface of the station to provide a solid all-weather working surface and to protect personnel from high currents and voltages during electrical fault conditions.

Storage and Staging Yards

Construction material storage yards may be located outside the terminal, substation or series compensation station-fenced area near the facility being constructed. These storage yards may be part of the terminal, substation series compensation station property or leased by the Contractor. After construction is completed, all debris and unused materials will be removed and the staging/storage yards returned to pre-construction conditions by the Contractor.

Grounding

A grounding system will be required in each terminal, substation and series compensation station for detection of faults and for personnel safety. The grounding system typically consists of buried copper conductor arranged in a grid and driven ground rods, typically eight to ten feet long. The ground rods and any equipment and structures are connected to the grounding conductor. The amount of conductor and length and number of ground rods required will be calculated based on fault current and soil characteristics.

Fencing and Lighting

Security fencing will be installed around the entire perimeter of each terminal, substation and series compensation station to protect sensitive equipment and prevent accidental contact with energized conductors by third parties. This seven-foot-high fence would be constructed of chain link with steel posts. One foot of barbed wire or similar material will be installed on top of the chain link yielding a total fence height of eight feet. Locked gates will be installed at appropriate locations for authorized vehicle and personnel access.

Safety and security lighting at the terminals, substations and series compensation stations will be provided inside the fence for safety and security, and for uncommon emergency night repair work. Dusk to dawn safety and security lighting will be used at the terminals and 500 kV AC substations.

Foundation Installation

Foundations for supporting structures and large buildings are of two types: spread footings or drilled piers. Spread footings are placed by excavating the foundation area, placing forms and reinforced-steel and anchor bolts, and pouring concrete into the forms. After the foundation has been poured, the forms would be removed, and the surface of the foundation finished. Drilled pier foundations are placed in a hole generally made by a track or truck-mounted auger. Reinforced-steel and anchor bolts are placed into the hole using a track or truck-mounted crane. The portion of the foundation above ground would be formed. The portion below ground uses the undisturbed earth of the augured hole as the form. After the foundation has been poured, the forms would be removed, the excavation would be backfilled, and the surface of the foundation finished.

Equipment foundations for circuit breakers, transformers, and small prefabricated buildings will be slab-on-grade type. These foundations are placed by excavating the foundation area; placing forms, reinforced steel, and anchor bolts (if required); and placing concrete into the forms. After the foundations have been poured, the forms are removed, and the surface of the foundation finished. Where necessary, provisions will be made in the design of the foundations to mitigate potential problems due to frost. Reinforced steel and anchor bolts will be transported to each site by truck, either as a prefabricated cage or loose pieces, which will then be fabricated into cages on the site. Concrete will be hauled to the site in concrete trucks. Excavated material will be spread at the site or disposed of in accordance with agency requirements or local ordinances. Structures and equipment will be attached to the foundations by means of threaded anchor bolts embedded in the concrete. Some equipment, such as transformers and reactors, may not require anchor bolts.

Oil Containment

Some types of electrical equipment, such as transformers, and some types of reactors and circuit breakers, are filled with an insulating liquid. Containment structures are required to prevent equipment insulating liquids from getting into the ground or waterbodies in the event of a rupture or leak. These structures take many forms depending on site requirements, environmental conditions, and regulatory restrictions. The simplest type of containment is a pit, of a calculated capacity, under the equipment that has an impervious liner. The pit is filled with rock to grade level. In case of a leak or rupture, the liquid captured in the containment pit is pumped into tanks or barrels and transported to a disposal facility. If required, more elaborate containment systems can be installed. This may take the form of an on-site or off-site storage tank and/or insulating liquid-water separator equipment depending on site requirements.

Structure and Equipment Installation

Supporting steel structures are erected on concrete foundations. These are set with a track or truck-mounted crane and attached to the foundation anchor bolts by means of a steel base plate. These

structures will be used to support the energized conductors and certain types of equipment. This equipment will be lifted onto the structure by means of a truck-mounted crane and bolted to the structures; electrical connections are then made. Some equipment, such as transformers, reactors, and circuit breakers, will be mounted directly to the foundations without supporting structures. These will be set in place by means of a truck-mounted crane. Some of this equipment requires assembly and testing on the pad. Electrical connections to the equipment will then be made.

Equipment Housing, Control, Storage and Ancillary Building Construction

The Project will require several buildings at each terminal, substation or series compensation site. Depending upon size and function, these buildings will be either prefabricated or constructed on-site as concrete block or metal clad steel frame buildings.

The following provides a brief description and approximate dimension of the building types generally required for the terminals:

The **HVDC Converter Valve Hall** is a large building that contains the high-voltage electronics involved in the conversion process (referred to as valves), the valve cooling circulation system (pipes required to circulate the cooling medium), clean air exchange, and other supporting environmental conditions required for operation of the converter system. The valves are typically suspended from the ceiling of the building which requires large clearance distances to the ground and surrounding structures due to the high voltages that are generated within the building during the conversion process. The building will be approximately 60 to 80 feet in height and the footprint will be approximately 200 by 80 feet. There will be two buildings of this size; one housing the valve equipment for the positive DC pole and the other housing the equipment for the negative DC pole.

An **HVDC Auxiliary Support Building** is typically placed between the two valve halls or very near the valve halls. This building contains the pumps and heat exchange system for cooling of the valves. The building is typically 100 feet wide, 100 feet long and approximately 20 feet high.

A **Main Operations Building** housing operations, general office and support functions is approximately 150 by 150 feet square and is typically a two-story building with a complete basement. The HVDC control room and supporting control systems are housed in a main operations building. The telecommunications equipment, the HVDC controls equipment, and the operational control room is typically located in separated secure spaces to assure safety and to restrict access to all levels of automation and telecommunication. Operations, administrative staff, and maintenance dispatch supporting facilities are also located within this building. Control spaces will be equipped with full ranges of uninterrupted power supply power protection, fire safety operations, and dispatcher coordination centers. This facility will also include the SCADA control and monitoring systems for the Project's entire AC substation, and transmission systems as necessary up to the points of interconnection with the regional grid.

The **Security Control Office Building** will be an approximately 30 by 30 foot single story building with a full basement, to facilitate life safety and other equipment including domicile facilities for security personnel on extended shift work.

The **Diesel Generator Building** will be an approximately 100 by 30 foot single story building. This building contains diesel generators and support equipment necessary to operate the facility on loss of the primary power source.

The **DC Switchyard Building** is typically a single story building of approximately 30 feet by 60 feet. One or more control buildings may be required at each terminal to house control devices, battery banks for primary control power, and remote monitoring equipment. The size and construction of the building will depend on DC switchyard requirements. Typically, the control building will be constructed of concrete block, pre-engineered metal sheathed, or composite surfaced materials. Once the control house is erected, protection and control equipment will be mounted and wired inside.

A **Hazardous Chemical and Dry Storage Building** will be developed to place the various chemical bulk storage and other items outside and apart from the other buildings in the terminal complex. This building will be approximately 30 feet by 30 feet. This building will be supplied with the code required containment, life, and fire safety systems.

A **Dry Indoor Storage Building** will be developed based on the requirements of the HVDC Contractor and is estimated to be approximately 100 feet by 150 feet, single story, high bay building.

The following provides a brief description and approximate dimension of the buildings types generally required for the terminals, substations and series compensation stations:

The **AC Switchyard Control House** is typically a single story structure of approximately 30 feet by 60 feet. One or more control buildings may be required at each switchyard, substation or series compensation station to house protective relays, control devices, battery banks for primary control power, and remote monitoring equipment. The size and construction of the building will depend on individual substation requirements. Typically, the control building will be constructed of concrete block, pre-engineered metal sheathed, or composite surfaced materials. Once the control house is erected, protection and control equipment will be mounted and wired inside.

Conductor Installation

The two main types of high-voltage conductors used in terminals and substations are tubular aluminum for rigid bus sections and/or stranded aluminum conductor for strain bus and connections to equipment. Rigid bus will be a minimum of four inches in diameter and will be supported on porcelain or polymer insulators on steel supports. The bus sections will be welded together and attached to special fittings for connection to equipment. Stranded aluminum conductors will be used as flexible connectors between the rigid bus and the station equipment.

Conduit and Control Cable Installation

Most terminal and substation equipment requires low-voltage connections to protect relaying and control circuits. These circuits allow metering, protective functions, and control (both remote and local) of the power system. Connections will be made from the control building to the equipment through multi-conductor control cables installed in conduits and/or a pre-cast concrete cable trench system.

5.4 Ground Electrode Construction

Construction of the two ground electrode facilities will be initiated with a survey and staking to layout the location of the access road, deep earth electrode wells, control building and low voltage underground electrical, control and monitoring cables connecting the wells to the control building. The Contractor will mobilize to perform site development work including grubbing and grading and

construction of an all-weather access road (gravel). Grubbing, grading, and contouring of the entire site is not required. Removal of vegetation will be required for the access road, control building site, well sites, alignments of the underground electrical, control and monitoring cables and on-site material storage yard/staging area.

Once the vegetation is cleared, the control building site will be graded essentially flat, with enough slope to provide for runoff of precipitation. After grading, the control building site will be treated with a soil sterilizer to prevent vegetation growth to minimize future maintenance. Next, a thin layer of gravel or crushed rock will be applied to the finished surface of the control building site. With the exception of the permanent and temporary access roads, no additional grading will be required. Clearing and grading material will be disposed of in compliance with local ordinances. Material from off-site will be obtained at existing borrow or commercial sites, and will be trucked to the ground electrode site using existing roads and the ground electrode site access road.

Security fencing will be installed around the perimeter of the control building site. This seven-foot-high fence would be constructed of chain link with steel posts. One foot of barbed wire or similar material will be installed on top of the chain link yielding a total fence height of eight feet. A locked gate will be installed for authorized vehicle and personnel access.

Foundations for the prefabricated building will be slab-on-grade type. These foundations are placed by excavating the foundation area; placing forms, reinforced steel, and anchor bolts; and placing concrete into the forms. After the foundations have been poured, the forms are removed, and the surface of the foundation finished. Where necessary, provisions will be made in the design of the foundations to mitigate potential problems due to frost.

Reinforced steel and anchor bolts will be transported to each site by truck which will then be fabricated into cages on the site. Concrete will be hauled to the site in concrete trucks. Excavated material will be spread at the site or disposed of in accordance with agency requirements or local ordinances. The pre-fabricated building will be transported to the site by truck and attached to the foundations by means of threaded anchor bolts embedded in the concrete.

Each ground electrode site will require drilling approximately 60 deep earth wells. Each electrode well will be a 12 to 18 inch diameter bore drilled to a depth of 200 to 700 feet (depth based upon engineering and design). The well drilling will require small amounts of water which will be procured from commercial or municipal sources. Ground water will not be removed although small amounts of water, mud and spoil will be brought to the surface as part of the drilling process. All excess water, mud, drilling fluids, and spoils will be contained adjacent to the drill rig and when completed will be disposed of per landowner and agency requirements.

Once drilling is completed, a wire will be grouted into the well, the well capped, and a small area excavated around the well head for the installation of the utility access vault. A precast concrete utility access vault is installed. This utility access vault provides access to the well in addition to preventing public access to the well connections or electrode components.

Several underground cables are installed in trenches connecting each well to the control building. These cables provide a low voltage electrical connection from the control building to each well, and perform control and monitoring functions. Cables will be direct buried with the trench backfilled and compacted with spoil. Once backfilling is complete, the trenched area will be contoured back to match existing slopes and grades.

A communication system used for monitoring and control of the ground electrode facility will be installed. This communication link will require installation of either a buried or overhead fiber optic cable, and equipment or fixed radio communication equipment and antenna.

Connection to a local electric distribution circuit will be required to provide power to the site. Additionally, an emergency generator with a liquid propane gas fuel tank will be installed adjacent to the control building inside the fenced area.

5.5 Communications System Construction

The fiber optic network will require regeneration sites at periodic distances along the transmission line, as determined in the detailed engineering studies. In general, these regeneration sites are planned to be within the transmission line ROW. The communications system facilities will be constructed concurrently with the transmission line.

Construction will be initiated with a survey and staking to layout the location, and extent of the regeneration site. The Contractor will mobilize to perform site development work including grubbing, grading, and construction of an all-weather access road (gravel).

Clearing of all vegetation will be required for the entire regeneration site, including a distance of approximately eight to ten feet outside the fence. Once the vegetation is cleared, the entire regeneration site will be graded essentially flat, with enough slope to provide for runoff of precipitation. After grading, the entire site will be treated with a soil sterilizer to prevent vegetation growth to minimize future maintenance. Next, a thin layer of gravel or crushed rock will be applied to the finished surface of the regeneration site. Clearing and grading material will be disposed of in compliance with local ordinances. Material from off-site will be obtained at existing borrow or commercial sites, and will be trucked to the regeneration site using existing roads and the regeneration site access road.

Security fencing will be installed around the entire perimeter of each regeneration station. This seven-foot-high fence would be constructed of chain link with steel posts. One foot of barbed wire or similar material will be installed on top of the chain link yielding a total fence height of eight feet. A locked gate will be installed for authorized vehicle and personnel access.

Foundations for the prefabricated building(s) will be slab-on-grade type. These foundations are placed by excavating the foundation area; placing forms, reinforced steel, and anchor bolts; and placing concrete into the forms. After the foundations have been poured, the forms are removed, and the surface of the foundation finished. Where necessary, provision will be made in the design of the foundations to mitigate potential problems due to frost.

Reinforced steel and anchor bolts will be transported to each site by truck which will then be fabricated into cages on the site. Concrete will be hauled to the site in concrete trucks. Excavated material will be spread at the site or disposed of in accordance with agency requirements or local ordinances. Pre-fabricated building(s) will be transported to the site by truck and attached to the foundations by means of threaded anchor bolts embedded in the concrete.

The fiber optic cable will be connected from the splice box located near the bottom of the nearest transmission structure to the control building at the regeneration site via two diverse paths, either overhead or underground. The overhead path may require one, two or three short distribution type poles all located on the transmission ROW. An underground path will require trenching and burial of an underground fiber optic cable. All trenching is to occur on the transmission ROW.

Connection to a local electric distribution circuit will be required to provide power to the site. Additionally, an emergency generator with a liquid propane gas fuel tank will be installed at the site inside the fenced area.

A short tower (generally less than 30 feet) with a UHF/VHF radio antenna will be installed to provide communication support for transmission line patrol and maintenance operations and allow emergency operations independent of commercial common carrier (i.e., cellular telephone).

5.6 Post-Construction Clean-Up and Restoration

Terminal, ground electrode, series compensation station and transmission line construction will generate a variety of solid wastes including concrete, hardware, and wood debris. The solid wastes generated during construction will be recycled or hauled away for disposal. Excavation along the ROW and at terminals and substations will generate excavated subsoil spoil that could potentially be used as fill; however, some of the excavated material will be removed for disposal.

The majority of waste associated with terminal and substation construction results from spoils created during site grading. Very little of the soil excavated during foundation installation is waste product. Above-grade waste will be packing material such as crates, pallets, and paper wrapping to protect equipment during shipping. It is assumed a 12-yard dumpster will be filled once a week with waste material for the duration of each terminal or substation project.

Clean-up and restoration will consist of:

- Removing packing crate reels, shipping material and debris, and disposing of them at approved landfill sites;
- Backfilling holes and ruts in access roads, installing water bars, and doing final grading;
- Dressing work sites and structure sites to remove ruts;
- Mitigating soil compaction and leveling, disking, and preparing areas for seeding, as required;
- Maintaining permanent access roads as needed for future maintenance work;
- Leaving access roads in place, but not regularly maintaining them. Access roads will be graded, have water bars installed, and reseeded to encourage vegetation cover according to appropriate land management agency or private landowner requirements;
- Repairing fences and gates to their original condition or better;
- Grounding fences;
- Seeding and revegetating, as specified in the Appendix Q Reclamation Plan and in accordance with appropriate land management agency or private landowner requirements; and
- Contacting property owners and processing claims for settlement.

5.7 Special Construction Practices

5.7.1 Blasting

As described earlier in this section, foundations for tubular steel poles and self supporting steel lattice towers will normally be installed using drilled shafts or piers. Foundations for guyed steel lattice towers will typically be small precast or cast-in-place concrete pedestals. If hard rock is encountered within the planned drilling depth, blasting may be required to loosen or fracture the rock to reach the required depth to install the tower foundations. Areas where blasting will likely occur will be identified during final design based on the geologic conditions of the selected Alternative alignment as determined by the geotechnical investigation. The Contractor will be required to prepare a Blasting Plan for the Project, subject to the approval of the Applicant. The Blasting Plan will detail the Contractor's proposals for compliance with the Applicant's blasting specifications and Blasting Plan framework (Appendix C), and will detail the general concepts proposed to achieve the desired excavations. In addition, the Blasting Plan will address proposed methods for controlling fly rock, for blasting warnings, and for use of non-electrical blasting systems. The Contractor will be required to provide data to support the adequacy of the proposed efforts regarding the safety of structures and slopes and to ensure that an adequate foundation is obtained. When utilized, blasting will take place between sunrise and sunset.

The Blasting Plan will contain shot plans which will detail the drilling and blasting procedures; the number, location, diameter, and inclination of drill holes; the amount, type, and distribution of explosive per hole and delay; and pounds of explosive per square foot for pre-splitting and smooth blasting. The Contractor will be required to maintain explosives logs.

Blasting near buildings, structures, and other facilities susceptible to vibration or air blast damage will be carefully planned by the Contractor and the Applicant, and controlled to eliminate the possibility of damage to such facilities and structures. The Blasting Plan will include provisions for control to eliminate vibration, fly rock, and air blast damage.

Blasting will be very brief in duration (milliseconds), and the noise will dissipate with distance. Blasting produces less noise and vibration than comparable non-blasting methods to remove hard rock. Non-blasting methods include track rig drills, rock breakers, jack hammers, rotary percussion drills, core barrels, and rotary rock drills with rock bits, which all require much longer time duration to excavate the same amount of rock as blasting.

5.7.2 Helicopter Construction

Helicopter construction techniques may be used for the erection of structures, stringing of conductor and shield wire, and other Project construction activities. The use of helicopters for structure erection is evaluated based on site- and region-specific considerations including access to structure locations, sensitive resources, permitting restrictions, construction schedule, weight of structural components, time of year, elevation, availability of heavy lift helicopters, and/or construction economics.

Helicopter erection of structures is a viable option for all locations without restrictions prohibiting or restricting helicopter use. As such "fly yards" have been incorporated into Project planning. In areas without restrictions on helicopter usage, the decision to employ helicopter construction techniques will be determined by the Contractor. However it is not anticipated that helicopter erection will be used except potentially in areas with extremely difficult access, in areas with some form of access restriction or in areas required by mitigation measures.

The use of helicopters for pulling shield wire and conductor lead lines is the normal and expected construction technique for wire stringing, as such, helicopters will be used for this purpose on the Project.

Other Project construction activities potentially facilitated by helicopters may include delivery of construction laborers, equipment, and materials to structure sites; structure placement and hardware installation. Helicopters may also be used to support the administration and management of the Project by the Applicant. Except in areas with restrictions on constructing or maintaining access roads, the use of helicopter construction methods would not change the length of the access road system required for operating the Project, because vehicle access will be required to each structure site regardless of the construction method employed.

When helicopter construction methods are employed, the structure assembly activities will be based at a fly yard. The fly yards will be approximately seven acres and will be sited typically at about five mile intervals within the section of the line employing helicopter erection. Optimum helicopter methods of erection will be used. Bundles of steel members and associated hardware for up to 15 to 20 towers (generally to include insulators, hardware, blocking, stringing sheaves, etc.) are transported to the appropriate fly yard by truck and stored. The steel bundles are opened and laid out by component section and then assembled into assemblies of convenient size and weight according to the helicopter's lifting capabilities. The leg extensions are typically transported to the tower location, assembled, and erected in place (with smaller equipment) in preparation for flying the completed tower sections to each location. After a planned quantity of towers is completely assembled, the helicopter and support force are mobilized and, within a few days, will set all the planned towers within a given section. A follow-up crew will then tighten all the bolts in the joints.

Prior to installation, each tower would be assembled in multiple sections at the fly yard. Tower sections or components would be assembled by weight, based on the lifting capacity of the helicopter in use. The lift capacity of helicopters is dependent on the elevation of the fly yard, the tower site, and the intervening terrain. The heavy lift helicopters that could be used to erect the complete towers or sections of a tower would be able to lift a maximum of 15,000 to 20,000 pounds per flight, depending on elevation.

After assembly at the fly yard, the complete tower or tower section would be attached by cables from the helicopter to the top of the tower section and airlifted to the tower location. Upon arrival at the tower location, the section would be placed directly onto the foundation or atop the previous tower section. Guide brackets attached on top of each section would assist in aligning the stacked sections. Once aligned correctly, line crews would climb the towers to bolt the sections together permanently.

It should be noted that the fly yard locations provided are considered approximate and subject to change, additions, or deletions upon acquisition of a Contractor prior to the beginning of construction. Upon completion of field review, a final determination would be made on the necessity of certain fly yards and the respective locations that provide the most efficient, economic, safest, and least impactful use of the fly yards that are needed.

A helicopter may be used to move personnel and equipment (e.g., pulling lines and assembling towers). Helicopters will set down in areas previously identified to receive temporary disturbance such as fly yards and staging areas. Travelers may be dropped at pulling and tensioning sites or other work areas previously described. Spill protection measures will be in place and all FAA regulations will be followed. Notification will be made to coordinate the air space with other possible helicopters or aircraft in the area (i.e., seeding operations, fire support, and Military Operation Areas).

If needed, additional temporary work areas within close proximity to or on the ROW will be identified by the Contractor and approved by the appropriate land management agency or private landowner for landing and refueling the helicopter. Each fuel truck will be equipped with automatic shutoff valves and will carry spill kits. In addition to the required preventive spill measures, a water truck may be required to spray the site to reduce dust. The Contractor will be required to clean up any materials released on the ROW. Any accidental spills will be handled according to the guidelines presented in the Hazardous Materials Management Plan (Appendix L).

5.7.3 Roadless Construction Methods

The standard construction methods described in this POD are the preferred methods for the TWE Project. Under specific conditions where access road construction is restricted or prohibited such as in IRAs, roadless construction methods will be used to eliminate the need for access roads and allow all construction activities to take place with specialized techniques, vehicles, and equipment. The roadless construction methods described in this section will be used to construct the Project in IRAs and other restricted areas.

The Applicant is not proposing to build or maintain any new temporary or permanent roads across IRAs. There will be no addition of Forest classified or temporary road miles for either construction or maintenance of the TWE Project. Where existing National Forest System roads are available and open to motor vehicle use, they will be used to access structure work areas in the TWE Project transmission line ROW. These system roads in or outside IRAs may need to be improved or widened depending on the condition of the road. However, existing roads will not be widened or otherwise upgraded for construction, as determined by the land management agency, where soils and vegetation are particularly sensitive to disturbance, except in areas where repairs are necessary to make existing roads passable and safe. Roadless construction methods include the use of helicopter construction techniques supported by minimal impact overland travel. A detailed description of helicopter construction techniques is provided in Section 5.7.2. Helicopters would transport personnel, drilling equipment, towers and other construction materials to and from the ROW and would be used for wire stringing. Access to the ROW for transport of personnel, equipment and material also could be accomplished by overland travel using low-impact vehicles. These low-impact vehicles would only be used in suitable terrain to the extent that no visible road or pathway is created. No blade work would be performed to assist overland travel within the IRAs.

Within a restricted area, the structure foundations could be constructed by several methods depending on soil conditions, terrain conditions, and final engineering design. Examples of construction options for installing tower foundations include using precast concrete support pedestals for the guyed steel lattice structures and micro-piles for the self supporting lattice tower foundations transported into the restricted area by helicopter or by overland travel using low-impact vehicles. Tower structure sections would be preassembled at approved construction fly yards located outside of the restricted areas and airlifted to the tower site locations by helicopter for erection.

Following the completion of construction activities, any temporary disturbance, including any associated with overland travel to access the ROW would be reclaimed. The use of low-impact vehicles and equipment for overland access and ground-based site work will result in minimal disturbance in the temporary work areas. Any disturbance that does occur will be re-contoured, topsoil replaced, and revegetated with vegetation consistent with USFS requirements and the Reclamation Plan (Appendix Q). Revegetation treatments would be monitored in accordance with USFS requirements and the Reclamation Plan. Once the roadless construction area is reclaimed, routine maintenance would be via aircraft or low-impact vehicles such as vehicles with rubber treading, low pressure tires, or specialized mechanical movement to accommodate the terrain and landscape, and ATVs, or by non-motorized methods (e.g., foot, horseback, or other non-motorized

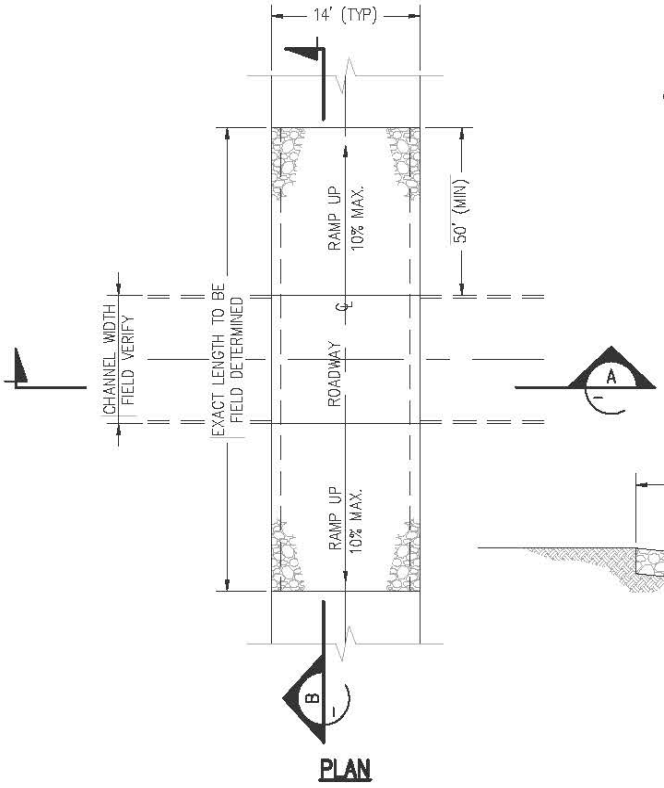
methods). Unless otherwise approved, the transmission line ROW would only be accessed with motorized equipment for emergency repairs, or to maintain NESC electrical line clearances. Long-term disturbances would include maintenance of a limited ROW width, in which active vegetation management would occur. Authorization for continued vegetation management and emergency repairs would be the responsibility of the USFS and conducted in accordance with the POD and USFS stipulations.

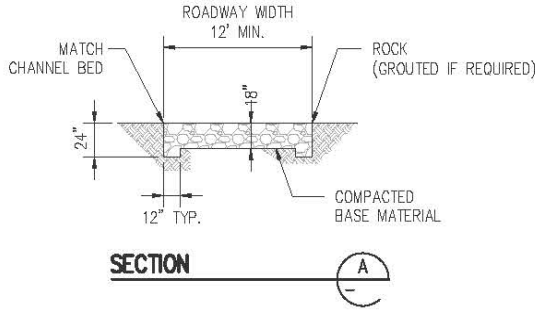
The Applicant will work with the USFS to control the use of the ROW and prevent unauthorized travel along the ROW by off-road vehicles. Measures would be determined in consultation with the USFS and may include the following: a) installing gates or other man-made physical barriers; b) creating natural barriers (e.g., large boulders or debris); and c) stockpiling trees cut for ROW clearing at barrier locations.

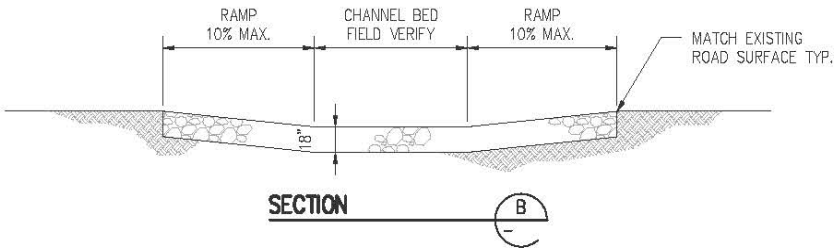
5.7.4 Water Crossings

Access roads will be designed and constructed to minimize disruption of natural drainage patterns and waterbodies including rivers, streams, ephemeral streams, ponds, lakes, reservoirs, and playas. Structure sites, new access roads, and other disturbed areas will be located away from waterbodies, wherever practicable. Each waterbody crossing will be designed in a distinct segment of the associated access roads as advanced engineering is completed. On all federally-managed lands, the Applicant will consult with the managing agency regarding relevant standards and guidelines pertaining to waterbody road-crossing methods.

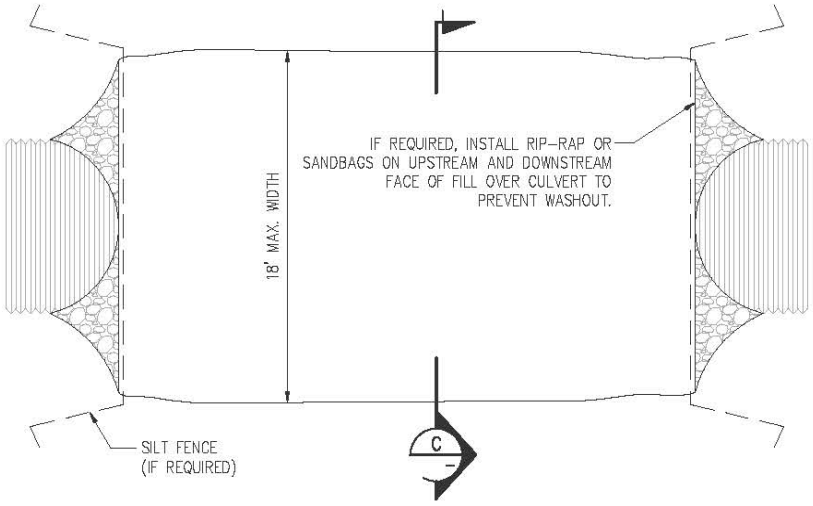
Consultation will include site assessment, design, installation, maintenance, and decommissioning of the crossings. Wherever needed, culverts, low-water crossings, and other devices of adequate accepted design will be used to accommodate estimated peak flows of waterways, including crossings of all affected perennial, intermittent, and ephemeral streams. Construction disturbances of banks and beds of waterbodies will be minimized. Performance of low water stream crossings (i.e., drive thru and ford) will be monitored for the life of the access road, and maintained as necessary to preserve water quality. Figure 18 shows typical road designs for low-water crossings and culvert stream crossings.

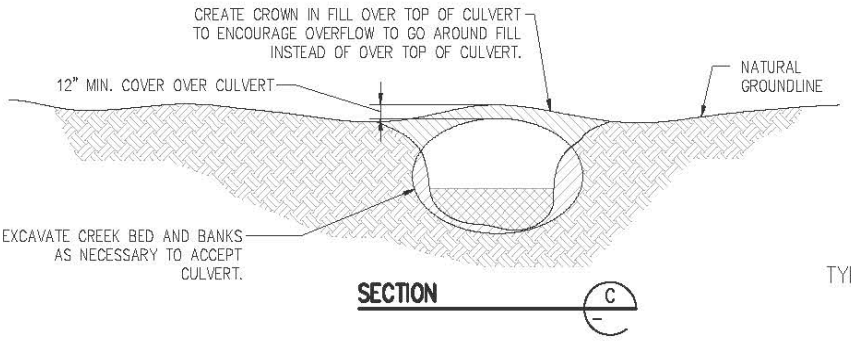






TYPICAL ROADS
CROSSING (GROUTED, IF REQUIRED)





TYPICAL ROADS – CULVERT

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FIGURE 18

TYPICAL ROAD DESIGNS FOR
LOW WATER & CULVERT CROSSINGS

Potential types of water crossings that would be implemented include:

- **Drive Thru (Arizona Crossing):** Crossing of a channel with minimal vegetation removal where no cut or fill is needed. This is typical for low-precipitation sagebrush country characterized by rolling topography and streams that rarely flow with water.

- **Ford:** Crossing of a channel that includes grading and stabilization. Stream banks and approaches will be graded and stabilized with rock or other erosion control devices to allow vehicle passage. With approval of the land management agency, streambeds in select areas will be reinforced with coarse rock material to support vehicle loads, prevent erosion, and minimize sedimentation of the waterways. Coarse rock will be installed in the streambed in a manner such that it will not raise the level of the streambed, thus allowing continued movement of water, fish, and debris. A typical ford crossing results in a disturbance footprint 25 feet wide (along the waterbody) and 50 feet long (along the roadway) for 1,250 square feet or 0.03 acre of disturbed area at each crossing. The 0.03 acre is based on an estimated disturbance based on the requirement to operate equipment within the riparian area to construct a 14-foot-wide travel way and install armoring to protect it from erosion.

- **Culvert:** Crossing of a waterbody that includes installation of a culvert and construction of a stable road surface for vehicle passage over the culvert. Culverts will be designed and installed under the direction of a qualified engineer who, in collaboration with a hydrologist and an aquatic biologist where required by the land management agency, will specify placement locations; culvert gradient, height, and sizing; and proper construction methods. Culvert design will consider roadbed loading and debris size and volume. The disturbance footprint for a typical culvert installation is estimated to be 50 feet wide (along the waterbody) and 150 feet long (along the road) for 7,500 square feet or 0.17 acre of disturbed area at each crossing. This disturbed area includes approaches to the crossing and side slopes. The amount of area disturbed by excavation and fill material at each crossing will typically be much less and will be determined during final design and engineering. Ground-disturbing activities will comply with agency approved BMPs. Construction will occur during periods of low water or normal flow. The operation of construction equipment in riparian areas will be minimized. All culverts will be designed and installed to meet specified riparian conditions, as identified in applicable unit management plans. Culvert slope will not exceed stream gradient.

  Culverts will typically be partially buried in the streambed to maintain streambed material in the culvert. Sandbags or other non-erosive material will be placed around culverts to prevent scour or water flow outside the culvert. Adjacent sediment control structures such as silt fences, check dams, rock armoring, or riprap may be necessary to prevent erosion or sedimentation. Stream banks and approaches may be stabilized with rock or other erosion control devices. Culverts will be inspected annually for proper operation and maintained to preserve water quality for the life of the Project (estimated at 50 years or longer).

Wetlands will be avoided to the maximum extent practicable in siting transmission line structures, terminals, ground electrode facilities, temporary work areas, and access roads. Wetlands can typically be spanned by transmission lines to avoid impacts. Timber or other types of matting can be used to support construction equipment in wetlands to avoid the need to fill a wetland either temporarily or permanently for access during construction. Impacts to wetlands and waters of the U.S. will require a CWA Section 404 permit from USACE, NPDES Construction Stormwater Permit (Section 402), and Section 401 water quality certification.

5.7.5 Water Use

Construction of the transmission line and substation/converter stations will require water. Major water uses are required for transmission line structure and substation foundations, and dust control during ROW and substation grading and site work. A minor use of water during construction would include the establishment of substation landscaping where required.

Water usage for transmission line construction is for two primary purposes: foundation construction and dust control. In the construction of foundations, water is transported to the batch plant site where it will be used to produce concrete. From the batch plant, the wet concrete will be transported to the structure site in concrete trucks for use in foundation installation.

Construction of the transmission lines and related facilities will generate a temporary increase in fugitive dust. If the level of fugitive dust is too high in specific project areas, as determined in cooperation with the landowner or agency, water would be applied to disturbed areas to minimize dust.

Water usage for substation/converter station construction is primarily for dust control during site preparation work. During this period, construction equipment would be cutting, moving, and compacting the subgrade surface. As a result, water trucks patrolling the site to control dust would make as many as one pass per hour over the site. Once site preparation work is complete, concrete for the placement of foundations becomes the largest user of water and dust control becomes minimal.

Once site grading is complete, the balance of the substation construction work would be performed on bare subgrade soil or subgrade with a thin layer of rock. Fire risk would be minimal due to the bare ground or rock surface and would be contained within the confines of station-fenced area.

The estimated water required per mile of transmission line construction is approximately 3,400 gallons for foundation concrete and 240,000 gallons for dust control. Water required for construction of the Northern Terminal is estimated to be 600,000 gallons including dust control. Water required for construction of the Southern Terminal is estimated to be 400,000 gallons including dust control due to less disturbance and fewer foundations. Estimated water required for each ground electrode site is 150,000 gallons including dust control. The required water will be procured from municipal sources, from commercial sources, or under a temporary water use agreement with landowners holding existing water rights. No new water rights will be required.

5.8 Construction Schedule, Workforce, and Equipment

The proposed construction schedule for the TWE Project will be developed for the selected Alternative during final engineering and design and will be presented in the NTP POD. The construction schedule for the TWE Project will incorporate timing restrictions for special status plant and animal species, as determined by the land management and regulatory agencies in their respective decision documents. For purposes of the FEIS analysis, conceptual schedules have been developed, which provide general estimates on the duration of activities for each of the proposed TWE Project facilities. Conceptual construction schedules are described in Section 5.8.1. Estimated workforce and equipment needs are described in Sections 5.8.2 and 5.8.3, respectively.

5.8.1 Construction Schedule

It is anticipated that total construction timeframe for the transmission line will be approximately three years, concurrent with terminals and ground electrode system construction.

Conceptual schedules for the proposed TWE Project are shown in Figures 19, 20, 21 and 22. Figure 19 provides a bar chart construction schedule for a typical 20-mile stretch of the ±600 kV DC transmission line. Figure 20 shows the entire conceptual schedule for constructing the 750 mile long ±600 kV DC transmission line, including access roads and communication facilities. Figure 21 is a schedule for the proposed Northern and Southern Terminals, and Figure 22 is a construction schedule for the ground electrode systems.

For planning purposes, the overall schedule for the transmission line has been separated into three construction spreads or operations by line segment. The transmission line schedules show a staggered start to allow time for setups, material and equipment logistics and coordination between spreads. The total elapsed time of the combined transmission line schedule is approximately 137 weeks. These construction schedules include consideration for the anticipated conditions; however, severe winter weather, delays in equipment manufacturing and/or delivery, seasonal restrictions required for permitting and/or unexpected mitigation could interrupt the schedule inserting delays of weeks to several months or more.

Construction spreads for the transmission line are anticipated at three different locations. The approximate geographic locations are: (1) Northern Terminal to North-East Utah; (2) North-East Utah to West-Central Utah; and (3) West-Central Utah to the Southern Terminal. The line construction will progress simultaneously at these locations. The construction spreads for the transmission line have been designed such that one or more Contractors may be employed to construct the complete line.

The duration of transmission line construction activities on any given parcel of land may extend up to a year, although the total amount of time of actual construction activity would be much shorter, in the range of a few months. Over any particular section of the route, transmission line construction would be characterized by short periods (ranging from a day to one to two weeks) of relatively intense activity interspersed with periods with no activity. Figure 19 illustrates the typical durations for the construction of a 20-mile section of the transmission line.

The construction of the Northern and Southern Terminals is planned to start approximately three to six months after the start of the construction of the transmission line and run concurrently. The total elapsed time is scheduled for approximately two years. These construction schedules include consideration for the anticipated conditions; however, severe winter weather at the Northern Terminal could interrupt the schedule inserting delays of weeks to several months or more. The ground electrode facilities will take approximately one year to construct and is planned to start 18 months after the start of construction of the transmission line.

TASK	DURATION (WEEKS)
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	2.5
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	2.5
GEOLOGICAL INVESTIGATIONS	3
SURVEY / STAKE STRUCTURE LOCATIONS	3
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	1
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	1
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	3
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	3
ERECT SELF SUPPORTING LATTICE STRUCTURE	4
WIRE INSTALLATION	3
FINAL CLEAN UP / RECLAMATION / RESTORATION	4

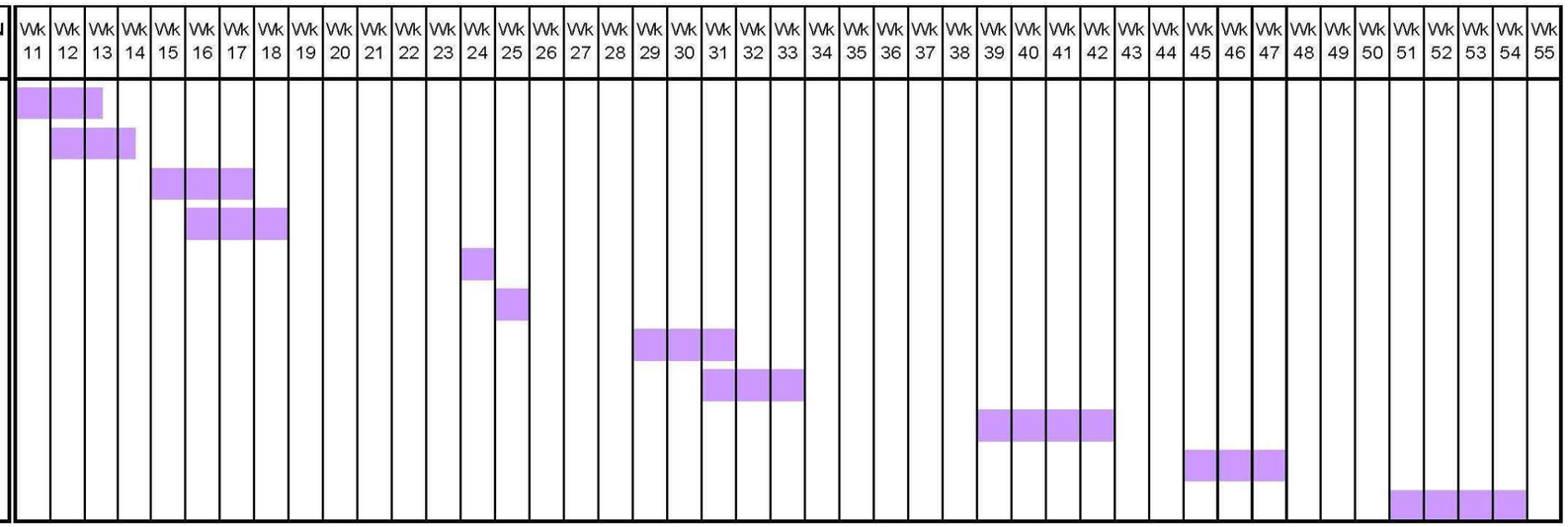

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FIGURE 19

CONSTRUCTION SCHEDULE FOR 20 MILE SECTION OF ±600kV DC TRANSMISSION LINE

SECTION 1 - NORTHERN TERMINAL - NORTHEASTERN UTAH

TOTAL DURATION: 111 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	111
INSPECTION	109
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	109
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	49
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	49
GEOLOGICAL INVESTIGATIONS	56
SURVEY / STAKE STRUCTURE LOCATIONS	56
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	67
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	67
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	60
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	60
ERECT SELF SUPPORTING LATTICE STRUCTURE	70
WIRE INSTALLATION	61
FINAL CLEAN UP / RECLAMATION / RESTORATION	70

SECTION 2 - NORTHEASTERN UTAH - WEST CENTRAL UTAH

TOTAL DURATION: 131 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	131
INSPECTION	129
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	129
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	60
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	60
GEOLOGICAL INVESTIGATIONS	69
SURVEY / STAKE STRUCTURE LOCATIONS	69
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	83
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	83
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	75
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	75
ERECT SELF SUPPORTING LATTICE STRUCTURE	87
WIRE INSTALLATION	76
FINAL CLEAN UP / RECLAMATION / RESTORATION	87

SECTION 3 - WEST CENTRAL UTAH - SOUTHERN TERMINAL

TOTAL DURATION: 120 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	120
INSPECTION	118
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	118
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	56
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	56
GEOLOGICAL INVESTIGATIONS	64
SURVEY / STAKE STRUCTURE LOCATIONS	64
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	75
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	75
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	70
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	70
ERECT SELF SUPPORTING LATTICE STRUCTURE	80
WIRE INSTALLATION	70
FINAL CLEAN UP / RECLAMATION / RESTORATION	80

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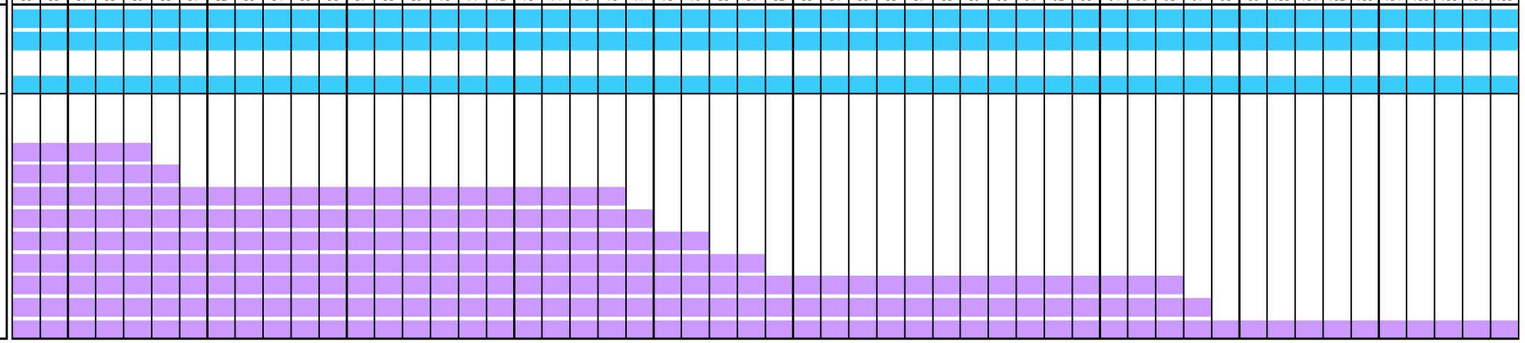
FIGURE 20

CONSTRUCTION SCHEDULE FOR
±600kV DC TRANSMISSION LINE BY SEGMENT
SHEET 1

SECTION 1 - NORTHERN TERMINAL - NORTHEASTERN UTAH

TOTAL DURATION: 111 weeks

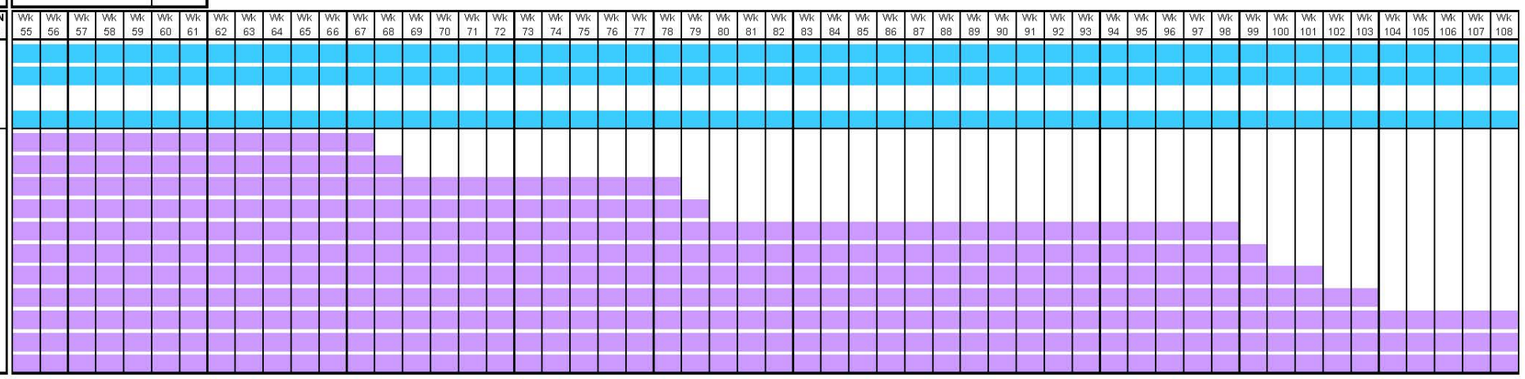
TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	111
INSPECTION	109
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	109
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	49
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	49
GEOLOGICAL INVESTIGATIONS	56
SURVEY / STAKE STRUCTURE LOCATIONS	56
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	67
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	67
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	60
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	60
ERECT SELF SUPPORTING LATTICE STRUCTURE	70
WIRE INSTALLATION	61
FINAL CLEAN UP / RECLAMATION / RESTORATION	70



SECTION 2 - NORTHEASTERN UTAH - WEST CENTRAL UTAH

TOTAL DURATION: 131 weeks

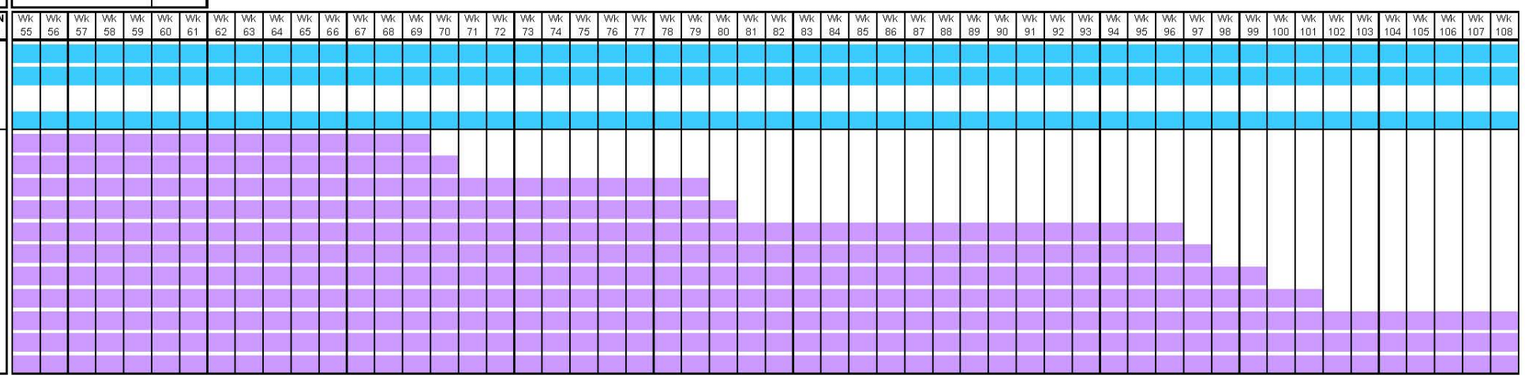
TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	131
INSPECTION	129
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	129
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	60
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	60
GEOLOGICAL INVESTIGATIONS	69
SURVEY / STAKE STRUCTURE LOCATIONS	69
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	83
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	83
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	75
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	75
ERECT SELF SUPPORTING LATTICE STRUCTURE	87
WIRE INSTALLATION	76
FINAL CLEAN UP / RECLAMATION / RESTORATION	87



SECTION 3 - WEST CENTRAL UTAH - SOUTHERN TERMINAL

TOTAL DURATION: 120 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	120
INSPECTION	118
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	118
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	56
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	56
GEOLOGICAL INVESTIGATIONS	64
SURVEY / STAKE STRUCTURE LOCATIONS	64
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	75
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	75
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	70
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	70
ERECT SELF SUPPORTING LATTICE STRUCTURE	80
WIRE INSTALLATION	70
FINAL CLEAN UP / RECLAMATION / RESTORATION	80



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TRANSWEST EXPRESS TRANSMISSION PROJECT

FIGURE 20

CONSTRUCTION SCHEDULE FOR
±600kV DC TRANSMISSION LINE BY SEGMENT
SHEET 2

SECTION 1 - NORTHERN TERMINAL - NORTHEASTERN UTAH		TOTAL DURATION	111 weeks

TASK	DURATION (WEEKS)	Wk 109	Wk 110	Wk 111	Wk 112	Wk 113	Wk 114	Wk 115	Wk 116	Wk 117	Wk 118	Wk 119	Wk 120	Wk 121	Wk 122	Wk 123	Wk 124	Wk 125	Wk 126	Wk 127	Wk 128	Wk 129	Wk 130	Wk 131	Wk 132	Wk 133	Wk 134	Wk 135	Wk 136	Wk 137	Wk 138	Wk 139	Wk 140
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	111																																
INSPECTION	109																																
MOBILIZE CONTRACTOR	6																																
RECEIVE / HANDLE MATERIALS	109																																
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	49																																
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	49																																
GEOLOGICAL INVESTIGATIONS	56																																
SURVEY / STAKE STRUCTURE LOCATIONS	56																																
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	67																																
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	67																																
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	60																																
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	60																																
ERECT SELF SUPPORTING LATTICE STRUCTURE	70																																
WIRE INSTALLATION	61																																
FINAL CLEAN UP / RECLAMATION / RESTORATION	70																																

SECTION 2 - NORTHEASTERN UTAH - WEST CENTRAL UTAH		TOTAL DURATION	131 weeks

TASK	DURATION (WEEKS)	Wk 109	Wk 110	Wk 111	Wk 112	Wk 113	Wk 114	Wk 115	Wk 116	Wk 117	Wk 118	Wk 119	Wk 120	Wk 121	Wk 122	Wk 123	Wk 124	Wk 125	Wk 126	Wk 127	Wk 128	Wk 129	Wk 130	Wk 131	Wk 132	Wk 133	Wk 134	Wk 135	Wk 136	Wk 137	Wk 138	Wk 139	Wk 140
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	131																																
INSPECTION	129																																
MOBILIZE CONTRACTOR	6																																
RECEIVE / HANDLE MATERIALS	129																																
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	60																																
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	60																																
GEOLOGICAL INVESTIGATIONS	69																																
SURVEY / STAKE STRUCTURE LOCATIONS	69																																
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	83																																
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	83																																
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	75																																
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	75																																
ERECT SELF SUPPORTING LATTICE STRUCTURE	87																																
WIRE INSTALLATION	76																																
FINAL CLEAN UP / RECLAMATION / RESTORATION	87																																

SECTION 3 - WEST CENTRAL UTAH - SOUTHERN TERMINAL		TOTAL DURATION	120 weeks

TASK	DURATION (WEEKS)	Wk 109	Wk 110	Wk 111	Wk 112	Wk 113	Wk 114	Wk 115	Wk 116	Wk 117	Wk 118	Wk 119	Wk 120	Wk 121	Wk 122	Wk 123	Wk 124	Wk 125	Wk 126	Wk 127	Wk 128	Wk 129	Wk 130	Wk 131	Wk 132	Wk 133	Wk 134	Wk 135	Wk 136	Wk 137	Wk 138	Wk 139	Wk 140
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	120																																
INSPECTION	118																																
MOBILIZE CONTRACTOR	6																																
RECEIVE / HANDLE MATERIALS	118																																
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	56																																
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	56																																
GEOLOGICAL INVESTIGATIONS	64																																
SURVEY / STAKE STRUCTURE LOCATIONS	64																																
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	75																																
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	75																																
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	70																																
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	70																																
ERECT SELF SUPPORTING LATTICE STRUCTURE	80																																
WIRE INSTALLATION	70																																
FINAL CLEAN UP / RECLAMATION / RESTORATION	80																																

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TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 20

CONSTRUCTION SCHEDULE FOR
±600kV DC TRANSMISSION LINE BY SEGMENT
SHEET 3

NORTHERN TERMINAL

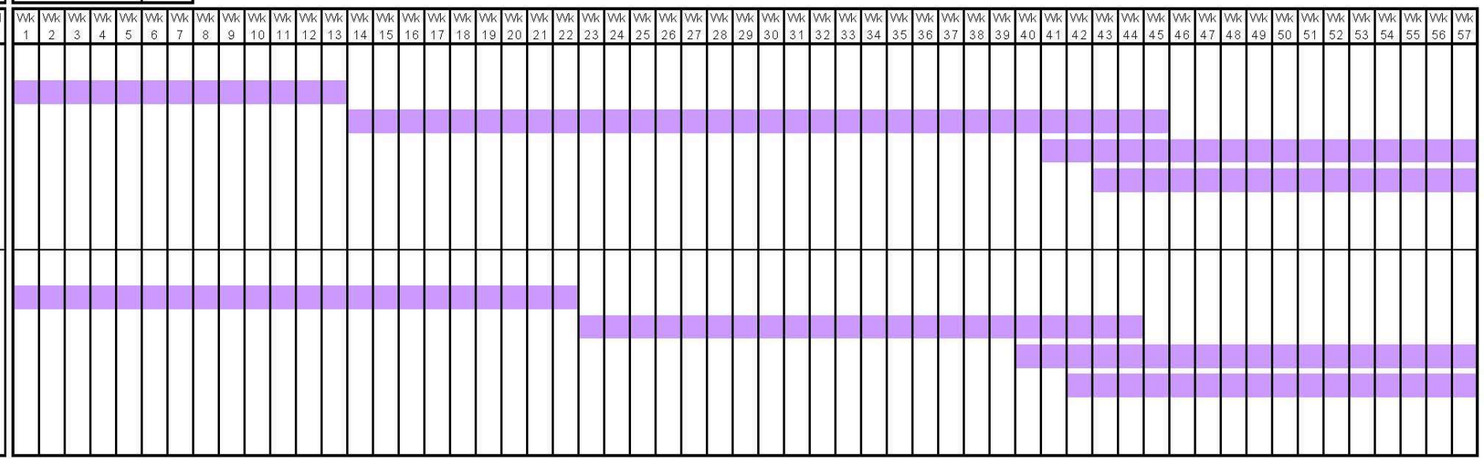
TOTAL DURATION: 111 week

TASK	DURATION (WEEKS)
AC/DC CONVERTER STATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	32
BUILDING CONSTRUCTION	35
EQUIPMENT INSTALLATION	39
EQUIPMENT TESTING	21
OPERATIONAL	9
500 kV AC SUBSTATION	
SITE GRADING	26
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	30
BUILDING CONSTRUCTION	34
EQUIPMENT INSTALLATION	30
EQUIPMENT TESTING	17
OPERATIONAL	7
230 kV AC SUBSTATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	17
BUILDING CONSTRUCTION	17
EQUIPMENT INSTALLATION	13
EQUIPMENT TESTING	9
OPERATIONAL	4

SOUTHERN TERMINAL

TOTAL DURATION: 111 week

TASK	DURATION (WEEKS)
AC/DC CONVERTER STATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	32
BUILDING CONSTRUCTION	35
EQUIPMENT INSTALLATION	39
EQUIPMENT TESTING	21
OPERATIONAL	9
500 kV AC SUBSTATION	
SITE GRADING	22
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	22
BUILDING CONSTRUCTION	26
EQUIPMENT INSTALLATION	22
EQUIPMENT TESTING	13
OPERATIONAL	6



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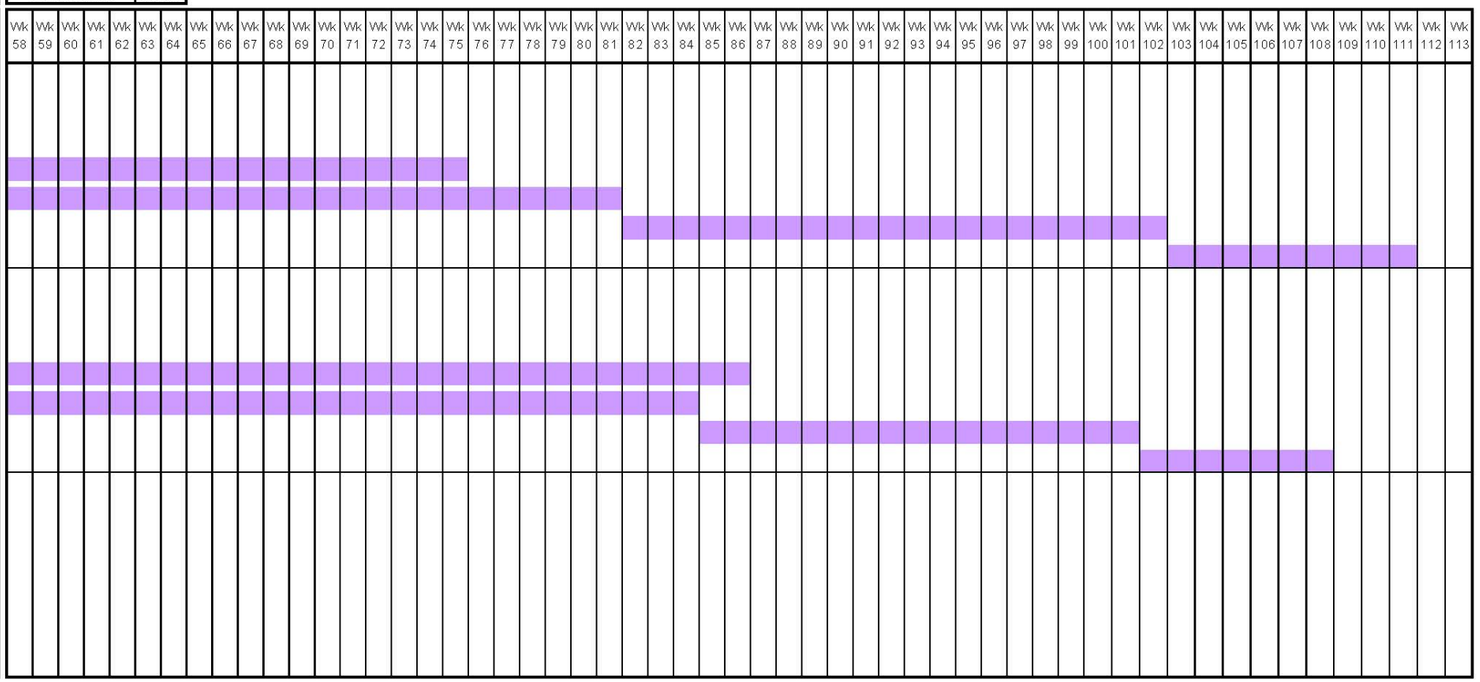
TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 21

CONSTRUCTION SCHEDULE FOR
NORTHERN & SOUTHERN TERMINALS
SHEET 1

NORTHERN TERMINAL

TOTAL DURATION: 111 week

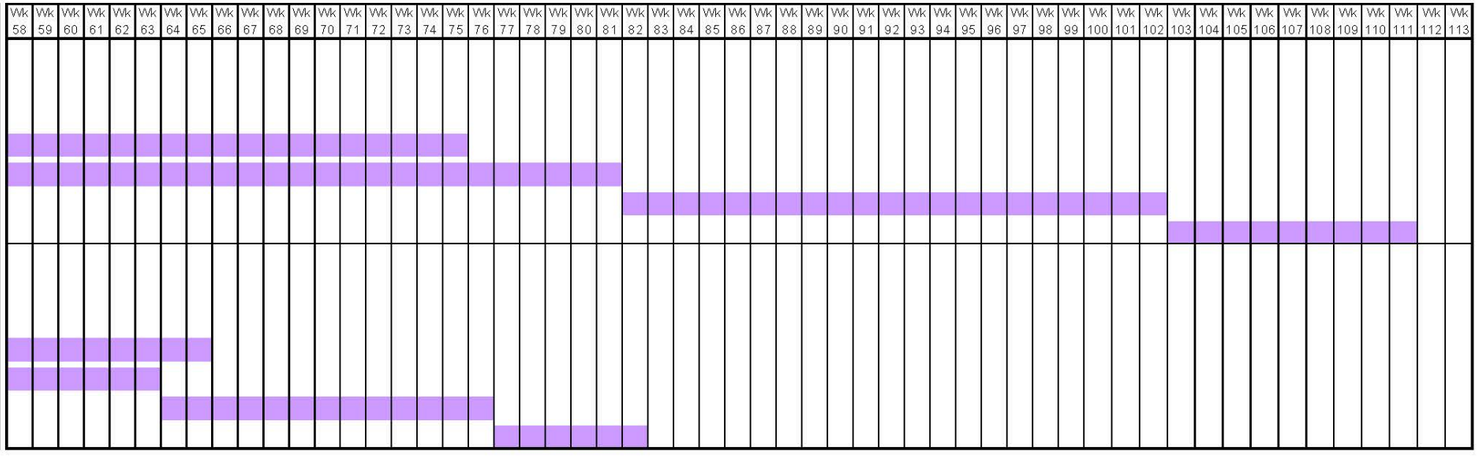
TASK	DURATION (WEEKS)
AC/DC CONVERTER STATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	32
BUILDING CONSTRUCTION	35
EQUIPMENT INSTALLATION	39
EQUIPMENT TESTING	21
OPERATIONAL	9
500 kV AC SUBSTATION	
SITE GRADING	26
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	30
BUILDING CONSTRUCTION	34
EQUIPMENT INSTALLATION	30
EQUIPMENT TESTING	17
OPERATIONAL	7
230 kV AC SUBSTATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	17
BUILDING CONSTRUCTION	17
EQUIPMENT INSTALLATION	13
EQUIPMENT TESTING	9
OPERATIONAL	4



SOUTHERN TERMINAL

TOTAL DURATION: 111 week

TASK	DURATION (WEEKS)
AC/DC CONVERTER STATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	32
BUILDING CONSTRUCTION	35
EQUIPMENT INSTALLATION	39
EQUIPMENT TESTING	21
OPERATIONAL	9
500 kV AC SUBSTATION	
SITE GRADING	22
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	22
BUILDING CONSTRUCTION	26
EQUIPMENT INSTALLATION	22
EQUIPMENT TESTING	13
OPERATIONAL	6



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TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 21
CONSTRUCTION SCHEDULE FOR NORTHERN & SOUTHERN TERMINALS
SHEET 2

CONSTRUCTION SCHEDULE FOR ONE GROUND ELECTRODE LOCATION

TASK	DURATION (WEEKS)	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12	Wk 13	Wk 14	Wk 15	Wk 16	Wk 17	Wk 18	Wk 19	Wk 20	Wk 21	Wk 22	Wk 23	Wk 24	Wk 25	Wk 26	Wk 27	Wk 28	Wk 29	Wk 30	Wk 31	Wk 32	Wk 33	Wk 34	Wk 35	Wk 36	Wk 37	Wk 38
SITE GRADING	3																																					
DRILLING 60 WELLS	8																																					
EXCAVATE CABLE TRENCHES	6																																					
BUILD CONCRETE CABLE TRENCHES	10																																					
INSTALL ELECTRODE ELEMENTS	8																																					
INSTALL LV CABLES, SWITCHES	4																																					
INSTALL TEMPERATURE & CURRENT TRANSDUCERS, WIRING	2																																					
BUILD CONTROL / COMMUNICATION BUILDING & FENCED AREA	8																																					
INSTALL SITE COMMUNICATIONS EQUIPMENT, SCADA	4																																					
ELECTRODE COMMISSIONING*	8																																					

*PERFORMED AFTER CONVERTER STATIONS ARE FUNCTIONAL

CONSTRUCTION SCHEDULE FOR LOW VOLTAGE TRANSMISSION LINE (10 MILES ASSUMED)

TASK	DURATION (WEEKS)	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12	Wk 13	Wk 14	Wk 15	Wk 16	Wk 17	Wk 18	Wk 19	Wk 20	Wk 21	Wk 22	Wk 23	Wk 24	Wk 25	Wk 26	Wk 27	Wk 28	Wk 29	Wk 30	Wk 31	Wk 32	Wk 33	Wk 34	Wk 35	Wk 36	Wk 37	Wk 38
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	3																																					
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	4																																					
FOUNDATION EXCAVATION	3																																					
HAUL STRUCTURES	3																																					
INSTALL STRUCTURES	4																																					
INSTALL WIRES	2																																					
FINAL CLEAN UP / RECLAMATION / RESTORATION	4																																					

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TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 22
CONSTRUCTION SCHEDULE FOR GROUND ELECTRODE FACILITIES

5.8.2 Construction Workforce

The proposed TWE Project will be constructed by contract personnel, with the Applicant responsible for Project management, Project administration, and inspection. The construction workforce will consist of laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel who will perform the construction tasks. Estimated construction workforce requirements by major activity are summarized in Tables 10 and 11.

Table 10 identifies the estimated personnel and equipment that is required for each of the three transmission line spreads. The total estimated number of construction personnel for construction of the entire transmission line is 630 people. Table 11 identifies the estimated personnel and equipment that is required for each of the two terminals and each of the two ground electrodes. The total estimated number of construction personnel for construction of both terminals and both ground electrodes is 360 people. The total estimated workforce for the complete proposed Project is approximately 1,000 people.

Construction will generally occur between 7 a.m. and 7 p.m., Monday through Saturday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities.

Temporary work camps are not expected to be necessary for the construction of the TWE Project. Variables considered in determining if work camps would be required are:

- The total distance between living facilities for construction workers and designated work areas. A general one-way travel time of two hours may be considered as a limit in determining if temporary work camps are necessary.
- Workers' Union wage agreement regarding the driving time one-way (to worksite) or round trip (to/from worksite). If the agreement allows for driving time then the camp consideration may not be required.
- The ability of existing communities to provide housing for workers or to make improvements to meet the workers' accommodation demands.
- Socioeconomic impacts on communities along the route with or without the work camps.
- Economic feasibility of permitting a work camp.
- Service life of the work camps and the restoration requirements after tear down.

The TWE Project does not appear to have areas that are more than 50 miles (on paved roads) from the ROW to existing communities or towns. The average travel distance for the Project is approximately 15 miles. The populations of these towns indicate their capability to handle the housing and/or accommodation demands of the construction workers. It should be noted during typical transmission line construction, the entire work force and support personnel generally do not all work in one area at any given time. Generally one or more activities are completed and the associated crews move to a new location prior to all the other activities becoming fully operational in that area.

5.8.3 Construction Equipment

Equipment required for construction of the TWE Project transmission lines, terminals and ground electrode facilities will include, but is not limited to, that listed in Tables 10 and 11.

TABLE 10 ESTIMATED PERSONNEL AND EQUIPMENT FOR TRANSMISSION LINE CONSTRUCTION FOR EACH SPREAD

ACTIVITY	PEOPLE	QUANTITY	TYPE OF EQUIPMENT	TRACK OR RUBBER TIRES
Survey Crew	6	2	Pickup trucks	Rubber
		2	ATV	Rubber
Geologic/ Geotechnical Investigations	6	2	Pickup trucks, 4-wheel drive	Rubber
		1	ATV	Rubber
		2	Rubber tire drill trucks (2-ton)	Either (should change description)
Road Construction Crew	6	2	Dozer (D-8 Cat or equivalent)	Track
		1	Motor grader	Rubber
		1	Pickup truck	Rubber
		2	Carry alls	Rubber
		1	Water truck (for construction and maintenance)	Rubber
		1	Dump truck	Rubber
		1	Front end loader	Either
		1	Diesel tractor w/lowboy	Rubber
Foundation Installation Crew	26	4	Hole diggers	Either
		2	Dozers	Either
		2	Trucks (2-ton)	Rubber
		2	Trucks, flatbed, w/boom (5-ton)	Rubber
		4	Concrete trucks	Rubber
		2	Dump trucks	Rubber
		2	Diesel tractors (equipment hauling)	Rubber
		3	Pickup trucks	Rubber
		1	Mechanics truck	Rubber
		1	Water truck	Rubber
		1	Carry all	Rubber
		2	Cranes, all terrain (35-ton)	Either
		1	Front end loader	Either
		1	Backhoe, w/bucket	Rubber
		1	Wagon drill	Either
		3	Equipment-tool trailers	Rubber
Anchor Installation	20	2	Pickup trucks	Rubber
		4	Carry alls	Rubber
		1	Truck, flatbed (2-ton)	Rubber

ACTIVITY	PEOPLE	QUANTITY	TYPE OF EQUIPMENT	TRACK OR RUBBER TIRES
		2	Trucks, flatbed, w/boom (5-ton)	Rubber
		1	Dump truck	Rubber
		1	Water truck	Rubber
		2	Concrete trucks	Rubber
		1	Mechanics truck	Rubber
		2	Diesel tractors, w/lowboy	Rubber
		2	Dozers	Track
		1	Loader, front end	Either
		3	Backhoes, w/bucket	Either
		3	Wagon drills	Either
		3	Cranes, all terrain (35-ton)	Either
Structure Steel Haul Crew	8	1	Equipment-tool trailer	Rubber
		2	Diesel tractors (steel hauling)	Rubber
		1	Pickup truck	Rubber
		1	Truck, flatbed (2-ton)	Rubber
		1	Carry all	Rubber
		5	Cranes, all terrain (35-ton)	Either
		3	Fork lifts	Rubber
Structure Assembly Crews 8-9 Crews	72	2	Pickup trucks	Rubber
		10	Carry alls	Rubber
		5	Cranes, all terrain (35-ton)	Either
		1	Water truck	Rubber
		5	Air compressors	Rubber
		2	Trucks (2-ton)	Rubber
		1	Mechanics truck	Rubber
		2	Tool-equipment trailers	Rubber
Structure Erection Crews 1-2 Crews	20	2	Cranes (120 – 300-ton)	Either
		2	Trucks (2-ton)	Rubber
		2	Pickup trucks	Rubber
		5	Carry alls	Rubber
		1	Mechanics truck	Rubber
		2	Air compressors	Rubber
		1	Tool-equipment trailer	Rubber
Wire Installation Crew	36	6	Wire reel trailers	Rubber

ACTIVITY	PEOPLE	QUANTITY	TYPE OF EQUIPMENT	TRACK OR RUBBER TIRES
		4	Haul trailers	Rubber
		4	Diesel tractors	Rubber
		4	Cranes (2) 20-ton, (2) 30-ton	Either
		5	Trucks, flatbed, w/bucket (5 -ton)	Rubber
		4	Pickup trucks	Rubber
		2	Splicing trucks	Rubber
		2	3-drum pullers (one medium, one heavy)	Rubber
		2	Single drum pullers (large)	Rubber
		1	Backhoe, w/bucket	Rubber
		1	Water truck	Rubber
		2	Trucks, flatbed (2-ton)	Rubber
		4	Double bull-wheel tensioner (two light and two heavy)	Rubber
		2	Sagging equipment (D-8 Cat)	Track
		6	Carry alls	Rubber
		2	Static wire reel trailers	Rubber
		3	Tool-equipment trailers	Rubber
		2	Mechanics trucks	Rubber
Clean-up Crew	4	1	Truck, flatbed, w/bucket (5-ton)	Rubber
		1	Pickup truck	Rubber
		1	Carry all	Rubber
Road Rehabilitation Crew (ROW Restoration)	6	1	Dozer (D-8 Cat or equivalent)	Track
		1	Front end loader w/bucket	Either
		1	Backhoe, w/bucket	Either
		1	Diesel tractor, w/lowboy	Rubber
		1	Seeding/harrowing equipment, w/tractor	Either
		1	Motor grader	Rubber
		1	Pickup truck	Rubber
		1	Dump truck	Rubber
		1	Carry all	Rubber

Estimated maximum personnel required for all transmission line tasks including maintenance, management, and quality control personnel = 210 for each of the three spreads.

TABLE 11 ESTIMATED PERSONNEL AND EQUIPMENT FOR EACH TERMINAL AND GROUND ELECTRODE FACILITIES

ACTIVITY	PEOPLE	QUANTITY	TYPE OF EQUIPMENT	TRACK OR RUBBER TIRE
Survey Crew	4	2	Pickup trucks	Rubber
Site Management Crew	10-12	4	Office trailers	Rubber
		4	Pickups	Rubber
		4	Generators	Rubber
Site Development – Civil Work Crew	30-35	4	Scrapers	Rubber
		2	Dozers (ripper)	Track
		2	Motor graders	Rubber
		2	Roller compactors	Rubber
		2	Excavators	Either
		4	Dump trucks	Rubber
		3	Water trucks	Rubber
		1	Mechanics truck	Rubber
		1	Fuel truck	Rubber
		2	Pickup trucks	Rubber
		6	Carry alls	Rubber
Fence Installation Crew	10-20	1	Pickup truck	Rubber
		1	Boom truck	Rubber
		2	Carry alls	Rubber
		1	Backhoe	Either
		1	Concrete truck	Rubber
		1	Reel stand truck	Rubber
		2	Bobcats	Either
Equipment Footings Installation Crew	24-30	2	Hole diggers	Either
		2	Boom trucks	Rubber
		1	Excavator	Either
		3	Concrete trucks	Rubber
		1	Dump truck	Rubber
		1	Roller compactor	Rubber
		2	Plate compactors	----------
		1	Backhoe	Either
		2	Bobcats	Either
		1	Mechanics truck	Rubber
		1	Fuel truck	Rubber

ACTIVITY	PEOPLE	QUANTITY	TYPE OF EQUIPMENT	TRACK OR RUBBER TIRE
		1	Water truck	Rubber
		2	Pickup trucks	Rubber
		4	Carry alls	Rubber
Cable Trench, Conduits, and Station Grounding Crew	12-16	2	Trenchers	Either
		2	Dozers (ripper)	Track
		2	Roller compactors	Rubber
		2	Plate compactors	----------
		2	Excavators	Either
		1	Boom truck	Rubber
		3	Pickup trucks	Rubber
		2	Flatbed trucks	Rubber
		4	Carry alls	Rubber
		1	Air compressor	Rubber
		1	Backhoe	Either
		1	Mechanics truck	Rubber
		1	Fuel truck	Rubber
		1	Dump truck	Rubber
		1	Reel stand truck	Rubber
Steel Structure and Bus Installation Crew, Converter Valve Hall, Ancillary Buildings Construction Crew, Equipment Assembly and Erection Crew	16-24	2	Cranes, RT	Either
		2	High capacity cranes	Either
		4	Boom trucks	Either
		6	Manlifts	Either
		4	Welder trucks	Rubber
		2	Carry alls	Rubber
		3	Pickup trucks	Rubber
		2	Flatbed trucks	Rubber
		1	Mechanics truck	Rubber
		4	Vans	Rubber
		2	Flatbed trucks	Rubber
Control Building and Wiring Crew	20-24	2	Boom trucks	Rubber
		4	Manlifts	Either
		3	Wire pullers-small	Rubber
		2	Reel stand trucks/trailers	Rubber
		4	Vans	Rubber

ACTIVITY	PEOPLE	QUANTITY	TYPE OF EQUIPMENT	TRACK OR RUBBER TIRE
		4	Pickup trucks	Rubber
		2	Carry alls	Rubber
		1	Splicing van	Rubber
		2	Concrete trucks	Rubber
		1	Bobcat	Either
		1	Trencher	Either
		2	Plate compactors	----------
Ground Electrode Construction Crew	12-18	2	Pickup trucks	Rubber
		1	Fuel truck	Rubber
		1	Water truck	Rubber
		2	Trenchers	Either
		2	Drill rigs	Either
		1	Boom truck	Rubber
		2	Flatbed trucks	Rubber
		1	Bobcat	Either
		1	Backhoe	Rubber
		1	Mechanics truck	Rubber
		1	Concrete trucks	Rubber
		1	Air compressor	Rubber

The above table reflects estimated personnel requirements, which may reach as high as 180 for each terminal, substation, and ground electrode construction, including maintenance, management, and quality control personnel.

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6.0 OPERATION AND MAINTENANCE

The TWE Project ±600 kV DC, 500 kV AC and 230 kV AC transmission lines, terminals, substations, ground electrode facilities, communications system, and other ancillary facilities will comprise critical infrastructure of the Desert Southwest transmission systems and of the western U.S. electrical grid. Limiting the duration of unplanned outages, and planning for the use of live-line maintenance techniques to minimize the requirement for and duration of outages is an important part of the design, construction, and operation/maintenance requirements for this Project.

Regular inspection of transmission lines, terminals, substations, ground electrodes, and support systems is critical for safe, efficient, and economical operation of the Project. Regular ground and aerial inspections will be performed in accordance with the Applicant's established policies and procedures for transmission line inspection and maintenance (Western 2007). The TWE Project ±600 kV DC, 500 kV AC and 230 kV AC transmission lines, terminals, substations, ground electrode facilities, communications system, and other ancillary facilities will be inspected regularly for corrosion, equipment misalignment, loose fittings, vandalism, and other mechanical problems. The need for vegetation management on transmission line ROWs will also be determined during inspection patrols. A detailed Operations and Maintenance Plan is included in Appendix O.

This section includes a discussion of compatible uses, ROW safety requirements, inspection, maintenance and repair, emergency response and decommissioning practices.

6.1 Compatible Uses

Transmission lines are designed and constructed to meet or exceed the requirements of the National Electrical Safety Code. These standards provide for the safety and protection of landowners and their property, the public, and utility employees. After construction, compatible uses in the ROW will be considered and approved by TransWest, BLM or other land management agencies depending on the land ownership.

For private lands, compatible uses are determined in accordance with the terms and conditions of the easement for the TWE Project with the property owner. Ranching and farming activities, gardening, recreational activities, and other uses are generally permitted in the easement as long as care is taken to prevent damage and maintain access to transmission line structures. No buildings or structures may be erected in the easement because they could impede the safe operation of the line or interfere with maintenance access. For safety reasons, pumps, wells, swimming pools, and flammables must not be placed in the easement area. Properly grounded and permitted irrigation systems are acceptable.

For public lands, BLM retains the right to require common use of a ROW, including subsurface and air space, and authorize use of the ROW for compatible uses (43 CFR §2805.15(b)). If BLM receives an application for a grant of land subject to TransWest's ROW Grant or near or adjacent to it, the BLM will notify TransWest in writing when it receives a grant application. BLM will consider TransWest's written recommendations as to how the proposed use affects the integrity of, or TransWest's ability to operate, its facilities. The notice will contain a time period within which TransWest must respond. The notice may also notify TransWest of additional opportunities to comment (43 CFR §2807.14).

Other federal and state agencies have their own rules and regulations concerning compatible uses of ROW. These rules and regulations as applicable will be incorporated into the terms and conditions of any special use permits, licenses or ROW issued for the TWE Project.

6.2 Right-of-Way Safety Requirements

The design, operation, and maintenance of the TWE Project will meet or exceed applicable criteria and requirements outlined by the FERC, WECC, NESC, and U.S. Department of Labor, Occupational Safety and Health Standards (OSHA) for the safety and protection of landowners, their property, and the general public. The transmission line will be protected with power circuit breakers and line relay protection equipment. If a conductor or component failure occurs, power will be automatically removed from the line. Lightning protection will be provided by overhead shield wires on the top of the line. Where vegetation presents a potential hazard, trees will be trimmed or cut to prevent accidental grounding contact with conductors.

The ±600 kV DC transmission line presents no risk of inducing line currents due to the static nature of the DC electrical and magnetic fields. In comparison, AC transmission systems can induce currents. As described below in Section 6.2.2, mitigation measures for AC inductive currents would be implemented for the AC transmission lines associated with the TWE Project or for Design Options 2 and 3.

6.2.1 Building and Fence Grounding

As part of the proposed TWE Project, short distances (five miles or less) of AC transmission lines will be constructed between the TWE Project substations and the existing and planned regional AC transmission system. In order to mitigate possible electric shock caused by electrostatic and electromagnetic AC induction, all buildings, fences, and other structures with metal surfaces located within 300 feet of the centerline of the ROW will be grounded to the mutual satisfaction of the parties involved. Typically, residential buildings located 300 feet or further from the centerline will not require grounding. Other buildings or structures outside of the ROW will be reviewed in accordance with the NESC to determine grounding requirements. All metal irrigation systems and fences that parallel the transmission line for distances of 500 feet or more, within 300 feet of the centerline will be grounded. All fences that cross under the transmission line also will be grounded. This procedure will be included in the construction specifications, and if grounding is required outside the ROW, agency and landowner consent will be obtained as necessary.

6.2.2 Induced Currents on Adjacent Facilities from AC Transmission Lines

Railroads

When a high voltage transmission line is located adjacent to a railroad, the tracks and signals may be subjected to electrical interference from electric and magnetic induction, conductive interference, and capacitive effects. Capacitive coupling results from the electric field from the transmission lines' conductors coupling with above ground conductive objects that are insulated from the earth, such as railroad tracks that are typically installed on high impedance ballast (the rock bed used to support the tracks). Electric and magnetic induction results from the magnetic field produced by the AC flowing in the conductors of the transmission line coupling with above ground and below ground metallic objects, such as railroad tracks and buried communications cables. If a transmission line is located in proximity and parallel to a railroad for long distances, these interference mechanisms can cause high currents and voltages to develop on the tracks and communication cables. If the AC interference is above certain thresholds, it can result in personal safety hazards, damage to signal and communication equipment, and false signaling of equipment.

These AC interference effects can be predicted with computer modeling. With proper planning and mitigation management, railroads and high voltage AC transmission lines can be safely co-located. The American Railway Engineering and Maintenance-of-Way Association has specifications for steady state rail-to-ground and equipment-to-ground voltage levels to ensure safety of railway

operating personnel and the public. During fault conditions the safety criteria established by the ANSI/IEEE (Institute of Electrical and Electronics Engineers) Standard 80 (Guide for Safety in AC Substation Grounding) is used. In addition, railroad signal and equipment manufacturers provide AC interference voltage tolerances for proper signal operation so that nearby transmission facilities can be designed to ensure that AC interference levels do not exceed the acceptable safety criteria or equipment voltage tolerance.

Depending on AC interference levels, several mitigation methods may be used. These include increasing the distance between the transmission line and the railroad tracks, reducing the distance between insulated joints in track sections, grounding the railroad's tracks, and burying gradient control wires or matting.

For locations where the final alignment of an AC section of transmission line is in close proximity to a railroad for long distances, the Applicant, during detailed design, would perform computer modeling of potential AC interference effects to design and implement required mitigation to be installed prior to energizing the transmission line.

Pipelines

When a high voltage transmission line is located adjacent to a pipeline ROW, the pipeline may be subjected to electrical interference from electric and magnetic induction, conductive interference, and capacitive effects. Electric and magnetic induction is the primary effect of the high voltage AC transmission line on a buried pipeline during normal (steady-state) operation. This form of interference is due to the magnetic field produced by the AC current flowing in the conductors of the transmission line coupling with the metallic pipeline, inducing a voltage and associated current on the pipeline.

Conductive interference is a concern when a transmission line fault occurs in proximity to the pipeline, because it can cause AC currents to enter the pipeline at coating holidays (flaws in the coating) and produce a voltage gradient across the pipeline coating. Electric and magnetic effects are also a concern during a fault because the phase current in at least one phase (conductor) of the high voltage AC transmission line is elevated.

If these electrical interference effects are great enough during normal operation, then a potential shock hazard exists for anyone that touches an above ground part of the pipeline, such as a valve or cathodic protection test station. In addition, during normal operation, if the induced AC current density at a flaw in the pipeline coating is great enough, AC pipeline corrosion may occur. Lastly, damage to the pipeline coating can occur if the voltage between the pipeline and surrounding soil becomes excessive during a fault condition.

With proper planning and mitigation, pipelines and high voltage AC transmission lines can be safely co-located. The AC interference effects can be easily predicted with computer modeling. The National Association of Corrosion Engineers has standards that ensure that pipeline integrity would not be degraded nor personnel safety compromised because of AC interference from a transmission line constructed and operated adjacent to a pipeline.

Mitigation techniques for AC interference on pipelines include reducing the impedance of the transmission structure grounds, grounding the pipeline in conjunction with de-couplers, burying gradient control wires along the pipeline or burying ground mats under aboveground facilities (such as valves) and using dead fronts at test stations.
The TWE Project configured as an overhead AC transmission line can be located in its 250 foot ROW adjacent to the ROW for buried underground high pressure natural gas and other petroleum pipelines

as long as proper grounding and cathodic protection systems are utilized for the pipeline. The TWE Project however, may not be sited in the same ROW as an underground pipeline regardless of whether the TWE Project is a DC or AC line. For locations where the final alignment of an AC section of transmission line is in close proximity to a pipeline, the Applicant, during detailed design, would ensure that computer modeling of AC interference effects is completed and that any required mitigation is designed and installed prior to energizing the transmission line.

6.3 Transmission Line Maintenance

Inspection of the entire transmission line system will be conducted semi-annually. Aerial inspection will be conducted by helicopter semi-annually and will require two or three crew members, including the pilot. Detailed ground inspections will take place on an annual basis. Ground inspection would use 4x4 trucks or 4x4 ATVs for all structures with access roads. For structures in areas without permanent access roads, ground inspection will be on foot or by other approved means. The inspector would assess the condition of the transmission line and hardware to determine if any components need to be repaired or replaced, or if other conditions exist that require maintenance or modification activities. The inspector would also note any unauthorized encroachments and trash dumping on the ROW that could constitute a safety hazard. The inspector would access each of the structure locations along each line and use binoculars and spotting scopes to perform this inspection.

If during transmission line maintenance and monitoring, it is determined that new or reconstruction activities should be implemented, the Applicant will notify the appropriate land management agency or private landowner.

Dust control during maintenance of the transmission line will be managed the same as during construction.

6.3.1 Routine Maintenance and Repairs

Routine maintenance activities are ordinary maintenance tasks that have historically been performed and are regularly carried out on a routine basis. The work performed is typically repair or replacement of individual components (no new ground disturbance), performed by relatively small crews using a minimum of equipment, and usually is conducted within a period from a few hours up to a few days. Work requires access to the damaged portion of the line to allow for a safe and efficient repair of the facility. Equipment required for this work may include four-wheel-drive trucks, material (flatbed) trucks, bucket trucks (low reach), boom trucks (high reach), or man lifts. This work is typically required due to issues found during inspections. For maintenance work near energized parts (insulators, hardware, conductors) and to the extent practicable, this work is scheduled for times when the transmission line can be taken out of service and de-energized. Typical items that may require periodic replacement on structures include insulators, hardware, or structural members. It is expected that these replacements would be required infrequently.

The Applicant plans to conduct maintenance on the ±600 kV DC, 500 kV AC and 230 kV AC transmission lines whenever practical in a de-energized condition. However, provisions for the use of live line maintenance techniques have been planned into the Project. Maintenance on the transmission lines can be completed safely using live line techniques thereby avoiding an outage to the critical transmission line infrastructure. High reach bucket trucks along with other equipment are used to conduct both de-energized and live-line maintenance activities. For the ±600 kV DC, 500 kV AC and 230 kV AC structures, this requires that adequate space be available at each structure site so that the high reach bucket truck can be positioned to one side or the other of the structure and reach up to or over the poles/phases to access the poles/phases or upper sets of wires (shield wires or OPGW) to perform the live-line maintenance procedures. To allow room at each structure for these activities in

low slope areas a crane pad is required with the structure in the center of 250 feet (ROW width) by 100 feet for the ±600 kV DC and 500 kV structures and 125 feet by 50 feet for the 230 kV structures. The size and location of these required crane pads near the structures may vary depending on the side slope and access road at each site. The pads are cleared to the extent needed to safely complete the work. The Applicant will work with the BLM Field Offices and USFS on a case-by-case basis to determine what size pad would be left in place and revegetated following initial construction for operations and maintenance.

For all structures in locations without permanent ground access, maintenance activities will be performed using low impact ground-based equipment and/or by helicopter/aerial methods. Maintenance activities for structures in these locations (without permanent ground access) will be performed using the same or similar equipment and methods as was used for initial construction.

6.3.2 ROW Maintenance and Repairs

The Applicant will maintain work areas adjacent to structures and along the ROW for vehicle and equipment access necessary for operations, maintenance, and repair. Where long-term access is required for maintenance of the line, the Applicant will maintain the approved access roads in a safe, useable condition, as directed by an authorized officer from the appropriate land management agency or private landowner.

When needed, ROW repairs may include grading or repair of existing maintenance access roads and work areas, and spot repair of sites subject to erosion, flooding or scouring. Access road maintenance entails activities to ensure that approved access roads are in appropriate condition for access to transmission lines by maintenance and inspection crews. These activities include re-grading, re-surfacing, and re-constructing water diversions such as culverts, ditches and water bars. Required equipment may include a grader, backhoe, four-wheel-drive pickup truck, and a cat-loader or bulldozer. The cat-loader has steel tracks whereas the grader, backhoe, and truck typically have rubber tires. Repairs to the ROW would be scheduled as a result of line inspections, or would occur in response to an emergency situation.

Snow removal, if necessary for terminal, substation, ground electrode and regeneration station access roads, will be performed with blades equipped with shoes to keep the blade off the road surface in order to avoid damage.

Vegetation within the ROWs will be managed in accordance with the TWE Project Vegetation Management Program described below in Section 6.3.4.

6.3.3 Access Road Maintenance

Authorized access roads will only be used for maintenance purposes upon completion of construction. Where long-term access is required for maintenance of the line, the Applicant shall maintain the approved access roads in a safe, useable condition, as directed by an authorized officer from the appropriate land management agency. A regular maintenance program may include, but is not limited to blading, ditching, culvert installation, and surfacing.

If snow removal is necessary, equipment used shall be equipped with shoes to keep the blade two inches off the road surface in order to avoid damage to it. Where the ground is uneven at drainage crossings, special precautions will be taken in order to ensure equipment blades do not destroy vegetation.

6.3.4 Vegetation Management

A ROW Preparation and Vegetation Management Plan is provided in Appendix R. The Plan has been designed to meet NERC reliability requirements in a cost-effective manner, and provide measures for minimizing potential conflicts with critical environmental resources or management issues. Vegetation management in the TWE Project transmission line ROWs is based on meeting reliability requirements of NERC through integrative vegetation management (IVM) practices (NERC 2009; ANSI 2006). The TWE Project will comply with NERC reliability standards.

NERC has established reliability standard FAC-003-2 to prevent vegetation related outages from occurring on bulk transmission systems, which could lead to cascading outages. The standard was developed in response to serious outages and operational problems, which have resulted from interference between overgrown vegetation and transmission lines over the past 10 to 20 years. Compliance with this standard is mandatory. FAC-003-2 requires having and implementing a documented transmission vegetation management program, designed to control vegetation on transmission ROWs (NERC 2009).

IVM is a best management practice conveyed in the American National Standard for Tree Care Operations, Part 7 (ANSI 2006) and the International Society of Arboriculture's *Best Management Practices: Integrated Vegetation Management* (Miller 2007). IVM is consistent with the requirements of FAC-003-2 and is recognized as containing the most appropriate techniques for transmission ROWs to meet and exceed the NERC requirements (NERC 2009). IVM is a system of managing plant communities by setting objectives for desired conditions and identifying and managing ROWs for compatible and incompatible vegetation. The TWE Project's ROW Preparation Vegetation Management Plan (Appendix R) complies with NERC standards through implementation of IVM practices. IVM principles will serve as guidance in establishing and maintaining a desired condition for TWE Project ROW and associated facilities.

6.4 Terminals, Substation, Ground Electrode and Communication Systems Maintenance

Maintenance activities include equipment testing, equipment monitoring and repair, and emergency and routine procedures for service continuity and preventive maintenance. Terminal, substation, ground electrode, and regeneration station monitoring and control functions are performed wholly or in part remotely from the Applicant's central operations facilities. Unauthorized entry into the terminal, substations or regeneration stations is prevented with the provision of fencing and locked gates. Warning signs would be posted and entry to the operating facilities would be restricted to authorized personnel.

Several forms of security are planned for each of the locations, although the security arrangements at each of the terminals, substations, ground electrode facilities, or regeneration stations may differ somewhat. Security measures may include fire detection in the control building via a monitoring system; alarming for forced entry; and a perimeter security system coupled with remote sensing infrared camera equipment in the fenced area of the station to provide visual observation/confirmation to the system operator of disturbances at the fence line.

Safety and security lighting at the terminals, substations and series compensation stations would be provided inside the fence for safety and security and for uncommon emergency night repair work. Dusk to dawn safety and security lighting will be used at the terminals and 500 kV AC substations.

Each of the terminals may have a control room staffed 24 hours per day, 365 days per year by two to three system operators and supervisory personnel. Remote operation, typically from control rooms

housed in nearby utility facilities, may be utilized. In addition to control room staffing, 8 to 20 technicians, engineers, maintenance, security, and supervisory personnel may be staffed at each terminal. Total staffing at each terminal is expected to be 20 to 30 people.

Routine maintenance for the terminal and adjacent substations would be performed by the on-site staff. Major inspection or maintenance activities would require additional personnel and equipment estimated to be 15 to 20 craft, technician, engineering, manufacturer, consultant and supervisory personnel for a period of two to four weeks on an estimated once per year basis.

For AC substations and series compensation stations located remote from the terminals it is anticipated that maintenance at each of these remote facilities would require approximately six trips per year by a two to four person crew. Routine operations would require two workers in a light utility truck to visit the remote substation or series compensation station monthly. Typically, once per year a major inspection or maintenance effort may be required which would require up to 15 personnel for one to three weeks. If substation landscaping is required by the permitting agency, drought-tolerant plant materials would be used to minimize watering requirements after plant establishment.

Ground electrode facilities would be visited every two to three months by two individuals in a light truck to inspect the facilities. Annual maintenance would be performed by a two man crew in a light truck over a two to five day period. The ground electrode connector line would be inspected by aerial and ground based inspection identical to the maintenance program described for the transmission lines.

Communication regeneration stations would be visited every two to three months by two individuals in a light truck to inspect the facilities. Annual maintenance would be performed by a two-man crew in a light truck over a two to five day period.

Water Use

Operation and maintenance of the Northern and Southern Terminals is expected to require water use by personnel in the Operations and Maintenance office building and by the HVDC evaporative cooling and misting systems during summer months. Monthly and annual estimated water use is provided in Table 12.

TABLE 12 NORTHERN AND SOUTHERN TERMINAL ANNUAL ESTIMATED WATER USE (ALL VALUES IN ACRE-FEET)

MONTH	OFFICE USE	COOLING & MISTING SYSTEMS FOR N. TERMINAL	COOLING & MISTING SYSTEMS FOR S. TERMINAL	TOTAL USE N. TERMINAL	TOTAL USE S. TERMINAL
January	0.07	0	0	0.07	0.07
February	0.06	0	0	0.06	0.06
March	0.07	0	0	0.07	0.07
April	0.07	0	0	0.07	0.07
May	0.07	0	0.03	0.07	0.10
June	0.07	0.07	0.07	0.13	0.13
July	0.07	0.14	0.14	0.21	0.21
August	0.07	0.07	0.14	0.14	0.20
September	0.07	0	0.07	0.07	0.13
October	0.07	0	0	0.07	0.07
November	0.07	0	0	0.07	0.07
December	0.07	0	0	0.07	0.07
Annual	0.81	0.27	0.44	1.08	1.25

Source: BBA 2012

Annual office use of water for each terminal is estimated at 0.809 acre-feet. The office building will consist of approximately 7,200 square feet of actively used space including offices, kitchen, and bathrooms with a shower. The annual office water use was conservatively estimated based upon this actively used square footage and a water use estimate of 0.75 acre-feet per year per 6,695 square feet of office space (Douglas County 1999).

Evaporative cooling will not likely be needed for ambient air temperatures up to 104° Fahrenheit (40° Celsius). If ambient air temperatures exceed 113° Fahrenheit (45° Celsius), then misting and evaporative cooling will be required for these short time periods.

Annual water use for HVDC evaporative cooling and misting systems at the Northern Terminal is estimated at 0.272 acre-feet. Use includes 400 gallons per year for maintenance and flushing of the cooling system and an estimated 88,000 gallons per year for the misting system. The misting system use was estimated to at 275 gallons per hour, running eight hours per day for 10 days in June, 20 days in July, and 10 days in August for a total of 40 days. Evaporative cooling of the filters is not anticipated.

Annual water use for HVDC evaporative cooling and misting systems at the Southern Terminal is estimated at 0.440 acre-feet. Use includes 400 gallons per year for maintenance and flushing of the cooling system and an estimated 143,000 gallons per year for the misting system. The misting system use was estimated to at 275 gallons per hour, running eight hours per day for 5 days in May, 10 days in June, 20 days in July, 20 days in August and 10 days in September for a total of 65 days. Evaporative cooling of the filters is not anticipated.

The water use for each of the terminals may vary from these estimates based on the cooling system technology employed for the terminals. Non-evaporative cooling technologies are available and will be considered during the detailed engineering for the terminal equipment.

6.5 Emergency Response

The operation of the system is managed and monitored from control rooms at or near each of the terminals and at the Applicant's operation center. Electrical outages or variations from normal operating protocols would be sensed and reported at these operation centers. The remote substations and series compensation stations are equipped with remote monitoring, proximity alarms, and in some cases, video surveillance with monitoring and control functions performed at the control rooms at the terminals and/or at the Applicant's operation center.

The implementation of routine operation and maintenance activities on power lines minimize the need for most emergency repairs. Emergency maintenance activities are often those activities necessary to repair natural hazard, fire, or human-caused damages to a line. Such work is required to eliminate a safety hazard, prevent imminent damage to the power line, or restore service if there is an outage. In an emergency, the Applicant must respond as quickly as possible to restore power.

In most cases, the equipment necessary to carry out emergency repairs is similar to that necessary to conduct routine maintenance. More extensive emergency repair may also require the same types of equipment used during construction, including hole drilling equipment, backhoes for excavation, and/or concrete trucks and cranes for structure erection. Other required equipment may include power tensioners, pullers, wire trailers, crawler tractors, and trucks and pickups for hauling materials, tools, and workers. Under certain conditions, a helicopter may be used to haul in material and erect towers or string conductor in those areas where access and/or terrain conditions preclude the use of

conventional methods. Site and access road disturbances, such as ruts created during emergency operations, will be restored to satisfactory condition using restoration and rehabilitation procedures.

In the event of an emergency, crews will be dispatched quickly to repair or replace any damaged equipment. Every attempt will be made to contact the agency or landowners along the ROW. In the event notification cannot be made, repair operations will proceed only in the case of an emergency situation. Repair of the line will have priority under emergency conditions, and reasonable efforts will be made to protect plants, wildlife, and other resources. Restoration and rehabilitation procedures following completion of repair work will be similar to those prescribed during construction.

Emergency response procedures will be implemented for the following potential events:

- Downed transmission lines, structures, or equipment failure
- Fires
- Sudden loss of power
- Natural disasters
- Serious personal injury

A detailed Emergency Preparedness and Response Plan is provided in Appendix F.

6.5.1 Fire Protection

All federal, state, and county laws, ordinances, restrictions, rules, and regulations pertaining to fire prevention and suppression would be strictly adhered to. All personnel would be advised of their responsibilities under the applicable fire laws and regulations. A framework Fire Protection Plan is provided in Appendix H.

When working on public or National Forest System lands, the Applicant's employees and Contractors would be equipped with approved suppression tools and equipment. The Applicant or its Contractor would notify local fire authorities and the BLM or USFS (as appropriate) if a Project-related fire occurs within or adjacent to a construction area.

If the Applicant becomes aware of an emergency situation that is caused by a fire on or threatening BLM-managed or USFS lands and that could damage the transmission lines or their operation, it would notify the appropriate agency contact. Specific construction-related activities and safety measures would be implemented during construction of the transmission line to prevent fires and to ensure quick response and suppression if a fire occurs. Typical practices to prevent fires during construction and maintenance/repair activities include brush-clearing prior to work, stationing a water truck at the job site to keep the ground and vegetation moist in extreme fire conditions, enforcing red flag warnings, providing "fire behavior" training to all pertinent personnel, keeping vehicles on or within designated roads or work areas, and providing fire suppression equipment and emergency notification numbers at each construction site. A framework Fire Protection Plan is included as Appendix H.

6.6 Decommissioning Practices

The proposed transmission line would have a projected operational life of at least 50 years or longer. At the end of the useful life of the Project and if the facility were no longer required, the transmission line would be removed from service. At such time, structures, conductors, insulators, and hardware

would be dismantled and removed from the ROW. The transmission foundations would be removed to below-ground surface.

Following abandonment and removal of the transmission line structures and equipment from the ROW, any areas disturbed during line dismantling would be restored and rehabilitated. In the same way, if a terminal, substation, or regeneration station is no longer required, the buildings, structures and equipment would be dismantled and removed from the site. The station structures would be disassembled and either re-used at another station or sold for scrap. Major equipment such as breakers, transformers, and reactors would be removed, refurbished, and stored for use at another facility. Foundations would be cut off below ground surface.

For access roads constructed by the Applicant and used for operations and maintenance of the transmission line, the Applicant will reclaim all access roads unless the landowner, land management agency, or county requests the road to remain open and the landowner, land management agency or county agrees in writing to assume all maintenance and reclamation responsibility for the road.

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TABLE 14 COMPARISON OF PROPOSED TWE PROJECT TO DESIGN OPTIONS 7-25

7.0 DESIGN OPTIONS

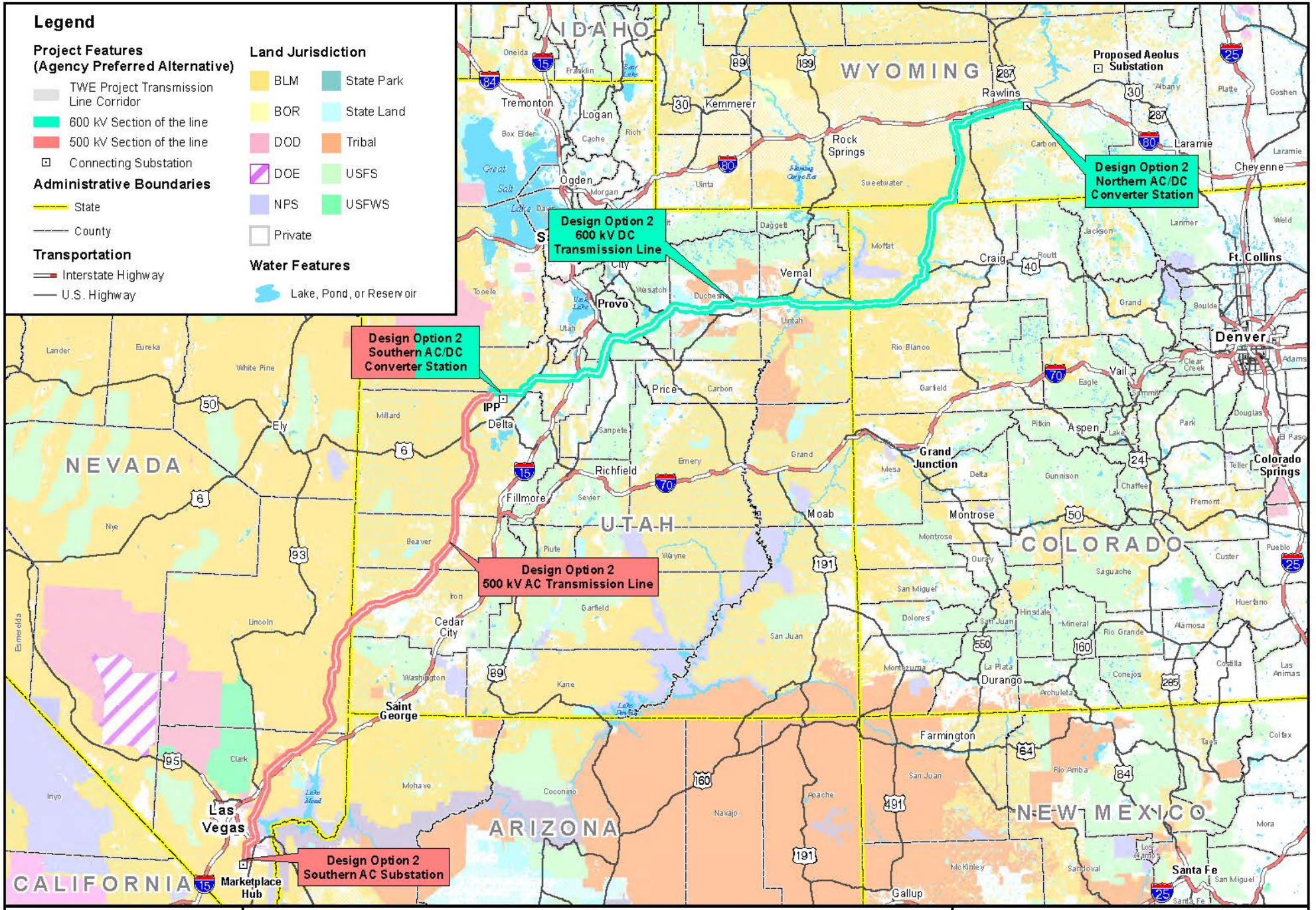
Section 7.0 describes the Design Options, formerly referred to as System Alternatives, considered for the TWE Project. System Alternatives 1, 2 and 3, were initially suggested by TransWest in the *TransWest Express Transmission Project ROW Application SF 299 (Amended from December 2008) January 2010* (TWE 2010b). TransWest amended the Preliminary ROW Application SF 299 to eliminate System Alternative 1 from further consideration in August 2012. System Alternatives 2 and 3 are recommended by TransWest for inclusion in the ROD and from here on are referred to as Design Options 2 and 3.

- Section 7.1 provides an overview of Design Options 2 and 3.
- Section 7.2 describes the design options according to the conditions under which each design option would meet the TWE Project purpose and need and the options' specific components and design characteristics.
- Section 7.3 discusses how the design options would differ from the proposed TWE Project with respect to construction, operation, and maintenance practices.
- Section 7.4 provides a comparison of the design options to the proposed TWE Project.

7.1 Overview of Design Options

Design Option 2 – Design Option 2 would be an alternative system configuration, which would replace the proposed TWE Project (Map Exhibit 6). This alternative would entail TransWest constructing and operating a 3,000 MW, ±600 kV DC transmission line approximately 375 miles in length, from the Northern Terminal to a new AC/DC converter station near the existing IPP Substation near Delta, Utah. From the new AC/DC converter station in Utah, a single circuit 1,500 MW, 500 kV AC transmission line, approximately 350 miles in length, would be constructed to one of the existing substations in the Eldorado Valley, south of Boulder City, Nevada (Marketplace Hub). Near the halfway point of the southern segment (AC segment), a 500 kV Series Compensation Station would also be constructed.

Design Option 3 – Design Option 3 would be a phased approach to building and operating the proposed TWE Project (Map Exhibit 7). This phased approach would entail construction of a 3,000 MW, ±600 kV DC transmission line approximately 375 miles in length between the location of the proposed Northern Terminal to the IPP substation near Delta, Utah and operated initially as a 1,500 MW, 500 kV AC transmission system. For AC operation, the initial phase of this design option would require 500/345 kV substation connections near the IPP line in Millard County, Utah and construction of a 500 kV series compensation station near the halfway point of the northern segment. Full development of the TWE Project using this phased build out approach would involve constructing the remaining portion of the 3,000 MW, ±600 kV DC line from IPP to the Southern Terminal, south of Boulder City, Nevada and converting operations to a DC system.



Map Exhibit 6

Design Option 2: DC from Wyoming to IPP, AC from IPP to Marketplace Hub

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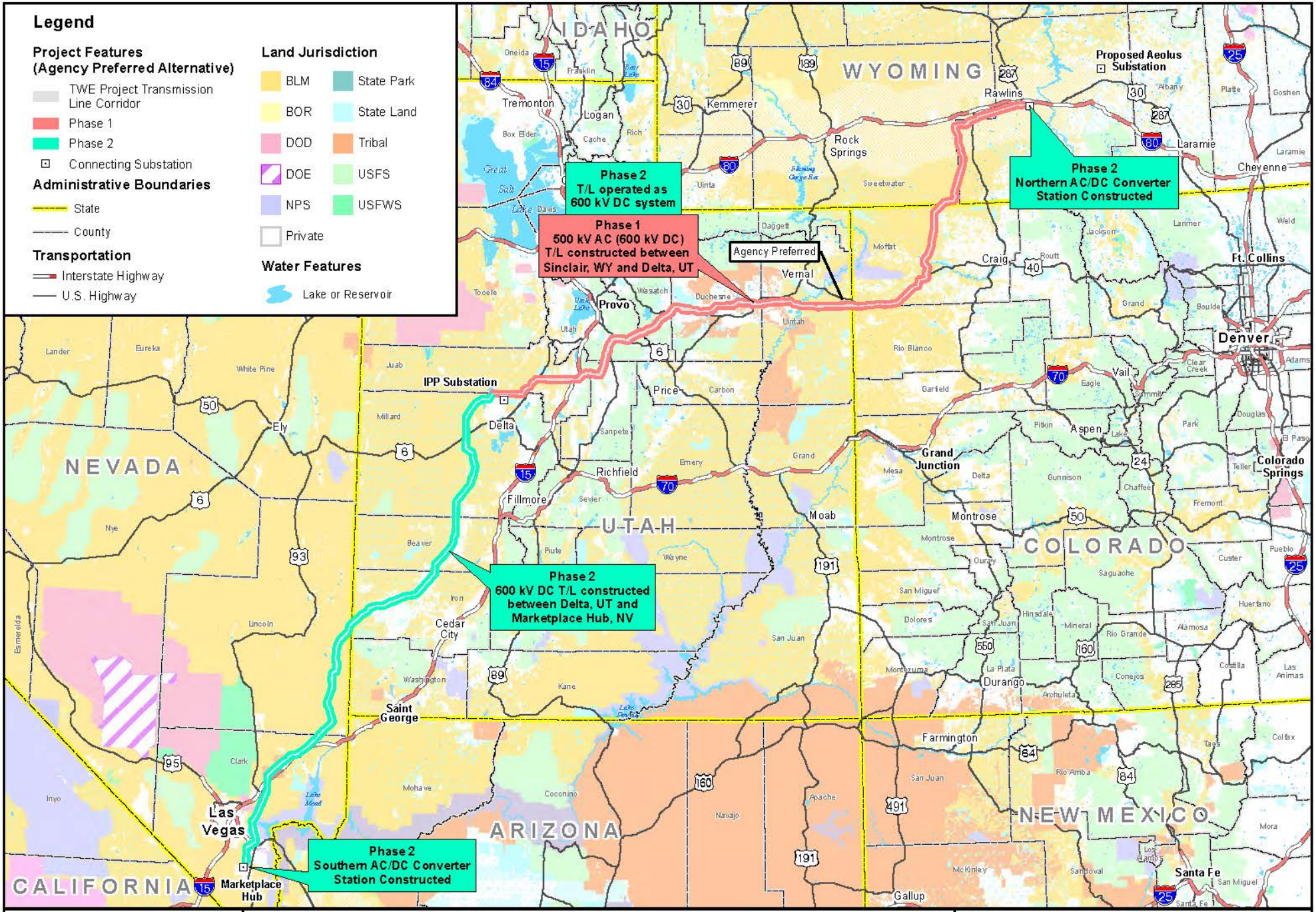
Legend
Project Features
(Agency Preferred Alternative)
TWE Project Transmission Line Corridor
Phase 1
Phase 2
Connecting Substation
Administrative Boundaries
State
County
Transportation
Interstate Highway
U.S. Highway
Land Jurisdiction
BLM
BOR
DOD
DOE
NPS
Private
State Park
State Land
Tribal
USFS
USFWS
Water Features
Lake or Reservoir
Phase 2
T/L operated as
600 kV DC system
Phase 1
500 kV AC (600 kV DC)
T/L constructed between
Sinclair, WY and Delta, UT
Agency Preferred
Proposed Aeolus
Substation
Phase 2
Northern AC/DC Converter
Station Constructed
IPP Substation
Phase 2
600 kV DC T/L constructed
between Delta, UT and
Marketplace Hub, NV
Phase 2
Southern AC/DC Converter
Station Constructed
Marketplace
Hub
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
CALIFORNIA
Tremonton
Logan
Kemmerer
Rawlins
Rock
Springs
Laramie
Cheyenne
Ft. Collins
Denver
Colorado
Springs
Vernal
Craig
Provo
Price
Delta
Fillmore
Richfield
Moab
Grand
Junction
Montrose
Durango
Cedar
City
Saint
George
Las
Vegas
Farmington
Gallup
Santa Fe
Aspen
Vail
0
25
50
Miles
Map Exhibit 7
Design Option 3: Phased Build-Out
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7.2 Design Options' Purpose and Need and Design Characteristics

7.2.1 Design Option 2 – DC from Wyoming to IPP, AC from IPP to Marketplace Hub

Design Option 2 would meet the TWE Project's stated objectives only if transmission capacity becomes available and can be utilized to transmit energy delivered by the TWE Project from Delta, Utah to Southern California. Under this design option, the delivery of energy to markets in the Desert Southwest region would be through both the new 1,500 MW, 500 kV transmission line and through the existing 2,400 MW, 500 kV DC transmission system, IPP's 'Southern Transmission System' (STS), between Delta, Utah and Adelanto, California. Because capacity is not currently available on the STS, Design Option 2 does not currently meet the TWE Project's purpose and need. Should capacity become available in the future, TransWest would only consider implementing this design option under the conditions that sufficient capacity, approximately 1,500 MW, was commercially available to transmit energy delivered by the TWE Project to California; and that TransWest is able to establish commercial interconnection agreements with the utility owning and operating the IPP transmission line (currently Los Angeles Department of Water and Power [LADWP]). TransWest will provide the lead agencies with notice if a decision is made to implement Design Option 2.

Design Option 2 would replace the proposed TWE Project. This alternative would entail a 3,000 MW, ±600 kV DC transmission line approximately 375 miles in length, from the Northern Terminal to a new AC/DC converter station near the existing IPP substation near Delta, Utah. From the new AC/DC converter station in Utah, a single circuit 1,500 MW, 500 kV AC transmission line, approximately 350 miles in length, would be constructed to one of the existing substations in the Eldorado Valley, south of Boulder City, Nevada (Marketplace Hub). See Map Exhibit 6.

Design Option 2 would entail the following specific facilities and actions:

1. Construction of the Northern Terminal and ground electrode system (identical facilities to the proposed TWE Project);

2. Construction of a new AC/DC converter station and an adjacent 500/345 kV AC substation near the IPP in Millard County, Utah;

3. Construction of a ground electrode system within 50 miles of Delta, Utah;

4. Construction of a double circuit 345 kV AC line between the new 500/345 kV AC Substation near IPP to the existing IPP 345 kV AC substation adjacent to the existing IPP AC/DC converter station. The length of the double circuit 345 kV AC connection is estimated to be less than five miles;

5. Construction of a ±600 kV DC transmission line, approximately 375 miles long, from the Northern Terminal to the new AC/DC converter station and associated 500/345 kV substation near IPP (northern segment, similar to proposed TWE Project);

6. Construction of a single circuit, 1,500 MW, 500 kV AC line from the new 500/345 kV AC substation near IPP to one of the existing Marketplace Hub substations in the Eldorado Valley (southern segment); and

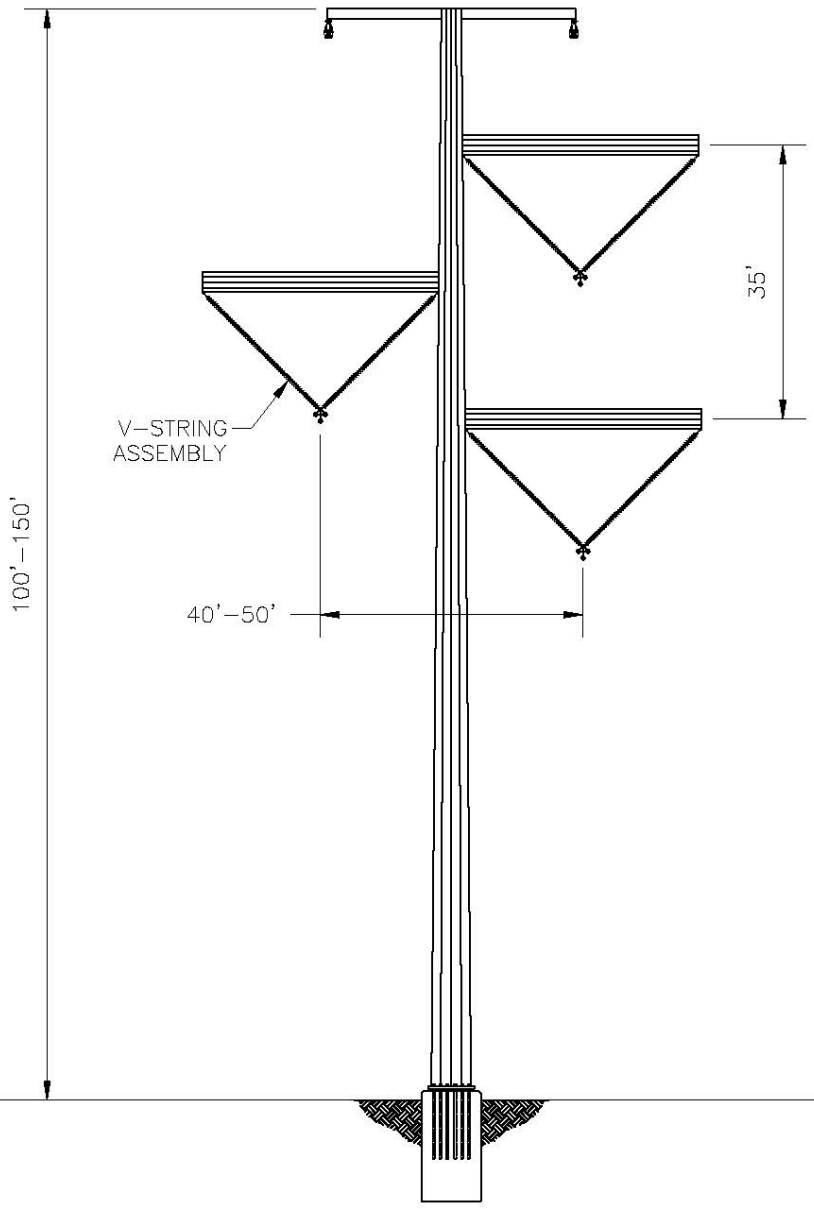
7. Construction of a series compensation station (similar to a small 500 kV substation) adjacent to the 500 kV AC transmission line, near the halfway point in the 500 kV AC line southern segment.

Compared to the proposed TWE Project, Design Option 2 would: 1) replace the ±600 kV DC transmission line with a single circuit 500 kV AC line, from near IPP in Millard County, Utah to one of the existing Marketplace Hub substations in Clark County, Nevada; 2) eliminate the Southern Terminal and ground electrode system in Clark County, Nevada and replace these facilities with similar facilities near IPP in Millard County, Utah; 3) construct additional new facilities, including a 500/345 kV AC substation, a double circuit 345 kV transmission line, less than five miles in length, and a 500 kV series compensation station, near the halfway point in the 500 kV AC line.

Design Option 2 would require both a 500 kV single circuit AC configuration and a 345 kV double circuit AC configuration. Design Option 2 would require a single circuit 500 kV configuration and structures, similar to the structure design shown in Figures 23 and 24. The 500 kV single circuit configuration would require three sets of conductor bundles, one steel shield wire, and one OPGW. The components for the 500 kV structures including foundations, guys, anchors, conductors, insulators, and associated hardware, overhead shield (ground) wires, and grounding rods, would be similar to those described for the ±600 kV DC transmission line.

One double circuit 345 kV transmission line would be required for Design Options 2 and 3. The 345 kV double circuit structures would be either self-supporting steel lattice towers or single shaft tubular steel poles. Figure 25 shows a typical steel pole design. The 345 kV double circuit configuration would require six sets of conductor bundles, one steel shield wire, and one OPGW. The components for the 345 kV structures including foundations, conductors, insulators, and associated hardware, overhead shield (ground) wires, and grounding rods, would be similar to those described for the ±600 kV DC transmission line.

Map Exhibit 8 depicts the siting areas for the Design Option 2 AC/DC converter station, 500/345 kV AC substation, ground electrode system, double circuit 345 kV connector line and the 500 kV series compensation station. The substation would be located on one of the two parcels shown on the map.



NOTES

1. DIMENSIONS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.

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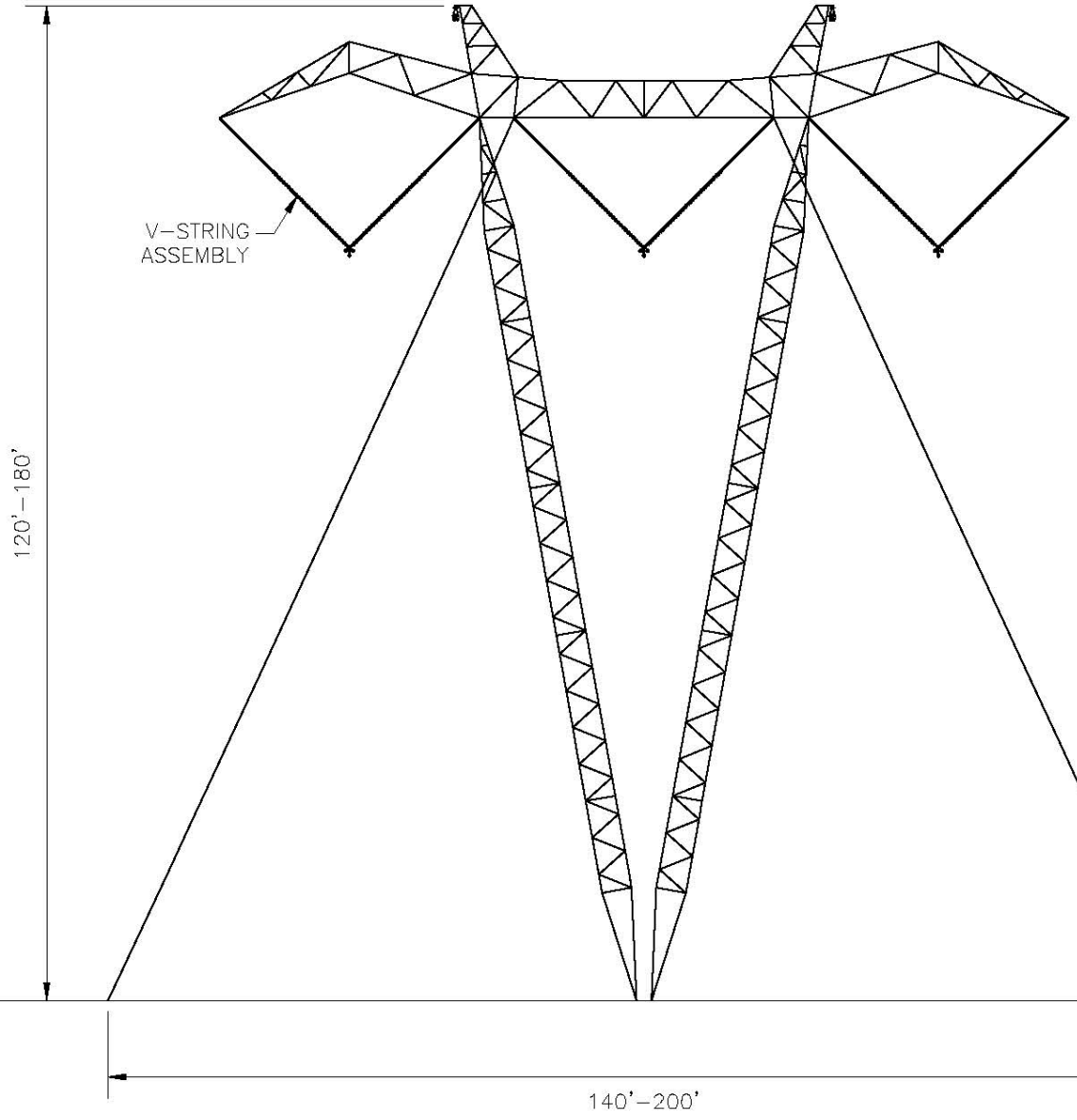
FIGURE 23

TYPICAL 500kV AC SINGLE CIRCUIT
TUBULAR POLE STRUCTURE



NOTES

1. DIMENSIONS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.
2. TOWER OUTLINE AND BRACINGS ARE INDICATIVE ONLY.

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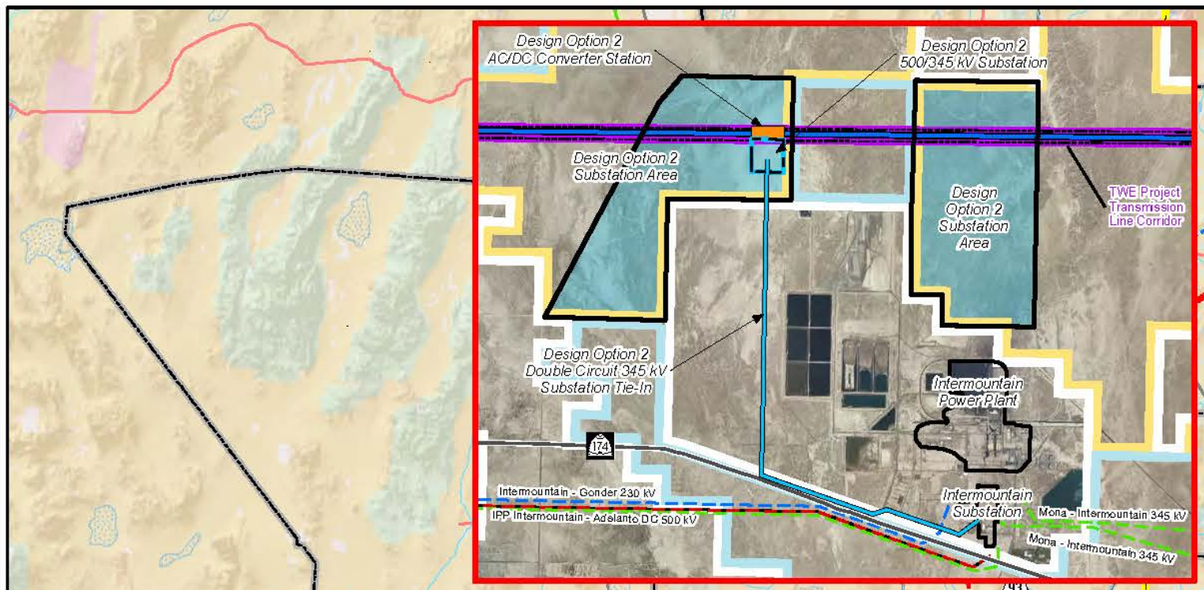
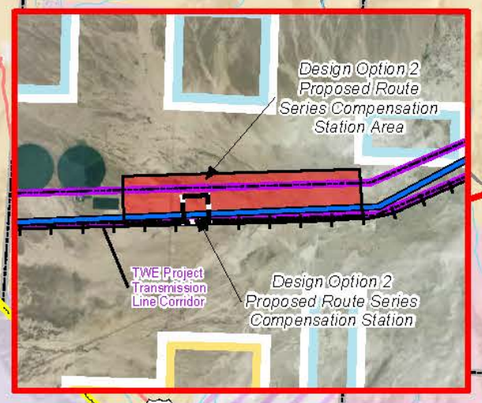
FIGURE 24

TYPICAL 500kV AC
SINGLE CIRCUIT GUYED
LATTICE STRUCTURE





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Map Exhibit 8

Design Option 2 Components

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line Corridor
- Terminal Siting Area
- Ground Electrode Area
- Ground Electrode Site
- Electrode Line

Administrative Boundaries
- Municipal Boundary

Existing Transmission
- 500 kV Line
- 500 kV DC Line
- 345 kV Line
- 287 kV Line
- 230 kV Line
- 138 kV Line
- Substation

Land Jurisdiction
- Indian Reservation
- State Land
- USDA Forest Service
- State Park or Recreation Area
- U.S. Department of Energy
- U.S.Department of Defense
- National Park or National Monument
- USDI Bureau of Land Management
- USDI Bureau of Reclamation
- USDI Fish and Wildlife Service

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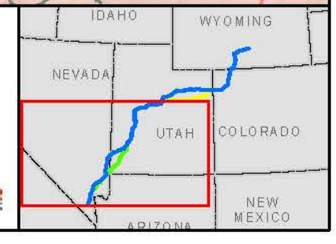

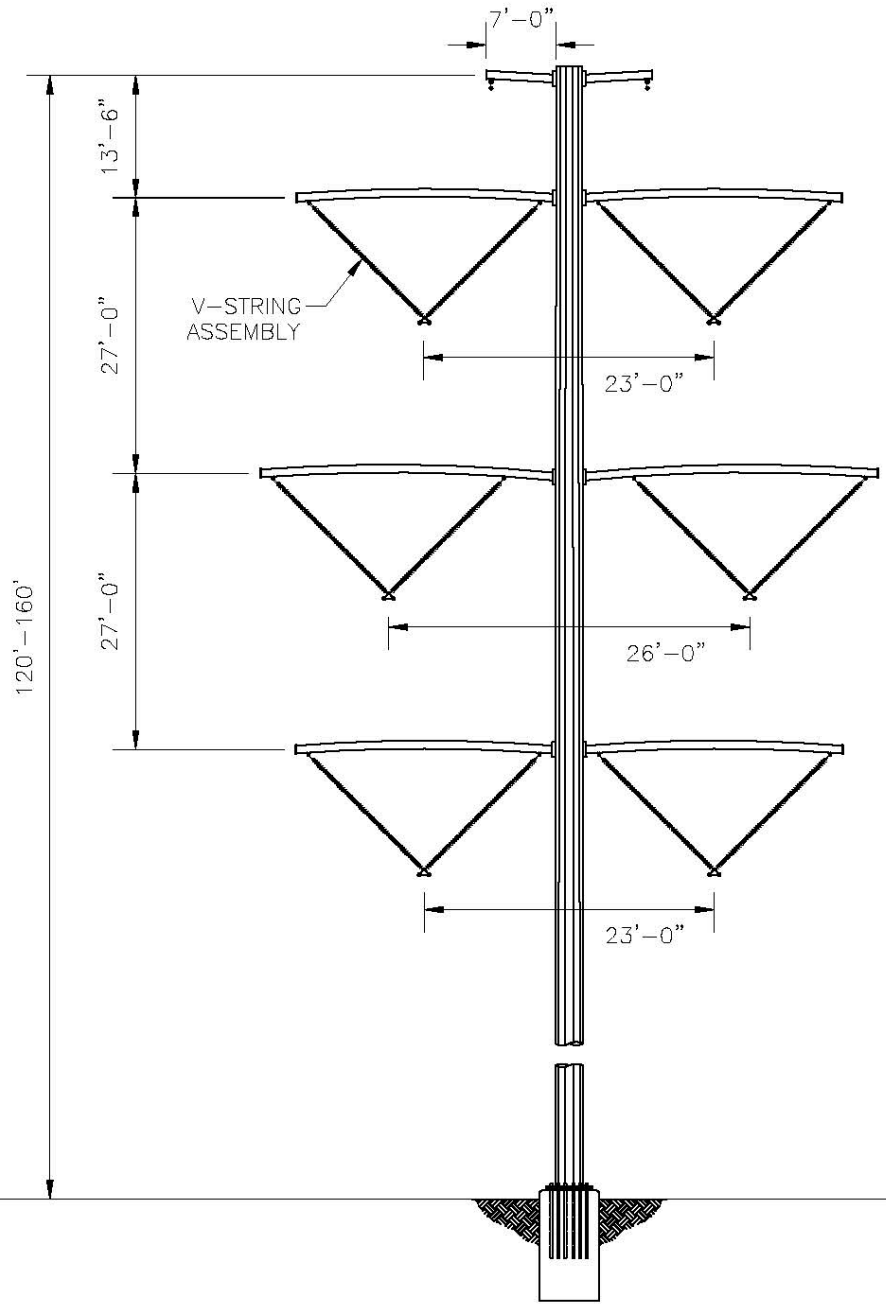

NOTES

1. DIMENSIONS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.

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FIGURE 25

TYPICAL 345kV AC DOUBLE CIRCUIT
SELF SUPPORTING STEEL POLE STRUCTURE

7.2.2 Design Option 3 – Phased Build Out

Similar to Design Option 2, this Design Option would meet the TWE Project's stated objectives only if transmission capacity becomes available and can be utilized to transmit energy delivered by the TWE Project from Delta, Utah to Southern California. This initial delivery of energy to markets in the Desert Southwest region would be through the existing 2,400 MW, 500 kV DC transmission system, and IPP's STS. This design option would meet the TWE Project's objectives and is considered feasible, however, it is more costly than building out the full system as a single non-phased project and would only be required if the demand for Wyoming resources in the Desert Southwest proves to be slower in development than expected. Construction of the line between Utah and Nevada, the Southern Terminal and completion of the Northern Terminal would be phased, however, to occur at some point in the future when market demands warrant converting the line's operation from 1,500 MW to 3,000 MW.

Should capacity become available, TransWest would only consider implementing this design option under the condition that sufficient capacity, approximately 1,500 MW, was commercially available to transmit energy delivered by the TWE Project to California; and that TransWest is able to establish commercial interconnection agreements with the utility owning and operating the IPP transmission line (currently LADWP). A market analysis would also need to be completed with results showing a phased approach to be commercially beneficial. TransWest will provide the lead agencies with notice if a decision is made to implement Design Option 3.

Design Option 3 is similar to the proposed TWE Project, except the project would be built and operated in phases. This phased approach would entail construction of a 3,000 MW, ±600 kV DC transmission line approximately 375 miles in length between the location of the proposed Northern Terminal to the IPP substation near Delta, Utah and operated initially as a 1,500 MW, 500 kV AC transmission system. For AC operation, the initial phase of this design option would require 500/345 kV substation connections near the IPP in Millard County, Utah and construction of a 500 kV Series Compensation Station near the halfway point of the northern segment. Full development of the TWE Project using this phased build out approach would involve constructing the remaining portion of the 3,000 MW, ±600 kV DC line from IPP to the Southern Terminal, south of Boulder City, Nevada and converting operations to a DC system (see Map Exhibit 7).

The TWE Project would be energized in phases. Phase 1 would entail the following:

1. Construction of the 500 kV substation portion of the Northern Terminal. The adjacent AC/DC converter station in Wyoming would be built in Phase 2;

2. Construction of a 500/345 kV AC substation in the vicinity of the existing IPP 345 kV substation near Delta, Utah;

3. Construction of a single circuit 500 kV AC line from the Northern Terminal near Sinclair, Wyoming to the new 500/345 kV AC substation near IPP (northern line segment). The single circuit 500 kV AC line would be designed to operate at both 500 kV AC and ±600 kV DC for easy conversion to ±600 kV DC operation;

4. Construction of a 500 kV series compensation station near the halfway point of the 500 kV AC northern line segment;

5. Construction of a double circuit 345 kV transmission line connecting the new 500/345 kV AC substation to the existing IPP 345 kV substation. The length of the double circuit 345 kV AC connection is estimated to be less than five miles; and

6. Energization of Phase 1 of Design Option 3 as a 1,500 MW, 500 kV AC system.

Phase 2 would entail the following:

1. Construction of the AC/DC converter station portion of the Northern Terminal in Wyoming and construction of the entire Southern Terminal in Nevada;

2. Construction of the ground electrodes for both the Northern and Southern Terminals (see Map Exhibits 4 and 5);

3. Construction of the ±600 kV DC transmission line between IPP and the Southern Terminal (southern line segment);

4. Removal of the connection to the IPP substation at Delta, Utah and connecting the Phase 1 500 kV AC line (constructed during Phase 1, designed for conversion to ±600 kV DC and operated at 500 kV AC during Phase 1) to the Phase 2 ±600 kV DC line between Delta, Utah and the Southern Terminal;

5. Convert the operation of the TWE Project to a 3,000 MW, ±600 kV DC system;

6. Decommission the 500/345 kV AC substation at IPP;

7. Decommission the double circuit 345 kV transmission line at IPP; and

8. Decommission the series compensation station on the 500 kV AC northern line segment.

Design Option 3 would utilize the same transmission corridor as the proposed TWE Project. Construction of the Northern Terminal in Wyoming would occur in phases. Phase 1 would require the construction of the AC substation portion of the Northern Terminal complex. In Phase 2, the AC/DC converter station portion of the Northern Terminal complex would be constructed adjacent to the 500 kV AC substation constructed in Phase 1, completing the Northern Terminal. The AC operation of the northern line segment would require the construction of a 500/345 kV substation near IPP. Upon conversion of the line to DC operations, this 500/345 kV substation would be decommissioned along with the double circuit 345 kV line. The 500 kV AC line constructed in Phase 1 from Wyoming to Utah (northern line segment) would be designed and constructed as a DC line to a criteria that would enable it to be initially operated at 500 kV AC and then converted from 500 kV AC operation to ±600 kV DC operation. No further changes to the transmission line would be required to convert the line from AC to DC operation. AC operation of the northern line segment would require the construction of a 500 kV series compensation station near the halfway point of this segment. Upon conversion of the line to DC operations, this 500 kV series compensation station would be decommissioned.

Phase 1 of Design Option 3 would require a single circuit 500 kV AC configuration designed and constructed to meet the ±600 kV DC criteria. The typical Phase 1 single circuit 500 kV AC structures would be similar in appearance to those shown in Figures 21 and 22. The single circuit 500 kV AC configuration would require three sets of conductor bundles, one steel shield wire, and one OPGW. The conversion from 500 kV AC to ±600 kV DC would not require physical changes to the structure or wire system constructed in Phase 1 as one of the three conductor bundle sets would be de-energized and left in place.

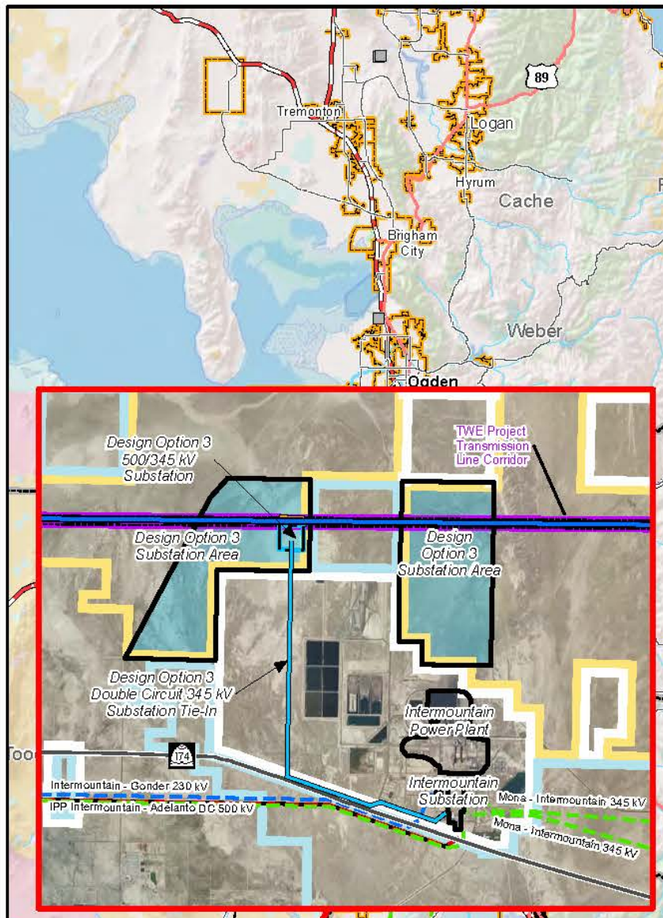
Phase 1 of Design Option 3 would also require one 345 kV double circuit transmission line. The 345 kV double circuit structures would be either self-supporting steel lattice towers or single shaft tubular steel poles. Figure 22 shows a typical steel pole design. The 345 kV double circuit configurations

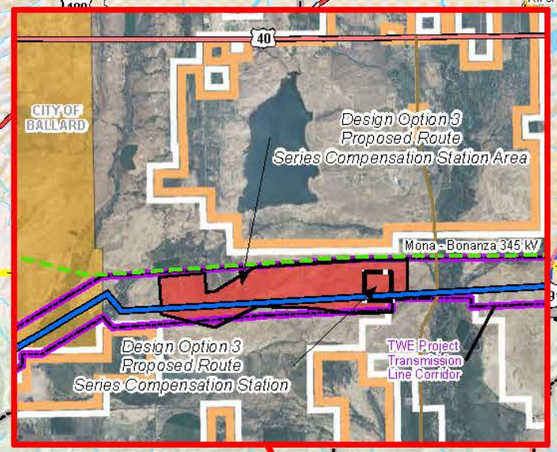
would require six sets of conductor bundles, one steel shield wire, and one OPGW. The components for the 345 kV structures including foundations, conductors, insulators, and associated hardware, overhead shield (ground) wires, and grounding rods, would be similar to those described for the ±600 kV DC transmission line.

Map Exhibit 9 depicts the siting areas for the Design Option 3 components, including the 500/345 kV AC substation, double circuit 345 kV connector lines and the 500 kV series compensation station.

7.3 Construction, Operation and Maintenance Activities of Design Options

The construction, operation, and maintenance activities described for the proposed TWE Project would be very similar for most aspects of the design options. Applicant-committed environmental mitigation measures would also apply to these alternatives. This section discusses key differences between the design options and the proposed TWE Project.





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Map Exhibit 9

Design Option 3 Components

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line Corridor
- Terminal Siting Area

Administrative Boundaries
- Municipal Boundary

Existing Transmission
- 500 kV Line
- 500 kV DC Line
- 345 kV Line
- 287 kV Line
- 230 kV Line
- 138 kV Line
- Substation

Land Jurisdiction
- Indian Reservation
- State Land
- USDA Forest Service
- State Park or Recreation Area
- U.S. Department of Energy
- U.S.Department of Defense
- National Park or National Monument
- USDI Bureau of Land Management
- USDI Bureau of Reclamation
- USDI Fish and Wildlife Service

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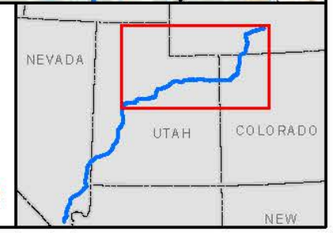

7.3.1 Design Option Construction Activities, Workforce and Equipment Requirements

The construction activities, workforce and equipment requirements for the transmission line and terminals would be very similar or the same for the design options as described for the proposed TWE Project in Section 5.8. Construction of each substation or series compensation station would require approximately 135 personnel. The construction activities, workforce and equipment requirements for the substations and series compensation stations for Design Options 2 and 3 would be approximately as shown in Table 13. Special construction methods and Applicant-committed environmental mitigation measures would apply to these alternatives, as presented in Section 5.7.

TABLE 13 ESTIMATED PERSONNEL AND EQUIPMENT FOR DESIGN OPTION SUBSTATIONS

ACTIVITY	PEOPLE	QUANTITY AND TYPE OF EQUIPMENT		TRACK OR RUBBER TIRE
Survey Crew	4	2	Pickup trucks	Rubber
Site Management Crew	8-10	2	Office trailers	Rubber
		3	Pickups	Rubber
		4	Generators	Rubber
Site Development – Civil Work Crew	20-25	4	Scrapers	Rubber
		2	Dozers (ripper)	Track
		2	Motor graders	Rubber
		2	Roller compactors	Rubber
		2	Excavators	Either
		4	Dump trucks	Rubber
		3	Water trucks	Rubber
		1	Mechanics truck	Rubber
		1	Fuel truck	Rubber
		2	Pickup trucks	Rubber
		6	Carry alls	Rubber
Fence Installation Crew	10-15	1	Pickup truck	Rubber
		1	Boom truck	Rubber
		2	Carry alls	Rubber
		1	Backhoe	Either
		1	Concrete truck	Rubber
		1	Reel stand truck	Rubber
		2	Bobcats	Either
Equipment Footings Installation Crew	20-25	2	Hole diggers	Either
		2	Boom trucks	Rubber
		1	Excavator	Either
		3	Concrete trucks	Rubber

ACTIVITY	PEOPLE	QUANTITY AND TYPE OF EQUIPMENT		TRACK OR RUBBER TIRE
		1	Dump truck	Rubber
		1	Roller compactor	Rubber
		2	Plate compactors	---------
		1	Backhoe	Either
		2	Bobcats	Either
		1	Mechanics truck	Rubber
		1	Fuel truck	Rubber
		1	Water truck	Rubber
		2	Pickup trucks	Rubber
		4	Carry alls	Rubber
Cable Trench, Conduits, and Station Grounding Crew	10-12	2	Trenchers	Either
		2	Dozers (ripper)	Track
		2	Roller compactors	Rubber
		2	Plate compactors	---------
		2	Excavators	Either
		1	Boom truck	Rubber
		3	Pickup trucks	Rubber
		2	Flatbed trucks	Rubber
		4	Carry alls	Rubber
		1	Air compressor	Rubber
		1	Backhoe	Either
		1	Mechanics truck	Rubber
		1	Fuel truck	Rubber
		1	Dump truck	Rubber
		1	Reel stand truck	Rubber
Steel Structure and Bus Installation Crew, Control Buildings Construction Crew, Equipment Assembly and Erection Crew	16-24	2	Cranes, RT	Either
		2	High capacity cranes	Either
		4	Boom trucks	Either
		6	Manlifts	Either
		4	Welder trucks	Rubber
		2	Carry alls	Rubber
		3	Pickup trucks	Rubber
		2	Flatbed trucks	Rubber
		1	Mechanics truck	Rubber

ACTIVITY	PEOPLE	QUANTITY AND TYPE OF EQUIPMENT		TRACK OR RUBBER TIRE
		4	Vans	Rubber
		2	Flatbed trucks	Rubber
Control Building and Wiring Crew	16-20	2	Boom trucks	Rubber
		4	Manlifts	Either
		3	Wire pullers-small	Rubber
		2	Reel stand trucks/trailers	Rubber
		4	Vans	Rubber
		4	Pickup trucks	Rubber
		2	Carry alls	Rubber
		1	Splicing van	Rubber
		2	Concrete trucks	Rubber
		1	Bobcat	Either
		1	Trencher	Either
		2	Plate compactors	---------

The above table reflects estimated personnel requirements, which may reach as high as 135 for each substation or series compensation station construction, including maintenance, management, and quality control personnel.

7.3.2 Design Option Construction Schedules

The conceptual construction schedule for the transmission line for Design Option 2 would employ a three spread approach very similar to the schedule presented for the proposed TWE Project in Section 5.8.1 and shown on Figure 19. For Design Option 2, the conceptual construction schedules shown in Figure 19 would need to be increased by approximately ten weeks to accommodate the additional work required for installing an AC transmission line in place of a DC transmission line.

The conceptual construction schedule for the transmission lines for Design Option 3 follows a phased approach and is shown on Figure 28. The conceptual construction schedule shown on Figure 28 would be used for both Phase 1 and Phase 2 of Design Option 3.

The construction schedules for the terminal, ground electrodes, substations and series compensation stations for Design Options 2 and 3 would differ from the proposed TWE Project, as illustrated on Figures 26 and 27.

7.3.3 Induced Currents on Adjacent Facilities

Unlike the proposed TWE Project ±600 kV DC transmission line, which presents no risk of inducing currents line due to the static nature of the DC electrical and magnetic fields, AC transmission systems can induce currents. Mitigation measures for AC inductive currents would be implemented as necessary for the AC portions of Design Options 2 and 3.[1] Mitigation measures would be incorporated into the siting of the AC transmission line ROWs, as well as through transmission line design and operation measures. Measures to mitigate induced current impacts on pipelines, railroads and other land uses are described in Section 6.2.2. .

[1] The proposed TWE Project includes short sections of AC transmission lines to connect between the terminals and existing and planned AC transmission systems. Potential impacts from AC induced currents on these system interconnection lines would be mitigated, if necessary.

DESIGN OPTION - 2		TOTAL DURATION	111 week

TASK	DURATION (WEEKS)
AC/DC CONVERTER STATION (NEAR IPP)	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	32
BUILDING CONSTRUCTION	35
EQUIPMENT INSTALLATION	39
EQUIPMENT TESTING	21
OPERATIONAL	9
500/345 kV AC SUBSTATION (NEAR IPP)	
SITE GRADING	22
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	22
EQUIPMENT INSTALLATION	26
CONTROL BUILDING INSTALLATION	22
EQUIPMENT TESTING	13
OPERATIONAL	7
IPP 345 kV AC SUBSTATION MODIFICATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	15
EQUIPMENT INSTALLATION	17
CONTROL BUILDING MODIFICATION	13
EQUIPMENT TESTING	7
OPERATIONAL	3
SERIES COMPENSATION STATION	
SITE GRADING	10
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	15
CONTROL HOUSE CONSTRUCTION	17
EQUIPMENT INSTALLATION	16
EQUIPMENT TESTING	10
OPERATIONAL	3

Wk 1 Wk 2 Wk 3 Wk 4 Wk 5 Wk 6 Wk 7 Wk 8 Wk 9 Wk 10 Wk 11 Wk 12 Wk 13 Wk 14 Wk 15 Wk 16 Wk 17 Wk 18 Wk 19 Wk 20 Wk 21 Wk 22 Wk 23 Wk 24 Wk 25 Wk 26 Wk 27 Wk 28 Wk 29 Wk 30 Wk 31 Wk 32 Wk 33 Wk 34 Wk 35 Wk 36 Wk 37 Wk 38 Wk 39 Wk 40 Wk 41 Wk 42 Wk 43 Wk 44 Wk 45 Wk 46 Wk 47 Wk 48 Wk 49 Wk 50 Wk 51 Wk 52 Wk 53 Wk 54 Wk 55 Wk 56 Wk 57

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FIGURE 26

CONSTRUCTION SCHEDULE FOR DESIGN OPTION 2 TERMINALS, SUBSTATIONS AND SERIES COMPENSATION STATION – SHEET 1

DESIGN OPTION - 2		TOTAL DURATION	111 week

TASK	DURATION (WEEKS)	Wk 58	Wk 59	Wk 60	Wk 61	Wk 62	Wk 63	Wk 64	Wk 65	Wk 66	Wk 67	Wk 68	Wk 69	Wk 70	Wk 71	Wk 72	Wk 73	Wk 74	Wk 75	Wk 76	Wk 77	Wk 78	Wk 79	Wk 80	Wk 81	Wk 82	Wk 83	Wk 84	Wk 85	Wk 86	Wk 87	Wk 88	Wk 89	Wk 90	Wk 91	Wk 92	Wk 93	Wk 94	Wk 95	Wk 96	Wk 97	Wk 98	Wk 99	Wk 100	Wk 101	Wk 102	Wk 103	Wk 104	Wk 105	Wk 106	Wk 107	Wk 108	Wk 109	Wk 110	Wk 111	Wk 112	Wk 113
AC/DC CONVERTER STATION (NEAR IPP)																																																										
SITE GRADING	13																																																									
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	32																																																								
BUILDING CONSTRUCTION	35																																																								
EQUIPMENT INSTALLATION	39																																																								
EQUIPMENT TESTING	21																																																								
OPERATIONAL	9																																																								
500/345 kV AC SUBSTATION (NEAR IPP)																																																										
SITE GRADING	22																																																								
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	22																																																								
EQUIPMENT INSTALLATION	26																																																								
CONTROL BUILDING INSTALLATION	22																																																								
EQUIPMENT TESTING	13																																																								
OPERATIONAL	7																																																								
IPP 345 kV AC SUBSTATION MODIFICATION																																																									
SITE GRADING	13																																																								
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	15																																																								
EQUIPMENT INSTALLATION	17																																																								
CONTROL BUILDING MODIFICATION	13																																																								
EQUIPMENT TESTING	7																																																								
OPERATIONAL	3																																																								
SERIES COMPENSATION STATION																																																								
SITE GRADING	10																																																								
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	15																																																								
CONTROL HOUSE CONSTRUCTION	17																																																								
EQUIPMENT INSTALLATION	16																																																								
EQUIPMENT TESTING	10																																																								
OPERATIONAL	3																																																								

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FIGURE 26

CONSTRUCTION SCHEDULE FOR DESIGN OPTION 2 TERMINALS, SUBSTATIONS AND SERIES COMPENSATION STATION – SHEET 2

DESIGN OPTION - 3		TOTAL DURATION	82 week

TASK	DURATION (WEEKS)
500/345 kV AC SUBSTATION (NEAR IPP)	
SITE GRADING	22
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	22
EQUIPMENT INSTALLATION	26
CONTROL BUILDING INSTALLATION	22
EQUIPMENT TESTING	13
OPERATIONAL	7
IPP 345 kV AC SUBSTATION MODIFICATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	15
EQUIPMENT INSTALLATION	17
CONTROL BUILDING MODIFICATION	13
EQUIPMENT TESTING	7
OPERATIONAL	3
SERIES COMPENSATION STATION	
SITE GRADING	10
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	15
CONTROL HOUSE CONSTRUCTION	17
EQUIPMENT INSTALLATION	16
EQUIPMENT TESTING	10
OPERATIONAL	3

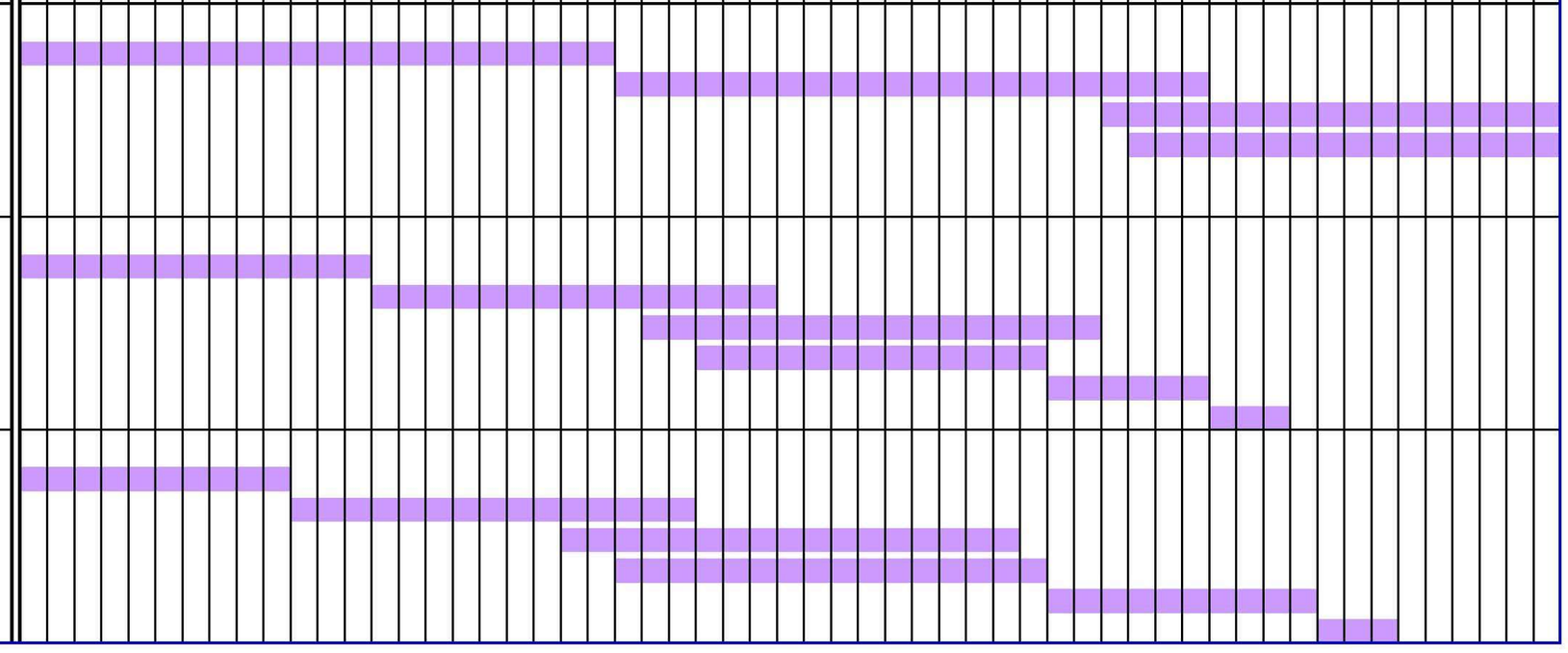

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FIGURE 27
CONSTRUCTION SCHEDULE FOR DESIGN OPTION 3 SUBSTATION AND SERIES COMPENSATION STATION – SHEET 1

DESIGN OPTION - 3	TOTAL DURATION	82 week

TASK	DURATION (WEEKS)	Wk 58	Wk 59	Wk 60	Wk 61	Wk 62	Wk 63	Wk 64	Wk 65	Wk 66	Wk 67	Wk 68	Wk 69	Wk 70	Wk 71	Wk 72	Wk 73	Wk 74	Wk 75	Wk 76	Wk 77	Wk 78	Wk 79	Wk 80	Wk 81	Wk 82	Wk 83	Wk 84	Wk 85
500/345 kV AC SUBSTATION (NEAR IPP)																													
SITE GRADING	22																												
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	22																												
EQUIPMENT INSTALLATION	26																												
CONTROL BUILDING INSTALLATION	22																												
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IPP 345 kV AC SUBSTATION MODIFICATION																													
SITE GRADING	13																												
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	15																												
EQUIPMENT INSTALLATION	17																												
CONTROL BUILDING MODIFICATION	13																												
EQUIPMENT TESTING	7																												
OPERATIONAL	3																												
SERIES COMPENSATION STATION																													
SITE GRADING	10																												
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	15																												
CONTROL HOUSE CONSTRUCTION	17																												
EQUIPMENT INSTALLATION	16																												
EQUIPMENT TESTING	10																												
OPERATIONAL	3																												

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FIGURE 27

CONSTRUCTION SCHEDULE FOR DESIGN OPTION 3 SUBSTATION AND SERIES COMPENSATION STATION – SHEET 2

SECTION 1 NORTHERN TERMINAL - NORTHEASTERN UTAH		TOTAL DURATION	122 weeks
TASK	DURATION (WEEKS)		
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	122		
INSPECTION	120		
MOBILIZE CONTRACTOR	6		
RECEIVE / HANDLE MATERIALS	120		
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	49		
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	49		
GEOLOGICAL INVESTIGATIONS	56		
SURVEY / STAKE STRUCTURE LOCATIONS	67		
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	70		
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	70		
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	60		
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	66		
ERECT SELF SUPPORTING LATTICE STRUCTURE	72		
WIRE INSTALLATION	85		
FINAL CLEAN UP / RECLAMATION / RESTORATION	70		

SECTION 2 NORTHEASTERN UTAH - WEST CENTRAL UTAH		TOTAL DURATION	124 weeks
TASK	DURATION (WEEKS)		
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	124		
INSPECTION	122		
MOBILIZE CONTRACTOR	6		
RECEIVE / HANDLE MATERIALS	122		
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	50		
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	50		
GEOLOGICAL INVESTIGATIONS	58		
SURVEY / STAKE STRUCTURE LOCATIONS	69		
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	72		
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	72		
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	63		
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	68		
ERECT SELF SUPPORTING LATTICE STRUCTURE	74		
WIRE INSTALLATION	88		
FINAL CLEAN UP / RECLAMATION / RESTORATION	72		

SECTION 3 WEST CENTRAL UTAH - SOUTHERN TERMINAL		TOTAL DURATION	140 weeks
TASK	DURATION (WEEKS)		
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	140		
INSPECTION	138		
MOBILIZE CONTRACTOR	6		
RECEIVE / HANDLE MATERIALS	138		
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	66		
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	66		
GEOLOGICAL INVESTIGATIONS	76		
SURVEY / STAKE STRUCTURE LOCATIONS	76		
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	90		
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	90		
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	83		
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	83		
ERECT SELF SUPPORTING LATTICE STRUCTURE	96		
WIRE INSTALLATION	84		
FINAL CLEAN UP / RECLAMATION / RESTORATION	96		

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TRANSWEST EXPRESS TRANSMISSION PROJECT

FIGURE 28

CONSTRUCTION SCHEDULE FOR
DESIGN OPTION 3 TRANSMISSION LINE
SHEET 1

SECTION 1
NORTHERN TERMINAL - NORTHEASTERN UTAH

TOTAL DURATION: 111 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	122
INSPECTION	120
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	120
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	49
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	49
GEOLOGICAL INVESTIGATIONS	56
SURVEY / STAKE STRUCTURE LOCATIONS	67
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	70
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	70
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	60
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	66
ERECT SELF SUPPORTING LATTICE STRUCTURE	72
WIRE INSTALLATION	85
FINAL CLEAN UP / RECLAMATION / RESTORATION	70

SECTION 2
NORTHEASTERN UTAH - WEST CENTRAL UTAH

TOTAL DURATION: 124 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	124
INSPECTION	122
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	122
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	50
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	50
GEOLOGICAL INVESTIGATIONS	58
SURVEY / STAKE STRUCTURE LOCATIONS	69
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	72
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	72
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	63
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	68
ERECT SELF SUPPORTING LATTICE STRUCTURE	74
WIRE INSTALLATION	88
FINAL CLEAN UP / RECLAMATION / RESTORATION	72

SECTION 3
WEST CENTRAL UTAH - SOUTHERN TERMINAL

TOTAL DURATION: 140 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	140
INSPECTION	138
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	138
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	66
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	66
GEOLOGICAL INVESTIGATIONS	76
SURVEY / STAKE STRUCTURE LOCATIONS	76
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	90
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	90
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	83
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	83
ERECT SELF SUPPORTING LATTICE STRUCTURE	96
WIRE INSTALLATION	84
FINAL CLEAN UP / RECLAMATION / RESTORATION	96

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TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 28

CONSTRUCTION SCHEDULE FOR
DESIGN OPTION 3 TRANSMISSION LINE
SHEET 2

SECTION 1
NORTHERN TERMINAL - NORTHEASTERN UTAH

TOTAL DURATION: 122 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	122
INSPECTION	120
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	120
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	49
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	49
GEOLOGICAL INVESTIGATIONS	56
SURVEY / STAKE STRUCTURE LOCATIONS	67
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	70
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	70
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	60
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	66
ERECT SELF SUPPORTING LATTICE STRUCTURE	72
WIRE INSTALLATION	85
FINAL CLEAN UP / RECLAMATION / RESTORATION	70

SECTION 2
NORTHEASTERN UTAH - WEST CENTRAL UTAH

TOTAL DURATION: 124 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	124
INSPECTION	122
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	122
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	50
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	50
GEOLOGICAL INVESTIGATIONS	58
SURVEY / STAKE STRUCTURE LOCATIONS	69
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	72
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	72
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	63
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	68
ERECT SELF SUPPORTING LATTICE STRUCTURE	74
WIRE INSTALLATION	88
FINAL CLEAN UP / RECLAMATION / RESTORATION	72

SECTION 3
WEST CENTRAL UTAH - SOUTHERN TERMINAL

TOTAL DURATION: 140 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	140
INSPECTION	138
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	138
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	66
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	66
GEOLOGICAL INVESTIGATIONS	76
SURVEY / STAKE STRUCTURE LOCATIONS	76
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	90
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	90
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	83
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	83
ERECT SELF SUPPORTING LATTICE STRUCTURE	96
WIRE INSTALLATION	84
FINAL CLEAN UP / RECLAMATION / RESTORATION	96

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TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 2B
CONSTRUCTION SCHEDULE FOR DESIGN OPTION 3 TRANSMISSION LINE
SHEET 3

7.4 Comparison of Proposed TWE Project to Design Options

Table 14 provides a comparison summary of Design Options 2 and 3 to the proposed TWE Project.

TABLE 14 COMPARISON OF PROPOSED TWE PROJECT TO DESIGN OPTIONS

COMPARISON FACTORS	PROPOSED TWE PROJECT	DESIGN OPTION 2	DESIGN OPTION 3
TWE Project Configuration	Two-terminal ±600 kV DC transmission line between WY and NV with potential interconnection to IPP system near Delta, UT.	Two terminal ±600 kV DC transmission line between WY and IPP system near Delta, UT. Two terminal single circuit 500 kV AC transmission line between Delta, UT and NV.	Phased Approach Phase 1 – Two terminal 500 kV AC (±600 kV DC) line between WY and IPP near Delta, UT. Phase 2 – proposed TWE Project. Involves building DC line from IPP to Marketplace and two AC/DC converter stations.
Contingencies for Design Options	N/A	Capacity available in the future on IPP STS to serve Desert Southwest.	Capacity available in the future on IPP STS to serve Desert Southwest. The need for transmission capacity requires a phased implementation.
Current Status of System Contingencies and Design Options	N/A	Future available capacity on the IPP STS is uncertain. Therefore, the status of Design Option 2 is uncertain.	Future available capacity on the IPP STS is uncertain. Currently, all of the TWE Project's 3,000 MW of capacity is needed by the projected in-service date. It is unlikely Design Option 3 will be pursued.
Routing Alternatives	As part of the EIS preparation, the BLM and Western have established four regions for the TWE Project route. Each region has a distinct set of Route Alternatives.	The TWE Project route region and all Route Alternatives for each region all apply to Design Option 2.	The TWE Project route region and all Route Alternatives for each region all apply to Design Option 3.
System Capacity	3,000 MW between WY and NV	3,000 MW between WY and UT 1,500 MW between UT and NV	Phase 1 - 1,500 MW between WY and UT Phase 2 - 3,000 MW between WY and NV
Typical Transmission Line Towers Used	Guyed or self-supporting lattice towers holding up two conductor bundles for entire Project.	Guyed or self-supporting lattice towers holding up two conductor bundles between WY and Delta, UT. Guyed or self-supporting lattice towers holding up three conductor bundles between Delta, UT and NV.	Guyed or self-supporting lattice towers holding up three conductor bundles between WY and Delta, UT. Guyed or self-supporting lattice towers holding up two conductor bundles between Delta, UT and NV.

COMPARISON FACTORS	PROPOSED TWE PROJECT	DESIGN OPTION 2	DESIGN OPTION 3
Terminals - AC/DC Converter Stations	Northern Terminal near Sinclair, WY. Southern Terminal at Marketplace Hub near Boulder City, NV.	Northern Terminal same as proposed TWE Project. Southern Terminal near the IPP near Delta, UT.	Phase 1 – no AC/DC Converter Stations Phase 2 - Same as proposed TWE Project.
TWE Project Interconnections	Northern Terminal will interconnect with existing 230 kV line and one (two total) 500 kV circuit of the Energy Gateway West and Energy Gateway South projects. Southern Terminal will interconnect with the existing 500 kV AC substations (up to 4 total) at the Marketplace Hub near Boulder City, NV. Potential interconnection with IPP system near Delta, UT.	Same as proposed TWE Project for Northern Terminal. Southern Terminal would be located near Delta, UT and would be interconnected to the IPP transmission system, and the TWE Project 500 kV AC line. The TWE Project 500 kV AC line would interconnect with one of the existing 500 kV AC substations at the Marketplace Hub near Boulder City, NV.	Phase 1 – The TWE Project 500 kV AC line would interconnect with the existing 230 kV line and the 500 kV Energy Gateway West and Energy Gateway South lines in WY and with the IPP Substation near Delta, UT. Phase 2 – same as the proposed TWE Project.
Related Structures and Facilities	Fiber optic network communications system. Two ground electrode facilities near terminals.	Same as the proposed TWE Project, however, ground electrode facility would be within 50 miles of the Southern Terminal near IPP Substation, Delta, UT.	Phase 1 – Fiber optic network communications system between WY and NV. No ground electrode. Phase 2 - Same as proposed TWE Project.

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8.0 ENVIRONMENTAL MITIGATION MEASURES

8.1 Introduction

This section of the ROD POD describes the environmental compliance program to be implemented for the TWE Project.

Prior to construction, TransWest will prepare the NTP POD, which will incorporate environmental measures and terms and conditions stipulated in the RODs, ROW grants and special use authorizations issued by each federal agency. The NTP POD will provide detailed information on the TWE Project's construction plans and specifications, and construction practices and procedures for the Selected Alternative. It will also describe the processes and procedures TransWest will employ to comply with the requirements of the RODs, ROW grants, and special use authorizations in compliance with the Environmental Compliance and Monitoring Plan attached as Appendix G.

Below is a table of specific environmental protection plans, which are part of this ROD POD (Table 15). These plans are stand-alone documents that will be used to implement the environmental compliance program for the TWE Project. The plans fall into two categories: "final" plans that have been completed by TransWest and "framework" plans that will be completed prior to construction, generally by the Construction Contractor. Table 15 identifies the status of each final and framework plan.

The process leading to a set of final environmental protection plans is iterative. The framework plans are based upon preliminary engineering and design of the Agency Preferred Alternative, potential impacts disclosed in the FEIS, Applicant committed environmental mitigation measures, and proposed BMPs and mitigation measures. Final plans will be based upon final engineering and design of the Selected Alternative, final mitigation measures, and requirements and terms and conditions of the RODs, ROW grants, special use authorizations, and any other required permits. Framework plans describe the process to be followed and matters to be considered in preparing the final plans for the Selected Alternative. These framework plans are an intermediate step and establish the structure of each plan.

TABLE 15 STATUS OF ENVIRONMENTAL PROTECTION PLANS

APPENDIX DESIGNATION	NAME	STATUS	DESCRIPTION
Appendix A	Access Road Siting and Management Plan	Framework - to be finalized prior to construction.	Provides a description of the types and location of access roads associated with the Project and establishes best management practices and mitigation measures.
Appendix B	Avian Protection Plan	Final	Provides a program to manage avian safety on the Project consistent with APLIC recommendations and establishes measures to protect avian species.
Appendix C	Blasting Plan	Framework - to be finalized prior to construction.	Provides safe procedural practices, environmental protection measures, and other specific stipulations and methods to minimize the environmental impact of blasting during Project construction
Appendix D	Cultural Resources Protection and Management Plan	Final	Establishes the procedures and measures developed for the Project to manage and protect cultural resources and historic properties.
Appendix E	Dust Control and Air Quality Plan	Framework - to be finalized prior to construction.	Addresses regulatory compliance, environmental concerns, mitigation recommendations, and monitoring related to dust control and air quality.
Appendix F	Emergency Preparedness and Response Plan	Final	Provides an overview of methods to be implemented if emergency management and response is necessary during the construction, operation, and maintenance of the Project.
Appendix G	Environmental Compliance and Monitoring Plan	Final	Provides information on how compliance with all laws, regulations and agreements will be managed for the Project.
Appendix H	Fire Protection Plan	Framework - to be finalized prior to construction.	Describes the measures to be taken for the Project to ensure fire prevention and suppression measures are carried out in accordance with federal, state, and local regulations.
Appendix I	Flagging, Fencing, and Signage Plan	Framework - to be finalized prior to construction.	Describes the methods that will be used to delineate the Project limits of disturbance and protect sensitive environmental and cultural resources.
Appendix J	Geotechnical Plan	Framework - to be finalized prior to construction.	Establishes the procedures to gather and incorporate geotechnical information into the design and construction of the Project.
Appendix K	Greater Sage-Grouse Mitigation Plan	Framework - to be finalized prior to construction.	Presents the results of the Project Habitat Equivalency Analysis modeling and a framework for compensatory mitigation for greater sage-grouse.
Appendix L	Hazardous Materials Management Plan	Framework - to be finalized prior to construction.	Identifies project-specific measures, stipulations, and methods to address hazardous materials spill prevention, response, and cleanup.
Appendix M	Health and Safety Plan	Final	Describes measures to address potential health and safety issues and protect both workers and the public during construction, operation, and decommissioning of the Project.
Appendix N	Noxious Weed Management Plan	Framework - to be finalized prior to construction.	Provides methods and measures to prevent, mitigate and control the spread of noxious and invasive weeds during construction, operation and maintenance of the Project.

APPENDIX DESIGNATION	NAME	STATUS	DESCRIPTION
Appendix O	Operations and Maintenance Plan	Final	Describes routine, corrective, and emergency operation and maintenance activities for the Project, including measures to avoid and minimize impacts from such activities.
Appendix P	Paleontological Resources Management and Mitigation Plan	Framework - to be finalized prior to construction.	Establishes the process to be used to identify sensitive paleontological resources, develop measures to mitigate impacts to those sensitive resources, and implementation and reporting of those measures for the Project.
Appendix Q	Reclamation Plan	Framework - to be finalized prior to construction.	Outlines reclamation goals and objectives and the reclamation process, including soil management, site preparation, revegetation, monitoring, and reporting.
Appendix R	ROW Preparation and Vegetation Management Plan	Final	Recommends vegetation management actions to meet regulatory requirements for ROW clearing and maintenance, fuels management, and to support restoration actions for implementation of the Reclamation Plan (App. Q).
Appendix S	Spill Prevention and Response Plan	Framework - to be finalized prior to construction.	Identifies measures to address spill prevention, response, and cleanup for the Project.
Appendix T	Stormwater Pollution Prevention Plan	Framework - to be finalized prior to construction.	Establishes measures to be taken to prevent stormwater pollution and comply with Section 402 of the Clean Water Act.
Appendix U	Traffic and Transportation Management Plan	Framework - to be finalized prior to construction.	Provides measures to minimize impacts on roads, traffic, and other users of roads from construction of the Project.
Appendix V	Visual Resources Management Plan	Final	Provides a strategy to implement measures to minimize visual contrasts and impacts from the Project.
Appendix W	Water Resources Protection Plan	Framework - to be finalized prior to construction.	Describes a program to avoid and minimize impacts to water resources from the Project.
Appendix X	Wildlife and Plant Conservation Measures Plan	Final	Presents measures to address regulatory requirements for ROW clearing, habitat disturbance, and impacts to special-status wildlife and plant species.

8.2 POD Implementation on Public/Private Lands

The NTP POD will outline the stipulations, terms and conditions, and mitigation measures set forth in the RODs, ROW grants, special use authorizations and other required permits that must be followed during construction, operation, and maintenance of the Project. The POD is intended to be used Project-wide as (1) a summary of Project environmental requirements and protection measures, and (2) a description of the processes and procedures that will be used to ensure compliance (including the requirements of the U.S. Fish and Wildlife Service, BLM, USFS, and other federal, state, and/or local agencies) as appropriate.

The POD will be an enforceable stipulation of the ROD and the BLM ROW grant. The USFS and Western may choose to make the POD or a similar document enforceable as part of each agency's respective ROD, or special use authorization (SUA). The POD applies not only to construction of the Project, but also to the operation and maintenance phase of the Project. The BLM and USFS have jurisdiction over all lands under the administrative control of each respective agency. Each agency has specific mitigation measures that would apply to lands under their jurisdiction. In addition, TransWest has committed to mitigation (Applicant committed mitigation) that would apply Project-wide except where noted otherwise.

8.3 Overview of Mitigation Measures

To outline and summarize the stipulations, terms and conditions and mitigation measures that apply to the Project, TransWest has prepared a series of tables containing its applicant-committed mitigation measures, as well as the applicable mitigation measures and stipulations identified through the EIS process. The following sections and tables outline the mitigation measures, BMPs, and stipulations that apply to the Project, and describe the situations in which the measures apply. The mitigation tables include the following:

- Section 8.3.1, Table 16 - Applicant Committed Environmental Mitigation Measures
- Section 8.3.2, Table 17 - Additional Mitigation Measures for the TWE Project
- Section 8.3.3, Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative
- Section 8.3.4, Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices
- Section 8.3.5, Table 20 – National BMP's for Water Quality Management on National Forest System Lands
- Section 8.3.6, Table 21 – [To Be Determined] ESA Species Conservation Measures Adopted in the ROD

8.3.1 Applicant Committed Environmental Mitigation Measures

Table 16 outlines the Applicant committed environmental mitigation measures proposed by TransWest that are being applied to reduce impacts to environmental resources. Mitigation measures are organized by major resource topics. These measures are part of the proposed TWE Project. Mitigation measures include general mitigation measures, which would apply to the TWE Project as a whole; and selective mitigation measures, which would be implemented on a case-by-case basis to address specific environmental impacts or localized conditions.

Table 16 identifies the phase(s) during which each measure would be implemented:

- P – planning and engineering design
- C – construction
- O – operation and maintenance
- D – decommissioning

TABLE 16 APPLICANT COMMITTED ENVIRONMENTAL MITIGATION MEASURES

NO.	PHASE(S)[1]	TOPIC	DESCRIPTION OF MITIGATION MEASURE	APPENDIX[2]
General Measures				
TWE-1	P	General, compliance with agency stipulations and RODs	The TWE Project will be planned, constructed, operated, and decommissioned in accordance with the agencies' Records of Decision (RODs), the U.S. Bureau of Land Management's (BLM) ROW Grant stipulations, U.S. Forest Service (USFS) Special Use Permit stipulations, and requirements of other permitting agencies.	No Applicable Appendix
TWE-2	P	General, compliance with laws and regulations	The Applicant will comply with all applicable environmental laws and regulations. Applicable laws and regulations may include, but are not limited to, the Clean Water Act (CWA) Section 303(d) and Section 404; the Wild and Scenic Rivers Act, Section 3(a) or 2(s)ii; the Endangered Species act (ESA), Section 7; the National Historic Preservation Act (NHP), Section 106; and the Native American Graves Protection and Repatriation Act (NAGPRA). Compliance with all applicable laws and regulations will be documents in the Final Plan of Development (POD)/Construction, Operation and Maintenance (COM) Plan.	X
TWE-3	P	General, mitigation monitoring plan	The POD will include a mitigation monitoring plan that will address how each mitigation measure required by permitting agencies in their respective decision documents and permits will be monitored for compliance.	G
TWE-4	P	General, environmental training	Prior to construction, all personnel will be instructed on the protection of cultural, paleontological, ecological resources, and other natural resources in accordance with the POD provisions. To assist in this effort, the construction contract would address (a) federal, state , and tribal laws regarding cultural resources, fossils, plants, and wildlife, including collection and removal; and (b) the importance of these resources and the purpose and necessity of protecting them.	D, G, R
Project Design, Access, and Construction				
TWE-5	P	General, compliance with laws and regulations	The POD will display the location of Project infrastructure (e.g., towers, access roads, substations) and identify short-term and long-term land and resource impacts and the mitigation measures that will be implemented for the site-specific and resource-specific environmental impacts.	A, AA
TWE-6	P	General, Access Road Plan	The POD will include an Access Road Siting and Management Plan that incorporates relevant agency standards regarding road design, construction, maintenance, and decommissioning. The Access Road Siting and Management Plan will incorporate best management practices, stipulated by the agencies in their respective decision documents and permits.	A
TWE-7	P	Access, visual	The alignment of any new access roads will follow the designated area's landform contours where practical, providing that such alignment does not additionally impact resource values. This will minimize ground disturbance and reduce scarring (visual contrast).	V

NO.	PHASE(S)[1]	TOPIC	DESCRIPTION OF MITIGATION MEASURE	APPENDIX[2]
TWE-8	P,C	Access, tower placements, surface water, vegetation management, drainage, dust control	Crossings of streams and waterways will be done in compliance with federal, state, and local regulations. Roads will be built as near as possible at right angles to the streams and washes (Arizona crossing). Culverts will be installed where necessary. All construction and maintenance activities will be conducted in a manner that will minimize disturbance to vegetation, drainage channels, and intermittent or perennial stream banks. In addition, fugitive dust will be controlled during road construction as required by state and local permits. All existing roads will be left in a condition equal to, or better than, their condition prior to the construction of the transmission line. Structures will be sited with a minimum distance of 200 feet from streams, wherever possible.	A, E, T, W
TWE-9	C,O	Access	All construction vehicle movement outside the ROW will be restricted to pre-designated access or public roads.	A, U
TWE-10	P,C	General ROW, visual	The area limits of construction activities will be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents will be applied to rocks or vegetation to indicate survey or construction activity limits.	I, Q, V
TWE-11	P,C	Access, visual	In construction areas where pre-contouring is not required, vegetation will be left in place, wherever possible, and original contour will be maintained to avoid excessive root damage and to allow for re-sprouting.	Q, R
TWE-12	P,C,O	Access, soils, vegetation, water, cultural visual resources	Except for repairs necessary to make roads passable, no widening or upgrading of existing access roads will be undertaken in the area of construction and operation, where soils or vegetation are sensitive to disturbance. In designated areas, structures will be placed to avoid sensitive features such as, but not limited to, riparian areas, water courses and cultural sites, or to allow conductors to clearly span the features within limits of standard structure design. This will minimize the amount of disturbance to the sensitive features or reduce visual contrast.	A, W, V
TWE-13	C	Vegetation management, restoration, erosion control	In construction areas (e.g., marshalling yards, structure sites, spur roads from existing access roads) where ground disturbance is significant or where re-contouring is required, surface restoration will occur as required by the landowner or land management agency. The method of restoration will normally consist of returning disturbed areas back to their natural contour, reseeding (if required), installing cross drains for erosion control, placing water bars in the road, and filling ditches.	Q

NO.	PHASE(S)[1]	TOPIC	DESCRIPTION OF MITIGATION MEASURE	APPENDIX[2]
TWE-14	P,C	General, soils, erosion control, visual	The POD will show the location of borrow sites, from which material will be obtained. Borrow pits will be stripped of topsoil to a depth of approximately six inches. Stripped topsoil will be stockpiled and, upon completion of borrow excavation, spread to a uniform depth of six inches over areas of borrow pits from which removed. Before replacing topsoil, excavated surfaces will be reasonably smooth and uniformly sloped. The sides of borrow pits will be brought to stable slopes with slope intersection shaped to carry the natural contour of adjacent undisturbed terrain into the pit to give a natural appearance. When necessary, borrow pits will be drained by open ditches to prevent accumulation of standing water.	Q, V, T, AA
TWE-15	C	Flagging, Fencing and Signage	The POD will include a Flagging, Fencing, and a Signage Plan. Except for permanent survey markers and material that locate proposed facilities, stakes, pins, rebar, spikes, and other material will be removed from the surface and within the top 15 inches of the topsoil as part of final clean-up. The Applicant will adhere to BLM fencing standards where required. Fences on ROW will be removed where necessary and replaced to the original condition or better when the work is finished. Where existing fences are removed to facilitate the work, temporary fence protection for lands adjacent to the ROW will be provided at all times during the continuation of the Contract. Such temporary fence protection will be adequate to prevent public access to restricted areas. Temporary fencing constructed on the ROW will be removed by the Contractor as part of the clean-up operations prior to final acceptance of the completed work.	I, Q
TWE-16	C	Site restoration and clean-up, water resources, land use	Watering facilities (tanks, natural springs and/or developed springs, water lines, wells, etc.) will be repaired or replaced, if damaged or destroyed by construction activities, to their pre-disturbed condition as required by the landowner or land management agency.	Q, W
TWE-17	C	Site restoration and clean-up	Existing vegetation such as landscape plants, gardens, and field crops, which are damaged by the application of the soil-applied herbicide, will be replaced by the Contractor at its expense.	I, N, Q
TWE-18	C	Site clean-up	The Applicant will pay fair market value to the land management agency for any merchantable forest products that will be cut during ROW clearing. Merchantable forest products will either be removed or stacked at locations determined by the land management agency.	R
Geology and Soils				
TWE-19	C	Drainage, soil erosion control	The POD will include an Erosion Control Plan as part of the Stormwater Pollution Prevention Plan (SWPPP). Grading will be performed to provide adequate drainage around structure sites and sufficient clearance under conductors. Excavated material will be spread around the site where it was excavated. Topsoil will be piled separately and replaced after work completion.	Q, T

NO.	PHASE(S)[1]	TOPIC	DESCRIPTION OF MITIGATION MEASURE	APPENDIX[2]
Groundwater, Surface Water and Wetlands				
TWE-20	P	Water quality	As part of the Clean Water Act (CWA) 404 Permit for the TWE Project, the POD will include a Water Resources Protection Plan, which will incorporate measures to avoid and minimize impacts to wetlands and waters of the U.S. to the extent practical. The POD will include a SWPPP. The Applicant will identify all streams in the vicinity of the proposed project sites that are listed as impaired under Section 303(d) of the CWA and develop a management plan to avoid, reduce, and/or minimize adverse impacts to those streams.	W
TWE-21	P	Water quality	The Applicant will obtain a National Pollutant Discharge Elimination System (NPDES) permit from the Environmental Protection Agency (EPA) prior to construction.	E, W
TWE-22	C	Water quality	Runoff from excavated areas, construction materials or wastes (including truck washing and concrete washes), and chemical products such as oil, grease, solvents, fuels, and pesticides will be controlled. Excavated material or other construction material will not be stockpiled or deposited near or on stream banks, lake shorelines, ditches, irrigation canals, or other areas where runoff could impact the environment.	N, Q, W
TWE-23	C	Water quality	Washing of concrete trucks or disposal of excess concrete in any ditch, canal, stream, or other surface water will not be permitted. Concrete wastes will be disposed of in accordance with all federal, state and local regulations.	W
TWE-24	C,O	Surface water, wetlands	Vehicle refueling and servicing activities will be performed in designated construction zones located more than 100 feet from wetlands and intermittent streams and more than 500 feet from perennial streams. Spill prevention and containment measures or practices will be incorporated as needed.	S, W
TWE-25	P	Dewatering	A dewatering permit will be obtained from the appropriate agencies if required for construction dewatering activities.	W
Vegetation and Soils Management				
TWE-26	P,C	Vegetation management and noxious weeds	The POD will include a Reclamation Plan and a Noxious Weed Management Plan. The Reclamation Plan will address plant removal and selective clearing. The Noxious Weed Management Plan will be developed in accordance with appropriate land management agencies' standards, consistent with applicable regulations and agency permitting stipulations for the control of noxious weeds and invasive species (Executive Order [E.O.] 13112). Included in the Noxious Weed Management Plan will be stipulations regarding construction, restoration, and operation (use of weed-free materials, washing of equipment, etc.).	N, Q, R
TWE-27	C	Vegetation management	In construction areas where re-contouring is not required, vegetation will be left in place wherever possible and original contour will be maintained to avoid excessive root damage and allow for re-sprouting.	Q, R

NO.	PHASE(S)[1]	TOPIC	DESCRIPTION OF MITIGATION MEASURE	APPENDIX[2]
TWE-28	C	Vegetation management, visual	Clearing will be performed in a manner that minimizes the marring and scarring of the countryside and preserves the natural beauty to the maximum extent possible. Except for danger trees, no clearing will be performed outside the limits of the ROW.	R
Ecological Resources				
TWE-29	P,C	Ecological, special status species	The POD will include a Wildlife and Plant Conservation Measures Plan, which will identify important, sensitive, or unique habitats and BLM sensitive, USFS sensitive, and state-listed species in the vicinity of the TWE Project. The POD will identify measures to be taken to avoid, minimize, or mitigate impacts to these habitats and species.	X
TWE-30	P	Ecological, raptors	In applicable areas, the TWE Project will be designed to meet the raptor safe design standards described in the Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 (Avian Power Line Interaction Committee [APLIC] 2006).	B
TWE-31	P,C,O	Ecological, special status species	Mitigation measures that will be developed during the consultation period with the BLM and the U. S. Fish and Wildlife Service under Section 7 of the ESA and adopted in the ROD will be adhered to, along with mitigation developed in conjunction with state authorities as required in any applicable permit.	X
TWE-32	P,C, D	Ecological, special status species	Seasonal restrictions may be implemented in certain areas to mitigate impacts on wildlife. With the exception of emergency repair situations, the activities of ROW construction, restoration, maintenance, and decommissioning will be modified or discontinued in designated areas during sensitive periods (e.g., nesting and breeding periods) for candidate, proposed of listed threatened or endangered, or other sensitive animal species, as required by permitting agencies. Potential seasonal restrictions and avoidance buffers for nesting raptors will be identified in the FEIS. The Wildlife and Plant Conservation Measures Plan will incorporate the seasonal restrictions and stipulations contained in the federal agency RODs.	X, Q, R
TWE-33	P,C	Ecological, special status species and habitats	Prior to the start of construction, the Applicant will provide training to all Contractor and Subcontractor personnel and others involved in construction activities where/if there is a known occurrence of protected species or habitat in the construction area. Sensitive areas will be considered avoidance areas. Prior to any construction activity, avoidance areas will be marked on the ground and maintained through the duration of the Contract. The Applicant will remove markings during or following final inspection of the Project.	G, I, N, Q, R, X
TWE-34	C	Ecological, special status species and habitats	If evidence of a protected species not previously identified or known is found in the Project area, the Contractor will immediately notify the appropriate land management agencies and provide the location and nature of the findings.	X

NO.	PHASE(S)[1]	TOPIC	DESCRIPTION OF MITIGATION MEASURE	APPENDIX[2]
Cultural Resources – Historic Archaeological, and Tribal Traditional				
TWE-35	P,C	Cultural resources	In consultation with the appropriate land management agencies and state historic preservation officers (SHPOs), and in accordance with the Programmatic Agreement (PA), a Cultural Resources Protection and Management Measures will be prepared as part of the POD to address the specific mitigation measures for cultural resources that will be developed and implemented to mitigate any identified adverse effects. These may include Project modifications to avoid adverse impacts, monitoring of construction activities, and data recovery studies.	D
TWE-36	P,C	Native American cultural resources	The Applicant will comply with all laws, policies, and regulations pertaining to consultations with federally recognized Tribes.	D
TWE-37	P	General, cultural	Prior to construction and upon the introduction of new construction personnel, all construction personnel will be instructed on the protection of cultural resources, including the provisions of federal, state, and tribal laws regarding the prohibition of collecting and removing cultural resources, and the importance of these resources and the purpose and necessity of protecting them.	D, R
Paleontological Resources				
TWE-38	P,C,O	Paleontology	If paleontological resources are known to be present in the Project area, or if areas with a high potential to contain paleontological material has been identified through the NEPA process and FEIS, the Applicant will prepare a Paleontological Resources Management and Mitigation Plan as part of the POD.	P
TWE-39	P	Paleontology	Paleontological mitigation may be required in areas of greatest disturbance and areas likely to have significant fossils. Preconstruction surveys of such areas may be conducted as agreed upon by the land management and lead federal agency.	P
Land Use and Visual Resources				
TWE-40	P,C,O	Land Use, agriculture	On agricultural land, the ROW will be aligned, in so far as practical, to reduce the impacts to farm operations and agricultural production.	A
TWE-41	C	Land Use, agriculture	In cultivated agricultural areas, soils that have been compacted by construction activities will be disked to uncompact soils.	A, Q
TWE-42	C	Land Use, ranching	In grazing areas, excessive amounts of pine needles left by clearing of trees, will be removed from the ROW and disposed of in a location to prevent harm to grazing domestic animals.	Q, R

NO.	PHASE(S)[1]	TOPIC	DESCRIPTION OF MITIGATION MEASURE	APPENDIX[2]
TWE-43	C	Access, land use, gates	The POD will include a Flagging, Fencing, and Signage Plan. The Applicant will adhere to BLM fencing standards where required. Fences and gates will be repaired or replaced to their original pre-disturbed condition as required by the landowner or the management agency if they are damaged or destroyed by construction activities. Temporary gates will be installed only with the permission of the landowner or the land management agency, and will be restored to their original pre-disturbed condition following construction. Cattle guards will be installed where new permanent access roads cut through fences, at the request of the land management agency.	I, Q
TWE-44	P,C,O	Visual	Non-specular conductors will be used to reduce potential visual impacts.	V
TWE-45	P,C,O	Structure design and public safety	Structures and/or shield/ground wire will be marked with high-visibility devices where required by governmental agencies (Federal Aviation Administration [FAA]). Structure heights will be less than 200 feet, where feasible, to minimize the need for aircraft obstruction lighting.	M
TWE-46	P,C,O	Visual resources	The Applicant will comply with federal permitting agency stipulations regarding visual resources through development of a Visual Resources Management Plan.	V
Air Quality				
TWE-47	P,C	Air quality, dust control	The POD will include a Dust Control and Air Quality Plan. Requirements of those entities having jurisdiction over air quality matters will be adhered to and dust control measures will be developed. Open burning of construction trash will not be allowed unless permitted by local authorities.	E
TWE-48	P,C	Air quality, emissions	The Contractor and Subcontractor(s) will be required to have and use air emissions control devices on construction machinery, as required by federal, state or local regulations or ordinances.	E
Corona Effects				
TWE-49	P,C,O	Corona	Transmission line materials will be designed to minimize corona. The proposed hardware and conductor will limit the audible noise, radio interference, and TV interference due to corona. Tension will be maintained on all insulator assemblies to assure positive contact between insulators, thereby avoiding sparking. Caution will be exercised during construction to avoid scratching or nicking the conductor surface that may provide points for corona to occur.	M
TWE-50	O	TV, radio interference	The Applicant will respond to complaints of line-generated radio or television interference by investigating the complaints and implementing appropriate mitigation measures. The transmission line will be patrolled on a regular basis so that damaged insulators or other line materials that could cause interference are repaired or replaced.	M

NO.	PHASE(S)[1]	TOPIC	DESCRIPTION OF MITIGATION MEASURE	APPENDIX[2]
Public Health and Safety				
TWE-51	P,C,O	Safety standards	The TWE project will be designed, constructed and operated to meet or exceed the requirements of the National Electrical Safety Code (NESC), U.S. Department of Labor, Occupational Safety and Health Administration standards, and the Applicant's requirements for safety and protection of landowners and their property.	C, H, M, R
TWE-52	O	Induced currents	The Applicant will apply necessary mitigation to eliminate problems of induced currents and voltages onto conductive objects sharing ROW, to the mutual satisfaction of the parties involved.	M
TWE-53	P,C	Blasting	The POD will include a Blasting Plan, which will identify methods and mitigation measures to minimize the effects of blasting, where applicable. The Blasting Plan will document the proposed methods to achieve the desired excavations, proposed methods for blasting warning, use of non-electrical blasting systems, and provisions for controlling fly rock, vibrations, and air blast damage.	C, E, H
TWE-54	P,C,O	Noise, electrostatic, and EMF	Research studies performed to determine the effects of audible noise and electrostatic and electromagnetic fields (EMF) will be regularly monitored by the Applicant to ascertain whether these effects are significant.	M
TWE-55	P,C,O	FAA regulations	The TWE Project will be designed to comply with FAA regulations, including lighting regulations, to avoid potential safety issues associated with proximity to airports, military bases or training areas, or landing strips.	M
TWE-56	P	Worker health and safety	As part of the POD, the Applicant will provide a Health and Safety Plan, which will outline measures to protect workers and the general public during construction, operation, and decommissioning of the TWE Project. The Heath and Safety Plan will identify applicable federal and state occupational safety standards, establish safe work practices, and define safety performance standards.	C, H, M, R
Hazardous Materials, Waste, and Wastewater Management				
TWE-57	P	Hazardous materials	As part of the POD, the Applicant will provide a Spill Prevention and Response Plan. The Plan will address compliance with all applicable federal, state and local regulations, and will include: spill prevention measures, notification procedures in the event of a spill, employee awareness training, and commitment of manpower, equipment, and materials to respond to spills, if they occur.	S
TWE-58	P	Hazardous materials	As part of the POD, the Applicant will provide a Pesticide Use Plan as a component of the Noxious Weed Management Plan. The Plan will address compliance with all applicable federal, state, and local regulations.	N

NO.	PHASE(S)[1]	TOPIC	DESCRIPTION OF MITIGATION MEASURE	APPENDIX[2]
TWE-59	P	Hazardous materials	As part of the POD, the Applicant will provide a Hazardous Materials Management Plan that has been approved by applicable federal, state or local environmental regulatory agencies. The plan will address on-site excavation of contaminated soils and debris and will include identification of contaminants, methods of excavation, personnel training, safety and health procedures, sampling requirements, management of excavated soils and debris, and disposal methods.	L
TWE-60	C	Waste management	No non-biodegradable debris will be deposited in the ROW. Slash and other biodegradable debris will be left in place or disposed of in accordance with agency requirements.	Q, R
TWE-61	C,O	Hazardous materials, waste management	As part of the POD, the Applicant will provide a Hazardous Materials Management Plan. Hazardous materials will not be drained onto the ground or drainage areas. Totally enclosed containments will be provided for all trash. All construction waste including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials will be removed to a disposal facility authorized to accept such materials.	L, N
TWE-62	C,O	Hazardous materials	If a reportable release of hazardous substance occurs at the work site, the Contractor will immediately notify the Applicant and all environmental agencies, as required by law. The Contractor will be responsible for the clean-up.	L, N
Fire Protection				
TWE-64	P,C	Fire, safety	The POD will include a Fire Protection Plan. The Applicant or its Contractor(s) will notify the BLM of any fires and comply with all rules and regulations administered by the BLM and USFS concerning the use, prevention, and suppression of fires on federal lands, including any fire prevention orders that may be in effect at the time of the permitted activity. The Applicant or its Contractor(s) may be held liable for the cost of fire suppression, stabilization, and rehabilitation. In the event of a fire, personal safety will be the first priority of the Applicant or its Contractor(s). The Applicant or its Contractor(s) will: • Operate all internal and external combustion engines on federally-managed lands per 36 CFR Part 261.52(j), which requires all such engines to be equipped with a qualified spark arrester that is maintained and not modified; • Carry shovels, water, and fire extinguishers that are rated at a minimum as ABC-10 pound on all equipment and vehicles. If a fire spreads beyond the suppression capability of workers with these tools, all workers will cease fire suppression action and leave the area immediately via pre-identified escape routes; • Initiate fire suppression actions in the work area to prevent fire spread to or on federally-administered lands. If fire ignitions cannot be prevented or contained immediately, or it may be foreseeable that a fire would exceed the immediate capability of workers, the operation must be modified or discontinued. No risk of ignition or re-ignition will exist upon leaving the operation area;	C, H, N, Q, R

NO.	PHASE(S)[1]	TOPIC	DESCRIPTION OF MITIGATION MEASURE	APPENDIX[2]
			• Notify the appropriate fire center immediately of the location and status of any escaped fire; • Review weather forecasts and the potential fire danger prior to any operation involving potential sources of fire ignition from vehicles, equipment, or other means. Prevention measures to be taken each workday will be included in the specific job briefing. Consideration will be given to additional mitigation measures or temporary discontinuance of the operation during periods of extreme wind and dryness; • Operate all vehicles on designated roads except in designated "drive and crush" areas. Vehicle parking to be restricted to areas free of vegetation on roads or within the permitted ROW and designated work areas.; • Operate welding, grinding, or cutting activities in areas cleared of vegetation within range of the sparks for that particular action. A spotter will be required to watch for ignitions; and • Use only diesel-powered vehicles in areas where excessive heat from vehicle exhaust systems could start brush or grass fires.	
National Park Service				
TWE-65	C	Flagging, Fencing and Signage	For any TWE Project construction areas within one mile of the boundary of Dinosaur National Monument or Lake Mead National Recreation Area, TransWest will mark the TWE Project right-of-way boundaries for the duration of the construction period.	I
Desert Tortoise				
TWE-66	C	Wildlife	In designated Critical Habitat for Desert Tortoise in the Las Vegas Field Office of the BLM, TransWest will use self-supporting tubular steel poles where not co-located with other transmission lines. This measure applies to approximately 2.7 miles of the transmission line route (TWE 2015).	X

Notes: [1] P = Planning and Engineering, C = Construction, O = Operation, D = Decommissioning
[2] Indicates the appendices to this POD that the specific measure may apply to or that may contain additional information.

8.3.2 Additional Mitigation Measures for the TWE Project

Table 17 includes additional mitigation measures for the TWE Project that were developed by BLM through its NEPA analysis that will be implemented by TransWest during construction, operations, maintenance, and decommissioning, as applicable. TransWest shall apply the additional mitigation measures in Table 17 of the Plan of Development to all lands regardless of ownership or jurisdiction, where practicable, provided that, for non-federal lands and for lands under the jurisdiction of an agency other than the BLM, and except as otherwise provided by applicable law, if a landowner or agency requests different or conflicting measures or actions on such lands it owns or manages, the specific measures in Table 17 covered by the different or conflicting measures or actions shall not apply. TransWest will identify and detail in the NTP POD those circumstances in which it deems the application of the additional mitigation measures in Table 17 not practicable, or where the landowner or agency requests different or conflicting measures or actions on lands it owns or manages, including the alternative mitigation measures to be employed to protect the resource(s).

TABLE 17 ADDITIONAL MITIGATION MEASURES FOR THE TWE PROJECT

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
CLIMATE AND AIR QUALITY		
AQ-1	In Region II, the Alternative II-B transmission line route passes within about 10 miles of Arches National Park. No concrete batch plants would be located within 30 miles of Arches National Park; therefore, concrete required for structure foundations should be acquired from local sources in the vicinity of Moab.	O
AQ-2	In Region III, Alternative III-A passes within about 20 miles of Zion National Park. No concrete batch plants would be located within 30 miles of Zion National Park; therefore, concrete required for structure foundations should be acquired from local sources in the vicinity of Cedar City or St. George, Utah.	O
AQ-3	The Clark County nonattainment area is located in both Region III and Region IV. No new concrete batch plants are to be located within the nonattainment area; concrete required for structure foundations and other construction are to be acquired from existing local vendors.	O
GEOLOGICAL, PALEONTOLOGICAL, AND MINERAL RESOURCES		
GE-1	In areas with geologic hazards (e.g., ground shaking, liquefaction, landslides, subsidence from karst, groundwater withdrawal, underground mining, and historic mining) and active mining; placement of structures and other TWE Project related disturbance would be avoided to the extent practical. Where avoidance is not possible a site-specific geotechnical investigation and engineering design would be completed following publication of the Record of Decision and prior to construction. Depending on the type of potential geologic hazards, the designs may vary and should address specific needs for enhanced structural supports. Site specific assessment of geologic hazards shall include review of available information concerning areas of mapped hazards and consultation with appropriate governmental agency (USFS, BLM, Utah Geological Survey, USGS) personnel who are knowledgeable about the hazards. Assessment also shall include, if necessary, field surveys and gathering of geotechnical information to determine what engineering design methods would mitigate or lessen potential risks. If active mines cannot be avoided, TransWest will conduct similar due diligence in regard to hazards from underground and historic mining to ensure that TWE Project facilities will not hinder access to mineral resources or create dangers to mining activities.	A, C, J, F, H, M, P
SOIL RESOURCES		
S-1	Where permanent facilities or structures would be located, the entire topsoil horizon would be salvaged for use in reclamation, prior to surface disturbance. Topsoil would be spread evenly around the permanent structure (not left in piles) and revegetated for future use.	A, E, Q, R, T
S-2	Construction, excavation, or re-spreading with frozen or saturated soils would be prohibited.	A, Q, R, T

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
S-3	During reclamation of temporary work areas and temporary construction access roads, compacted areas (typically any area that receives repeated traffic or 3 or more passes by heavy equipment) would be decompacted, to the depth of compaction, as necessary by subsoiling, paraplowing, or parabolic ripping on the contour to the depth of compaction. This would help prepare the seed bed, encourage infiltration and help to prevent accelerated runoff and erosion. Scarification would only be used on shallow soils. The need for decompaction and the compaction depth would be determined on a case by case basis, by a qualified environmental inspector or soil scientist.	A, E, Q, R, T, W
S-4	During decommissioning, where a soil sterilizer has been applied, sterile soils would be removed prior to the replacement of topsoil and seeding.	E, Q, R, T
S-5	Surface activities would be prohibited when soils or road surfaces become saturated to a depth of 3 inches or less if mixing of the topsoil and subsoil would occur or the soil surface becomes unsafe for vehicular travel.	A, M, O, R, T, U
S-6	During construction, erosion control measures would be inspected after every storm event and maintained.	A, R, T, U, W
S-7	Lands managed by federal agencies would be subject to any restrictions related to construction on steep slopes or sensitive soils under the applicable federal land use plans. For lands not subject to such restrictions, permanent access roads would not be constructed on slopes over 25 percent unless TransWest provides an engineering design and associated Best Management Practices to ensure slope stability and erosion control to be reviewed and approved by the appropriate land management agency or land owner.	A, R, T, U
S-8	Newly constructed access roads would be gated to restrict motorized use by the public at the land management agency or landowner's discretion. In some instances, other methods may need to be employed to prevent public access. After construction is complete, permanent access roads would remain gated at the land management agency or landowner's discretion. If the road is no longer needed for operations, it would be reclaimed with the following procedures or in accordance with the land-managing agencies direction: 1. Remove all stream crossings and restore stream banks to natural contours; 2. Reestablish natural drainage patterns; 3. Decompact the road surface by subsoiling along the entire disturbed length; 4. Recontour the road prism to the original land contours; 5. Seed with an agency or landowner approved seed mixture; and 6. Gates and closure signage should be left in place until adequate regeneration/rehabilitation occurs.	A, E, I, O, Q, R, T, U, W
S-9	Excess subsoil that is excavated for foundations would not be spread on the soil surface (on top of topsoil) or on access roads. Excess subsoil would be disposed of in accordance with federal, state, and local requirements.	A, E, R, T, U
S-10	Prime farmlands would be avoided to the extent practicable for permanent TWE Project facilities and structure foundations.	A, V,
S-11	Permanent erosion control measures would be installed on all project access roads used for operations and maintenance. Erosion control measures would be inspected and maintained at least annually or as required by the applicable state Stormwater Pollution Prevention Plan.	A, M, O, T, U, W
S-12	This mitigation measure was removed after review of the Draft EIS.	N/A

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
S-13	Follow-up seeding using native seed or corrective erosion control measures would be required on areas of surface disturbance that experience reclamation failure.	A, U, Q, R, T, W
WATER RESOURCES		
WR-1	Existing stream crossings would be utilized to maximum extent practicable as requested by agencies. This would be determined on a site-specific basis through finalization of the Plan of Development. Stream crossings would be maintained as appropriate.	A, U, T, U, W
WR-2	When existing crossings were not used, drive through (Arizona) crossings would not be utilized when un-protected (bare soil) streambeds are wet or when the stream is flowing water.	A, O, T, U, W
WR-3	As part of the Right of Way Grant and prior to the final agency authorization for construction, TransWest would consult with federal agencies having land jurisdiction regarding location and design of access roads and temporary work areas near impaired streams to avoid erosion and sedimentation effects. The proposed design and location of new and upgraded access roads and temporary work areas within watersheds (HUC10) containing sediment- or ion-impaired waters (according to 303(d) lists) would be provided by TransWest to the agencies upon completion of conceptual design of these facilities. The agencies would coordinate and provide input (as deemed applicable by the agencies) to TransWest for modification of locations and designs within TransWest's final engineering schedule to prevent the TWE Project from contributing additional sediment to impaired waters.	A, C, T, U, W
WR-4	As part of the Stormwater Pollution Prevention Plan, TransWest would include monitoring of erosion and sedimentation effects that would be recorded as part of the construction stormwater permits. In the event that the agencies deem erosion control measures ineffective, the agencies and TransWest would coordinate to develop additional measures for TransWest to implement for erosion control.	A, O, T, U, W

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
VEGETATION		
NX-1	The Noxious Weed Management Plan to be developed as part of the TWE Project Plan of Development would include the following: 1. Pre-construction surveys for noxious weeds in the footprints of the Right of Way, access roads, and ancillary facilities; 2. Pre-construction weed control; 3. Education of construction and operation personnel in each TWE Project region; 4. Washing of vehicles and equipment before entering and leaving the Right of Way; 5. Herbicide spraying; and 6. Annual monitoring and reporting. Survey information collected during pre-construction surveys would include species name, GPS location of weed infestations, percent cover, and approximate size of weed infestations. Control of noxious and invasive species could include chemical, physical, and biological methods and would be developed in consultation with the land agencies and private landowners. The plan would identify species of concern for each BLM Field Office and USFS forest and would focus monitoring and control methods on these species. The plan would comply with the existing BLM, USFS, USFWS, state, and federal regulations concerning noxious weed management. Post construction annual monitoring would be determined with the appropriate land management agencies.	A, B, I, K, N, O, R, S, W
NX-2	Herbicide spraying would be conducted following all applicable state and federal laws regarding chemical use, adverse weather, chemical storage, and chemical drift. Further guidelines and protocols for herbicide spraying on BLM land are provided in the Final BLM Vegetation Treatment Using Herbicides Programmatic EIS (BLM Vegetation EIS) (BLM 2007b,c). Standard operating procedures for herbicide spraying include buffers for sensitive areas such as riparian and wetland areas and threatened and endangered species habitat, timing restrictions, and safety protocols. No aerial spraying of herbicides would be permitted within 500 feet of known sensitive species with hand-only application methods allowed.	B, I, K, L, M, N, O, R, S, T, W, X
NX-3	On lands managed by the BLM, an approved Pesticide Use Proposal (PUP) would be obtained from each BLM Field Office prior to herbicide spraying. PUPs would have site-specific information about the herbicides to be used. The PUPs and associated reporting requirements would be submitted in accordance with the schedule required for each BLM Field Office. Herbicide spraying in desert tortoise habitat in Nevada would require consultation with the BLM and USFWS.	B, K, N, O, R, S, T, X
NX-4	The cut-stumps of mature salt cedar stands that are cut as part of vegetation clearing would be immediately painted with herbicides. The specific control methods and herbicide to be used would be determined in consultation with the appropriate state or federal land-managing agencies. Additional control measures could include the planting of native or desired plant species following treatment to provide erosion control and the use of biocontrols.	N, O, R, S, T

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
VG-1	Native seed mixes to be used for reclamation would be developed in consultation with the land managers for the various regions crossed by the TWE Project. Seed mixes would meet the requirements of the individual agency Field Offices crossed by the TWE Project. Site-specific seed mixes for soils with LRP would be developed. The LRP seed mixes would be specifically designed for alkaline, saline, or sodic soils and would be used in areas where reclamation would potentially be difficult based on soil conditions. Additional soil amendments may be required in these areas, and would be implemented at the direction of the land manager. Reclaimed areas would be monitored annually by TransWest to ensure successful reclamation is occurring. The length of time for the annual monitoring and the definition of successful reclamation would be determined by the appropriate land management agency. Subsequent actions in areas without successful reclamation would be determined in consultation with the appropriate land management agency.	A, K, O, Q, R, T
VG-2	This mitigation measure was removed after review of the Draft EIS.	No Applicable Appendix
VG-3	A reclamation plan would be developed as part of the Plan of Development. The reclamation plan would define reclamation success for each vegetation type and management agency, list reclamation seed mixes, and detail reclamation monitoring for both interim and final reclamation. Interim and final reclamation success would be monitored annually, or at intervals as required in the reclamation plan, for at least 3 years, or until reclamation success as defined by the reclamation plan is achieved. Reporting of construction, reclamation progress, and monitoring results would be submitted to each land management agency per each office's reporting requirements.	A, K, O, Q, R, I
VG-4	Combined with VG-5. Please refer to VG-5.	No Applicable Appendix
VG-5	During vegetation clearing, masticated and chipped material spread in the Right of Way would not exceed a depth of 6 inches. Materials would be distributed in discontinuous patches that would not result in a continuous chip mat (less than 40 percent of surface covered up to 6 inches thick).	A, O, R, T
WET-1	Wetland surveys would be conducted at terminals, in the Right of Way, at ancillary facilities, and along proposed access roads corridors to identify wetlands, waters of the U.S., and riparian areas located in these areas. Survey information collected would include wetland type, type and cover of hydrophytic and riparian vegetation species present, soil characteristics, site hydrology, Global Positioning System (GPS) location of the wetland, and associated information required to determine jurisdictional status. Based on survey results, no surface disturbance including temporary and permanent facilities, the placement of fill material or vegetation clearing for storage, parking, construction activities, or construction work areas as feasible would occur within the avoidance buffer or surface use restriction defined in the resource management plan for each BLM Field Office and USFS national forest. If avoidance is not feasible, USACE, BLM, USFS, and USFWS crossing and construction techniques for wetlands and riparian areas would be employed. The wetland crossing and construction techniques would be approved by the USACE, BLM, USFS, and USFWS and will be outlined in the final Plan of Development.	A, I, L, T, W
WET-2	Redundant with TWE-2. Please refer to TWE-2.	No Applicable Appendix

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
WET-3	Access roads would be routed around riparian areas, wetlands, intermittent or perennial drainages, and ephemeral channels to the extent practical. If jurisdictional wetlands or waters of the U.S. cannot be avoided, USACE approved construction techniques for construction in wetlands and waters of the U.S. would be applied. BLM and USFS construction techniques for non-jurisdictional wetlands, riparian areas, intermittent drainages, and ephemeral channels would be applied on BLM and USFS lands, as appropriate. These include the use of timber mats, erosion controls, and the placement of equipment outside of the wetland, riparian area, intermittent drainage, and ephemeral channel boundaries.	A, I, W
SPECIAL STATUS PLANT SPECIES		
SS-1	(Species-specific Surveys) – BLM Sensitive plant species requiring surveys would be identified by the BLM and Western in consultation with the appropriate agency. For the BLM Sensitive plant species that require surveys, site- and species-specific surveys would be conducted. The timing and methodology of the surveys would be determined by the BLM in consultation with Western and TransWest. Surveys would be conducted in areas identified as potential habitat through models developed for the EIS or from agency-provided models for those specific plant species. If individuals or populations are identified during surveys in potential habitat areas, species-specific avoidance would be developed and implemented where practicable. For BLM Sensitive plant species that cannot be avoided, species-specific minimization and/or mitigation would be developed by BLM, Western, and TransWest. BLM Sensitive plant species-specific mitigation may include compensatory mitigation and transplanting of individuals. For federally listed plant species, the species-specific mitigation measures that may be adopted in the Record of Decision are identified in the TWE Project Biological Assessment and Biological Opinion.	A, C, I, O, R, I, W, X
SS-2	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to Ute ladies'-tresses orchids and habitat.	X
SS-3	Construction would occur downslope of BLM Sensitive plant species where practicable. If surface disturbance must be sited upslope, erosion controls would be implemented at the direction of the BLM to prevent sedimentation and erosion from upslope surface disturbance. Where practicable, a minimum 300-foot buffer distance would be implemented between surface disturbing activities and BLM Sensitive plant species. Where the minimum 300-foot buffer is not practicable, species-specific minimization and/or mitigation would be developed by BLM, Western, and TransWest.	A, C, I, O, R, T, W, X
SS-4	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to federally listed plants.	X
SS-5	The Dust Control and Air Quality Plan would include dust abatement measures to minimize impacts to special status plant species, including as appropriate use of slower speed limits on unpaved roads, gravel on roads in occupied habitat and avoidance areas, and the application of water for dust abatement.	A, E, I, O, R, T, X
SS-6	Prior to vegetation management activities, including vegetation removal, herbicide use, and ORV access, within federally listed occupied plant habitat, TransWest will coordinate with the USFWS and BLM to minimize impacts to federally listed and candidate plant species.	A, E, H, N, O, R, S, T, X
SS-7	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to Deseret milkvetch and habitat.	X

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
SS-8	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to clay phacelia and habitat.	X
SS-9	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to federally listed plants.	X
SS-10	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to Uinta basin hookless cactus and habitat.	X
WILDLIFE AND MIGRATORY BIRDS		
WLF-1	To minimize disturbance to migratory birds during the breeding and nesting season, no vegetation clearing or trimming, blasting, or other new surface-disturbing activities would occur during the avian breeding season as defined by TWE Project Region and illustrated in Figures 3.22-5, 3.22-8, and 3.22-13 of the Final EIS. If avoidance of vegetation clearing during the nesting season is not possible, then a qualified biologist would conduct nest searches no more than 7 days prior to clearing and trimming activities. Active nests would be identified and protected in accordance with the TWE Project Avian Protection Plan.	A, B, C, I, L, X
WLF-2	To minimize disturbance to nesting raptors, no vegetation clearing or trimming, blasting, or other new surface-disturbing activities would occur within the appropriate spatial buffer for an occupied nest during the breeding season of the species using it. Raptor breeding seasons vary widely based on species, weather conditions, prey availability, latitude, elevation, and other factors. Figures 3.22-5, 3.22-8, and 3.22-13 of the Final EIS present approximate raptor breeding seasons by species and TWE Project region. If surface-disturbing activities within the appropriate spatial buffer cannot be avoided during the associated raptor nesting season, preconstruction raptor nest surveys and monitoring using agency-approved protocols would be performed to identify and protect occupied nests. Spatial avoidance buffers and seasonal restrictions would be applied as required by applicable BLM and USFS land and resource management plan stipulations (See Appendix C of the Final EIS) on lands administered by these agencies. Seasonal and spatial raptor nest buffers recommended by the USFWS and the appropriate state wildlife agency that are more restrictive than the applicable, required BLM and USFS plan stipulations would be applied at the discretion of these land management agencies (See Table 3.22-4 of the Final EIS). Additionally, raptor seasonal and spatial buffers recommended by USFWS and the appropriate state wildlife agency would be applied to all other land jurisdictions in coordination with TransWest and respective landowners whose lands would be crossed by the TWE Project.	A, B, C, I, X
WLF-3	To ensure wildlife access to existing wildlife water developments (e.g., “guzzlers”), TransWest would avoid impacts to these developments to the extent possible during final project siting and development. TransWest would be required to offset the loss of any permanently impacted wildlife water developments by installing new developments of equal capacity, in coordination with the appropriate state wildlife agency.	A, B, I, T, W, X
WLF-4	Please refer to mitigation measure VR-8 for mitigation of impacts to migratory birds from lighting	B

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
WLF-5	In Audubon Important Bird Areas crossed by the 250-foot-wide transmission line Right of Way, TransWest would follow the recommendations in Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012). In addition, vegetation management Level 3, as described in the TWE Project ROW Preparation and Vegetation Management Plan, would be employed at the discretion of the appropriate BLM Field Office Manager in Audubon Important Bird Areas crossed by the 250-foot-wide transmission line Right of Way.	B, K, R, X
WLF-6	BLM, in coordination with state wildlife officials, will identify forested and woodland habitats of particular importance to wildlife on BLM-administered lands. To minimize fragmentation impacts on these lands, TransWest would employ vegetation management Level 3 (as described in the TWE Project ROW Preparation and Vegetation Management Plan), as determined necessary by the appropriate BLM Field Office Manager. At the discretion of the appropriate BLM Field Office Manager, TransWest may also be required to leave downed woody debris greater than 3 inches in diameter (not including merchantable timber) in place to provide habitat for insects, small mammals, and other small prey species utilized by owls, raptors, and other predators.	B, I, R, X
WLF-7	In Bird Habitat Conservation Areas crossed by the 250-foot-wide transmission line Right of Way, TransWest would follow the recommendations in Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012). In addition, vegetation management Level 3, as described in the TWE Project ROW Preparation and Vegetation Management Plan, would be employed at the discretion of the appropriate BLM Field Office Manager in Bird Habitat Conservation Areas crossed by the 250-foot-wide transmission line Right of Way.	B, K, R, X
WLF-8	To minimize collision potential for avian species, TransWest would design the TWE Project to meet the standards described in the Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012).	B, K, O, X
WLF-9	To minimize collision potential for avian species, prior to construction TransWest would conduct a site-specific risk assessment consistent with Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012) in all areas of priority migratory bird habitats, including Audubon Important Bird Areas, Bird Habitat Conservation Areas, riparian crossings, and other sensitive habitats identified in coordination with land management, USFWS, and applicable state wildlife agencies. Based upon the results of the site-specific risk assessment and following the recommendations described in APLIC 2012, TransWest would install avian flight diverters on guy wires as needed. TransWest would also be required to install flight diverters on guyed structures at tower locations identified by post construction monitoring as having high collision potential as recommended by APLIC 2012.	B, K, O, X
WLF-10	To avoid or minimize long-term disturbance to wildlife associated with public use of the ROW and new access roads during Project operation, these roads would be closed or rehabilitated using methods and monitoring developed through consultation with the landowner or land management agency. Depending on facility and ROW maintenance needs, methods for closure could include gates, obstructions such as berms or boulders, or partial or full restoration to natural contour and vegetation.	A, B, I, K, O, R, T, U, X

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
SPECIAL STATUS WILDLIFE SPECIES		
SSWS-1	In order to protect nesting mountain plovers, TransWest would follow the USFWS 2002 Mountain Plover Survey Guidelines and would conduct mountain plover nest surveys if construction were to occur in suitable habitat, as identified by the BLM and applicable state wildlife agency, during the mountain plover breeding season (April 10 to July 10). If a nest is located, a 0.25–mile protection buffer would be implemented around the active nest until the birds fledge from the nest. This measure applies only where there are no specific measures to protect mountain plovers in the applicable BLM Field Office Resource Management Plan.	A, B, C, I, N, O, R, X
SSWS-2	Prior to construction activities in suitable pygmy rabbit habitat, TransWest would be required to conduct presence/absence surveys consistent with the Interagency Pygmy Rabbit Working Group Survey Protocols (Ulmschneider et al. 2004). Survey areas would be selected in coordination with the BLM, Western, and appropriate state wildlife management agencies and would be limited to suitable habitat within 100 meters of proposed TWE Project disturbance areas. If presence/absence surveys conclude that pygmy rabbits are present, TransWest would be required to further coordinate with the BLM and applicable agencies to avoid or minimize impacts to the extent practicable through micro–siting and the application of mitigation measures justified by the best-available scientific information.	A, C, I, N, O, R, X
SSWS-3	Prior to construction activities in suitable Wyoming pocket gopher habitat, TransWest would conduct presence/absence surveys following appropriate protocols. Presence/absence surveys will also be used to collect information necessary to classify pocket gopher mounds to the species level using an appropriate habitat model. If active Wyoming pocket gopher mounds are identified, the proposed surface disturbing activities would avoid the active Wyoming pocket gopher mounds by 75 m (BLM 2009). If avoidance of the active Wyoming pocket gopher mounds by 75 m is not possible, the "Occupied Wyoming Pocket Gopher Habitat Protection Measures" would apply (BLM 2009). If the results conclude that the associated species is a northern pocket gopher, then the proposed surface disturbance may proceed without mitigation. If the habitat model fails to conclusively identify the associated pocket gopher to the species level, then it would be assumed that the species is a Wyoming pocket gopher and the "Occupied Wyoming Pocket Gopher Habitat Protection Measures" would apply (BLM 2009).	A, C, I, N, O, R, X
SSWS-4	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to desert tortoise and its habitat.	X
SSWS-5	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to greater sage-grouse and its habitat.	X
SSWS-6	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to western yellow-billed cuckoo.	X
SSWS-7	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to Utah prairie dogs.	X
SSWS-8	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to southwestern willow flycatcher.	X

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
SSWS-9	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision avoid, minimize, and mitigate impacts to black-footed ferret.	X
SSWS-10	There is no Mexican spotted owl habitat along the TWE Project Agency Preferred Alternative. If Mexican spotted owls or their habitat are identified along the final alignment or in the construction area for the TWE Project, TransWest would apply mitigation measure SSWS-15.	No Applicable Appendix
SSWS-11	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to Canada lynx.	X
SSWS-12	To reduce impacts to the banded Gila monster from the construction and operation of the TWE Project, TransWest would be required to implement measures outlined in the NDOW 2012 Gila Monster Status, Identification, and Reporting Protocol for Observations.	A, C, I, N, O, R, X
SSWS-13	To prevent impacts to bald eagles, TransWest would be required to avoid disturbance within 0.25 mile of an active winter roost site (0.5 mile if there is a direct line of sight to disturbance) from November 15 to March 15, and avoid disturbance within 0.5 mile of communal winter roosts from November 1 to April 1. Construction of above-ground structures would be restricted within 0.5 mile of bald eagle nests and communal winter roost sites through the implementation of BLM Field Office Resource Management Plan timing restrictions. This measure applies only where there are no specific measures to prevent impacts to bald eagles in the applicable BLM Field Office Resource Management Plan.	A, B, C, I, N, O, R, X
SSWS-14	This mitigation measure was removed after review of the Draft EIS.	No Applicable Appendix
SSWS-15	If evidence of an Endangered Species Act (ESA) protected wildlife species not previously identified or known is found in the construction area, the Contractor would immediately notify the appropriate land management agencies and provide the location and nature of the findings. Construction in the vicinity of the newly located ESA protected wildlife species would be halted and would resume when a biologist from the appropriate agency determines that the species would not be affected by continued construction.	A, C, I, K, O, R, X
SSWS-16	To reduce impacts to federally listed wildlife species, TransWest would be required to obtain approval from the applicable land management agency prior to applying dust palliatives to construction areas located within areas designated as suitable habitat for federally listed species.	A, B, E, K, O, R, T, X
AQUATIC BIOLOGICAL RESOURCES		
AB-1	(Fish Passage): When avoidance of perennial streams with fish populations is not feasible and a culvert is required during construction, flow would be maintained in a portion of the stream to allow unrestricted fish passage. Any plan for dewatering the stream at the culvert site must be approved by the appropriate federal and state agencies. Culvert size and type would be selected to facilitate the continued and long-term connectivity and movement of target aquatic species. If the culvert is proposed to be in place during project operation, approval must be obtained from the federal or state agency management authority. An alternative crossing method may be required.	A, O, T, W, X

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
AB-2	(Avoid Game Fish Spawning Periods): If spawning areas for game fish species are known to occur at streams proposed for vehicle crossing or culvert construction, instream disturbance would be scheduled to avoid the spawning period. The exact dates for avoidance would be determined through discussions with WGFD, CPW, UDWR, or USFS. All disturbed areas would be restored to pre-construction conditions prior to the next spawning season.	A, O, T, W, X
AB-3	(Invasive Aquatic Species Protection): It is assumed that any waterbody could contain aquatic invasive species and invasive weed species. If work occurs in or near a waterbody, all equipment would be decontaminated. Decontamination would occur before arrival at a TWE Project site to avoid the transfer of aquatic invasive species from a previous work site in or near water. Decontamination would consist of either of these actions: 1) Drain all water from equipment and compartments; clean equipment of all mud, plants, debris, and aquatic organisms; and dry equipment for specified time by season (5 days in June through August, 18 days in March through May, and 3 days in December through February when temperatures are at or below freezing); or 2) Use a high pressure (2,500 psi) hot water (140°F) pressure washer to thoroughly clean equipment and flush all compartments that may hold water. A field monitor would be present to ensure that the cleaning was completed prior to vehicle and equipment moving to other streams and drainages.	A, O, T, W, X
AB-4	As part of vegetation management, TransWest would prepare a noxious weed management plan. The Plan would identify a list of approved herbicides that may be used as well as locations of areas that may be treated. Licensed herbicide applicators would be used in the treatment process. All herbicides would be used in accordance with label instructions for the chemical. The Plan also would discuss compliance with applicable federal, state, and local agencies.	B, L, N, O, R, S, T, W, X
SPECIAL STATUS AQUATIC SPECIES		
SSS-1	(Sediment Protection for Streams with Special Management Fish Species): Mitigation measure WR-3 would be applied to perennial streams providing habitat for fish species requiring special management as mandated by existing federal land use plans.	A, O, T, W, X
SSS-2	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to federally listed fish species.	X
SSS-3	(Avoidance of Water Withdrawal and Entrainment/Impingement Effects for Conservation Agreement Fish Species): Where waterbodies containing conservation agreement fish species (bluehead sucker, Bonneville cutthroat trout, Colorado River cutthroat trout, flannelmouth sucker, least chub, southern leatherside chub, and Virgin River spinedace) and other special status fish species cannot be avoided as construction water sources, approval must be obtained from appropriate federal, state, and/or land management agencies regarding water withdrawal sites and methods. A site-specific withdrawal plan will be prepared by TransWest for review/approval by the agencies. Requirements for water pumping in habitat for Conservation Agreement Fish Species would include: 1) avoidance of pumping between approximately April 1 through August 31, with specific dates dependent upon the water year; 2) intake hoses would be screened with 3/32-inch mesh size; 3) intake velocity would not exceed 0.33 feet/second in an area where larval stages of fish may be present; and (4) pumping from off-channel locations (i.e., no connection to the river during high spring flows) would use an infiltration gallery constructed in an agency-approved location.. Additional requirements include the use of private, off-stream water sources if possible; withdrawal sites must reviewed/approved by applicable agencies; and approval should include provisions to maintain adequate instream flows to protect conservation agreement fish species and their habitat.	O, I, W, X

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
SSS-4	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to federally listed fish species.	X
SSS-5	(Avoid Spawning Habitat Disturbance for Special Status Trout Species): If spawning areas for special status trout species (Colorado River and Bonneville cutthroat trout) are known to occur at streams proposed for vehicle crossing or culvert construction, instream disturbance would be scheduled to avoid the spawning period from April through May. The exact dates for avoidance would be determined through discussions with Wyoming Game and Fish Department, Colorado Parks and Wildlife, or Utah Division of Wildlife Resources. With the exception of culvert installations required for long-term operations and maintenance access, all disturbed areas would be restored to pre-construction conditions prior to the next spawning season. Where long-term access is required, culverts would be placed to minimize spawning habitat impacts and all disturbed areas surrounding culverts would be restored prior to the next spawning season. The state agencies also would determine if a habitat survey would be required prior to any TWE Project disturbance, which would assist in defining habitat conditions for restoration. A stream crossing plan would be prepared by TransWest, with approval required by the state agencies' aquatic biologists.	A, O, T, W, X
SSS-6	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to June sucker.	X
SSS-7	(Avoid Spawning Habitat Disturbance for Southern Leatherside Chub): If spawning areas for southern leatherside chub are known to occur at streams proposed for vehicle crossing or culvert construction, instream disturbance would be scheduled to avoid the spawning period from April through June. The exact dates for avoidance would be determined through discussions with Utah Division of Wildlife Resources. With the exception of culvert installations required for long-term operations and maintenance access, all disturbed areas would be restored to pre-construction conditions prior to the next spawning season. Where long-term access is required, culverts would be placed to minimize spawning habitat impacts and all disturbed areas surrounding culverts would be restored prior to the next spawning season.	A, O, T, W, X
SSS-8	No vehicle or equipment disturbance from Right of Way work or access road construction would be allowed within 300 feet of the unnamed spring located near Thistle Creek (SW1/4 S12 T11S R3E, Salt Lake Meridian) that contains southern Bonneville pyrg, unless approved by the Utah Division of Wildlife Resources.	A, O, T, W, X
SSS-9	There is no known California floater habitat along the TWE Project Agency Preferred Alternative. If southern California floater or their habitat are identified along the final alignment or in the construction area for the TWE Project, and if instream construction is proposed for Currant Creek (T12S R1E, Salt Lake Meridian), a survey would be conducted to determine if California floater is present. If the species is absent, construction would be allowed after meeting Utah Division of Wildlife Resources requirements for restoration. If the species is present, relocation of individuals in the disturbance area would be considered to avoid impacts.	A, O, T, W, X

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
SSS-10	There is no known Boreal toad breeding habitat along the TWE Project Agency Preferred Alternative. If boreal toad or their breeding habitat are identified along the final alignment or in the construction area for the TWE Project, the Right of Way alignment would be evaluated so that the number of Sowers Creek (T12S R1E, Salt Lake Meridian; T2S R2W, T3S R2W, T3S R3W, T4S R3W, T4S R4W, T5S R4W, T5S R5W, T6S R5W through R7W, T7S R7W, Uintah Meridian) crossings can be reduced. The portion of the creek that would be crossed by the Right of Way also would be evaluated as breeding habitat for boreal toad to identify any priority areas that should be avoided if practicable.	A, I, O, T, W, X
SSS-11	(No Vehicle Crossings or New Roads in the Muddy River): No vehicle crossings or new roads would be constructed across the Muddy River (T15S, R66E, Mount Diablo Meridian). This measure would protect habitat for special status fish species (Virgin River chub, Moapa speckled dace, Moapa White River springfish, Meadow Valley Wash desert sucker, and Meadow Valley Wash speckled dace) in the Muddy River.	A, O, T, W, X
SSS-12	There is no known Arizona toad habitat along the TWE Project Agency Preferred Alternative. If Arizona toad or their habitat are identified along the final alignment or in the construction area for the TWE Project, no vehicle or equipment disturbance from Right of Way work or access road construction would be allowed in Abe and Hiway springs (T38S R16W, Salt Lake Meridian) to protect Arizona toad breeding habitat.	A, O, T, W, X
CULTURAL RESOURCES		
CUL-1	Please refer to the TWE Project Programmatic Agreement for the procedure that will be implemented to determine effects to historic properties from the TWE Project, including effects to the Old Spanish National Historic Trail, the California Wagon Road, and other historic trails in Wyoming, Colorado, Utah, and Nevada. Following the determination of effects, the procedures in the Programmatic Agreement will be used to avoid, minimize, and mitigate adverse effects to historic properties including, as appropriate, direct, indirect, and cumulative effects under the National Environmental Policy Act and as required by the National Trails System Act.	A, C, D, I, O, T, V
CUL-2	Please refer to the TWE Project Programmatic Agreement for the procedure that will be implemented to determine effects to historic properties from the TWE Project, including effects to the Gypsum Cave Traditional Cultural Property in Nevada and other historic properties in Wyoming, Colorado, Utah, and Nevada. Following the determination of effects, the procedures in the Programmatic Agreement will be used to avoid, minimize, and mitigate adverse effects to historic properties including, as appropriate, direct, indirect, and cumulative effects under the National Environmental Policy Act.	A, C, D, I, O, T, V
CUL-3	Please refer to mitigation measure CUL-1 for the procedures that will be implemented to avoid, minimize, and mitigate effects to historic trails from the TWE Project, including the Old Spanish National Historic Trail, the California Wagon Road, and other historic trails in Wyoming, Colorado, Utah, and Nevada.	No Applicable Appendix
CUL-4	Please refer to mitigation measure CUL-2 for the procedure that will be implemented to avoid, minimize, and mitigate effects to historic properties from the TWE Project, including historic properties in Wyoming, Colorado, Utah, and Nevada.	No Applicable Appendix

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
VISUAL RESOURCES		
VR-1	Remove pinyon-juniper woodlands only as necessary for construction and maintenance of transmission towers and access roads (vegetation management Level 3, as described in the TWE Project ROW Preparation and Vegetation Management Plan) for foreground-middleground and background views from linear or stationary KOPs on BLM lands and within Class A Scenic Quality areas within BLM VRM Class 1 and 2 areas, as appropriate.	A, B, C, L, M, O, R, V, X
VR-2	Use BLM environmental colors (Standard Environmental Colors, Color Chart CC-001, 2008) for surface coatings of permanent buildings, gates, and tanks at terminal sites. Color selection is based on a site-specific assessment. Paint grouped structures the same color to reduce visual complexity and color contrast.	I, O, V
VR-3	Locate structures, roads, and other project elements as far back from road, trail, and river crossings (linear KOPs) as possible, and, where feasible, employ terrain and vegetation to screen views from crossings.	A, O, V
VR-4	In areas with no existing transmission lines, move the transmission line (alignment) away from the immediate foreground of stationary (non-linear) KOPs to a distance of 0.5 mile or more in locations where it would not conflict with other resource values and where practicable. Where feasible, approach and cross at right angles to linear KOPs such as roads, trails, and rivers	V
VR-5	Materials and surface treatments of structures and land disturbances (e.g., Permeon) should repeat and/or blend with the existing form, line, color, and texture of the landscape and have little or no reflectivity (non-specular).	B, I, O, V
VR-6	Where paralleling an existing transmission line of a similar voltage class, where practicable, place the structures to match the locations of structures in the existing line where it would not conflict with other resource values.	B, V, X
VR-7	Where practicable, position roads at the toe of a slope, at the edge of vegetation openings, and perpendicular with the line of sight.	A, V
VR-8	Minimize lighting at terminals, substations, series compensation stations and construction facilities by installing dark-sky lighting to the extent permitted by Occupational Safety and Health Administration (OSHA) and down-shield lights to reduce night glare and light pollution.	A, B, F, M, O, V, X
VR-9	Where practicable as determined by TransWest, in tree-covered steep terrain, perform construction operations for towers and conductors with helicopters to reduce the need for access roads and laydown clearings.	A, V
VR-10	TransWest would implement vegetation management Level 3, as described in the TWE Project ROW Preparation and Vegetation Management Plan, in the foreground-middleground distance zone from linear and stationary KOPs on BLM lands	L, O, V
VR-11	This mitigation measure is applicable to USFS land only. USFS will incorporate mitigation measures addressing visual resources on USFS land into its Record of Decision as appropriate. TransWest will address USFS mitigation measures in its final Plan of Development.	No Applicable Appendix
VR-12	This mitigation measure is applicable to USFS land only. USFS will incorporate mitigation measures addressing visual resources on USFS land into its Record of Decision as appropriate. TransWest will address USFS mitigation measures in its final Plan of Development.	No Applicable Appendix

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
RECREATION RESOURCES		
REC-1	Where practicable, operation phase vegetation maintenance activities within dispersed Recreation Areas or key hunting locales such as Wildlife Habitat Management Areas/Wildlife Management Areas/State Wildlife Areas would not occur during big game hunting seasons.	N, O, X
REC-2	Within designated recreation management areas, access shall be limited to existing roads whenever practicable. If new and improved access cannot be avoided within these areas, access roads shall be closed or rehabilitated through methods and monitoring developed through consultation with the landowner or land management agency. Methods for closure could include gates, obstructions such as berms or boulders, or partial or full restoration to natural contour or vegetation.	A, I, U
REC-3	If designated corridors exist within the Recreation Areas, new roads and ancillary construction areas shall only be located within designated utility corridors unless otherwise directed by the land-managing agency.	A
REC-4	Where practicable, construction activities within key hunting locales such as Wildlife Habitat Management Areas/Wildlife Management Areas/State Wildlife Areas would not occur during big game hunting seasons	A, C, X
REC-5	Construction activities within 1 mile of developed recreation sites would cease: (1) after 5:00 p.m. on weeknights; (2) on weekends and holidays; and (3) on the opening day of big game hunting seasons.	A, E, U, V
REC-6	Construction zones will be sited such that access to high use recreational areas and trails is not impeded. If public safety concerns are such that current access or use cannot be maintained, TransWest will work with the appropriate land manager to develop alternative access points or redirect users to alternative existing points of access.	A, E, M, U, V
REC-7	Ancillary construction areas would not be located within 1 mile of developed Recreation Areas (trails, trailheads, campgrounds, etc.)	A, E, U, V
REC-8	Temporary roads and ancillary construction areas would not be located within the viewshed of boaters on the Yampa River from May 1 to July 31.	A, V, W
REC-9	In and immediately adjacent to designated off-road vehicle/all-terrain vehicle (ORV/ATV) use areas where there are active dunal complexes, TransWest will use non-guyed transmission structures. The specific areas for the Agency Preferred Alternative where this measure will be applied are the Sheeprock/Tintic ORV Area, the Cricket Mountains ATV Trails, and the Little Sahara Recreational Areas for a total of approximately 35.5 miles (TWE 2015). TransWest will also utilize guy wire sleeve markers on BLM lands in open ORV areas where there is a high volume of recreational use as agreed to with BLM before a notice to proceed is issued in these areas.	M
REC-10	This mitigation measure is applicable to USFS land only. USFS will incorporate mitigation measures addressing recreation on USFS land into its Record of Decision as appropriate. TransWest will address USFS mitigation measures in its final Plan of Development.	No Applicable Appendix
REC-11	This measure does not apply to the Agency Preferred Alternative (Alternative II-G) and has therefore been removed.	No Applicable Appendix
REC-12	TransWest shall plan construction activities to occur outside of specially permitted event areas or times; or work with organizers to ensure adequate access and use. The feasibility of this mitigation measure would be dependent on TransWest being given adequate notice of permit timing.	A, C, E, M, R, U, V

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
REC-13	TransWest shall consider the view from key recreational areas in its placement of the transmission line Right of Way to locate the line where it best blends in with the surrounding environment, and/or is co-located with other existing transmission lines.	R, V
LAND USE		
AGRI-1	Coordinate with farm and ranch operators to identify problems with structure placement and determine structure locations to ensure implementation of design feature TWE-40. Locate structures along fence lines, field lines, or adjacent to roads. Use longer spans between structures to clear fields. Consider use of non-guyed free-standing transmission structures in agricultural areas.	B, R, V
AGRI-2	Schedule construction activities to avoid planting and harvesting activities to the extent practicable and as agreed to with the landowner.	A, E, U
AGRI-3	Minimize locating access roads within the analysis area in areas with croplands. For croplands that cannot be avoided by access roads, establish procedures for determining temporary and permanent access road locations with landowners and operators, and establish protection methods for roads over croplands that cannot be avoided by construction activities. Restore locations of temporary access roads to pre-construction conditions and leave permanent access roads intact through mutual agreement with the landowner and operator.	A, U
AGRI-4	Minimize the use of guy wires in crops and hay lands to the extent possible. If guy wires have to be used in crop and hay lands, highly visible shield guards will cover the wires.	B
LU-1	TransWest would develop an approved POD and coordinate with land owners, land managers, and agencies with jurisdictional authority on final structure placement, including all aboveground components, access roads, and permanent disturbance areas, to ensure optimal compatible land use with valid existing land uses and rights. If this coordination results in alternative routing or impacts outside of the scope of this EIS analysis, additional analysis and/or NEPA disclosure may be required.	A, R, V
LU-2	On private lands, access shall be limited to existing roads whenever practicable or as desired by the landowner. If new and improved access cannot be avoided on private lands, access roads shall be closed or rehabilitated at the direction of the landowner and through methods and monitoring developed in consultation with the landowner. Methods for closure could include gates, obstructions such as berms or boulders, or partial or full restoration to natural contour and/or vegetation.	A, I, U
LU-3	This mitigation measure is applicable to USFS land only. USFS will incorporate mitigation measures addressing recreation on USFS land into its Record of Decision as appropriate. TransWest will address USFS mitigation measures in its final Plan of Development.	N/A
LU-4	Lines connecting to the Halfway Wash-East ground electrode site may need to be adjusted or placed underground at the discretion of FAA so as to not interfere with the future potential land use of an airport.	D, M, O, P, R, V
LU-5	In the event that TWE Project towers are more than 10 feet higher than existing structures in the Sevier B Military Operating Area, TransWest would coordinate with University of Utah and DOD to develop tower lighting systems to reduce the impact to dark skies and, subsequently, operation of University of Utah's Telescope Array Project to the extent practicable while still meeting DOD safety requirements.	B, M, V

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
RANGE-1	Prior to construction of each segment, access road, or ancillary facility crossing a BLM or USFS grazing allotments, TransWest shall coordinate with the associated BLM Field Office and USFS national forest concerning planned development and operations activities that will occur and identify potential livestock management issues. Coordination will include identification of: - Site-specific routing options, and surface disturbance locations. - Site-specific mitigation for individual grazing allotments, such as micro-siting around areas of concern, and additional reclamation activities. - Proposed application of vegetation management activities on individual grazing allotments. - Identification of areas of low reclamation potential that may require additional restoration activities. - Identification of areas where trespassing and increased access could require additional mitigation.	A, N, O, Q, R, I, U
RANGE-2	Prior to construction of transmission line segments, access road, or ancillary facilities, water sources/systems for livestock and wildlife shall be inventoried. Based on the results of these inventories, no roads, or ancillary facilities would be placed within 200 meters of water sources/systems for livestock and wildlife. If avoidance is not practicable, following construction, TransWest will repair any water sources/systems for livestock and wildlife that are damaged from construction and maintenance activities to pre-construction conditions.	A, I, W, X
RANGE-3	Damage to livestock and livestock facilities shall be reported as quickly as possible to BLM, USFS, and affected livestock operators. If damage is caused by the construction, operation, or maintenance of this project, TransWest will be financially responsible for the replacement of the livestock and/or livestock facilities.	A, O

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
RANGE-4	The Flagging, Fencing, and Signage Plan would include: - Prevention measures to avoid damaging fences, gates, and cattleguards during construction and operation activities. - Mitigation to prevent livestock from passing through breaks in fences as a result of construction and operation activities. Measures would include the installation of temporary gates, or cattleguards, and coordination with landowners and grazing permittees. - Limit the placement of guy wires where livestock water or where they would fall in stock driveways. Shield guards would be used as appropriate. - Upgrading cattleguard gate widths and load-bearing requirements as appropriate for construction and operation vehicles on access roads. - Require heavy equipment to use by-pass gates to avoid damage to cattleguards. - If a by-pass gate is not already in place, install a by-pass gate adjacent to existing cattleguards to prevent damage by heavy equipment. - Existing cattle guards would be cleaned as determined necessary by the appropriate land management agency post-construction activities. - Following construction activities any Range Improvement Projects that are damaged from construction and maintenance activities would be repaired to pre-construction conditions. - Mitigation for loss of livestock due to damaged fences and gates that were result of construction and operation activities. - Mitigation for loss of livestock as a result of construction and operation vehicle collisions.	A, I, O, U
RANGE-5	If construction or operation activities disrupt the transport of water to water locations for livestock or wildlife, an alternative water source will be provided until the transport of water is resumed. Alternative water sources could include the hauling of water to watering locations, an alternate pipeline, or the establishment of a temporary watering facility for the livestock and wildlife.	A, O, X
RANGE-6	Prior to construction and placement of permanent facilities and access roads, TransWest shall coordinate with the associated BLM Field Office and USFS national forest to identify areas where the placement of tower structures, facilities, and access roads would prevent access to either a portion or all of a livestock grazing allotment resulting in the livestock grazing allotment becoming unusable or decreasing the AUMs available to a point that requires the grazing permit to be modified. In these areas, corrective actions would then be identified including rearranging of grazing allotment fences, additional access roads to the grazing allotment, re-arrangement of project facilities and access roads as feasible, etc.	A
RANGE-7	Speed limits would be followed and signs would be erected in lambing/calving areas, shipping pastures, or adjacent to working corrals to warn vehicle operators of the agricultural operations.	A, I, O, U, X

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
SPECIAL DESIGNATIONS		
SDA-1	Within Special Designation Areas (SDA), access shall be limited to existing roads whenever practicable, and construction staging areas/fly yards, material storage yards and batch plant sites shall not be placed in SDAs. If the TWE Project alignment is not currently sited within an SDA, TransWest will avoid placement of the final alignment within the SDA during subsequent micro-siting efforts associated with development of the Plan of Development to the extent practicable.	A, O, R
SDA-2	If new or improved access roads cannot be avoided within Special Designation Areas, TransWest will consult with the land management agency to determine the need for mitigation measures. Where appropriate, mitigation measures may include access restrictions, closure using gates, or obstructions such as berms or boulders, or partial or full restoration to natural contour or vegetation.	A, Q, R, U
SDA-3	Where consistent with state and federal agency approvals, if designated corridors exist within Special Designation Areas, the transmission alignment, new roads, and ancillary construction areas shall be located within designated utility corridors where practicable.	A, R, U
SDA-4	Ground electrode systems shall be sited outside of any designated Special Designation Areas.	R
SDA-5	Within all Special Designation Areas, vegetation management Level 3, as described in the TWE Project ROW Preparation and Vegetation Management Plan, would be utilized as necessary and as determined by the land management agency to reduce impacts to visual, recreation, wildlife and other resources.	R, T, V
SDA-6	During Right of Way clearing in Special Designation Areas, root-mat and low growing understory would retained to minimize sediment erosion. Construction would span sensitive resources to reduce resource impacts.	R, T, V, W
SDA-7	This mitigation measure is applicable to USFS land only. USFS will incorporate mitigation measures addressing special designated areas on USFS land into its Record of Decision as appropriate. TransWest will address USFS mitigation measures in its final Plan of Development.	No Applicable Appendix
SDA-8	This mitigation measure is applicable to USFS land only. USFS will incorporate mitigation measures addressing special designated areas on USFS land into its Record of Decision as appropriate. TransWest will address USFS mitigation measures in its final Plan of Development.	No Applicable Appendix
SDA-9	This mitigation measure is applicable to USFS land only. USFS will incorporate mitigation measures addressing special designated areas on USFS land into its Record of Decision as appropriate. TransWest will address USFS mitigation measures in its final Plan of Development.	No Applicable Appendix
SDA-10	This mitigation measure is applicable to USFS land only. USFS will incorporate mitigation measures addressing special designated areas on USFS land into its Record of Decision as appropriate. TransWest will address USFS mitigation measures in its final Plan of Development.	No Applicable Appendix
SDA-11	This mitigation measure is applicable to USFS land only. USFS will incorporate mitigation measures addressing special designated areas on USFS land into its Record of Decision as appropriate. TransWest will address USFS mitigation measures in its final Plan of Development.	No Applicable Appendix

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
SDA-12	This mitigation measure is applicable to USFS land only. USFS will incorporate mitigation measures addressing special designated areas on USFS land into its Record of Decision as appropriate. TransWest will address USFS mitigation measures in its final Plan of Development.	No Applicable Appendix
SDA-13	This mitigation measure is applicable to USFS land only. USFS will incorporate mitigation measures addressing special designated areas on USFS land into its Record of Decision as appropriate. TransWest will address USFS mitigation measures in its final Plan of Development.	No Applicable Appendix
SDA-14	Placement of any project component within/across river segments that are eligible or suitable for inclusion in the National Wild and Scenic River System shall be micro-sited in coordination with BLM to minimize surface or visual disturbances from towers, roads, or other facilities to the outstandingly remarkable values that led to segment eligibility/suitability. Additionally, the agencies may require compensatory mitigation on a case-by-case basis to offset the effects to the outstandingly remarkable values	A, R, V, W
SDA-15	Series compensation stations shall not be sited in any Special Designation Areas.	R
TRANSPORTATION AND ACCESS		
	No additional mitigation measures	
SOCIAL AND ECONOMIC RESOURCES		
SOCIO-1	TransWest would address temporary workforce housing needs in conjunction with any application for a Wyoming Industrial Siting Permit.	O
SOCIO-2	TransWest should encourage its contractors to purchase materials, equipment and supplies locally, have non-locally purchased materials and supplies delivered to the counties in which the materials would be utilized, and complete all sales and use reports regarding taxable purchases in a timely manner so that proper attribution of sales and use tax revenues to the local jurisdictions can occur.	A, O
SOCIO-3	TransWest should conduct annual coordination meetings with local emergency management officials (law enforcement, fire, health care, state prison, etc.) to review and update emergency coordination and situation management.	C, F, H, I, L, M, O, U
SOCIO-4	If not required by existing regulations or included in the various operations plans to be developed (see Section 2.4 of the Final EIS), TransWest should develop and implement a plan for on-going communications with local county and municipal governments to inform them of construction schedules and progress, specifically as they relate to the anticipated timing of activity across each spread, or other about other aspects of the TWE Project that could affect local communities and service providers.	A, C, F, H, I, L, M, O, U
PUBLIC HEALTH AND SAFETY		
PH-1	Develop, implement, and maintain a noise complaint reporting and review process to deal with potential queries and issues as they arise. This would include a toll-free telephone number for receiving question or complaints during TWE Project construction and a public liaison person before and during TWE Project construction to respond to concerns over noise.	C, F, O, U

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
WILD HORSE MANAGEMENT AREAS		
WH-1	Construction activities would be suspended as needed during wild horse gathers, as determined through consultation with the BLM.	A, C, M, R, X
WH-2	Series compensation stations shall not be sited in any Herd Area or Herd Management Area.	X
LANDS WITH WILDERNESS CHARACTERISTICS		
LWC-1	Applicable Special Designation Areas (SDA) mitigations noted in Section 3.15 of the Final EIS shall be applied to areas where the BLM has documented wilderness characteristics and, through the land use planning process, has determined to protect those wilderness characteristics as a priority over other multiple uses. At the discretion of the BLM Authorized Officer, considering the recommendations of the local BLM Field Office, these mitigations could also be applied to inventoried areas that have been documented to contain wilderness characteristics.	A, X
WILDLAND FIRE		
FR-1	The fire protection plan to be developed as part of the TWE Project Plan of Development, in addition to the items outlined in TWE-64, would include the following: - TransWest would implement line patrols to inspect the Right of Way for hazard trees, damage to any component of the TWE Project, and other potentially unsafe conditions that could increase wildland fire ignition risk. - TransWest would develop a wildland fire traffic control plan which would stipulate mechanisms through which narrow roads shall be kept passable for emergency service providers in a wildland fire emergency situation; designate the point of contact to administer the wildland fire traffic control plan and facilitate emergency service providers access; identify vehicle parking for construction and maintenance vehicles during wildland fire emergencies; and identify alternative routes for large equipment and vehicle evacuation during wildland fire emergencies. - TransWest would outline communication methods to ensure that immediate reporting of fires during construction activities and maintenance activities is feasible. Each crew member would carry a laminated card listing pertinent telephone numbers for reporting fires and defining immediate steps to take if a fire starts. The cards would be updated as needed, and redistributed to crew members. - In consultation with land management agencies, TransWest would identify when and where construction and maintenance work would cease in response to Red Flag Warning events as issued daily by the National Weather Service. Overland drive-and-crush travel would be prohibited or limited (at land management agencies' discretion) during times of high fire risk. - TransWest would develop its fire protection plan in consultation with the appropriate land management agencies.	A, C, F, H, , I, M, O, R
FR-2	No open trash burning would occur, unless specifically permitted by the appropriate authorities.	E, H, M, X
FR-3	Activities that could generate a spark such as refueling, smoking, blasting, and welding would only occur on areas that have been cleared. A spotter would be used for welding and other similar activities. The spotter would be equipped with water and tools to quickly extinguish any sparks.	C, H, F, M, R
FR-4	All engines used in the Right of Way would have an approved spark arrestor.	F, H, M, R

MITIGATION MEASURE NO.[1]	MITIGATION MEASURE	APPENDIX[2, 3]
FR-5	TransWest would consult with the land management agencies to ensure vegetation management activities are in line with land management agencies fire management objectives.	C, H, M, O, R, X
FR-6	Where appropriate and feasible, micro-siting of the route would occur in recently burned areas.	H, O, U

Notes:
[1] The mitigation measure numbers in Table 17 correspond to the mitigation measure numbers in Table C.5-1 in Appendix C of the TWE Project Final EIS.
[2] Indicates the appendices to this POD that the specific measure may apply to or that may contain additional information.
[3] The Environmental Compliance and Monitoring Plan (Appendix E) could be applied to all mitigations. Rather than listing under each measure, it is referenced here as a general footnote.

8.3.3 BLM Field Office Stipulations Along Agency Preferred Alternative

Table 18 lists the BLM Field Office Resource Management Plan (RMP) requirements applicable to the Agency Preferred Alternative on land managed by the BLM that would be implemented by TransWest during construction, operation and maintenance unless a waiver, exception or modification is obtained. The measures listed in Table 18 are a more complete description of Applicant committed measure TWE-1 (Table 16). These measures are based upon Table C.5-1 of Appendix C of the FEIS and will be updated following publication of the BLM ROD to address any changes made by BLM.

TABLE 18 BLM FIELD OFFICE STIPULATIONS ALONG AGENCY PREFERRED ALTERNATIVE

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
RAWLINS FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
Cultural Resources	--	Historic trails	Surface disturbance and disruptive activities will be prohibited within either one-quarter mile or the visual horizon (whichever is closer) of historic trails.	NSU	--	0.25 mile
Cultural Resources	--	NRHP-eligible sites	Surface disturbing activities will not be allowed within one-quarter mile of a cultural property or the visual horizon, whichever is closer, if the setting contributes to NRHP eligibility.	NSU	--	0.25 mile
Lands and Realty	--	Transmission line corridor	CIG/Entrega/WIC Transmission line corridor-Buried utilities only. 1, 320' width.	CSU	--	No buffer
Soils	--	Erodible, fragile soils and unstable soils	Surface disturbing activities will be avoided on unstable areas, such as landslides, slumps, and areas exhibiting soil creep. Reclamation practices and BMPs will be applied as appropriate for surface disturbing activities (Appendix 13).	CSU	--	No buffer
Soils	--	Slopes > 25%	Surface disturbance will be prohibited in slopes in excess of 25 percent.	NSU	--	No buffer
Visual	--	VRM Class I and II areas	Surface disturbance will be prohibited within important scenic areas (Class I and II Visual Resource Management Areas).	NSU	--	No buffer
Water Resources	--	100-year floodplains	Surface disturbing activities will be avoided in identified 100-year floodplains	CSU	--	No buffer
Water Resources	--	All surface water	Surface disturbance will be prohibited within 500 feet of surface water. Stream crossings for roads and pipelines will be constructed during the period of lowest flow (i.e., late summer or fall) and perpendicular to flow. No surface water or shallow ground waters in connection with surface waters will be utilized for proposed projects. Proper erosion control techniques, such as water bars, netting, rip-rap, etc.	NSU	--	500 feet
Water Resources	--	Ephemeral drainages	Surface disturbing activities will be avoided within 100 feet from the inner gorge of ephemeral channels.	CSU	--	100 feet

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	Bald eagle	Roosts	No ground disturbing activities will be permitted within 0.5 miles of active bald eagle communal winter roost sites year-round. This buffer zone restriction may be adjusted based on site-specific information through coordination with (including written concurrence) the Service, Wyoming Field Office.	NSU	--	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	Year round, well locations, roads, ancillary facilities, and other surface structures requiring a repeated human presence will not be allowed within 1,200 feet of active ferruginous hawks nests. Distance may vary depending on factors such as nest activity, natural topographic barriers, and line-of-sight distances.	NSU, CSU	--	1,200 feet
Wildlife-Raptors	Bald eagle	Nests	Surface disturbing and disruptive activities potentially disruptive to nesting raptors are prohibited within a 1-mile buffer (no seasonal buffer).	NSU	--	1 mile
Wildlife-SSS	Western boreal toad	Known habitat	Any action that would result in stream channel instability, erosion, and sedimentation within known Western boreal toad habitat will be avoided.	CSU	--	No buffer
Recreation	--	Recreation sites, developed and undeveloped	Lands within one-quarter mile of developed and undeveloped recreation sites (17,590 acres) are closed to locatable mineral entry, mineral material disposals, and operation of the public land laws, including sale (Map 3-7). Withdrawals will be pursued. Buried utilities will be allowed with adequate reclamation of the surface. Above-ground facilities will be avoided unless adequately mitigated to protect the recreation site viewshed.	CSU	--	0.25 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Recreation	--	Recreation sites, developed and undeveloped	Lands within one-quarter mile of developed and undeveloped recreation sites (17,590 acres) are closed to locatable mineral entry, mineral material disposals, and operation of the public land laws, including sale (Map 3-7). Withdrawals will be pursued. Buried utilities will be allowed with adequate reclamation of the surface. Above-ground facilities will be avoided unless adequately mitigated to protect the recreation site viewshed.	CSU	--	0.25 mile
Special Designations -Wildlife Habitat Management Area	--	Red Rim-Daley Wildlife Habitat Management Area	Surface disturbing and disruptive activities will be intensively managed to prevent loss of significant habitat. Management will be applied on a case-by-case basis. Developments, uses, and facilities will be managed to avoid damage to vegetation and wildlife habitat. Off-road motor vehicle use for "necessary tasks" (as defined in the Glossary) is allowed. OHV use is limited to designated roads and vehicle routes and closed to over-the-snow vehicles.	CSU	--	No buffer
Vegetation-SSS	Ute ladies'-tresses	0.25 miles from any known orchid habitat	All proposed rights-of-way projects (powerlines, pipelines, roads, etc.) will be designed and locations selected at least 0.25 miles from any known orchid habitat to minimize disturbances. If avoidance of adverse effects is not possible, the Bureau will re-initiate consultation with the Service.	CSU	--	0.25 mile
Wildlife-Raptors	Bald eagle	Nests	Well locations, roads, and ancillary facilities, and other surface structures requiring a repeated human presence, will not be allowed within 1/2 mile of active bald eagle nests. The distance may vary depending on factors such as nest activity, nest topographic barriers, and line-of-sight distance. Surface disturbing and other identified activities, as well as habitat alterations, that may disturb bald eagles will be restricted within suitable habitats that occur within the following bald eagle buffer zones: Zone 1: This area is intended to protect active and alternative nests located within ½ mile of the	CSU	--	825 feet

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			proposed surface disturbing activity. Between February 1 and August 15, minimal human activity levels will be allowed during the period of first occupancy to two weeks after fledging in this area. Zone 2: This area is intended to protect bald eagle primary use areas located within ½-1 mile of the proposed surface disturbing activity. Light human activity levels will be allowed in this area. Zone 3: This area is designated to protect foraging/concentration areas year-round and would include one of two larger areas, depending on habitat types: a) 2.5 miles extending in all directions from the nest or b) ½ mile from the stream-bank of all streams within 2.5 miles of the nest. Site-specific habitat types and foraging areas will be evaluated to determine which Zone 3 buffer applies. Zone delineation depends on habitat types. No ground disturbing activities will be permitted within 1 mile of active roost sites year round. Other activities that may disturb bald eagles within 1 mile of known communal winter roosts will be restricted during the period of November 1 through April 1.			
Wildlife-Raptors	Raptors, all	Nests	Year-round, well locations, roads, ancillary facilities, and other surface structures requiring a repeated human presence will not be allowed within 825 feet of active raptor nests (ferruginous hawks, 1,200 feet). Distance may vary depending on factors such as nest activity, species, natural topographic barriers, and line-of-sight distances.	CSU	--	825 feet
Wildlife-SSS	Sage grouse	Leks	High-profile structures (overhead power lines) will be authorized on a case by-case basis from one-quarter mile to 1 mile of an occupied greater sage-grouse and sharp-tailed _grouse lek.	CSU	--	0.25 mile to 1 mile
Wildlife-SSS	Sage grouse	Leks	"Controlled surface use" stipulation will be applied to a one-half mile radius of active sage-grouse strutting grounds, including no aboveground facilities (power lines. storage tanks, fences, etc.).	CSU	--	0.5 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
RAWLINS FIELD OFFICE TIMING RESTRICTIONS						
Wildlife-Raptors	All unspecified	Nests	Seasonal buffer of February 1–July 15.	TL	2/1 to 7/15	0.5 to 1.0 mile
Wildlife-Raptors	All unspecified	Nests	To protect important raptor nesting habitat, activities or surface use will not be allowed from February 1 to July 31. Areas encompassed by the authorization (½ or 1 mile of raptor nests) may be shortened, depending on nesting chronology of individual species, nest site location, and topography).	TL	2/1 to 7/31	0.5 to 1 mile
Wildlife-Raptors	All unspecified	Winter concentration areas	Activities or surface use will not be allowed from November 15 to April 30.	TL	11/15 to 4/30	No buffer
Wildlife-Raptors	Barn owl	Nests	Seasonal buffer of February 1–July 15.	TL	2/1 to 7/15	0.75 mile
Wildlife-Raptors	Burrowing owl	Nests	Seasonal buffer April 15–September 15.	TL	4/15 to 9/15	0.75 mile
Wildlife-Raptors	Cooper's hawk	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Ferruginous hawk	Nests	Seasonal buffer of March 1–July 31.	TL	3/1 to 7/31	1.0 mile
Wildlife-Raptors	Golden eagle	Nests	Seasonal buffer of February 1–July 15.	TL	2/1 to 7/15	1.0 mile
Wildlife-Raptors	Great horned owl	Nests	Seasonal buffer of February 1–July 15.	TL	2/1 to 7/15	0.75 mile
Wildlife-Raptors	Kestrel	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Long-eared owl	Nests	Seasonal buffer of March 1–July 31.	TL	3/1 to 7/31	0.75 mile
Wildlife-Raptors	Merlin	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Northern goshawk	Nests	Seasonal nest buffer of April 1–August 31.	TL	4/1 to 8/31	0.75 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	Northern harrier	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Osprey	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Peregrine falcon	Nests	Seasonal buffer of March 1–July 31.	TL	3/1 to 7/31	0.75 mile
Wildlife-Raptors	Prairie falcon	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Red-tailed hawk	Nests	Seasonal buffer of February 1–July 15.	TL	2/1 to 7/15	0.75 mile
Wildlife-Raptors	Screech owl	Nests	Seasonal buffer of March 1–July 31.	TL	3/1 to 7/31	0.75 mile
Wildlife-Raptors	Sharp-shinned hawk	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Short-eared owl	Nests	Seasonal buffer of March 1–July 31.	TL	3/1 to 7/31	0.75 mile
Wildlife-Raptors	Swainson's hawk	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Swainson's hawk	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-SSS	Sage grouse	Leks, nesting and early brood rearing habitat	Nesting/early brood-rearing habitat: Avoid surface disturbing and disruptive activities, geophysical surveys, and organized recreational activities (events) that require a special use permit in suitable greater sage-grouse and sharp-tailed grouse nesting and early brood rearing habitat within 2 miles of the perimeter of an occupied greater sage-grouse lek, and within 1 mile of the perimeter of a sharp-tailed grouse lek, or in identified greater sage-grouse and sharp-tailed grouse nesting and early brood rearing habitat, from March 1 to July 15. Avoidance of surface disturbance or other disruptive activity from March 1 through July 15 within 2 miles from an "active" lek or in suitable greater sage-grouse nesting and early brood rearing habitat.	TL	3/1 to 7/15	1 mile sharp-tailed, 2 miles greater sage grouse

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-SSS	Sage grouse	Nesting habitat	To protect important sage and sharp-tailed grouse nesting habitat, activities or surface use will not be allowed from February 1 to July 31 within certain areas encompassed by the authorization.	TL	2/1 to 7/31	None specified
Wildlife-SSS	Sage grouse	Winter concentration areas	Surface disturbing and disruptive activities potentially disruptive to delineated greater sage-grouse and sharp-tailed grouse winter concentration areas are prohibited during the period of November 15 to March 14 for the protection of greater sage-grouse and sharp-tailed grouse winter concentration areas.	TL	11/5 to 3/14	No buffer
Wildlife-SSS	Yellow-billed cuckoo	Identified habitat	Surface disturbing or other disruptive activities will be prohibited within 1/2-mile of identified habitat during the period April 15 to August 15 for the protection of nesting Western yellow-billed cuckoos.	TL	4/15 to 8/15	0.5 mile
LITTLE SNAKE FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
Recreation		Recreation sites, developed	Developed recreation sites (40-acre blocks) are NSU.	NSU	--	No buffer
Soils	NA	Erodible, fragile soils and unstable soils	Fragile soils: areas rated as highly or severely erodible by wind or water as described by the Natural Resources Conservation Service (NRCS) in the Area Soil Survey Report or as described by onsite inspection. Fragile soil criteria are also slopes greater than or equal to 35 percent if they have one of the other following soil characteristics: surface texture that is sand, loamy sand, very fine sandy loam, silty clay, or clay; a depth to bedrock of less than 20 inches; an erosion condition rated as "poor"; or a K factor greater than 0.32. Surface disturbing activities will be allowed on isolated sites that meet fragile soil criteria, but only when performance standards and objectives can be met. Surface occupancy on public land will be permitted only where adherence to performance objectives for surface disturbing activities within fragile-soil areas is assured.	CSU	--	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Vegetation-SSS	All	Occupied habitat	There will be CSU stipulations on habitat areas containing special status species, such as federally listed, proposed, and candidate species.	CSU	--	No buffer
Vegetation-SSS	Utes ladies'-tresses	Known habitat	All proposed ROW projects (powerlines, pipelines, roads, etc.) will be designed and locations selected at least 0.25 miles from any known Ute ladies'-tresses orchid habitat to minimize disturbances. If avoidance of adverse effects is not possible, the Bureau will re-initiate consultation with the Service.	CSU	--	0.25 mile
Water Resources	--	Perennial streams	Establish no surface occupancy (NSO) stipulations for up to 0.25 mile from perennial water sources, if necessary, depending on type and use of the water source, soil type, and slope steepness.	NSU	--	0.25 mile
Wildlife-Aquatic Species-SSS	Colorado River fishes	Critical or occupied habitat	Require NSO stipulations within critical or occupied habitat of Colorado pikeminnow (Ptychocheiluslucius), razorback sucker (Xyrauchentexanus), humpback chub (Gila cypha), and bonytail (Gila elegans).	NSU	--	No buffer
Wildlife-Raptors	All except bald eagle and peregrine falcon	Nests	0.25 miles from nest sites raptors (golden eagle, osprey, all accipiters, falcons [except the kestrel], buteos, and owls, and not including special status species raptors Bald Eagle and Peregrine Falcon).	NSU	--	0.25 mile
Wildlife-Raptors	Bald eagle	Nests, abandoned	NSO within 100 meter radius of abandoned nests (unoccupied for 5 consecutive years, but with all or part of the nest remaining).	NSU	--	328 feet

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	Bald eagle	Nests, occupied and unoccupied	Year-round NSO will be applied within a 0.25 mile radius of roost sites and both occupied and unoccupied nests. The definition of an "occupied nest" (from the Northern States Bald Eagle Recovery Plan 1983, page D4) includes (a) young were observed, (b) eggs were laid (eggs or eggshell fragments observed), (c) one adult was observed in incubating ("sitting low") posture on the nest during the incubation period, (d) two adults were observed at an empty nest or within the breeding area, or (e) one adult eagle and one eagle in immature plumage were observed at or near a nest, especially if mating or reproductive behavior (display flights, copulation, nest repair, etc.) was observed.	NSU	--	0.25 mile
Wildlife-Raptors	Bald eagle	Roosts	New roads and bridges on BLM lands should be located at least 1/2 mile from critical night roosts.	CSU	--	0.5 mile
Wildlife-Raptors	Peregrine Falcon	Cliff nesting complexes	NSO will be allowed within a 0.25 mile radius of cliff nesting complexes. NSO areas may be altered depending upon the active status of the nesting complex or upon the geographical relationship of topographical barriers and vegetation screening.	NSU	--	0.25 mile
Wildlife-SSS	All	T&E and candidate species habitat	There will be CSU stipulations on habitat areas containing special status species, such as federally listed, proposed, and candidate species.	CSU	--	No buffer
Wildlife-SSS	Black-footed ferret	Black-footed ferret reintroduction areas	Active white-tailed prairie dog colonies will continue to be avoidance areas for surface disturbing activities within the black-footed ferret reintroduction area.	CSU	--	No buffer
Wildlife-SSS	Black-footed ferret	Occupied habitat	Occupied black-footed ferret habitat is designated as a ROW avoidance area. ROWs on public land with the potential to disturb occupied black-footed ferret habitat will be rerouted to avoid those prairie dog towns.	CSU	--	No buffer
Wildlife-SSS	Black-footed ferret	Prairie dog towns	ROWs on public land with the potential to disturb occupied black-footed ferret habitat will be rerouted to avoid those prairie dog towns.	CSU	--	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-SSS	Mountain plover	Plover nest site	Establish 0.125 mile NSO stipulations around all plover nest sites. The boundaries of the stipulated area may be modified if the authorized officer determines that surface occupancy will not harm the integrity of the nest or nest location.	NSU	--	0.125 mile
Wildlife-SSS	Prairie dog, white-tailed	Colonies	Surface disturbing activities occurring over more than 1 acre will not be permitted in active prairie dog towns less than 10 acres in size. These activities will be relocated to the edge of the active prairie dog town.	NSU	--	No buffer
Wildlife-SSS	Sage grouse, greater	Leks	To reduce potential impacts on greater sage-grouse lek integrity, NSO will be applied within a 0.6 mile radius of a lek site. The NSO area may be altered depending upon the active status of the lek, habitat characteristics, or the geographical relationship of topographical barriers and vegetation screening to the lek site.	NSU	--	0.6 mile
Wildlife-SSS	Yellow-billed cuckoo	Suitable habitat	Prohibit permanent surface disturbing activities within 0.25 mile of any suitable yellow-billed cuckoo habitat. Exceptions should be evaluated on a case-by-case basis to avoid adverse impact.	NSU	--	0.25 mile
Wildlife-Waterfowl	Waterfowl	Waterfowl habitat management areas and rookeries	NSO will be allowed on significant production areas, such as waterfowl habitat management areas and rookeries. NSO areas may be altered depending upon the active status of the production areas or upon the geographical relationship of topographical barriers and vegetation screening.	NSU	--	No buffer
LITTLE SNAKE FIELD OFFICE TIMING RESTRICTIONS						
Livestock Grazing	Domestic sheep	Lambing grounds	Exploration (including seismic exploration, drilling, or other development or production activity) will generally not be allowed on domestic sheep lambing grounds during lambing activity. Lambing activities usually fall between April 10 and June 30 and last for approximately 6 weeks. Dates for the six week closure will be determined for each operation as local conditions dictate.	TL	4/1 to 6/30	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Big Game	All	Winter habitat, crucial	Crucial winter habitat will be closed to surface disturbing activities from December 1 to April 30, with the intent that this stipulation will be applied after the big game hunting season.	TL	12/1 to 4/30	No buffer
Wildlife-Big Game	Elk	Parturition areas	Elk calving areas will be closed to surface disturbing activities from April 16 to June 30.	TL	4/16 to 6/30	No buffer
Wildlife-Big Game	Pronghorn	Parturition areas	Pronghorn antelope fawning areas will be closed to surface disturbing activities from May 1 to July 15.	TL	5/1 to 7/15	No buffer
Wildlife-Fish	Colorado River fishes	Critical or occupied habitat	No work in the active river channel will take place between July 1 and September 30 to prevent adverse effects from sedimentation during spawning; also, no work will take place when larval fishes are drifting in the river channel. Other than pipelines, controlled surface uses crossing any critical or occupied habitat of the Colorado River fishes will require separate Section 7 consultation.	TL	7/1 to 9/30	No buffer
Wildlife-Raptors	Bald eagle	Critical night roosts	Human activity within 0.5 miles of bald eagle critical night roosts on BLM land should be restricted from November 15 to March 15. Buffers can be reduced to 0.25 miles for night roosts if the activity is visually screened by vegetation or topography. Development may be permitted at other periods. If periodic visits, such as those that occur with oil well maintenance work, are required within the buffer zone after development, such activity should be restricted to between the hours of 10 a.m. and 2 p.m. during the period November 15 to March 15.	TL	11/15 to 3/15	0.5 mile
Wildlife-Raptors	Bald eagle	Critical night roosts	If BLM chooses to construct a road or bridge within 1/2 mile of critical night roosts, then the road must be closed to all use from November 15 to March 15. If topography or vegetation provides a visual screen, the buffer can be reduced to 1/4 mile, but the seasonal closure would still be required.	TL	11/15 to 3/15	No buffer
Wildlife-Raptors	Bald eagle	Nests, occupied	No human activity or surface disturbance will be allowed within a 0.5 mile radius of occupied nests from November 15 through July 31.	TL	11/15 to 7/31	0.5 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	Bald eagle	Winter hunting perches	Human activity within 0.25 miles of known bald eagle winter hunting perches should be restricted from November 15 to March 15. Buffers can be reduced to 0.125 miles for hunting perches if the activity is visually screened by vegetation or topography. Development may be permitted at other periods. If periodic visits, such as those that occur with oil well maintenance work, are required within the buffer zone after development, such activity should be restricted to between the hours of 10 a.m. and 2 p.m. during the period November 15 to March 15.	TL	11/15 to 3/15	0.25 mile
Wildlife-Raptors	Ferruginous hawk	Nesting and fledgling habitat	From February 1 to August 15, a 1 mile buffer around nesting and fledgling habitat will be closed to surface disturbing activities to avoid nest abandonment.	TL	2/1 to 8/15	1 mile
Wildlife-Raptors	Osprey	Nesting and fledgling habitat	Osprey nesting and fledgling habitat will be closed to surface disturbing activities from April 1 to August 31. This closure will apply to a 0.5 mile buffer zone around the habitat to avoid nest abandonment.	TL	4/ tp 8/15	0.5 mile
Wildlife-Raptors	Peregrine falcon	Nesting complex	Peregrine falcon cliff nesting complexes will be closed to surface disturbing activities from March 16 to July 31 within a 0.5 mile buffer area around the nesting complex to prevent abandonment and desertion of established territories. However, during years when a nest is unoccupied, or unoccupied by or after May 15, the seasonal stipulation may be excepted. The stipulations may also be excepted once the young have fledged and dispersed from the nest.	TL	3/16 to 7/31	0.5 mile
Wildlife-Raptors	Raptors (golden eagle, osprey, all accipiters, falcons [except the kestrel], buteos, and owls)	Nests	Raptor nesting and fledgling habitat will be closed to surface disturbing activities from February 1 to August 15 within a 0.25 mile buffer zone around the nest site. However, during years when a nest site is unoccupied, or unoccupied by or after May 15, these seasonal limitations may be excepted; they may also be excepted once the young have fledged and dispersed from the nest.	TL	5/1 to 8/15	0.25 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-SSS	Greater sage-grouse	Leks	To prevent disturbing up to 75 percent of nesting birds, between March 1 and June 30, greater sage-grouse nesting and early brood-rearing habitat (Map 5) will be stipulated as CSU for oil and gas operations and avoidance areas for other surface disturbing activities within a 4 mile radius of the perimeter of a lek. All surface disturbing activities will avoid only nesting and early brood-rearing habitat within the 4 mile radius of the lek during this time period. Exceptions, modification, or waivers will be granted according to criteria established in Appendix B. The actual area to be avoided will be determined on a case-by-case basis, depending on applicable scientific research and site-specific analysis and in coordination with commodity users and other appropriate entities.	TL	3/1 to 6/30	4 mile
Wildlife-SSS	Greater sage-grouse	Winter habitat, crucial	Crucial winter habitat will be closed from December 16 to March 15. In addition, exceptions would be granted according to criteria established in Appendix B.	TL	12/16 to 3/15	No buffer
Wildlife-SSS	Mexican spotted owl	PACs	Activities in PACs that are not surface disturbing will avoid the Mexican spotted owl breeding season, which runs from March 1 through August 31.	TL, CSU	3/1 to 831	No buffer
Wildlife-SSS	Mountain plover	Nest sites	Prohibit surface occupancy and use from April 1 to July 15 within 0.25 mile of all plover nest sites.	TL	4/1 to 7/15	0.25 mile
Wildlife-SSS	Prairie dog, white-tailed	Prairie dog towns	To protect prairie dog pups, surface disturbing activities will not be permitted in prairie dog towns between April 1 and June 15.	TL	4/1 to 6/15	No buffer
Wildlife-SSS	Yellow-billed cuckoo	Suitable habitat	Construction of roads, pipelines, and powerlines through riparian habitat should be placed near the edge of the current YBC habitat. This construction should not occur from June 1 through August 1. Roads, new trails, and rights of way (ROW) should be combined where possible, and stream crossings should be at right angles to YBC habitat to minimize impacts.	TL	6/1 to 8/1	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
WHITE RIVER FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
Soils	--	Erodible, fragile soils and unstable soils	Identified soils are considered unstable and subject to slumping and mass movement. Surface occupancy will not be allowed in such areas delineated from USDA SCS Order III Soil Surveys.	NSU	--	No buffer
Vegetation-SSS	All	BLM sensitive plants and RVAs	No surface occupancy will be allowed within known populations of BLM sensitive plants and remnant vegetation associations (RVAs). Motorized travel within known locations of sensitive plants and high priority RVAs that are located outside ACECs is limited to designated roads and trails.	NSU, CSU	--	No buffer
Vegetation-SSS	All	Federally listed species known and potential habitat	No Surface Occupancy (NSO) stipulation will be placed on known and potential habitat of federally listed and candidate T/E plants. New T/E plant habitat mapped as a result of future surveys will also be protected by a NSO stipulation. This stipulation will apply to all surface disturbing activities within these areas. All known and potential T/E habitat, including ACECs, will be exclusion areas for new Rights-of-Way authorizations. Land use authorizations will be denied in exclusion areas, with the exception of short-term land use permits involving no development, and projects that are consistent with management objectives for the area.	NSU	--	No buffer
Water Resources	--	Riparian areas	Surface disturbing activities would be required to avoid riparian habitat.	CSU	--	No buffer
Wildlife-Raptors	Bald eagle	Nests	Surface Occupancy is not allowed within 0.25 mile of Bald Eagle nests. Prior to authorizing surface disturbance within Nest, Roost, and Perch habitat, and pending conferral consultation with the USFWS as required by the Endangered Species Act, the Area Manager may require the proponent/applicant to submit a plan of development that would demonstrate that: 1) involvement of cottonwood stands or cottonwood regeneration areas have been avoided to the extent practicable; 2) special reclamation measures or design features are incorporated that would accelerate recovery and/or reestablishment of affected cottonwood	NSU, CSU	--	0.25 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			communities: 3) the pre-development potential of affected floodplains to develop or support riverine cottonwood communities has not been diminished: and 4) the current/future utility of such cottonwood substrate for bald eagle use would not be impaired.			
Wildlife-Raptors	Bald eagle	Roosts	Surface Occupancy is not allowed within 0.25 mile of Bald Eagle Roost/Concentration Areas. Prior to authorizing surface disturbance within Nest, Roost, and Perch habitat, and pending conferral consultation with the USFWS as required by the Endangered Species Act, the Area Manager may require the proponent/applicant to submit a plan of development that would demonstrate that: 1) involvement of cottonwood stands or cottonwood regeneration areas have been avoided to the extent practicable; 2) special reclamation measures or design features are incorporated that would accelerate recovery and/or reestablishment of affected cottonwood communities: 3) the pre-development potential of affected floodplains to develop or support riverine cottonwood communities has not been diminished: and 4) the current/future utility of such cottonwood substrate for bald eagle use would not be impaired.	NSU, CSU	--	0.25 mile
Wildlife-Raptors	Raptors, non-SSS	Nests	Disruptive surface occupation or adverse habitat modification will be prohibited within l/8 mile of non-listed members (i.e. not listed, proposed, candidate, and BLM sensitive) of the raptor group.	NSU	--	0.125 mile
Wildlife-Raptors	Raptors, SSS (listed, proposed, candidate, and BLM sensitive)	Nests	Disruptive surface occupation or adverse habitat modification will be prohibited within l/4 mile of functional nest sites of special status species (i.e. listed, proposed, candidate, and BLM sensitive).	NSU	--	0.25 mile
Wildlife-SSS	Sage grouse	Leks	This area encompasses sage grouse leks. Surface Occupancy is not allowed within l/4 mile of identified lek sites.	NSU	--	0.25 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Soils	--	Saline Soils derived from Manco shale	Surface disturbing activities will be allowed in these areas only after an engineered soils derived construction/reclamation plan is submitted by the operator and approved by the Area Manager.	CSU	--	No buffer
Soils	--	Slopes > 35%	Surface disturbing activities will be allowed in fragile soils on Slopes >35% only after an engineered soils derived construction/reclamation plan is submitted by the operator and approved by the Area Manager.	CSU	--	No buffer
Vegetation	--	Aspen, serviceberry and chokecherry communities	Blue Mountain Deciduous Browse/Aspen/Serviceberry/Chokecherry Communities are a controlled surface use area in order to maintain and the distribution, condition, and functional capacity of deciduous browse and aspen communities integral to high priority big game and blue grouse habitats. Prior to authorizing activities in this area, the proponent/applicant would be required to submit a plan of development that would demonstrate that: 1) involvement of aspen, serviceberry, and chokecherry associations have been avoided to the extent possible: 2) special reclamation measures or design features would promote accelerated recovery or establishment of desirable plant community components: 3) the potential or capacity of the area to support viable, self-sustaining aspen, serviceberry, and chokecherry communities has not been diminished; 4) involvement of community derived values are mitigated through project life commensurate with projected impacts. Surface disturbance or occupation within aspen, serviceberry, and chokecherry communities may be prohibited.	CSU	--	No buffer
Visual	--	VRM Class II and III areas within White River FO	Measures may be required to protect scenic and natural landscape values. These design and measures may include transplanting trees and shrubs, mulching and fertilizing disturbed areas, use of low profile permanent facilities, and painting to minimize visual contrasts. Surface disturbing activities may be moved up to 200 meters to avoid sensitive areas or to reduce the visual effects of the proposal. These measures would be applied to the following VRM Class II and III areas: Canyon Pintado National Historic District; Highways 13,	CSU	--	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			40, 64, and 139 corridors; Viewsheds in the Blue Mountain/Moosehead GRA; White River Corridor; Douglas and Baxter Pass divide; Cathedral Bluffs; and VRM Class II areas around Meeker. These measures may also be applied to other areas on a case by case basis.			
Wildlife-Aquatic Species	Colorado cutthroat trout	Aquatic trout habitat (habitats occupied by populations of Colorado River cutthroat trout)	Prior to authorizing surface disturbance of occupied stream reaches or within watersheds contributing to occupied habitats, the Area Manager may require the proponent/applicant to submit a plan of development that would demonstrate that the proposed action would not: 1) increase stream gradient: 2) result in a net increase in sediment contribution; 3) decrease stream channel sinuosity: 4) increase the channel width to depth ratio; 5) increase water temperature; 6) decrease vegetation derived stream shading; and 7) degrade existing water quality parameters, including specific conductance, turbidity, organic/inorganic contaminant levels, and dissolved oxygen in occupied reaches or contributing perennial or intermittent tributaries. If approvals are granted and development results in these standards being exceeded, additional measures would be required to correct the deficiencies.	CSU	--	No buffer
Wildlife-Avian	Avian	Nest sites of all special status and tree-nesting species	Permitted land use activities within l/4 mile of functional nest sites of cavity, cliff, and ground-nesting species, and within l/2 mile of functional nest sites of special status and tree-nesting species, will be subject to relocation or design modifications to preclude, or reduce to acceptable levels, long-term reduction or deterioration.	CSU	--	No buffer
Wildlife-SSS	Black-footed ferret	Potential habitat for wild or reintroduced populations	Lands within this lease parcel involve prairie dog ecosystems that constitute potential habitat for wild or reintroduced populations of the federally endangered black footed ferret. Conservation and recovery efforts for the black-footed ferret are authorized by the Endangered Species Act of 1973 (as amended). The successful lessee may be required to perform special conservation measures prior to and during lease development. These measures may include one or more	CSU	--	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			of the following: 1. Performing site-specific habitat analysis and/or participating in ferret surveys. 2. Participating in the preparation of a surface use plan of operations with BLM, USFWS, and COW, which integrates and coordinates long term lease development with measures necessary to minimize adverse impacts to black-footed ferrets or their habitat. 3. Abiding by special daily and seasonal activity restrictions on construction, drilling, product transport, and service activities. 4. Incorporating special modifications to facility siting, design, construction, and operation. 5. Providing in-kind compensation for habitat loss and/or displacement (e.g. special on-site rehabilitation/revegetation measures or off-site habitat enhancement).			
Wildlife-SSS	Black-footed ferret	Black-footed ferret Reintroduction Area	Prior to authorizing activities in this area, the Area Manager will confer or consult with the USFWS as required by Section I of the Endangered Species Act. Depending on the scope of the proposed action, a plan of development may be required that demonstrates how the proposed activities would be conducted or conditioned to: 1) avoid the direct or indirect loss of black-footed ferrets: or 2) avoid affecting the capability of the site to achieve reestablishment objectives. The Area Manager may impose land use measures and limitations derived from a site specific ferret reintroduction and management plan. The measures and limitations would be designed to avoid, or reduce to acceptable levels, the short and long term adverse effects on ferret survival, behavior, reproductive activities, and/or the area's capacity to sustain ferret population objectives.	CSU	--	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-SSS	Sage grouse	Sage grouse habitat	Conversion or adverse modification of the following sage grouse habitats will be avoided: 1) sagebrush stands with ≤50 percent canopy and ≤30" in height, and ≤2 miles from a lek; 2) sagebrush stands with ≤30 percent canopy and ≤30" in height; >2 miles from a lek on occupied summer ranges; 3) any sagebrush stand on slopes ≤0 20 percent in defined winter concentration areas; and 4) sagebrush stands on slopes ≤20 percent showing evidence of winter use.	CSU	--	2 mile
WHITE RIVER FIELD OFFICE TIMING RESTRICTIONS						
Wildlife-Big Game	All	Winter range, severe	No development activity in big game severe winter range is allowed from December 1 through April 30. Exceptions apply.	TL	12/1 to 4/30	No buffer
Wildlife-Big Game	Mule deer, elk	Summer range	This stipulation will not take effect until direct and indirect impacts to suitable summer range habitats exceed 10% of that available within the individual Game Management Units. When this threshold has been reached, no further development activity will be allowed from May 15 through August 15. Exceptions apply.	TL	5/15 to 8/15	No buffer
Wildlife-Raptors	All listed, candidate T/E &/ BLM sensitive species except bald eagle and ferruginous hawks)	Nests	No development activities are allowed within ½ mile of identified nest sites from February 1 through August 15, or until fledgling and dispersal of young. Exceptions apply.	TL	2/1 to 8/15	0.25 mile
Wildlife-Raptors	All raptors other than T/E and candidate T/E species	Nests	No development activities are allowed within ¼ mile of identified nests from February 1 through August 15, or until fledgling and dispersal of young. Exceptions apply.	TL	2/1 to 8/15	0.125 mile
Wildlife-Raptors	Bald eagle	Nests	No development is allowed within 1/2 mile of identified nests from December 15 through July 15, or until fledgling and dispersal of young.	TL	12/15 to 7/15	0.5 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	Bald eagle	Roosts, winter concentration areas	No development is allowed within ½ mile of identified sites from November 15 through April 15. Exceptions apply.	TL	11/15 to 4/15	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	No development is allowed within one (1) mile of identified nests from February 1 through August 15, or until fledgling and dispersal of young. Exceptions apply.	TL	2/1 to 8/15	1.0 mile
Wildlife-SSS	Sage grouse	Leks	If direct and indirect impacts to suitable nesting cover exceeds 10 percent of the habitat available within 2 miles of identified leks, further development will not be allowed from April 15 through July 7. (Development can occur until 10 percent of the habitat associated with a lek is impacted, from then on, additional activity can occur from July 8 through April 14).	TL	4/15 to 7/7	2 miles
Wildlife-SSS	Sage grouse	Winter habitat	This area encompasses sagebrush habitats that are occupied by wintering concentrations of grouse, or represent the only habitats that remain available for use during periods of heavy snowpack. No development activity will be allowed between December 16 and March 15.	TL	12/16 to 3/15	No buffer
VERNAL FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
Cultural Resources	--	Uinta foothills area	The area would be open for oil and gas leasing and other surface disturbing activities subject to timing and controlled surface-use stipulations or NSO. [Per the RMP, ROWs exclusion and avoidance areas are consistent with areas closed to oil and gas leasing or with a no surface occupancy stipulation, respectively.]	CSU	--	No buffer
Lands and Realty	--	ROW corridors	Future ROWs that cross the Lower or Upper Green River will be placed in the Four Mile Bottom Area or at the Head of Little Swallow Canyon.	CSU	--	No buffer
Recreation	--	Recreation sites, developed	All developed recreation sites within VFO will be closed to all forms of surface-disturbing activities not directly related to recreation development. Developed recreation sites would be closed to the shooting of firearms, grazing, and all forms of surface-disturbing activities. An exemption would be granted if the disturbance were related to recreational infrastructure support.	NSU	--	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Soils	--	Slopes between 21-40%	If surface-disturbing activities cannot be avoided on slopes from 21-40% a plan would be required. The plan would be approved by BLM prior to construction and maintenance and include: • An erosion control strategy• GIS modeling• Proper survey and design by a certified engineer. The surface operating standards for oil and gas exploration and development (Gold Book) would be used as a guide for surface-disturbing proposals on steep slopes/hillsides.	CSU	--	No buffer
Soils	--	Slopes > 40%	For slopes greater than 40%, allow NSO. If after an environment analysis the authorized officer determines that it would cause undue or unnecessary degradation to pursue other placement alternatives, surface occupancy in the NSO area may be authorized. Additionally a plan would be submitted by the operator and approved by BLM prior to construction and maintenance and include: • An erosion control strategy; • An erosion control strategy; • Proper survey and design by a certified engineer. Modifications also may be granted if a more detailed analysis, i.e. Order I, soil survey conducted by a qualified soil scientist finds that surface disturbance activities could occur on slopes greater than 40% while adequately protecting the area from accelerated erosion.	CSU	--	No buffer
Special Designations -ACEC	--	Lower Green River ACEC - (8,470 acres)	ROW avoidance area. Leasing NSO allowed within line of sight or up to one-half mile from the centerline of the river, whichever is less. OHV use will be limited to designated routes. VRM Class II. Approximately 71 acres will be open to leasing subject to moderate constraints such as TLs and CSU. Approximately 8,079 acres will be open to leasing subject to major constraints such as NSO stipulations. No areas open to standard tips, no areas unavailable for leasing. Future facilities would be placed within the existing ROW corridor near the Four Mile Bottom area where an existing pipeline crosses the Green River. 8,079 NSO; 71 CSU/TL.	CSU	--	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Special Designations -WSR	--	Lower Green River from the public land boundary south of Ouray to the Carbon County line	The segment of the Lower Green River from the public land boundary south of Ouray to the Carbon County line will continue to be managed as previously recommended as a suitable scenic segment to protect its outstandingly remarkable values. Management will include: Oil and Gas Leasing – NSO; Mineral Materials – Closed; OHV – Closed and limited to designated routes; VRM – Classes I and II.	NSU	--	No buffer
Vegetation-SSS	Ute ladies'-tresses	Occupied habitat	Within occupied habitat, project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants: a. Follow the above (#3) recommendations for project design within suitable habitats; b. Buffers of 300 feet minimum between right of way (roads and surface pipelines) or surface disturbance (well pads) and plants and populations will be incorporated; c. Surface pipelines will be laid such that a 300-foot buffer exists between the edge of the right of way and the plants, using stabilizing and anchoring techniques when the pipeline crosses habitat to ensure the pipelines don't move towards the population; f. Designs will avoid altering site hydrology and concentrating water flows or sediments into occupied habitat; g. Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat, with berms and catchment ditches to avoid or minimize the potential for materials to reach occupied or suitable habitat.	CSU	--	300 feet

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Water Resources	--	100-year floodplains, municipal/culinary/public water/reservoirs, riparian areas	Allow no new surface-disturbing activities within active flood plains, public water reserves, or 100 meters of riparian areas unless there are no practical alternatives, impacts will be fully mitigated, and the action is designed to enhance the riparian resources. The following mitigation measures could be included as applicable: • Keep construction of all new stream crossings to a minimum. Stream crossings with culverts will be designed and constructed to allow fish passage, where needed. All stream crossings will be designed and constructed to keep impacts to riparian and aquatic habitat to a minimum. • Relocate existing routes out of riparian areas where feasible or necessary to restore watershed and riparian stability.	NSU	--	100 meters (328 feet)
Wildlife-Aquatic species-SSS	Bonytail, Colorado pikeminnow, humpback chub, and razorback sucker	Colorado, Green, Duchesne, Price, White, and San Rafael rivers.	Colorado Pikeminnow, Humpback Chub, and Razorback Sucker Conservation Measures: 3.b. Surface-disturbing activities [other than oil and gas activities] maybe restricted within 1/4 mile of the channel centerline of the Colorado, Green, Duchesne, Price, White, and San Rafael Rivers.	NSU	--	.025 miles of channel centerline
Wildlife-Big Game	Deer	Crucial deer winter range	Within crucial deer winter range, no more than 10% of such habitat will be subject to surface disturbance and remain un-reclaimed at any given time. (Exception: This stipulation may be excepted if either the resource values change or the lessee/operator demonstrates to BLMs satisfaction that impacts can be mitigated.)	CSU	--	No buffer
Wildlife-Big Game	Deer	Crucial deer winter range – recommendation only	It is preferred that surface-disturbing actions within crucial deer winter range will be located in pinyon juniper rather than browse where both vegetation types occur.	CSU	--	No buffer
Wildlife-Raptors	Raptors, all	Nests	Raptor management will be guided by the use of "Best Management Practices for Raptors and Their Associated Habitats in Utah" (Utah BLM, 2006, Appendix A), utilizing seasonal and spatial buffers, as well as mitigation, to maintain and enhance raptor nesting and foraging habitat, while allowing other resource uses. Spatial and temporal buffers applied to disturbances in the vicinity of nesting raptors will be tailored to the individual raptor species involved and	NSU	--	Refer to Raptor Guide

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			based on factors such as line of sight distance between nest and disturbance, type and duration of disturbance, nest structure security, sensitivity of the species to disturbance, observed responses to related disturbances, and the amount of other disturbances already occurring in the vicinity. Land use activities which would have an adverse impact on an occupied raptor nest, would not be allowed within the spatial or seasonal buffer.			
Wildlife-SSS	Prairie dog, white-tailed	White-tailed prairie dogs	No surface-disturbing activities within 660 feet of prairie dog colonies identified within prairie dog habitat. No permanent aboveground facilities are allowed within the 660-foot buffer. Exception: An exception may be granted by the AO if the applicant submits a plan that indicates that impacts of the proposed action can be adequately mitigated or, if due to the size of the town, there is no reasonable location to develop a lease and avoid colonies the AO will allow for loss of prairie dog colonies and/or habitat to satisfy terms and conditions of the lease. The AO may modify the boundaries of the stipulation area if portions of the area does not include prairie dog habitat or active colonies are found outside the current defined area, as determined by the BLM.	NSU	--	660 feet from colonies
Wildlife-SSS	Sage grouse	Leks	No surface-disturbing activities within 0.25 mile of active Sage-grouse leks will be allowed year round.	NSU	--	.025 mile
Wildlife-SSS	Sage grouse	Leks	No permanent facilities or structures will be allowed within 2 miles of active sage grouse leks when possible.	CSU	--	2 miles
Wildlife-SSS	Sage grouse	Leks	Within 0.5 mile of known active leks, the best available technology will be used to reduce noise, e.g., installation of multi-cylinder pumps, hospital sound-reducing mufflers, and placement of exhaust systems.	CSU	--	0.5 miles
VERNAL FIELD OFFICE TIMING RESTRICTIONS						
Wildlife- Big Game	Deer, elk	Winter habitat, crucial	Activities that will result in adverse impacts to deer and elk within crucial winter range will not be allowed from December 1 through April 30. This restriction will not apply if deer and/or elk are not present, or if it is determined through analysis and coordination with	TL	12/1 to 4/30	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			UDWR that impacts will be mitigated. Factors to be considered will include snow depth, temperature, snow crusting, location of disturbance, forage quantity and quality, animal condition, and expected duration of disturbance. The stipulation could be modified based on findings of collaborative monitoring and analysis. For example, the winter range configuration and time frames could be changed if current animal use patterns are determined to be inconsistent with the dates and boundaries established. This stipulation could be waived if it is determined through collaborative monitoring and analysis that the area is not crucial winter range or that timing restrictions are unnecessary.			
Wildlife- Big Game	Pronghorn	Parturition areas	Do not allow activities that will result in adverse impacts to antelope from May 1 through June 30 to minimize stress and disturbance during crucial antelope birthing time. An exception may be granted to these dates by the authorized officer if the operator submits a plan which demonstrates that impacts from the proposed action can be adequately mitigated or if it is determined the habitat is not being utilized for fawning in any given year. The authorized officer may modify the boundaries of the stipulation area if a portion of the area is not being used as fawning grounds or if habitat is being utilized outside of stipulation boundaries as crucial fawning grounds and needs to be protected. May be granted if the fawning grounds are determined to be unsuitable or unoccupied and there is no reasonable likelihood of future use of the fawning grounds.	TL	5/1 to 6/30	No buffer
Wildlife- Raptors	Bald eagle	Nests	No surface disturbance within a 1 mile buffer of active nests from 1/1 – 8/31, unless the area has been surveyed according to protocol and determined to be unoccupied.	TL	1/1 to 8/31	1 mile
Wildlife- Raptors	Boreal owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 7/31.	TL	2/1 to 7/31	0.25 mile
Wildlife- Raptors	Burrowing owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	California condor	Nests	No surface disturbance within 1 mile buffer of active nests during breeding season (undefined).	TL	undefined	1.0 mile
Wildlife-Raptors	Cooper's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.5 mile
Wildlife-Raptors	Flammulated owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 9/30.	TL	4/1 to 9/30	0.25 mile
Wildlife-Raptors	Golden eagle	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 1/1 – 8/31.	TL	1/1 to 8/31	0.5 mile
Wildlife-Raptors	Great horned owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 12/1 – 9/31.	TL	12/1 to 9/31	0.25 mile
Wildlife-Raptors	Long-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 8/15.	TL	2/1 to 8/15	0.25 mile
Wildlife-Raptors	Merlin	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Mexican spotted owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	Northern goshawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern harrier	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/15.	TL	4/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern pygmy owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/1.	TL	4/1 to 8/1	0.25 mile
Wildlife-Raptors	Northern saw-whet owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	Osprey	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Peregrine falcon	Nests	No surface disturbance within a 1 mile buffer of active nests from 2/1 – 8/31.	TL	2/1 to 8/31	1 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	Prairie falcon	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.25 mile
Wildlife-Raptors	Red-tailed hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Sharp-shinned hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Short-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.25 mile
Wildlife-Raptors	Swainson's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.5 mile
Wildlife-Raptors	Turkey vulture	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 5/1 – 8/15.	TL	5/1 to 8/15	0.5 mile
Wildlife-Raptors	Western screech owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.25 mile
Wildlife-SSS	Black-footed ferret	Known home ranges	Activities involving the development or construction of temporary or permanent surface disturbances would be prohibited within 1/8 mile boundaries of known home ranges of female ferrets during the "critical" period from May 1 thru July 15. Exceptions: Ephemeral surface disturbance (disturbance in prairie dog habitat for less than six months, after which it again becomes or can be made suitable for prairie dog use), such as prescribed fire or herbicide treatment, may be conducted within 1/8 mile of the boundary of the home range of a female from March 1 to May 1. In general, the disturbance should be completed before the critical period begins. The Service, UDWR, and the land management agencies would determine if this exemption applies. Normal travel and surveying activities would not be restricted.	TL	5/1 to 7/15	0.125 mile
Wildlife-SSS	Sage grouse	Leks	No surface-disturbing activities within two miles of active Sage-grouse leks will be allowed from March 1 through June 15.	TL	March 1 through June 15	2 miles

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
SALT LAKE FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
Hazardous Materials	--	Lands with known or suspected hazardous materials	Rights-of-way, whether within or outside a corridor, will avoid lands with known or suspected hazardous materials.	CSU	--	No buffer
Lands and Realty	--	ROW corridors	Future proposals for major rights-of-way such as pipelines, large power lines and permanent improved roads must utilize identified corridors as shown in Figure 10. Otherwise, a planning amendment and appropriate environmental analysis will be required.	NSU	--	No buffer
Soils	--	Slopes > 30%	Rights-of-way, whether within or outside a corridor, will avoid lands with slopes greater than 30 percent. Surface disturbing activities will be allowed in fragile soils on Slopes >35% only after an engineered soils derived construction/reclamation plan is submitted by the operator and approved by the Area Manager.	CSU	--	
Visual	--	Ridge tops, narrow drainages	Rights-of-way, whether within or outside a corridor, will avoid lands where an above-ground right-of-way would be an obvious visual or physical intrusion such as ridge tops or narrow drainages.	CSU	--	No buffer
Visual	--	VRM Class II and III areas within Salt Lake FO	Rights-of-way, whether within or outside a corridor, will avoid lands within VRM Class II and III areas.	CSU	--	No buffer
Water Resources	--	Riparian areas	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities from within 1,200 feet of riparian habitats. Rights-of-way, whether within or outside a corridor, will avoid lands within 1200 feet of riparian/aquatic habitats.	CSU	--	1,200 feet

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
SALT LAKE FIELD OFFICE TIMING RESTRICTIONS						
Wildlife-Big Game	Elk	Winter range, crucial	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities within crucial elk winter range December 1 to April 30.	TL	12/1 to 4/30	Wildlife-Big Game
Wildlife-Big Game	Mule deer	Winter range	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities within mule deer winter range December 1 to April 15.	TL	12/1 to 4/15	Wildlife-Big Game
Wildlife-Raptors	All	Nests	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities within 0.5 mile of active raptor nest sites between March I to July 15.	TL	3/1 to 7/15	Wildlife-Raptors
Wildlife-Raptors	Bald eagle	Roosts	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities within .5 mile radius of the roosts sites from November 15 to March 15.	TL	11/15 to 3/15	Wildlife-Raptors
RICHFIELD FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
Lands and Realty	--	Administrative sites	Manage BLM administrative sites as open to leasing with NSO, except as otherwise provided in other management decisions…."All NSO areas are ROW avoidance areas."	CSU	--	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Lands and Realty	--	Cemeteries	Manage all cemeteries as open to leasing with NSO, except as otherwise provided in other management decisions:. "All NSO areas are ROW avoidance areas."	CSU	--	No buffer
Lands and Realty	--	Landfills	Manage landfills—existing and closed-as open to leasing with NSO, except as otherwise provided in other management decisions. NSO areas are ROW avoidance areas.	CSU	--	No buffer
Lands and Realty	--	R&PP lease areas	Manage lands managed under a R&PP lease as open to leasing with NSO, except as otherwise provided in other management decisions. NSO areas are ROW avoidance areas.	CSU	--	No buffer
Recreation	--	Developed Recreation Sites	Manage developed recreation sites as open to leasing with NSO, except as otherwise provided in other management decisions. NSO areas are ROW avoidance areas.	CSU	--	No buffer
Soils	--	Erodible, fragile soils and unstable soils	Soils identified by the NRCS as having high potential for wind erosion are to be avoided. If avoidance is impracticable then a plan of operation that addressed erosion control and mitigation will be required.	CSU	--	No buffer
Soils	--	Slopes > 30%	Routing through areas with slopes of 30% or greater is to be avoided. If the action cannot be avoided, rerouted, or relocated than a proposed project would include an erosion control strategy, reclamation and a site plan with a detailed survey and design completed by a certified engineer. This proposed project must be approved by the BLM prior to construction and maintenance.	CSU	--	No buffer
Vegetation-SSS	Ute ladies'-tresses	Occupied habitat	Buffers of 300 feet minimum between right of way (roads and surface pipelines) or surface disturbance (well pads) and plants and populations will be incorporated. Occupied Ute ladies'-tresses habitats within 300' of the edge of the surface pipelines' right-of-ways, 300' of the edge of the roads' right-of-ways, and 300' from the edge of the well pad shall be monitored for a period of three years after ground disturbing activities. Monitoring will include annual plant surveys to determine plant and habitat impacts relative to project facilities. Habitat impacts include monitoring any	CSU	--	300 feet

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			changes in hydrology due to project related activities. Annual reports shall be provided to the BLM and the Service. To ensure desired results are being achieved, minimization measures will be evaluated and may be changed after a thorough review of the monitoring results and annual reports during annual meetings between the BLM and the Service. Surface pipelines will be laid such that a 300-foot buffer exists between the edge of the right of way and the plants, using stabilizing and anchoring techniques when the pipeline crosses habitat to ensure the pipelines don't move towards the population.			
Visual	--	Existing ROWs	To avoid potential conflicts with the construction, operation, maintenance, and termination of facilities and improvements located on existing ROWs on public land, apply the following: Where a ROW grant specifically identifies an area and/or width, the VRM class within the specified area/width would be VRM Class IV. Where no width is specified, the VRM class within the interior boundaries of the area disturbed when the facility or improvement was initially constructed would be VRM Class IV.	CSU	--	No buffer
Visual Resources	--	All VRM classes	All ROWs must comply with the applicable visual resource management (VRM) classification objectives.	CSU	--	No buffer
Water Resources	--	Perennial streams; intermittent streams	Prohibit surface disturbing activities within the 100-year floodplain or 330 feet on either side from the centerline, whichever is greater, of streams with intermittent or perennial reaches, resulting in NSO in this area, for protection of habitat for riparian-obligate species.	NSU	--	300 feet or 100-yr floodplain, whichever greater
Water Resources	--	Riparian areas	A buffer zone of the 100 year floodplain or 330 feet either side of centerline, whichever is greater, will be maintained around riparian areas (NSO).	NSU	--	300 feet or 100-yr floodplain, whichever greater

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Water Resources	--	Springs	Maintain buffer zones of no surface disturbance and/or occupancy around natural springs. Base the size of the buffer on hydrological, riparian, and other factors necessary to protect the water quality of the springs. If these factors cannot be determined, maintain a 330-foot buffer zone from outer edge. (Maintain a buffer zone of the 100-year floodplain or 330 feet on either side from the centerline, whichever is greater.)	NSU	--	300 feet or 100-yr floodplain, whichever greater
Water Resources	--	Wetlands	No surface occupancy on wetland soils or soils identified as having hydric properties. Consider exceptions to NSO if a site-specific environmental analysis determines that other placement alternatives would cause undue or unnecessary degradation to resources. In addition, require the operator to submit a plan prior to commencing operations that addresses: • Erosion control strategies • Mitigation to protect surface from rutting, compaction, and displacement, and disruption of surface and subsurface hydrologic function • Mitigation or restoration measures to restore hydrologic function to site • Proper survey and design by a certified engineer.	NSU	--	No buffer
Wildlife-Raptors	Bald eagle	Nests	No permanent infrastructure will be placed within 1.0 mile of nest sites.	NSU	--	1.0 mile
Wildlife-Raptors	Bald eagle	Roosts	No permanent structures are permitted within 0.5 miles of bald eagle winter concentration areas/roosts.	CSU	--	0.5 mile
Wildlife-Raptors	Bald eagle	Roosts	No permanent infrastructure will be placed within 0.5 miles of winter roost areas.	NSU	--	0.5 mile
RICHFIELD FIELD OFFICE TIMING RESTRICTIONS						
Wildlife-Big Game	All	Winter range, crucial	Surface disturbing activities are restricted in crucial winter habitat from December 15 through April 15.	TL	12/15 to 4/15	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	Bald eagle	Nests	No surface disturbance within a 1 mile buffer of active nests from 1/1 – 8/31. Temporary activities or habitat alterations that could disturb nesting bald eagles are restricted from 1/1 – 8/31 within 1 miles of nest sites, unless the area has been surveyed according to protocol and determined to be unoccupied.	TL	1/1 to 8/31	1.0 mile
Wildlife-Raptors	Bald eagle	Roosts	Temporary activities within 0.5 miles of winter roost areas, e.g., cottonwood galleries, will not occur during the winter roost season of November 1 to March 31, unless the area has been surveyed according to protocol and determined to be unoccupied. In addition, require daily activities approved through subsequent consultation within these spatial buffers to start after 9 a.m. and terminate at least 1 hour before sunset to ensure that bald eagles using these roosts have the opportunity to vacate their roost in the morning and return undisturbed in the evening.	TL	11/1 to 3/31	0.5 mile
Wildlife-Raptors	Boreal owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 7/31.	TL	2/1 to 7/31	0.25 mile
Wildlife-Raptors	Burrowing owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	California condor	Nests	Temporary activities within 1.0 mile of nest sites will not occur during the breeding season.	TL	breeding season (undefined)	1.0 mile
Wildlife-Raptors	California condor	Roosts	Temporary activities within 0.5 miles of established occupied roosting sites or areas will not occur between 8/1 – 11/31.	TL	8/1 – 11/31	0.5 mile
Wildlife-Raptors	Cooper's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.5 mile
Wildlife-Raptors	Flammulated owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 9/30.	TL	4/1 to 9/30	0.25 mile
Wildlife-Raptors	Golden eagle	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 1/1 – 8/31.	TL	1/1 to 8/31	0.5 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	Great horned owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 12/1 – 9/31.	TL	12/1 to 9/31	0.25 mile
Wildlife-Raptors	Long-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 8/15.	TL	2/1 to 8/15	0.25 mile
Wildlife-Raptors	Merlin	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Northern goshawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern harrier	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/15.	TL	4/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern pygmy owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/1.	TL	4/1 to 8/1	0.25 mile
Wildlife-Raptors	Northern saw-whet owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	Osprey	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Peregrine falcon	Nests	No surface disturbance within a 1 mile buffer of active nests from 2/1 – 8/31.	TL	2/1 to 8/31	1.0 mile
Wildlife-Raptors	Prairie falcon	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.25 mile
Wildlife-Raptors	Red-tailed hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Screech owl, western	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.25 mile
Wildlife-Raptors	Sharp-shinned hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Short-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.25 mile
Wildlife-Raptors	Swainson's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.5 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	Turkey vulture	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 5/1 – 8/15.	TL	5/1 to 8/15	0.5 mile
Wildlife-SSS	Mexican spotted owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
FILLMORE FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
Lands and Realty	--	Sigurd to Nevada, IPP to NV, and IPP to CA transmission corridors	Rights-of-way will be processed on a case-by-case basis, generally in the order received. Existing major rights-of-way are designated as corridors. New rights of-way will be restricted to these corridors wherever feasible. Existing transmission line access roads shall be used, and only the roads to new tower sites shall be constructed for new ROWs. Transmission line ROWs shall be adjacent to each other or as close as possible.	CSU	--	No buffer
Lands and Realty	--	Highway 50, 6, and 257 ROW corridor	All land disturbed by new ROW except authorized new access roads shall be rehabilitated to as close to natural conditions as possible, All rights-of-way must comply with the applicable Visual Resource Management Class guidelines. Roads that are needed for construction of a new ROW shall be temporary and fully rehabilitated. The road or highway within the right-of-way corridor shall be used to the maximum extent possible for construction and maintenance of new ROWs.	CSU	--	No buffer
Lands and Realty	--	ROW corridors	Existing transmission line access roads shall be used and only roads to new tower sites shall be constructed for new rights-of-way.	CSU	--	No buffer
Lands and Realty	--	ROW corridors	Transmission line rights-of-way shall be adjacent or located as close together as possible.	CSU	--	No buffer
Special Designations	--	All SDAs	All Special management designation areas in this FO are right-of-way avoidance areas.	CSU	--	No buffer
Visual Resources	--	VRM II areas	VRM Class II areas [within the Warm Springs Resource Area] are right-of-way avoidance areas.	CSU	--	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
FILLMORE FIELD OFFICE TIMING RESTRICTIONS						
Wildlife-Raptors	Raptor management will be guided by the use of "Best Management Practices for Raptors and Their Associated Habitats in Utah" (Utah BLM, 2006, Appendix A), utilizing seasonal and spatial buffers, as well as mitigation, to maintain and enhance raptor nesting and foraging habitat, while allowing other resource uses. Spatial and temporal buffers applied to disturbances in the vicinity of nesting raptors will be tailored to the individual raptor species involved and based on factors such as line of sight distance between nest and disturbance, type and duration of disturbance, nest structure security, sensitivity of the species to disturbance, observed responses to related disturbances, and the amount of other disturbances already occurring in the vicinity. Land use activities which would have an adverse impact on an occupied raptor nest, would not be allowed within the spatial or seasonal buffer.					
Wildlife-Raptors	Bald eagle	Nests	No surface disturbance within a 1-mile buffer of active nests from 1/1 – 8/31	TL	1/1 to 8/31	1.0 mile
Wildlife-Raptors	Boreal owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 7/31.	TL	2/1 to 7/31	0.25 mile
Wildlife-Raptors	Burrowing owl	Nests	No surface disturbance or occupancy within a 0.25 mile buffer of active nests during breeding/nesting season (from 3/1 – 8/31).	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	California condor	Nests	Temporary activities will not occur within 1.0 mile of occupied nest sites during breeding season. A temporary action is completed prior to the following important season of use, leaving for habitat functionality.	TL	Breeding season (undefined)	1.0 mile
Wildlife-Raptors	Cooper's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	No surface disturbance or occupancy within a 0.5 mile buffer of active nests during breeding/nesting season (from 3/1 – 8/1).	TL	3/1 to 8/1	0.5 mile
Wildlife-Raptors	Flammulated owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 9/30.	TL	4/1 to 9/30	0.25 mile
Wildlife-Raptors	Golden eagle	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 1/1 – 8/31.	TL	1/1 to 8/31	0.5 mile
Wildlife-Raptors	Great horned owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 12/1 – 9/30.	TL	12/1 to 9/30	0.25 mile
Wildlife-Raptors	Long-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 8/15.	TL	2/1 to 8/15	0.25 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	Merlin	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Mexican spotted owl	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.5 mile
Wildlife-Raptors	Northern goshawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern harrier	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/15.	TL	4/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern pygmy owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/1.	TL	4/1 to 8/1	0.25 mile
Wildlife-Raptors	Northern saw-whet owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	Osprey	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Peregrine falcon	Nests	No surface disturbance within a 1 mile buffer of active nests from 2/1 – 8/31.	TL	2/1 to 8/31	1.0 mile
Wildlife-Raptors	Prairie falcon	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.25 mile
Wildlife-Raptors	Red-tailed hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/15.	TL	3/15 to 8/15	0.5 mile
Wildlife-Raptors	Screech owl, western	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.25 mile
Wildlife-Raptors	Sharp-shinned hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Short-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.25 mile
Wildlife-Raptors	Swainson's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.5 mile
Wildlife-Raptors	Turkey vulture	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 5/1 – 8/15.	TL	5/1 to 8/15	0.5 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
CEDAR CITY FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
Lands and Realty	--	ROW avoidance/exclusion areas	Rights-of-way will not be authorized in Category 3 (NSO) or 4 (withdrawn or No lease) oil and gas designation areas.	NSU	--	No buffer
Water Resources	--	Municipal/culinary/public water/reservoirs/wells	Within a designated corridor, blasting and other surface disturbances would be prohibited within 500 feet of reservoirs or water wells.	NSU	--	500 feet
Water Resources	--	Springs	Within a designated corridor, blasting and other surface disturbances would be prohibited within 500 feet of all live springs.	NSU	--	500 feet
Water/Soils	--	Stream channels, areas of unstable soils, and seeps	Construct roads to avoid stream channels, areas of unstable soils, and seeps. Avoid constructing long, down slope straightaways, providing instead curves with water drainages off the road bed.	CSU	--	No buffer
Wildlife-multiple species	--	Deer habitat, prairie dog, sage grouse, bald & golden eagle dens, burrows, nests, and roosting sites.	Following the advice of a qualified wildlife biologist as designated by the appropriate federal official, roads, railroads, towers, and other ground disturbing activities would be located 200 yards from identified active dens, burrows, nests, or roosting sites to protect deer, Utah prairie dog, bald and golden eagles, and sage grouse.	NSU	--	200 yards (600 feet)
Wildlife-SSS	Prairie dog, Utah	Prairie dog towns	Prairie dogs require Category 3 protection of no occupancy or drilling within prairie dog towns.	CSU	--	No buffer
CEDAR CITY FIELD OFFICE TIMING RESTRICTIONS						
Wildlife-Raptors	All raptors	Nests	Raptors are protected during their nesting season by a special stipulation which requires no drilling or exploration around nest sites from February 15 through June 30.	TL	2/15 to 6/31	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	All raptors	Nests	In order to protect important raptor nesting areas, exploration, drilling, and other development activity will be allowed only during the period from July 1 to February 14. TL-Feb 15 to June 30.	TL	2/15 to 6/30	No buffer
ELY FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
Geology (Karst)	--	Caves	Ground disturbing activities are not allowed within 100 yards (horizontally or vertically) of known cave resources including entrances, drainage areas, subsurface passages, and developed recreation sites.	NSU	--	300 feet
Special Designations -ACEC	--	Beaver Dam Slope ACEC	Limited Rights-of-way area. Limited: Rights-of-way; limit authorization of future communication sites to existing established rights-of-way unless technically unfeasible and encourage use of existing corridors for all future rights-of-way when possible. Avoidance: Avoidance area; granting rights-of-way (surface, subsurface, aerial) within the area will be avoided, but rights-of-way may be granted if there is minimal conflict with identified resource values and impacts can be mitigated . In general, proposed ACECs are Rights-of-Way avoidance areas (subject to designated corridors). New rights-of-way will be granted in these areas only when feasible alternative routes or designated corridors are not available. Manage rights-of-way in desert tortoise habitat the same as that described for the Beaver Dam Slope, Kane Springs, and Mormon Mesa ACECs.	CSU	--	No buffer
Special Designations -ACEC	--	Mormon Mesa ACEC	Limited/avoidance/exclusion area: Limited: Rights-of-way; limit authorization of future communication sites to existing established rights-of-way unless technically unfeasible and encourage use of existing corridors for all future rights-of-way when possible. Avoidance: Avoidance area; granting rights-of-way (surface, subsurface, aerial) within the area will be avoided, but rights-of-way may be granted if there is minimal conflict with identified resource values and impacts can be mitigated. Manage rights-of-way in desert tortoise habitat the same as that described for the Beaver Dam Slope, Kane Springs, and Mormon Mesa ACECs.	CSU	--	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
ELY FIELD OFFICE TIMING RESTRICTIONS						
Wildlife-Big Game	All	Parturition areas	Where appropriate, restrict permitted activities in big game calving/fawning/kidding/lambing grounds and crucial summer range from April 15 through June 30.	TL	4/15 to 6/30	No buffer
Wildlife-Big Game	Big horn sheep	Occupied habitat	Where appropriate, restrict permitted activities within occupied desert bighorn sheep habitat from March 1 through May 31 and from July 1 through August 31.	TL	3/1 to 5/31	No buffer
Wildlife-Big Game	Big horn sheep	Occupied habitat	Where appropriate, restrict permitted activities within occupied desert bighorn sheep habitat from March 1 through May 31 and from July 1 through August 31.	TL	7/1 to 8/31	No buffer
Wildlife-Raptors	Raptors	Nests	Where appropriate, restrict permitted activities from May 1 through July 15 within 0.5 mile of raptor nest sites unless the nest site has been determined to be inactive for at least the previous 5 years.	TL	6/1 to 7/15	0.5 mile
Wildlife-SSS	Desert tortoise	Habitat	Where appropriate, restrict permitted activities from March 1 through October 31 within desert tortoise habitat.	TL	3/1 to 10/31	No buffer
LAS VEGAS FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
Special Designations -ISA	--	Sunrise ISA	No rights-of-way could be authorized within the Sunrise Instant Study Area, unless it is released from further wilderness consideration. There is a corridor 1,400 feet wide from the north side of the Sunrise Instant Study Area south through Rainbow Gardens to the Lake Mead crossover. This corridor is described as west of the east boundary of the IPP-McCullough powerlines. Activation and use of this corridor is contingent upon Congressional action releasing the Instant Study Area from further wilderness consideration and study.	NSU	--	No buffer
Special Designations -ACEC	--	Mormon Mesa ACEC	Critical tortoise habitat ACEC. ROW avoidance area except within designated corridor; NSO for leasing; "Limited to designated roads and trails" for all motorized and mechanized vehicles. Limit utility corridors to 3,000 feet or less in width. On a case-by-case basis, support fencing of highways and moderately to heavily traveled dirt roads with tortoise-proof fencing and installation of	CSU	--	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			culverts to allow tortoises to cross under the highway and roads. Require reclamation of disturbed lands resulting from activities that result in loss or degradation of tortoise habitat with habitat be reclaimed so that pre-disturbance condition can be reached within a reasonable time frame. Reclamation may include salvage and transplant of cactus and yucca, recontouring of the area, scarification of compacted soil, soil amendments, seeding, and transplant of seedling shrubs. Subsequent seeding or transplanting efforts may be required if monitoring indicates that the original effort was not successful. Require reclamation of temporary roads. Authorize new roads in response to specific proposed actions where no feasible alternative exists. Ensure access to private property. In general, proposed ACECs are Rights-of-Way avoidance areas (subject to designated corridors). New rights-of-way will be granted in these areas only when feasible alternative routes or designated corridors are not available.			

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Special Designations -ACEC	--	Rainbow Garden ACEC	Critical tortoise habitat ACEC. ROW avoidance area except within designated corridor; NSO for leasing; Limited to designated roads and trails" for all motorized and mechanized vehicles. Limit utility corridors to 3,000 feet or less in width. On a case-by-case basis, support fencing of highways and moderately to heavily traveled dirt roads with tortoise-proof fencing and installation of culverts to allow tortoises to cross under the highway and roads. Require reclamation of disturbed lands resulting from activities that result in loss or degradation of tortoise habitat with habitat be reclaimed so that pre-disturbance condition can be reached within a reasonable time frame. Reclamation may include salvage and transplant of cactus and yucca, recontouring of the area, scarification of compacted soil, soil amendments, seeding, and transplant of seedling shrubs. Subsequent seeding or transplanting efforts may be required if monitoring indicates that the original effort was not successful. Require reclamation of temporary roads. Authorize new roads in response to specific proposed actions where no feasible alternative exists. Ensure access to private property.	CSU	--	No buffer
Special Designations -ACEC	--	River Mountains ACEC	Designated ACEC for geological, scientific, scenic, cultural, plants. ROW avoidance area except within corridors. Closed to mineral material ROWs. NSO to fluid leasing. Require reclamation of temporary roads. Authorize new roads in response to specific authorized actions only, ensure access to private property.	--	--	No buffer
Geology (Karst)	--	Caves	All lands within 0.25 mile of significant caves, exclusive of any designated corridors, are designated as right-of-way avoidance areas.	CSU	--	0.25 mile
Water Resources	--	All artificial and natural waters	Protect artificial and natural waters that provide benefit to wildlife by providing a minimum buffer of 0.25 mile for permitted activities (such as for off-road vehicle events).	CSU	--	0.25 mile
LAS VEGAS FIELD OFFICE TIMING RESTRICTIONS (NONE APPLICABLE TO AGENCY PREFERRED ALTERNATIVE)						
None	None	--	--	--	--	--

8.3.4 Westwide Energy Corridor Final Programmatic EIS Best Management Practices

Table 19 addresses the West Wide Energy Corridor (WWEC) Interagency Operating Procedures (IOPs) that TransWest will comply with where the TWE Project is located within a corridor designated under Section 368 of the Energy Policy Act. 42 U.S.C. §15926(a). The 2009 WWEC Resource Management Plan Amendment and Record of Decision amended BLM's RMPs along the corridor routes to incorporate Section 368 corridors (BLM 2009 at p. 3). As part of the RMP Amendments, BLM adopted IOPs which are listed in Appendix B of the WWEC ROD (BLM 2009). The WWEC ROD provides that the IOPs are mandatory within Section 368 corridors, but acknowledges that not all IOPs are applicable to a given project, "those that apply to pipelines, for instance, are not appropriate to transmission lines." (BLM 2009 at B-2). Moreover, in 2014, BLM issued Instruction Memorandum 2014-080 regarding the use of Section 368 corridors and addressed IOPs (BLM 2014). Consistent with the WWEC ROD, BLM directed that "[l]ine managers should ensure applicable IOPs are used for projects sited within EPAct Section 368 corridors." (BLM 2009, 2014). Table 19 lists the IOPs applicable to the TWE Project, including those applying at the Planning, Construction and Operations stages. The IOPs applicable to the Planning stage are listed in Table 19 for the sake of completeness; however, these IOPs have already been met by the BLM and, where appropriate, TransWest. TransWest will comply with the construction and operation IOPs in Table 19 where the TWE Project is located within a Section 368 corridor. If and to the extent that TransWest's Applicant committed environmental mitigation measures conflict with the IOPs, TransWest will comply with the IOPs, in lieu of the applicant-committed measures, where the route is located within a Section 368 corridor.

Table 19 identifies the phase(s) during which each measure would be implemented:

- P – planning
- C – construction
- O – operation
- D – decommission

TABLE 19 WESTWIDE ENERGY CORRIDOR FINAL PROGRAMMATIC EIS BEST MANAGEMENT PRACTICES

BMP NO.[1]	WWEC IOP NO.	PHASE(S)	WWEC IOP DESCRIPTION	APPENDIX[2]
REGULATORY COMPLIANCE				
RC-1	1	P	The appropriate agency, assisted by the applicant, must conduct project-specific NEPA analyses in compliance with Section 102 of NEPA. The scope, content, and type of analysis shall be determined on a project-by-project basis by the Agencies and the applicants.	No Applicable Appendix
RC-2	2	P	The appropriate agency, assisted by the project applicant, must comply with Section 106 of the NHPA on a project by-project basis. Consultation with SHPOs, any federally recognized Tribes, and other appropriate parties as per regulations (36 CFR 800) must begin early in the planning process and continue throughout project development and execution. The ACHP retains the option to comment on all undertakings (36 CFR 800.9).	D
RC-3	3	P	The appropriate agency, assisted by the project applicant, must consult with the USFWS and the NMFS as required by Section 7 of ESA. The specific consultation requirements, as set forth in regulations at 50 CFR Part 402, would be applied on a project-by-project basis. Applicants shall identify known occupied sites, such as nest sites, for threatened and endangered species and special status species.	X
RC-4	4	P	The appropriate agency, assisted by the project applicant, must coordinate and consult with NMFS regarding potential impacts to essential fish habitat (EFH) as required by the 1996 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act.	No Applicable Appendix
AGENCY COORDINATION				
AC-1	1	P	Applicants seeking to develop energy transport projects within corridors located on or near DOD facilities or flight training areas (see Appendix L for applicable corridors) must, early in the planning process and in conjunction with the appropriate agency staff, inform and coordinate with the DOD regarding the characteristics and locations of the anticipated project infrastructure.	No Applicable Appendix
AC-2	2	P	Early in the planning process, applicants seeking ROW authorization within a Section 368 energy corridor that is located within five miles of a unit of the NPS should contact the appropriate Agency staff and work with the NPS regarding the characteristics and locations of anticipated project infrastructure. In those instances where corridors cross lands within the boundaries of a unit of the NPS, the National Park Service Organic Act and other relevant laws and policies shall apply.	No Applicable Appendix
AC-3	3	P	In those instances where projects using energy corridors are proposed to also cross National Wildlife Refuge System lands, the National Wildlife System Administration Act and other relevant laws and policies pertinent to national wildlife refuges shall apply.	No Applicable Appendix
AC-4	4	P	For electricity transmission projects, the applicant shall notify the Federal Aviation Administration (FAA) as early as practicable in the planning process in order to identify appropriate aircraft safety requirements.	No Applicable Appendix

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AC-5	5	P	All project applications must consider applicable findings, mitigation, and/or standards contained in regional land management plans, such as the Northwest Forest Plan, when such regional plans have been incorporated into agency planning guidelines and requirements. Modification of some standards may be needed to reasonably allow for energy transport within a corridor.	No Applicable Appendix
GOVERNMENT-TO-GOVERNMENT COORDINATION				
GG-1	1	P	The appropriate agency, assisted by the project applicant, must initiate government-to-government consultation with affected Tribes at the outset of project planning and shall continue consultation throughout all phases of the project, as necessary. Agencies should determine how to consult in a manner that reflects the cultural values, socioeconomic factors, and administrative structures of the interested Tribes.	D
GG-2	2	P	The agency POC may require the project proponent to prepare an ethnographic study when Tribal consultation indicates the need. The study shall be conducted by a qualified professional selected in consultation with the affected Tribe.	D
GENERAL				
GEN-1	1	P	Applicants seeking to develop an electricity transmission or pipeline project will develop a project-specific plan of development (POD). The POD should display the location of the project infrastructure (i.e., towers, power lines) and identify areas of short- and long-term land and resource impacts and the mitigation measures for site-specific and resource-specific environmental impacts. The POD should also include notification of project termination and decommissioning to the agencies at a time period specified by the agencies.	N, Q, R
GEN-2	2	P	Applicants, working with the appropriate agencies, shall design projects to comply with all appropriate and applicable Agency policies and guidance.	No Applicable Appendix
GEN-3	3	P	Project planning shall be based on the current state of knowledge. Where corridors are subject to sequential projects, project-related planning (such as the development of spill-response plans, cultural resource management plans, and visual resource management plans) and project-specific mitigation and monitoring should incorporate information and lessons learned from previous projects.	N, Q, R
GEN-4	4	P	Applicants shall follow the best management practices for energy transport project siting, construction, and operations of the states in which the proposed project would be located, as well as federal agency practices.	No Applicable Appendix
GEN-5	5	P	Corridors are to be efficiently used. The applicant, assisted by the appropriate agency, shall consolidate the proposed infrastructure, such as access roads, wherever possible and utilize existing roads to the maximum extent feasible, minimizing the number, lengths, and widths of roads, construction support areas, and borrow areas.	A

BMP NO.[1]	WWEC IOP NO.	PHASE(S)	WWEC IOP DESCRIPTION	APPENDIX[2]
GEN-6	6	P	When concurrent development projects are proposed and implemented within a corridor, the agency POCs shall coordinate among projects to ensure consistency with regard to all regulatory compliance and consultation requirements, and to avoid duplication of effort.	No Applicable Appendix
GEN-7	7	P	Applicants, assisted by the appropriate agency, shall prepare a monitoring plan for all project-specific mitigation activities.	N, Q
GEN-8	8	P	Potential cumulative impacts to resources should be considered during the early stages of the project. Agency POCs must coordinate various development projects to consider and minimize cumulative impacts. A review of resource impacts resulting from other projects in the region should be conducted and any pertinent information be considered during project planning.	No Applicable Appendix
GEN-9	1	C	To avoid conflict with federal and nonfederal operations, the applicant shall be aware of liabilities pertaining to environmental hazards, safety standards, and military flying areas.	No Applicable Appendix
GEN-10	2	C	The applicant shall locate all stationary construction equipment (i.e., compressors and generators) as far as practicable from nearby residences.	M
GEN-11	3	C	Applicants will pay fair market value to the land management agency for any merchantable forest products that will be cut during ROW clearing. The local land management agency will determine the fair market value, which will be paid prior to clearing. The applicant will either remove the forest products from the area or will stack the material at locations determined by the local land management agency. Treatment of unmerchantable products will be determined by the local land management agency.	R
GEN-12	1	D	Where applicable, decommissioning activities will conform to agency standards and guidance for mitigation and reclamation (e.g., BLM's Gold Book [BLM and USFS 2007]).	Q
GEN-13	2	D	Applicants shall locate desired projects within energy corridors to promote effective use of the corridors by subsequent applicants and to avoid the elimination of use or encumbrance of use of the corridors by ROW holders. Proposed projects should be compatible with identified energy transport modes and avoid conflicts with other land uses within a corridor.	No Applicable Appendix
GEN-14	3	D	Gravel work pads will be removed; gravel and other borrow material brought to the ROW during construction will be disposed of as approved by the agency.	Q
GEN-15	4	D	Any wells constructed on the ROW to support operations will be removed and properly closed in accordance with applicable local or state regulations.	No Applicable Appendix
GEN-16	5	D	All equipment, components, and aboveground structures must be cleaned and removed from the site for reclamation, salvage, or disposal; all below-ground components will be removed to a minimum depth of three feet to establish a root zone free of obstacles; pipeline segments and other components located at greater depths may be abandoned in place provided they are cleaned (of all residue) and filled with inert material to prevent possible future subsidence.	Q

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GEN-17	6	D	Dismantled and cleaned components will be promptly removed; interim storage of removed components or salvaged materials that is required before final disposition is completed will not occur on federal land.	No Applicable Appendix
GEN-18	7	D	At the close of decommissioning, applicants will provide the federal land manager with survey data precisely locating all below-grade components that were abandoned in place.	No Applicable Appendix
PROJECT DESIGN				
PD-1	1	P	Applicants shall locate desired projects within energy corridors to promote effective use of the corridors by subsequent applicants and to avoid the elimination of use or encumbrance of use of the corridors by ROW holders. Proposed projects should be compatible with identified energy transport modes and avoid conflicts with other land uses within a corridor.	No Applicable Appendix
PD-2	2	P	Applicant shall identify and delineate existing underground metallic pipelines in the vicinity of a proposed electricity transmission line project and design the project to avoid accelerating the corrosion of the pipelines and/or pumping wells.	J, M
SOILS, EXCAVATION, AND BLASTING				
SOIL-1	1	C	Applicants shall salvage, safeguard, and reapply topsoil from all excavations and construction activities during restoration.	Q
VEG-1	2	C	All areas of disturbed soil shall be restored by the applicant using weed free native grasses, forbs, shrubs, and trees as directed by the agency. Restoration should not be unnecessarily delayed. If native species are not available, noninvasive vegetation recommended by agency specialists may be used.	N, Q
SOIL-2	3	C	The applicant must not create excessive slopes during excavation. Areas of steep slopes, biological soil crusts, erodible soil, and stream channel crossings would often require site-specific and specialized construction techniques by the applicant. These specialized construction techniques should be implemented by adequately trained and experienced employees.	Q
WAT-1	4	C	Blasting activities will be avoided or minimized in the vicinity of sole source aquifer areas to reduce the risk of releasing sediments or particles into the groundwater and inadvertently plugging water supply wells.	C
SOIL-3	5	C	The applicant must backfill foundations and trenches with originally excavated material as much as possible. Excess excavation materials should be disposed of by the applicant only in approved areas.	Q
SOIL-4	6	C	The applicant shall obtain borrow (fill) material only from authorized sites. Existing sites should be used in preference to new sites.	Q

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PHS-1	7	C	The applicant shall prepare an explosives use plan that specifies the times and meteorological conditions when explosives will be used and specifies minimum distances from sensitive vegetation and wildlife or streams and lakes.	C, E, H
PHS-2	8	C	If blasting or other noisy activities are required during the construction period, the applicant must notify nearby residents in advance.	C
MITIGATION AND MONITORING				
MIT-1	1	C	All control and mitigation measures established for the project in the POD and other required plans must be maintained and implemented by the applicant throughout construction. Necessary adjustments may be made with the concurrence of the appropriate agency.	N, Q, R
MIT-2	1	O	All control and mitigation measures established for the project shall be maintained and implemented by the applicant throughout the operation of the project. Necessary adjustments may be made with the concurrence of the appropriate agency.	G
MIT-3	1	D	All control and mitigation measures established for the project in the POD and other required plans will be incorporated into a decommissioning plan that will be approved by the federal land manager(s); the decommissioning plan will include a site reclamation plan and a monitoring program and will be coordinated with owners and operators of other systems on the corridor to ensure no disruption to the operation of those systems.	G
TRANSPORTATION				
TRAN-1	1	P	The applicant shall prepare an access road siting and management plan that incorporates relevant agency standards regarding road design, construction, maintenance, and decommissioning. Corridors will be closed to public access unless determined by the appropriate federal land manager to be managed as part of an existing travel and transportation network in a land use plan or subsequent travel management plan(s).	A
TRAN-2	2	P	The applicant shall prepare a comprehensive transportation plan for the transport of transmission tower or pipeline components, main assembly cranes, and other large equipment. The plan should address specific sizes, weights, origin, destination, and unique equipment handling requirements. The plan should evaluate alternative transportation routes and should comply with state regulations and all necessary permitting requirements. The plan should address site access roads and eliminate hazards from truck traffic or adverse impacts to normal traffic flow. The plan should include measures such as informational signage and traffic controls that may be necessary during construction or maintenance of facilities.	A, U
TRAN-3	3	P	Applicants shall consult with local planning authorities regarding increased traffic during the construction phase, including an assessment of the number of vehicles per day, their size, and type. Specific issues of concern (e.g., location of school bus routes and stops) should be identified and addressed in the traffic management plan.	A, U

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TRAN-4	1	D	Additional access roads needed for decommissioning will follow the paths of access roads established during construction to the greatest extent possible; all access roads not required for the continued operation and maintenance of other energy systems present in the corridor shall be removed and their footprints reclaimed and restored.	A, U
GROUNDWATER				
WAT-2	1	P	Applicants must identify and delineate all sole source aquifers in the vicinity of a proposed project and design the project to avoid disturbing these aquifers or to minimize potential risks that the aquifers could be contaminated by spills or leaks of chemicals used in the projects.	W
WAT-3	2	P	In instances where a project within an energy corridor crosses sole source aquifers, the applicant must notify the U.S. Environmental Protection Agency (EPA) and the agencies that administer the land as early as practicable in the planning process. Section 1424(e) of the Safe Drinking Water Act and other relevant laws and policies pertinent to the corridors that cross sole source aquifers shall apply.	W
SURFACE WATER				
WAT-4	1	P	Applicants must identify all wild and scenic rivers (designated by act of Congress or by the Secretary of the Interior under Section 3(a) or 2(a)(ii) of the Wild and Scenic Rivers Act, respectively), congressionally authorized wild and scenic study rivers, and agency identified (eligible or suitable) wild and scenic study rivers in the vicinity of a proposed project and design the project to avoid the rivers or minimize the disturbance of the rivers and their vicinity.	No Applicable Appendix
WAT-5	2	P	In instances where a project within an energy corridor crosses a wild and scenic river or a wild and scenic study river, the appropriate federal permitting agency, assisted by the project applicant, must coordinate and consult with the river-administrating agency regarding the protection and enhancement of their free-flowing condition, water quality, and outstandingly remarkable natural, cultural, and recreational values.	No Applicable Appendix
WAT-6	3	P	Applicants shall identify all streams in the vicinity of proposed project sites that are listed as impaired under Section 303(d) of the Clean Water Act and provide a management plan to avoid, reduce, and/or minimize adverse impacts on those streams.	W
WAT-7	1	D	A SWPPP permit will be obtained and its provisions implemented for all affected areas before any ground disturbance activities commence.	A, Q
SURFACE WATER AND GROUNDWATER RESOURCES				
WAT-8	1	C	The applicant must safeguard the possibility of dewatering shallow groundwater and/or wetland in the vicinity of project sites during foundation excavations or excavations for buried pipelines.	W
WAT-9	2	C	The applicant must implement erosion controls complying with county, state, and federal standards, such as jute netting, silt fences, and check dams, and secure all necessary storm water pollution prevention plan (SWPPP) permits.	Q

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WAT-10	3	C	The applicant shall minimize stream crossings by access roads to the extent practicable. All structures crossing intermittent and perennial streams should be located and constructed so that they do not decrease channel stability, increase water velocity, or impede fish passage.	A, Q, X
WAT-11	4	C	Applicants shall not alter existing drainage systems and should give particular care to sensitive areas such as erodible soils or steep slopes. Soil erosion should be reduced at culvert outlets by appropriate structures. Catch basins, roadway ditches, and culverts should be cleaned and maintained.	A, W
WAT-12	5	C	Applicants must not create hydrologic conduits between aquifers.	W
PALEONTOLOGICAL RESOURCES				
PAL-1	1	P	The applicant shall conduct an initial scoping assessment to determine whether construction activities would disturb formations that may contain important paleontological resources. Potential impacts to important paleontological resources should be avoided by moving or rerouting the site of construction or removing or reducing the need for surface disturbance. When avoidance is not possible, a mitigation plan should be prepared to identify physical and administrative protective measures and protocols such as halting work, to be implemented in the event of fossil discoveries. The scoping assessment and mitigation plan should be conducted in accordance with the managing agency's fossil management practices and policies.	P
PAL-2	2	P	If paleontological resources are known to be present in the project area, or if areas with a high potential to contain paleontological material have been identified, the applicant shall prepare a paleontological resources management and mitigation plan. If adverse impacts to paleontological resources cannot be avoided or mitigated within the designated corridors, the agency may consider alternative development routes to avoid, minimize, or mitigate adverse effects.	P
PAL-3	3	P	A protocol for unexpected paleontological discoveries should be developed. Unexpected discovery during construction should be brought to the immediate attention of the responsible federal agency's authorized officer. Work should be halted in the vicinity of the discovery to avoid further disturbance of the resource while the resource is being evaluated and appropriate mitigation measures are being developed.	P
PAL-4	1	C	Project construction activities will follow the protective measures and protocols identified in the paleontological resources mitigation plan.	P
PAL-5	2	C	All paleontological specimens found on federal lands remain the property of the U.S. government. Specimens, therefore, may only be collected by a qualified paleontologist under a permit issued by the managing agency and must be curated in an approved repository.	P
ECOLOGICAL RESOURCES				
ECO-1	1	P	Applicants shall identify important, sensitive, or unique habitats and BLM sensitive, USFS sensitive, and state-listed species in the vicinity of proposed projects and, to the extent feasible, design the project to avoid, minimize, or mitigate impacts to these habitats and species.	Q, R, X

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ECO-2	2	P	To restore disturbed habitats, the applicant will prepare a habitat restoration plan that identifies the approach and methods to be used to restore habitats disturbed during project construction activities. The plan will be designed to expedite the recovery to natural habitats supporting native vegetation, and require restoration to be completed as soon as practicable after completion of construction, minimizing the habitat converted at any one time. To ensure rapid and successful restoration efforts, the plan will include restoration success criteria, including time frames, which will be developed in coordination with the appropriate agency and which must be met by the applicant. Bonding to cover the full cost of restoration will be required.	Q
ECO-3	3	P	In consultation with the U.S. Army Corps of Engineers, the appropriate agency, assisted by the project applicant, will identify wetlands (including ephemeral, intermittent, and isolated wetlands), riparian habitats, streams, and other aquatic habitats in the project area and, to the extent feasible, design the project to avoid, minimize, or mitigate impacts to these habitats.	W
ECO-4	1	C	Areas that are known to support ESA-listed species, BLM-sensitive, USFS-sensitive, and state-listed species or their habitats must be identified and marked with flagging or other appropriate means to avoid direct impacts during construction activities. Construction activities upslope of these areas should be avoided to prevent indirect impacts of surface water and sediment runoff.	Q, X
ECO-5	2	C	All construction activities that could affect wetlands or waters of the United States must be conducted in accordance with permit requirements identified in permits issued by the U.S. Army Corps of Engineers.	W
ECO-6	1	O	Applicants shall review existing information regarding plant and animal species and their habitats in the vicinity of the project area and identify potential impacts to the applicable agencies.	X
ECO-7	2	O	Project staff shall avoid harassment or disturbance of wildlife, especially during reproductive courtship, migratory, and nesting seasons.	X
ECO-8	3	O	Observations by project staff of potential wildlife problems, including wildlife mortality, will be immediately reported to the applicable agency authorized officer.	X
VEGETATION MANAGEMENT				
VEG-2	1	P	Applicants shall develop an integrated vegetation management plan consistent with applicable regulations and agency policies for the control of unwanted vegetation, noxious weeds, and invasive species (E.O. 13112). The plan should address monitoring; ROW vegetation management; the use of certified weedseed-free hay, straw, and/or mulch mulching; the cleaning of vehicles to avoid the introduction of invasive weeds; education of personnel on weed identification; the manner in which weeds spread; and the methods for treating infestations (BLM 2006, 2007a,b, 2008).	R

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PESTICIDE AND HERBICIDE USE				
VEG-3	1	O	If pesticides are used, the applicant shall ensure that pesticide applications as specified in the integrated vegetation management plan are conducted within the framework of agency policies and entail only the use of EPA registered pesticides that are applied in a manner consistent with label directions and state pesticide regulations. Pesticide use should be limited to non persistent immobile pesticides and may be applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications (BLM 2007b,c).	N
VEG-4	2	O	Pesticide and herbicide uses must be avoided in the vicinity of sole source aquifer areas (BLM 2007b,c).	N
CULTURAL RESOURCES				
CULT-1	1	P	Cultural resources management services and individuals providing those services shall meet the Secretary of the Interior's Standards for Archaeology and Historic Preservation.	D
CULT-2	2	P	The project applicant may, with the approval of the agency POC, assign a Cultural Resource Coordinator to ensure an integrated compliance process across administrated and jurisdictional boundaries. The Cultural Resource Coordinator will facilitate and coordinate compliance with multiple laws, policies, regulations, and existing pertinent agreements (PAs, MOAs, or MOUs) among multiple agencies and other entities, jurisdictions, and federally recognized Tribes. The coordinator may assist with development of pertinent agreements among concerned parties during the course of the project. The coordinator shall be a qualified professional with experience in cultural resource compliance. Where appropriate, the Cultural Resource Coordinator may also serve as the Tribal Coordinator. Alternatively, the agency POC may assign such coordinators, to be paid for through project cost-recovery funds. The agencies, through the POC, remain responsible for consultation.	D
CULT-3	3	P	The project applicant may, with the approval of the agency POC, assign a Tribal Coordinator to facilitate and coordinate consultation and compliance with multiple laws, agencies, and Tribes in order to ensure effective government-to- government consultation throughout the life of the project. Alternatively, the agency POC may assign such coordinators, to be paid for through project cost-recovery funds. The agencies, through the POC, remain responsible for consultation.	D
CULT-4	4	P	All historic properties in the Area of Potential Effect (APE) will be identified and evaluated. The APE shall include that area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties and shall include a reasonable construction buffer zone and laydown areas, access roads, and borrow areas, as well as a reasonable assessment of areas subject to effects from visual, auditory, or atmospheric impacts, or impacts from increased access.	D

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CULT-5	5	P	Project proponents must develop a cultural resources management plan (CRMP) to outline the process for compliance with applicable cultural resource laws during pre-project planning, management of resources during operation, and consideration of the effect of decommissioning. CRMPs should meet the specifications of the appropriate agency and address compliance with all appropriate laws. CRMPs should include the following, as appropriate: identification of the federally recognized Tribes, State Historic Preservation Offices (SHPOs), and consulting parties for the project; identification of long- and short-term management goals for cultural resources within the APE of the project; the definition of the APE; appropriate procedures for inventory, evaluation, and identification of effects to historic properties; evaluation of eligibility for the NRHP for all resources in the APE; description of the measures to avoid, minimize, or mitigate adverse effects to historic properties; procedures for inadvertent discovery; procedures for considering Native American Graves Protection and Repatriation Act (NAGPRA) issues, monitoring needs, and plans to be employed during construction; curation procedures; anticipated personnel requirements and qualifications; public outreach and interpretation plans; and discussion of other concerns. The draft CRMP should be reviewed and approved by the agency POC in consultation with historic preservation partners, including appropriate SHPOs, Tribes, and consulting parties. CRMPs must specify procedures that would be followed for compliance with cultural resource laws, should the project change during the course of implementation.	D
CULT-6	6	P	Project applicants will provide cultural resources training for project personnel regarding the laws protecting cultural resources, appropriate conduct in the field (such as procedures for the inadvertent discovery of human remains), and other project-specific issues identified in the CRMP. Training plans should be part of the CRMP and should be subject to the approval of the POC. When government-to-government consultation identifies the need and the possibility, Tribes may be invited to participate in or contribute to relevant sessions.	D
CULT-7	7	P	If adverse effects to historic properties will result from a project, a Historic Property Treatment Plan will be developed in consultation with the SHPO, the appropriate federally recognized Tribes, and any consulting parties. The plan will outline how the impacts to the historic properties would be mitigated, minimized, or avoided. Agency officials will give full consideration to the applicable mitigation measures found in Section 3.10.5.2 of the Final PEIS when consulting during the project preplanning stages to resolve adverse effects on historic properties.	D
CULT-8	8	P	As directed by the agency POC, project proponents will prepare a public education and outreach component regarding cultural resources such as a public presentation, a news article, a publication, or a display. Public education and outreach components will be subject to Agency approval and Tribal review and consultation when the content or format is of interest to affected Tribes.	D
CULT-9	9	P	Cultural resources inventory, evaluation, and mitigation practices should incorporate modeling and sampling strategies to the extent practicable, in concurrence with SHPOs and other relevant parties, and as approved by the agency POC.	D

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CULT-10	10	P	Project applicants shall provide all cultural resources reports and data in an electronic format that is approved by the Agency POC and integrated across jurisdictional boundaries, that meets current standards, and that is compatible with SHPO systems. The Agency will submit this data to the SHPO in a timely fashion. Project proponents should submit cultural resources data on a regular basis to ensure that SHPO systems are kept up to date for reference as the different phases of the project proceed. Paper records may also be required by the agency.	D
CULT-11	11	P	Cultural resources inventory procedures, specified in the CRMP, will include development of historic contexts based on the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (48 FR 44716) sufficient to support the evaluation of cultural resources encountered in the APE.	D
CULT-12	1	C	Project applicants shall provide all cultural resources reports and data in an approved electronic format that is integrated across jurisdictional boundaries, that meets current standards, and that is compatible with SHPO systems. Project proponents shall submit cultural resources data on a regular basis to ensure that SHPO systems are kept up to date for reference as the different phases of the project proceed.	D
CULT-13	2	C	When an area is identified as having a high potential for cultural resources but none are found during a pre-construction field survey, a professionally qualified cultural resources specialist will be required to monitor ground-disturbing activities during project construction, and to complete a report when the activities are finished. The protocol for monitoring should be identified in the CRMP.	D
CULT-14	3	C	When human remains, funerary objects, sacred objects, or objects of cultural patrimony are inadvertently discovered, the provisions of NAGPRA shall apply and the process identified in the CRMP must be followed.	D
TRIBAL TRADITIONAL CULTURAL RESOURCES				
CULT-15	1	P	The appropriate agency, assisted by the applicant, must comply with all laws, policies, and regulations pertaining to government-to-government consultation with federally recognized Tribes. Agencies shall initiate consultation with affected Tribes at the outset of project planning and shall continue consultation throughout project planning, construction, operation, and decommissioning. Consultation shall include, but not be limited to, the following: (a) identification of potentially affected Tribes; (b) identification of appropriate Tribal contacts and the preferred means of communication with these Tribes; (c) provision to the Tribes of project specific information (e.g., project proponents, maps, design features, proposed ROW routes, construction methods, etc.) at the outset of project planning and throughout the life of the project; (d) identification of issues of concern specific to affected Tribes (e.g., potential impacts to culturally sensitive areas or resources, hazard and safety management plans, treaty reserved rights and trust responsibilities); (e) identification of areas and resources of concern to Tribes; and (e) resolution of concerns (e.g., actions to avoid, minimize, or mitigate impacts to important resources; Memoranda of Agreement stating what actions would be taken to mitigated project effects; or agreements for Tribal participation in monitoring efforts or operator training programs).	D

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CULT-16	2	P	The appropriate agency, assisted by the applicant, must comply with all pertinent laws, policies, and regulations addressing cultural and other resources important to Tribes, including the NHPA, ARPA, NAGPRA, and other laws and regulations as listed in Table 3.11-2 of this EIS.	D
CULT-17	3	P	The agencies shall recognize the significance to many Tribes of traditional cultural places, such as sacred sites, sacred landscapes, gathering grounds, and burial areas, and shall seek to identify such areas through consultation with affected Tribes early in the project planning process. Agencies shall seek to avoid, minimize, or mitigate impacts to such places in consultation with the Tribes, project proponents, and other relevant parties. Where confidentiality concerning these areas is important to an affected Tribe, agencies shall honor such confidentiality unless the Tribe agrees to release the information.	D
CULT-18	4	P	A protocol must be developed for inadvertent discovery of Native American human remains and funerary items to comply with the NAGPRA in consultation with appropriate federally recognized Tribes. Unexpected discovery of such items during construction must be brought to the immediate attention of the responsible federal agency's authorized officer. Work must be halted in the vicinity of the find of Native American graves and funerary items to avoid further disturbance to the resources while they are being evaluated and appropriate mitigation measures are being developed. The procedures for reporting items covered under NAGPRA must be identified in the CRMP.	D
VISUAL RESOURCES				
VIS-1	1	P	Applicants shall identify and consider visual resource management (VRM) and scenery management (SMS) issues early in the design process to facilitate integration of VRM and scenery treatments into the overall site development program and construction documents. Visual/scenery management considerations, environmental analyses, mitigation planning, and design shall reference and be in accordance with the land management agency visual/scenery management policies and procedures applicable to the jurisdiction the project lies within. Applicants shall coordinate between multiple agencies on visual/scenery sensitive issues when projects transition from one jurisdiction to another, especially when transitions occur within a shared viewshed.	V
VIS-2	2	P	Applicants shall prepare a VRM or scenery management plan. The applicant's planning team shall include an appropriately trained specialist, such as a landscape architect with demonstrated VRM and/or SMS experience. The VRM/SMS specialist shall coordinate with the BLM/FS on the availability of the appropriate visual or scenic inventory data, VRM management class delineations, Scenic Integrity Objectives (SIOs), and federal agency expectations for preparing project plans and mitigation strategies to comply with RMP or LRMP direction related to scenery and/or visual resources. Applicants shall confirm that a current Visual Resource Inventory and/or Scenic Class inventory is available and that the resource management plan (RMP) or land resource and management plan (LRMP) VRM classifications or SIOs have been designated in the current land management plan. Project plans shall abide by the VRM class designations and SIOs and consider sensitivities defined within the visual or scenic resource Inventory. If visual or scenic management objectives are absent, then the proper inventory and classification process shall be followed to develop them in accordance	V

BMP NO.[1]	WWEC IOP NO.	PHASE(S)	WWEC IOP DESCRIPTION	APPENDIX[2]
			with the BLM VRM manual and handbooks or FS SMS process, depending on the agency. When the VRM management classes or SIOs are absent, then the project alternatives must reflect a range of management options related to scenery and visual resources that reflect the values identified in the visual/scenic inventory. Responsibility for developing an inventory or VRM management classes (or in the case of the FS, Scenic Classes and SIOs) will remain with the respective agency, but how to accomplish these tasks will be determined by the Field Office Manager or Forest Supervisor, who will consider the applicant's role and financial participation in completing the work.	
VIS-3	3	P	Visual and scenic mitigation planning/design and analysis shall be performed through integrated field assessment, applied global positioning system (GPS) technology, field photo documentation, use of computer-aided design and development software, 3-D modeling GIS software, and visual simulation software, as appropriate. Proposed activities, projects, and site development plans shall be analyzed and further developed using these technologies to meet visual and scenic objectives for the project area and surrounding areas sufficient to provide the full context of the viewshed. Visual simulations shall be prepared according to BLM Handbook H-8432-1, or other agency requirements, to create spatially accurate depictions of the appearance of proposed facilities, as reflected in the 3-D design models. Simulations shall depict proposed project appearance from sensitive/scenic locations as well as more typical viewing locations. Transmission towers, roads, compressor stations, valves, and other aboveground infrastructure should be integrated esthetically with the surrounding landscape in order to minimize contrast with the natural environment.	V
VIS-4	4	P	Applicants shall develop adequate terrain mapping on a landscape/viewshed scale for site planning/design, visual impact analysis, visual impact mitigation planning/design, and for full assessment and mitigation of cumulative visual impacts through applied, state-of the-art design practices using the cited software systems. The landscape/ viewshed scale mapping shall be geo-referenced and at the same Digital Elevation Model (DEM) resolution and contour interval within the margin of error suitable for engineered site design. This level of mapping shall enable proper placement of proposed developments into the digital viewshed context. Final plans shall be field verified for compliance.	V
VIS-5	5	P	The full range of visual and scenic best management practices shall be considered, and plans shall incorporate all pertinent best management practices (BMPs). Visual and scenic resource monitoring and compliance strategies shall be included as a part of the project mitigation plans.	V
VIS-6	6	P	Compliance with VRM/SMS objectives shall be determined through the use of the BLM Contrast Rating procedures defined in BLM Handbook H-8431-1 Visual Contrast Rating, or the FS SMS Handbook 701. Mitigation of visual impacts shall abide by the requirements of these handbooks.	V

BMP NO.[1]	WWEC IOP NO.	PHASE(S)	WWEC IOP DESCRIPTION	APPENDIX[2]
VIS-7	1	C	A pre-construction meeting with BLM/FS landscape architects or other designated visual/scenic resource specialist shall be held before construction begins to coordinate on the VRM/SMS mitigation strategy and confirm the compliance-checking schedule and procedures. Applicants shall integrate interim/final reclamation VRM/SMS mitigation elements early in the construction, which may include treatments such as thinning and feathering vegetation along project edges, enhanced contour grading, salvaging landscape materials from within construction areas, special revegetation requirements, etc. Applicants shall coordinate with BLM/FS in advance to have BLM/FS landscape architects or other designated visual/scenic resource specialists onsite during construction to work with implementing BMPs.	Q, R
VIS-8	1	O	Terms and conditions for VRM/SMS mitigation compliance shall be maintained and monitored for compliance with visual objectives, with adaptive management adjustments and modifications as necessary and approved by the BLM/FS landscape architect or other designated visual/scenic resource specialist.	V
PUBLIC HEALTH AND SAFETY				
PHS-3	1	P	An electricity transmission project shall be planned by the applicant to comply with FAA regulations, including lighting regulations, and to avoid potential safety issues associated with proximity to airports, military bases or training areas, or landing strips.	Q
PHS-4	2	P	A health and safety program shall be developed by the applicant to protect both workers and the general public during construction, operation, and decommissioning of an energy transport project. The program should identify all applicable federal and state occupational safety standards, establish safe work practices for each task (e.g., requirements for personal protective equipment and safety harnesses, Occupational Safety and Health Administration [OSHA] standard practices for safe use of explosives and blasting agents, measures for reducing occupational electromagnetic field [EMF] exposures), and define safety performance standards (e.g., electrical system standards). The program should include a training program to identify hazard training requirements for workers for each task and establish procedures for providing required training to all workers. Documentation of training and a mechanism for reporting serious accidents to appropriate agencies should be established.	C, H, N, R
PHS-5	3	P	The health and safety program shall establish a safety zone or setback from roads and other public access areas that is sufficient to prevent accidents resulting from various hazards. It should identify requirements for temporary fencing around staging areas, storage yards, and excavations during construction or decommissioning activities. It should also identify measures to be taken during the operations phase to limit public access to those components of energy facilities that present health or safety risks.	A, U

BMP NO.[1]	WWEC IOP NO.	PHASE(S)	WWEC IOP DESCRIPTION	APPENDIX[2]
PHS-6	4	P	Applicants will develop a comprehensive emergency plan that considers the vulnerabilities of their energy system to all credible events initiated by natural causes (earthquakes, avalanches, floods, high winds, violent storms, etc.), human error, mechanical failure, cyber attack, sabotage, or deliberate destructive acts of both domestic and international origin and the potential for and possible consequences of those events. Vulnerability, threat, and consequence assessment methodologies and criteria in the sector-specific plan (SSP) for energy will be used and appropriate preemptive and mitigative response actions will be identified. The applicant must coordinate emergency planning with state, local, and Tribal emergency and public safety authorities and with owners and operators of other energy systems collocated in the corridor or in adjacent corridors that could also be impacted.	F
PHS-7	5	P	In addition to directives contained in other IOPs in this chapter, the applicant must identify all federal, state, and local regulations pertaining to environmental protection, worker health and safety, public safety, and system reliability that are applicable throughout the construction, operation, and decommissioning phases of their facility's life cycle and must develop appropriate compliance strategies, including securing all necessary permits and approvals.	N, R, U, Q
HAZARDOUS MATERIALS MANAGMENT				
PHS-8	1	P	Applicants for petroleum pipelines and projects involving oil-filled electrical devices shall develop a spill prevention and response plan identifying spill prevention measures to be implemented, training requirements, appropriate spill response actions, and procedures for making timely notifications to authorities. The spill prevention and response plan should include identification of any sensitive biotic resources and locations (such as habitats) that require special measures to provide protection, as well as the measures needed to provide that protection.	No Applicable Appendix
HAZARDOUS MATERIALS AND WASTEWATER MANAGMENT				
PHS-9	1	C	Any wastewater generated by the applicant in association with temporary, portable sanitary facilities must be periodically removed on a schedule approved by the agency, by a licensed hauler and introduced into an existing municipal sewage treatment facility. Temporary, portable sanitary facilities provided for construction crews should be adequate to support expected on-site personnel and should be removed at completion of construction activities.	M
PHS-10	2	C	All hazardous materials (including vehicle and equipment fuels) brought to the project site will be in appropriate containers and will be stored in designated and properly designed storage areas with appropriate secondary containment features. Excess hazardous materials will be removed from the project site after completion of the activities in which they are used.	N
PHS-11	1	O	The applicant shall provide secondary containment for all on-site hazardous materials and waste storage areas.	N
PHS-12	2	O	The applicant shall ensure that wastes are properly containerized and removed periodically for disposal at appropriate off-site permitted disposal facilities.	N

BMP NO.[1]	WWEC IOP NO.	PHASE(S)	WWEC IOP DESCRIPTION	APPENDIX[2]
PHS-13	3	O	In the event of an accidental release to the environment, the applicant must initiate spill cleanup procedures and document the event, including a cause analysis; appropriate corrective actions taken; and a characterization of the resulting environmental or health and safety impacts. Documentation of the event should be provided to the land management agency's authorized officer and other federal and state agencies, as required.	N
HAZARDOUS MATERIALS AND WASTE MANAGMENT				
PHS-14	1	D	All fuels, hazardous materials, and other chemicals will be removed from the site and properly disposed of or reused.	L, N
PHS-15	2	D	Incidental spills of petroleum products and other chemicals will be removed and the affected area cleaned to meet applicable standards.	L, N
PHS-16	3	D	Solid wastes generated during decommissioning will be accumulated, transported, and disposed in permitted off-site facilities in accordance with state and local requirements; no solid wastes will be disposed of within the footprint of the ROW or the corridor.	L
PHS-17	4	D	Hazardous wastes generated as a result of component cleaning will be containerized and disposed of in permitted facilities.	L
FIRE MANAGMENT				
FIRE-1	1	P	Applicants shall develop a fire management strategy to implement measures to minimize the potential for a human-caused fire during project construction, operation, and decommissioning. The strategy should consider the need to reduce hazardous fuels (e.g., native and non-native annual grasses and shrubs) and to prevent the spread of fires started outside or inside a corridor, and clarify who has responsibility for fire suppression and hazardous fuels reduction for the corridor.	H
FIRE-2	2	P	Applicants must work with the local land management agency to identify project areas that may incur heavy fuel buildups, and develop a long-term strategy on vegetation management of these areas. The strategy may include land treatment during project construction, which may extend outside the planned ROW clearing limits.	H
FIRE SAFETY				
FIRE-3	1	C	The applicant must ensure that all construction equipment used is adequately muffled and maintained and that spark arrestors are used with construction equipment in areas with, and during periods of, high fire danger.	H
FIRE-4	2	C	Flammable materials (including fuels) will be stored in appropriate containers.	H
AIR EMISSIONS				
AIR-1	1	C	The applicant shall cover construction materials and stockpiled soils if these are sources of fugitive dust.	E, Q

BMP NO.[1]	WWEC IOP NO.	PHASE(S)	WWEC IOP DESCRIPTION	APPENDIX[2]
AIR-2	2	C	To minimize fugitive dust generation, the applicant shall water land before and during surface clearing or excavation activities. Areas where blasting would occur should be covered with mats.	C, E
AIR QUALITY				
AIR-3	1	O	Dust abatement techniques (e.g., water spraying) shall be used by the applicant on unpaved, unvegetated surfaces to minimize airborne dust. Water for dust abatement should be obtained and used by the applicant under the appropriate state water use permitting system. Used oil will not be used for dust abatement.	E
NOISE				
NOISE-1	1	C	The applicant shall limit noisy construction activities (including blasting) to the least noise-sensitive times of day (i.e., daytime only between 7 a.m. and 10 p.m.) and weekdays.	C
NOISE-2	1	O	The applicant shall ensure that all equipment has sound-control devices no less effective than those provided on the original equipment.	O
RESTORATION				
REST-1	1	D	Topsoil removed during decommissioning activities shall be salvaged and reapplied during final reclamation; all areas of disturbed soil shall be reclaimed using weed-free native shrubs, grasses, and forbs or other plant species approved by the land management agency; grades will be returned to pre-development contours to the greatest extent feasible.	Q
REST-2	2	D	The vegetation cover, composition, and diversity shall be restored to values commensurate with the ecological setting, as approved by the authorizing officer.	Q

Notes: [1] The best management practice numbers in Table 19 correspond to the best management practice numbers in Table C.5-1 in Appendix C of the TWE Project Final EIS.
[2] Indicates the appendices to this POD that the specific measure may apply to or that may contain additional information.

8.3.5 U.S. Forest Service Management Units Crossed by the TWE Project Agency Preferred Alternative and National BMP's for Water Quality Management

This section and Table 20 list USFS Management Units crossed by the TWE Project Agency Preferred Alternative and the USFS National Best Management Practices (BMPs) for Water Quality Management. These measures and BMPs will be applied by TransWest on National Forest System lands where applicable and as required in the USFS Record of Decision for the TWE Project.

The TWE Project Agency Preferred Alternative crosses NFS lands under the jurisdiction of two different national forests. NFS lands within the Agency Preferred Alternative contain special managed units, which are held to special management prescriptions developed to protect resources or specific opportunities. Each Forest Land and Resource Management Plan (LRMP) provides direction, goals, standards, and guidelines for unit management of these areas. Each Forest and the management units and prescriptions that may be applicable to the Project are listed below.

Manti- La Sal National Forest (FEIS citing USFS 1986)

- General Big-Game Winter Range (GWR): Management emphasis is on providing general big game winter range. These are areas wildlife traditionally use. Treatments of various types are applied to increase forage production and plant species composition. Investments in compatible resource activities may occur. Permanent roads and special uses may be permitted. Short-term or temporary roads are obliterated and rehabilitated within 1 year after intended use. Motorized use is managed as appropriate to prevent unacceptable stress on big-game animals during the primary use season. Specific cover opening ratios, opening width, and stand design are maintained in pinyon-juniper woodland chaining areas.
- Key Big-Game Winter Range (KWR): Management emphasis is on providing winter forage and cover for big-game species in areas that must be available and unencumbered for wildlife use each year during the critical winter period. Vegetative treatments are applied to increase forage production of grass, forb, and especially browse species and/or to create and maintain thermal and hiding cover. Conflicting uses are not permitted on a continuing basis, but may be permitted outside the critical season if there is no long-term degradation. New roads other than short-term (temporary) roads are located outside of the management unit. Short-term roads will be rehabilitated to provide for wildlife use within one season after completed use. Prohibit motorized use to prevent unacceptable stress on big game during critical use periods.
- Developed Recreation Sites (DRS): Management emphasis is for developed recreation facilities such as campgrounds, picnic grounds, trailheads, visitor information facilities, summer homes areas, ski areas, and water-related support facilities. Proposed sites) are managed to maintain the site attractiveness until developed. Facilities such as roads, trails, signs, etc., may dominate or subordinate, but should harmonize and blend with the characteristic landscape. As appropriate, existing developed sites should be withdrawn from locatable mineral entry, and closed to surface occupancy for leasable and saleable minerals. The prescription can be considered for application to all existing developed recreation sites and proposed sites identified for development.
- Minerals Management Area (MMA): Management emphasis is on making land surface available for existing and potential major mineral developments. This prescription is applies where the lands surface is or will be used for facilities needed for the extraction of leasable minerals over an extended period. The areas associated with known, potential, development sites are included in this unit. Additional areas may be added to

this unit as mines or fields are located and developed. As the developments are removed and restoration is completed, these areas may be changed to other appropriate management units. In units where mineral development is pending, renewable resource activities strive to be compatible with the management goals of adjacent management units. Long-term investments, such as timber planting, generally are not made. However, short-term investments, such as range and wildlife revegetation projects, may be made on these units.

- Range Forage Production (RNG): Emphasis is on production of forage and cover for domestic livestock and wildlife. Intensive grazing management systems are generally favored. Some periodic heavy forage utilization may occur. Opportunities for investments in structural and non-structural improvements to increase forage production is moderate to high. Investments are made in compatible resource activities. Dispersed recreation opportunities vary between semi-primitive non-motorized and roaded natural appearing. Management activities are evident, but harmonize with the natural setting
- Utility Corridor (UC): Emphasis is on providing transportation corridors for major cross-country pipelines, electrical transmission lines, and telephone lines. Management activities within these linear corridors strive to be compatible with the management goals of the adjacent management units.
- Wood Fiber Production and Utilization (TBR): Emphasis is on management for the production and use of wood-fiber for a variety of wood products. The harvest methods by Forest cover type are single tree and group selection and shelterwood in Englemann spruce-subalpine fire, Douglas-fire, ponderosa pine, mixed conifers, and clear cutting in aspen. Harvesting will be accomplished with methods including cable, conventional crawler tractor, or rubber-tired skidders. Pre-commercial thinning and intermediate harvest will be used to increase or maintain fiber production. Dispersed recreation opportunities vary between semi-primitive non-motorized and roaded natural appearing. Wildlife habitat diversity may be enhanced by vegetative manipulation. Livestock grazing may be permitted. This prescription could alter water yield through vegetation management, as well as decreased evapotranspiration and maximize snow retention in small openings on low energy slopes.
- Research, Protection, and Interpretation of Lands and Resource (RPI): Management emphasis for these units is to manage unique ecological, geological, paleontological, archeological, or historical sites or features of the Forest for research, protection, and/or interpretation of land and resources condition while making them available for study and viewing. Other resource use may be made of these units as long as they do not conflict with the purpose for which they exist. Activities that might cause impairment or occupancy of the unit for any reason other than interpretive are usually prohibited.
- Special Land Designation (SLD): Management emphasis is on making lands available for existing and potential specialized uses. Sites that may be considered for application of this prescription include Ranger or Guard Stations and other administrative sites, electronic sites, and similar special land uses. Generally, other resource development and use activities within these units strive to be compatible with the management goals of the adjacent management units. However, this is often limited by the special activity or use authorized on the unit.
- Undeveloped Motorized Recreation Sites (UDM): Management emphasis is on providing high quality dispersed recreation opportunities in areas characteristically receiving moderate to heavy levels of use. Visual resources are managed so that activities of man remain visually subordinate or are not evident. Range, timber, wildlife, and mineral resource activities and use may occur subject to maintaining appropriate ROS user experience or setting characteristics visual quality objectives, not permanently exceeding threshold levels for noise and air quality, or seriously impairing

recreation use. These units generally occur along arterial and collector roads, although they may occur along local roads or trails and generally near water bodies.

- Watershed Protection/Improvement (WPE): Management emphasis is for watershed protection and improvement in areas where watershed treatment (i.e., contour trenching and furrowing) have been, or should be, applied, and where other use restrictions are implemented to protect on-site and downstream values from flooding and sedimentation. Also included, but not mapped, are some areas that have received damage by landslide and flood events. Units receiving damage by such events should be entered on the Watershed Improvement Needs Inventory list and evaluated against all other potential projects for priority of treatment.

Uinta National Forest Planning Area (FEIS citing USFS 2003, 2006)

- 3.1 Aquatic, Terrestrial, and Hydrologic Resources: Emphasis is on maintaining or improving existing quality aquatic, terrestrial, and hydrologic conditions through limited to moderate management activity. This prescription includes areas where multiple habitat and resource values are present. These values are recognized as important and may require restoration to reach desired conditions. Other uses and activities may be allowed provided they do not inhibit attainment of objectives for the areas. Vegetation management activities, including timber harvest, may be used to address vegetation needs for wildlife habitat, watershed improvement, and/or forest health needs. Additional motorized trails may be constructed. Livestock grazing is allowed where compatible with desired aquatic, terrestrial, and hydrologic conditions. Leasing stipulations are CSU for all areas except, semi-primitive non-motorized, which is NSO.
- 3.3 Aquatic and Terrestrial Habitat: These areas are managed for quality habitat to contribute toward maintenance and/or recovery of plant and animal species. Resources are maintained or improved to achieve desired conditions for habitats of threatened, endangered, sensitive, and Management Indicator Species (MIS). Most, but not all, of the critical deer and elk winter range is included within this prescription. This prescription applies to areas with multiple habitats (big game winter range, Lynx Analysis Units [LAUs], greater sage grouse habitat in the Vernon and Strawberry Reservoir Management Areas, etc.). Where habitats overlap, the most restrictive standard or guideline will take precedence. No additional winter recreation facilities may be constructed in the areas of this prescription managed as Lynx Analysis Units (LAUs). Leasing stipulations are TL/CSU for all areas except, semi-primitive non-motorized, which is NSO.
- 4.4 Dispersed Recreation: The emphasis in this prescription is on providing opportunities for and/or facilitating dispersed recreation. This management prescription includes areas of existing or anticipated concentrations of recreational use. Intensive vegetation management may be required to maintain desired conditions. Additional motorized trails may be constructed. Development is limited to a level that facilitates the dispersed recreation experience and addresses resource impacts. Leasing stipulations are TL/CSU for all areas except, semi-primitive non-motorized, which is NSO.
- 4.4 Developed Recreation: These areas include developed facilities such as campgrounds, boat docks, resorts, and water systems. Because of the large capital investments in these areas, site protection will be paramount. Wildland fire use is not allowed. Intensive vegetation management may be required to maintain desired conditions. Additional motorized trails may be constructed.

- 5.1 Forested Ecosystems – Limited Development: Emphasis is on maintaining or restoring vegetation to achieve multiple resource values. Additional motorized trails may be constructed. Management of forested ecosystems enhances wildlife habitats, improves watershed stability, and improves vegetative diversity. Management encompasses the full range of land and resource treatment activities. Additional motorized trails may be constructed. Grazing by livestock is allowed, but forage production for livestock use is limited to meet requirements for wildlife, riparian, water quality, or other objectives. Leasing stipulations are CSU for all areas except, semi-primitive non-motorized, which is NSO.
- 5.2 Forested Areas -Vegetation Management: Emphasis is on maintaining or restoring vegetation to achieve multiple resource values and provide for multiple uses. Management area direction also includes timber resource goals and objectives, but achievement of high yields is not the primary purpose. The Forest's suitable timber base is located within this management prescription. Timber volumes harvested are applied to the Forest's allowable sale quantity (ASQ). Management encompasses the full range of activities and uses. Road densities and designs are compatible with multiple resource values. Additional motorized trails may be constructed. Recreation and other developments requiring the construction and reconstruction of roads and trails will be considered.
- 6.1 Non-forested Ecosystems: Emphasis is on maintaining or restoring vegetation conditions to achieve ecosystem health. Additional motorized trails may be constructed. Standard lease terms for all ROS except for semi-primitive non-motorized (NSO) and semi-primitive motorized (CSU).
- 8.2 Utility Corridor/Communication Sites: Features in these areas may include various non-recreation special uses such as utility corridors or communication sites allocated for long-term site investment. Vegetation management should be limited to activities consistent with installation and maintenance of the utility line or communication site and mitigation against potential erosion and visual quality impacts. Recreation use is limited to incidental dispersed use, such as a trail crossing through the area. Public access restrictions may be imposed within energy transmission, utility, and communication corridors and sites for health, safety, or resource considerations, or to be compatible with management direction for surrounding areas. CSU for all leasing. See other management areas for surrounding area stipulations.

TABLE 20 NATIONAL BMPS FOR WATER QUALITY MANAGEMENT ON NATIONAL FOREST SYSTEM LANDS

BMP NO.[1]	TITLE	DESCRIPTION
AqEco-2	Operations in Aquatic Ecosystems	Objective: Avoid, minimize, or mitigate adverse impacts to water quality when working in aquatic ecosystems. Explanation: Common construction or maintenance operations in waterbodies often involve ground disturbance. The close proximity to, and contact with, the waterbody increases the potential for introducing sediment and other pollutants that can affect water quality. This BMP includes practices for minimizing direct and indirect water quality impacts when working in or adjacent to waterbodies. Practices: See Page 21, Volume 1: National Core BMP Technical Guide (USFS 2012)
Chem-1	Chemical Use Planning	Objective: Use the planning process to develop measures to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources from chemical use on NFS lands. Explanation: Pollution risk from chemical use depends on chemical mobility and persistence, application mode and rate, and distance from water. Risk of entry to surface water is highest for broadcast and aerial treatments and for fine droplets. Risk to groundwater is highest over sandy soils, shallow water tables, and groundwater recharge areas. The planning process is the framework for incorporating measures to avoid or minimize impacts to soil and water resources into project design and management to reduce the risk of contamination from chemical use. Practices: See Page 31, Volume 1: National Core BMP Technical Guide (USFS 2012)
Chem-2	Follow Label Directions	Objective: Avoid or minimize the risk of soil and surface water or groundwater contamination by complying with all label instructions and restrictions required for legal use. Explanation: Directions found on the label of each chemical are detailed, specific, and include legal requirements for use. In brief, "...the label is the law..." with respect to chemical use. Not following label directions increases the risk of adverse effects to surface water or groundwater as a result of using chemicals inappropriate to the site, an inappropriate method of application, and an inappropriate application rate (too much or too little) to meet project objectives. Practices: See Page 32, Volume 1: National Core BMP Technical Guide (USFS 2012)
Chem-3	Chemical Use Near Waterbodies	Objective: Avoid or minimize the risk of chemical delivery to surface water or groundwater when treating areas near waterbodies. Explanation: Some chemicals used in terrestrial applications are toxic to aquatic flora and fauna, may overly enrich aquatic systems, and may pose a human health hazard if drinking water sources are contaminated during or after chemical applications. During application, chemicals may drift into waterbodies or other nontarget areas. After application, chemicals or chemical residues may enter surface water or groundwaters through runoff and leaching. Most State and local water quality standards include a general narrative standard that requires surface waters to be free from substances attributable to human-caused discharges in amounts, concentrations, or combinations that are toxic to humans, animals, plants, or aquatic life. To help protect surface waters and wetlands from contamination, a buffer zone of land and vegetation adjacent to the waterbody may need to be designated. Treatment within this zone may differ from that applied to upland areas or the buffer zone may be left untreated if necessary. Practices: See Page 33, Volume 1: National Core BMP Technical Guide (USFS 2012)

BMP NO.[1]	TITLE	DESCRIPTION
Chem-5	Chemical handling and Disposal	Objective: Avoid or minimize water and soil contamination when transporting, storing, preparing and mixing chemicals; cleaning application equipment; and cleaning or disposing chemical containers. Explanation: Handling chemicals, chemical containers, and equipment can lead to contamination of surface water or groundwater if not done carefully. Spills, leaks, or wash water can contaminate soil and leach into groundwater. Residue left on containers or equipment can wash off during precipitation events and enter surface waters. Preparing and mixing chemicals and cleaning and disposing of chemical containers must be done in accordance with Federal, State, and local laws, regulations, and directives. Specific procedures are documented in the Forest Service Pesticide Use Management and Coordination Handbook (FSH 2109.14, chapter 40) as well as in State and local laws. Practices: See Page 35, Volume 1: National Core BMP Technical Guide (USFS 2012)
Chem-6	Chemical Application Monitoring and Evaluation	Objective: 1. Determine whether chemicals have been applied safely, have been restricted to intended targets, and have not resulted in unexpected nontarget effects. Explanation: Monitoring of chemical applications is used to evaluate and document chemical application accuracy, amount, and effects on soils and water quality to reduce or eliminate hazards to nontarget biological or physical resources. Monitoring can occur before, during, and after chemical application depending on treatment objectives and monitoring questions. Monitoring methods may include any of the following: visual observations; vegetation surveys; use of spray cards; dye tracing (fluorometry); and sampling of water, soil, sediment, flora, or fauna to measure chemical presence in or near water. Monitoring needs and methods are determined in the project planning process and should consider treatment objectives; resource values at risk; chemical properties; potential for offsite movement; Federal, State, and local requirements; monitoring costs; and available project funding. Practices: See Page 36, Volume 1: National Core BMP Technical Guide (USFS 2012)
Fac-1	Facilities and Nonrecreation Special Uses Planning	Objective: Use the applicable special use authorization and administrative facilities planning processes to develop measures to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources during construction and operation of facilities and nonrecreation special uses activities. Explanation: Facilities may be developed on NFS lands by the Forest Service for a variety of administrative and recreational purposes. Potential effects of the proposed facility construction and operation on water quality should be considered when new sites are created or existing sites are improved and operated. In the planning process, site-specific BMP prescriptions are developed to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources. Facilities developed and operated by others on NFS lands are administered through special use authorizations issued by the Forest Service to public or private agencies, a group, or an individual. Special use permits must include terms and conditions to protect the environment and otherwise comply with the requirements of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1752). These environmental protection requirements include the use of appropriate BMPs to control nonpoint source pollution. State and local governments regulate many activities associated with facility development and operation, such as public water supplies, sanitation systems, waste disposal, and control of stormwater discharges. State or local requirements applicable to these activities should be incorporated into facility design, construction, and operation plans, and terms and conditions during the planning process. Practices: See Page 40, Volume 1: National Core BMP Technical Guide (USFS 2012)

BMP NO.[1]	TITLE	DESCRIPTION
Fac-2	Facility Construction and Stormwater Control	Objective: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources by controlling erosion and managing stormwater discharge originating from ground disturbance during construction of developed sites. Explanation: During construction and operation of facility sites, land may be cleared of existing vegetation and ground cover, exposing mineral soil that may be more easily eroded by water, wind, and gravity. Changes in land use and impervious surfaces can temporarily or permanently alter stormwater runoff that, if left uncontrolled, can affect morphology, stability, and quality of nearby streams and other waterbodies. Erosion and stormwater runoff control measures are implemented to retain soil in place and to control delivery of suspended sediment and other pollutants to nearby surface water. This practice is initiated during the planning phase and applied during project implementation and operation. This BMP contains practices for managing erosion and stormwater discharge that are generally applicable for any project that involves ground disturbance, including developed recreation, mineral exploration and production sites, pipelines, water developments, etc., and should be used for all such projects. Practices: See Page 41, Volume 1: National Core BMP Technical Guide (USFS 2012)
Fac-3	Potable Water Supply Systems	Objective: Provide potable water supplies of sufficient quality and quantity to support the use at facilities. Explanation: Many facilities provide potable water from a surface water or groundwater source. Water systems should supply an adequate volume of acceptably clean water as needed by the facility. A water system is comprised of collection, treatment, storage, and distribution facilities. Water systems are classified into categories (e.g., public versus nonpublic, community versus noncommunity, and transient versus nontransient) based on ownership, size, and permanence of the population served. Regulations are based on these different categories. Management requirements and controls to protect drinking water quality and provide potable water are incorporated into each facility's operation and maintenance plan (FSM 7410). Practices: See Page 43, Volume 1: National Core BMP Technical Guide (USFS 2012)
Fac-4	Sanitation Systems	Objective: Avoid, minimize, or mitigate adverse effects to soil and water quality from bacteria, nutrients, and other pollutants resulting from collection, transmission, treatment, and disposal of sewage and wastewater at facilities. Explanation: Sanitation systems at facilities vary from a portable toilet to a sophisticated treatment plant. Facilities also may have wastewater systems for showers and washbasins. The type of sanitation system at a facility depends on the purpose and capacity of the site, available and needed infrastructure, Forest Service policy, and State or local regulations. Bacteria, nutrients, and other contaminants from sanitation systems can enter surface water or groundwater if the system is not properly designed and operated. Facilities are required to comply with State and local public health and sanitation ordinances. Management requirements and controls to minimize the possibility of water contamination from wastewater collection, treatment, and disposal are incorporated into each facility's operation and maintenance plan (FSM 7410). Practices: See Page 44, Volume 1: National Core BMP Technical Guide (USFS 2012)
Fac-5	Solid Waste Management	Objective: Avoid, minimize, or mitigate adverse effects to water quality from trash, nutrients, bacteria, and chemicals associated with solid waste management at facilities. Explanation: Uncollected garbage and trash at developed facilities can contaminate water by introducing nutrients, bacteria, or chemicals to the water. Trash can be blown about by the wind or carried by runoff into waterbodies. In addition, uncollected garbage can attract wildlife, which are looking for an easy meal, to the facility. Practices: See Page 45, Volume 1: National Core BMP Technical Guide (USFS 2012)

BMP NO.[1]	TITLE	DESCRIPTION
Fac-6	Hazardous Materials	Objective: Avoid or minimize short- and long-term adverse effects to soil and water resources by preventing releases of hazardous materials. Explanation: Constructing and operating facilities often involve the storage and use of hazardous materials. Improper storage and use can contaminate nearby soils and surface water or groundwater resources. Practices: See Page 46, Volume 1: National Core BMP Technical Guide (USFS 2012)
Fac-7	Vehicle and Equipment Wash Water	Objective: Avoid or minimize contamination of surface water and groundwater by vehicle or equipment wash water that may contain oil, grease, phosphates, soaps, road salts, other chemicals, suspended solids, and invasive species. Explanation: Washing vehicles and equipment is a common method used to maintain vehicles and minimize the spread of noxious and invasive species. Wash water and the resulting residue removed from vehicles and equipment may contain oils, chemicals, or sediment harmful to water and aquatic resources if not properly contained and treated. Work centers, ranger stations, fire stations, and other facilities may have washing equipment and locations designated for cleaning fleet or contracted vehicles and equipment. Temporary wash locations may also be installed during incident management or project work. Practices: See Page 47, Volume 1: National Core BMP Technical Guide (USFS 2012)
Fac-8	Nonrecreation Special Use Authorizations	Objective: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources from physical, chemical, and biological pollutants resulting from activities under non-recreation special use authorizations. Explanation: This BMP covers all non-recreation special use activities with the exceptions of pipelines; transmission facilities and other rights-of-ways; and water diversions, storage, and conveyance. BMP Fac-9 (Pipelines, Transmission Facilities, and Rights-of-Way), BMP WatUses-4 (Water Diversions and Conveyances), and BMP WatUses-5 (Dams and Impoundments) are provided for those activities. The Forest Service role in defining and requiring the use of BMPs occurs during the development of the special use authorization and administration of the use. Discussions between the Forest Service and the permit holder concerning soil, water quality, and riparian resource impacts and appropriate BMPs to use should occur at the time of permit development or renewal. The special use authorization operation and maintenance plan details the conditions that must be met, including management requirements and mitigation measures to protect water quality. The permit holder will be required to conform to all applicable Federal, State, and local regulations and land management plan direction governing water resource protection and sanitation. State or Federal law may require that the permit holder obtain a pollution discharge permit or other authorization from a State, regional or local government entity. Authorized uses often cover a wide range of activities and may require that BMPs from several management activity categories be included in the authorization. Practices: See Page 47-48, Volume 1: National Core BMP Technical Guide (USFS 2012)

BMP NO.[1]	TITLE	DESCRIPTION
Fac-9	Pipelines, Transmission Facilities, and Rights-of-Way	Objective: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources during the construction and maintenance of pipelines, powerlines, transmission facilities, and other rightsof-way. Explanation: Powerlines and pipelines are constructed on NFS land by both public and private agencies under either an easement or special use authorization. Impacts to soil and water resources during transmission corridor and pipeline construction and maintenance include those originating from directional drilling, pipeline testing, soil disturbance, and erosion associated with vegetation removal and road construction. Other water quality impacts could occur from natural events, inappropriate or unauthorized activities, chemical spills, herbicide use, and other maintenance activities. Measures to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources should be incorporated in the authorization terms and conditions, project plans for construction and design, and the right-of way management plans for ongoing maintenance of vegetation along the corridor. Practices: See Page 48-49, Volume 1: National Core BMP Technical Guide (USFS 2012)
Fac-10	Facility Site Reclamation	Objective: Reclaim facilities and surrounding disturbed areas to as near to the predisturbed condition as is reasonably practicable following closure or completion of operations, or as necessary for mitigation purposes, to avoid, minimize, or mitigate long-term adverse effects to soil, water quality, and riparian resources. Explanation: Abandoned structures and wastes, particularly hazardous materials, at facility sites may pose a safety risk to the public. Lack of ongoing maintenance of facility sites can also threaten surface water and groundwater quality via erosion and chemical leaks as they fall into disrepair. Facility sites should be closed and reclaimed after the need for it ends or the recurrent impacts to resources indicate the site cannot be properly managed with available resources. Heavily used recreation sites will cause some areas to become denuded and compacted. These disturbed sites may become unstable and begin to erode at accelerated rates if not stabilized. Reestablishing stable grades, functional drainages, some level of site infiltration capacity, and effective ground cover on terrestrial sites and stabilizing substrates impacted by water flow or wave action are necessary to rehabilitate disturbed areas to avoid or minimize water quality and riparian resource degradation. Disturbances in and immediately adjacent to surface waters, riparian areas, and wetlands should be the highest priority for reclamation or rehabilitation. Practices: See Page 50, Volume 1: National Core BMP Technical Guide (USFS 2012)
Plan-2	Project Planning and Analysis	Objective: Use the project planning, environmental analysis, and decisionmaking processes to incorporate water quality management BMPs into project design and implementation. Explanation: The project planning, environmental analysis, and decisionmaking process is the framework for incorporating water quality management BMPs into project design and implementation. The process should identify likely direct, indirect, or cumulative impacts from the proposed project or management activities on soils, water quality, and riparian resources in the project area. Project documents (plans, contracts, permits, etc.) should include site-specific BMP prescriptions to meet water quality objectives as directed by the environmental analysis. Project planning should ensure that activities are consistent with land management plan direction; State BMPs, floodplain, wetland, coastal zone; and other requirements including CWA 401 certification, CWA 402 permits, and CWA 404 permits; wilderness or wild and scenic river designations; and other Federal, State, and local rules and regulations. Practices: See Page 15, Volume 1: National Core BMP Technical Guide (USFS 2012)

BMP NO.[1]	TITLE	DESCRIPTION
Plan-3	Aquatic Management Zone Planning	Objective: To maintain and improve or restore the condition of land around and adjacent to waterbodies in the context of the environment in which they are located, recognizing their unique values and importance to water quality while implementing land and resource management activities. Explanation: The land around and adjacent to waterbodies plays an important ecologic role in maintaining the structure, function, and processes of the aquatic ecosystem. These areas provide shading, soil stabilization, sediment and water filtering, large woody debris recruitment, and habitat for a diversity of plants and animals. The quality and quantity of water resources and aquatic habitats may be adversely affected by ground-disturbing activities that occur on these areas. Because of the importance of these lands, various legal mandates have been established pertaining to management of these areas, including, but not limited to, those associated with floodplains, wetlands, water quality, endangered species, wild and scenic rivers, and cultural resources. Protection and improvement of soil, water, and vegetation are to be emphasized while managing these areas under the principles of multiple use and sustained yield. Riparian-dependent resources are to be given preferential consideration when conflicts among land use activities occur. Designation of a zone encompassing these areas around and adjacent to a waterbody is a common BMP to facilitate management emphasizing aquatic and riparian-dependent resources. These management zones are known by several common terms such as streamside management area or zone, riparian management area, stream environment zone, and water influence zone. For purposes of the National Core BMPs, these areas will be referred to as AMZs. AMZs are intended to be large enough to protect a waterbody and its associated beneficial uses and aquatic and riparian ecosystems. AMZs along streams and rivers may be linear swaths extending a prescribed distance from a bank, though widths are usually adjusted to include features such as riparian vegetation and unstable landforms as well as critical floodplain components necessary to sustain waterbody integrity and protect beneficial uses. AMZ areas around wetlands, lakes, and other nonlinear features may be irregular in shape to encompass sensitive riparian areas and other water-dependent features. Local regulation often stipulates the area and extent of AMZs and may be listed in land management plans; biological opinions, evaluations, or assessments; and other regional or State laws, regulations, and policies. Virtually all States have BMPs that include AMZs, as do most land management plans. Practices: See Page 17, Volume 1: National Core BMP Technical Guide (USFS 2012)

BMP NO.[1]	TITLE	DESCRIPTION
Road-1	Travel Management Planning and Analysis	Objective: Use the travel management planning and analysis processes to develop measures to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources during road management activities. Explanation: Road management related planning includes travel analyses as well as consideration of road management objectives and maintenance levels to address access needs and adjustments for projects. Planning occurs at scales that range from forestwide assessments and plans, to watershed scale or project-level analyses, to individual road activities. Effects to soil, water quality, and riparian resources are evaluated during planning and balanced with the social, economic, and land management needs of the area. Appropriate protection and mitigation measures are considered when soil, water quality, and riparian resources may be adversely impacted. Travel analysis is conducted at a scope and scale determined by the line officer and used to inform future project decisions on the benefits and risks of, as well as the ongoing need for, the transportation system. Project-level travel analyses are conducted to inform decisions and facilitate vegetation, fire and fuels, rangeland, recreation, minerals, or other management actions. Such analyses contain detail on the condition of individual roads. Options for road management are shown in figure 3. Road Management Objectives (RMOs) are developed and documented for each system road and include the intent and purpose in providing access to implement the land management plan. In addition to considering route needs at the site scale, RMOs also document the purpose of the road (access needs) along with operational maintenance levels and objectives. Practices: See Page 105-107, Volume 1: National Core BMP Technical Guide (USFS 2012)
Road-2	Road Location and Design	Objective: Locate and design roads to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources. Explanation: Roads are located according to standards and specifications to meet their use objectives while protecting other resources. Well-defined project objectives are needed to locate and design roads that will best address environmental and resources issues as well as road use, safety, and traffic requirements. New roads can be designed to avoid or minimize adverse effects to soil, water quality, and riparian resources, while existing roads may need to be redesigned or relocated to mitigate such effects. Management needs have changed considerably since most NFS roads were constructed. Influences of roads on aquatic and riparian systems are currently better understood. Designs for improvements to existing roads often revise the original design to change location, drainage, crossing type or size, or surfacing. Improvements to the road system are made on a priority basis that considers road and resource condition, values at risk, available funding, and cost. In addition, some situations may require adherence to special conditions associated with Clean Water Act (CWA) 401 certification, CWA 402 permits, and CWA 404 permits. State and local entities may also provide guidance and regulations such as a Forest Practices Act or a Stream Alteration Act. Land management plans often contain direction on location of roads relative to streams, wetlands, and unstable landforms. Practices: See Page 108-109, Volume 1: National Core BMP Technical Guide (USFS 2012)
Road-3	Road Construction and Reconstruction	Objective: Avoid or minimize adverse effects to soil, water quality, and riparian resources from erosion, sediment, and other pollutant delivery during road construction or reconstruction. Explanation: During road construction and reconstruction activities, vegetation and ground cover is removed exposing soil to erosion. Temporary and long-term erosion control and stormwater management measures are necessary to reduce erosion and maintain overall slope stability. These erosion control measures may include vegetative and structural practices to ensure long-term stability of the area. Practices: See Page 110-111, Volume 1: National Core BMP Technical Guide (USFS 2012)

BMP NO.[1]	TITLE	DESCRIPTION
Road-4	Road Operations and Maintenance	Objective: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources by controlling road use and operations and providing adequate and appropriate maintenance to minimize sediment production and other pollutants during the useful life of the road. Explanation: Control of road use and operations and appropriate maintenance can protect road investment and soil, water quality, and riparian resources. Periodic inventory and assessment that determine road condition are used to determine operational controls and maintenance needs. Operational objectives and activities are documented in the RMOs. In travel management decisions, roads open to motorized vehicle use are designated by allowed vehicle class and, if appropriate, by time of year. Road operations include administering permits, contracts, and agreements, controlling allowed use, maintaining roads in closed status, and revising maintenance levels and seasonal closures as needed. Road closures and restrictions are necessary because many forest roads are designed for dry season use. Many local roads are not surfaced; while others have some surfacing but little to no base. Such roads can be damaged by use during wet periods or by loads heavier than the road was designed to convey. Properly maintained road surfaces and drainage systems can reduce adverse effects to water resources by encouraging natural hydrologic function. Roads and drainage systems normally deteriorate because of traffic, weather, and age. In addition, roads occasionally become saturated by groundwater springs and seeps after a wildfire or unusually wet periods. Many such conditions can be corrected by timely maintenance. While routine maintenance is needed to ensure the road performs as designed, however, it can also be a source of soil disturbance, concentrated flow, sediment production, and slope instability if done improperly. Lower impact maintenance techniques may be desired to minimize disturbance of stable sites. Practices: See Page 112-114, Volume 1: National Core BMP Technical Guide (USFS 2012)
Road-5	Temporary Roads	Objective: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources from the construction and use of temporary roads. Explanation: Temporary roads may be used in situations where access needs are short-term and the roads canbe constructed without requiring advanced engineering design or construction practices to avoid, minimize, or mitigate adverse effects to resources. Practices related to road location and stormwater and erosion control should be applied to temporary roads. Temporary roads are to be decommissioned and the area returned to resource production after the access is no longer needed. Practices: See Page 114-115, Volume 1: National Core BMP Technical Guide (USFS 2012)

BMP NO.[1]	TITLE	DESCRIPTION
Road-6	Road Storage and Decommissioning	Objective: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources by storing closed roads not needed for at least 1 year (Intermittent Stored Service) and decommissioning unneeded roads in a hydrologically stable manner to eliminate hydrologic connectivity, restore natural flow patterns, and minimize soil erosion. Explanation: Roads not needed for access for long periods (greater than 1 year) may be put into storage (Intermittent Stored Service—Maintenance Level 1) to reduce maintenance costs. Level 1 roads receive basic custodial maintenance focusing on maintaining drainage facilities and runoff patterns to avoid or minimize damage to adjacent resources and to perpetuate the road for future use. The integrity of the roadway is retained to the extent practicable and measures are implemented to reduce sediment delivery from the road surface and fills and reduce the risk of crossing failure and stream diversion. Roads no longer needed are identified during transportation planning activities at the forest, watershed, or project level. The former road may be decommissioned or converted to a trail as appropriate. Decommissioned roads are stabilized and restored to a more natural state to protect and enhance NFS lands. Temporary roads constructed for a specific short-term purpose (e.g., ski area development, minerals exploration, or timber harvesting) are decommissioned at the completion of their intended use. Road decommissioning includes a variety of treatments to block the road, revegetate the road surface, restore surface drainage, remove crossing structures and fills, mitigate road surface compaction, re-establish drainageways, remove unstable road embankments, and recontour the surface to restore natural slopes. One or more treatments are applied to decommission the road depending on resource objectives and cost. Practices: See Page 115-117, Volume 1: National Core BMP Technical Guide (USFS 2012)
Road-7	Stream Crossings	Objective: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources when constructing, reconstructing, or maintaining temporary and permanent waterbody crossings. Explanation: Forest and grassland management activities often occur in areas that require surface waters to be crossed. Depending on the activity type and duration, crossings may be needed permanently or temporarily. Permanent crossings, in general, are more durable and are designed by an engineer to meet applicable standards while also protecting water quality and riparian resources. Examples of crossings include culverts, bridges, arched pipes, low-water crossings, vented fords, and permeable fills. Crossing materials and construction will vary based on the type of access required, duration of need, and volume of use expected. Crossings should be designed and installed to provide for flow of water, bedload, and large woody debris, desired aquatic organism passage, and to minimize disturbance to the surface and shallow groundwater resources. Construction, reconstruction, and maintenance of a crossing usually requires heavy equipment to be in and near streams, lakes, and other aquatic habitats to install or remove culverts, fords, and bridges, and their associated fills, abutments, piles, and cribbing. Such disturbance near the waterbody can increase the potential for accelerated erosion and sedimentation by altering flow paths and destabilizing streambanks or shorelines, removing vegetation and ground cover, and exposing or compacting the soil. Use of heavy equipment has a potential for contaminating the surface water from vehicle fluids or introducing aquatic nuisance species. Some crossings may require adherence to special conditions associated with CWA 401 certification or CWA 404 permits. State and local entities may also provide guidance and regulations such as a Forest Practices Act or a Stream Alteration Act. Practices: See Page 117-120, Volume 1: National Core BMP Technical Guide (USFS 2012)

BMP NO.[1]	TITLE	DESCRIPTION
Road-8	Snow Removal and Storage	Objective: Avoid or minimize erosion, sedimentation, and chemical pollution that may result from snow removal and storage activities. Explanation: Snow removal from roads and parking areas may adversely affect water quality and riparian resources in several ways. Plowing may physically displace native or engineered surfaces on roads, damage drainage structures, or alter drainage patterns. Plowing may also remove protective soil cover (e.g., vegetation or mulch). These changes can result in concentrated flow, increased erosion, and greater risk of sediment delivery to waterbodies. Snow piled in large mounds or berms, or in sensitive areas, may contribute to increased run-off, hill slope erosion, mass slope instability, and in-channel erosion from snowmelt. Snow stored in riparian areas and floodplains may compact soils, break or stunt vegetation, or channel runoff in undesirable patterns, thereby weakening the buffering capacity of these areas. Additionally, both snow removal and storage may result in additions of salts or fine aggregates used for de-icing or traction control and other vehicle pollutants directly to surface water and indirectly to both surface water and groundwater during runoff. Practices: See Page 121-122, Volume 1: National Core BMP Technical Guide (USFS 2012)
Road-9	Parking and Staging Areas	Objective: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources when constructing and maintaining parking and staging areas. Explanation: Parking and staging areas on NFS lands may be permanent or temporary and are associated with a variety of uses including administrative buildings, developed recreation sites, trailheads, and forest management projects. These parking facilities sometimes constitute large areas with little or no infiltration capacity. Runoff from these areas can create rills or gullies and carry sediment, nutrients, and other pollutants to nearby surface waters. Practices: See Page 122-123, Volume 1: National Core BMP Technical Guide (USFS 2012)
Road-10	Equipment Refueling and Servicing	Objective: Avoid or minimize adverse effects to soil, water quality, and riparian resources from fuels, lubricants, cleaners, and other harmful materials discharging into nearby surface waters or infiltrating through soils to contaminate groundwater resources during equipment refueling and servicing activities. Explanation: Many activities require the use and maintenance of petroleum-powered equipment in the field. For example, mechanical vegetation management activities may employ equipment that uses or contains gasoline, diesel, oil, grease, hydraulic fluids, antifreeze, coolants, cleaning agents, and pesticides. These petroleum and chemical products may pose a risk to contaminating soils, surface water, and groundwaters during refueling and servicing the equipment. BMP Fac-6 (Hazardous Materials) provides additional guidance for handling hazardous materials. Practices: See Page 123-124, Volume 1: National Core BMP Technical Guide (USFS 2012)

BMP NO.[1]	TITLE	DESCRIPTION
Road-11	Road Storm-Damage Surveys	Objective: Monitor road conditions following storm events to detect road failures; assess damage or potential damage to waterbodies, riparian resources, and watershed functions; determine the causes of the failures; and identify potential remedial actions at the damaged sites and preventative actions at similar sites. Explanation: Large storms stress road systems in multiple ways: large volumes of water are transported on road surfaces and through its drainage systems; significant volumes of water and debris are transported through stream crossings; and elevated pore pressures on unstable hillslopes, road cutslopes, and fillslopes sometimes generate mass failures. All road drainage systems, stream crossings with culverts, and unstable slopes have the potential to fail during periods of high runoff. The probabilities of failure differ greatly, and the potential consequences to water quality and designated uses vary dramatically from no impacts to severe and long-term impacts to aquatic systems.Surveying roads during or soon after storms is critical to timely detection of these problems. Observation of problems caused by storm runoff is of great value in understanding both the causes of failure and in adapting designs and prescriptions that reduce both the probability and consequences of future road failures. Over time, this kind of monitoring illustrates how and where roads can fail and points readily to practice modifications that can reduce adverse effects to water quality and watershed function. The Emergency Relief for Federally Owned Roads (ERFO) Program is intended to help assess and fund the unusually heavy expenses associated with repairing and reconstructing Federal roads and bridges seriously damaged by a natural disaster over a wide area or catastrophic failure. To qualify for this type of funding, applications for repair must be submitted to the Federal Highways Administration through the ERFO program (FSM 7700). Practices: See Page 125, Volume 1: National Core BMP Technical Guide (USFS 2012)
Veg-1	Vegetation Management Planning	Objective: Use the applicable vegetation management planning processes to develop measures to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources during mechanical vegetation treatment activities. Explanation: Vegetation on NFS lands is managed for a variety of purposes to achieve land management plan desired conditions, goals, and objectives for many resources. Planning for vegetation management generally follows a sequence of steps. The gathering and assessment of data involves evaluating the current condition of the vegetation compared to land management plan desired conditions, goals, and objectives. Potential vegetation treatment options to move the site towards desired conditions are developed and compared. Detailed treatment prescriptions are prepared to implement the preferred treatment option. The project is subjected to the National Environmental Policy Act (NEPA) analysis process where alternatives are developed and effects are analyzed. A decision is made and implemented. During the development of vegetation treatment prescriptions and alternatives, site specific measures consistent with BMP guidance to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resource are identified and included in the project as design criteria or mitigation measures. These BMP prescriptions are incorporated into the timber sale contract, stewardship contract, or project plan. Vegetation management for scheduled timber harvest on NFS lands has additional specific requirements from the National Forest Management Act that are incorporated into the project in the planning process. Scheduled timber harvest can occur only where watershed conditions will be maintained, lands can be adequately restocked within 5 years after final regeneration harvest, and water quality will be protected. Practices: See Page 129, Volume 1: National Core BMP Technical Guide (USFS 2012)

BMP NO.[1]	TITLE	DESCRIPTION
Veg-2	Erosion Prevention and Control	Objective: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources by implementing measures to control surface erosion, gully formation, mass slope failure, and resulting sediment movement before, during, and after mechanical vegetation treatments. Explanation: Prevention and control of erosion on areas undergoing mechanical vegetation treatments is critical to maintaining water quality. The process of erosion control has three basic phases: planning, implementation, and monitoring. During planning, areas subject to excessive erosion, detrimental soil damage and mass failure can be identified and avoided. Also during planning, treatments can be designed and units laid out to minimize or mitigate damage to soils, streambanks, shorelines, wetlands, riparian areas, and water quality. Planning for erosion control is addressed in BMP Plan-2 (Project Planning and Analysis) and BMP Veg-1 (Vegetation Management Planning). Suitable erosion control measures are implemented while the mechanical vegetation treatment is ongoing and following project completion. Inspection and maintenance of implemented measures will ensure their function and effectiveness over their expected design period. The potential for accelerated erosion or other soil damage during or following mechanical treatments depends on climate, soil type, site conditions, and type of equipment and techniques used at the site. Erosion control measures are grouped into two general categories: structural measures to control and treat runoff and increase infiltration and nonstructural measures to increase ground cover. Many erosion control handbooks, technical guides, and commercial products are available. Both structural and nonstructural measures require onsite expertise to ensure proper design and implementation to conform to local site characteristics. Practices: See Page 131-132, Volume 1: National Core BMP Technical Guide (USFS 2012)
Veg-3	Aquatic Management Zones	Objective: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources when conducting mechanical vegetation treatment activities in the AMZ. Explanation: Designation of an AMZ around and adjacent to waterbodies is a typical BMP to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources. Mechanical vegetation treatments are a tool that can be used within the AMZ to achieve a variety of resource-desired conditions and objectives when implemented with suitable measures to maintain riparian and aquatic ecosystem structure, function, and processes. Depending on site conditions and resource desired conditions and objectives, mechanical vegetation treatments in the AMZ could range from no activity or equipment exclusion to purposely using mechanical equipment to create desired disturbances or conditions. When treatments are to be used in the AMZ, a variety of measures can be employed to avoid, minimize, or mitigate soil disturbance, damage to the waterbody, loss of large woody debris recruitment, and shading, and impacts to floodplain function. Practices: See Page 132-134, Volume 1: National Core BMP Technical Guide (USFS 2012)
Veg-8	Mechanical Site Treatment	Objective: Avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources by controlling the introduction of sediment, nutrients, chemical, or other pollutants to waterbodies during mechanical site treatment. Explanation: Mechanical treatments are used to remove or reduce the amount of live and dead vegetation on a site to meet management objectives, such as site preparation for reforestation, fuel treatments to reduce fire hazards, wildlife habitat improvement, recreation access, utility corridor maintenance, and other activities that require removing vegetation from specified areas on a periodic and repeated basis. Mechanical treatments include cutting and piling; chipping or mulching; roller chopping or masticating using heavy equipment; and pushing over vegetation. Disturbance from mechanical site treatments can expose and compact soils, resulting in accelerated runoff and erosion. Practices: See Page 139, Volume 1: National Core BMP Technical Guide (USFS 2012)

Notes: [1] The best management practice numbers in Table 20 correspond to the best management practice numbers in Table C.4-1 in Appendix C of the TWE Project Final EIS.

8.3.6 ESA Species Conservation Measures Adopted in the ROD

This section and Table 21 will describe the conservation measures for plants and wildlife listed as threatened or endangered under the Endangered Species Act. As these measures are not currently available, this section appears as a place holder in this document. Following publication of BLM's Record of Decision for the TWE Project, Table 21 will be completed in compliance with Applicant Committed Environmental Mitigation Measure TWE-31 (Table 16) which provides that "Mitigation measures that will be developed during the consultation period with the BLM and the U. S. Fish and Wildlife Service under Section 7 of the ESA and adopted in the ROD will be adhered to, along with mitigation developed in conjunction with state authorities as required in any applicable permit", and various mitigation measures contained in Table 17 that refer to the TWE Project Biological Assessment and Biological Opinion for measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to threatened or endangered species. These conservation measures will be applied to the TWE Project as required in BLM's Record of Decision and are all applicable to the Wildlife and Plan Conservation Measures Plan (Appendix X).

TABLE 21 RESERVED

8.4 Selective Mitigation by Milepost

To be provided in the NTP POD.

TABLE OF CONTENTS

9.0 REFERENCES 9-1

9.0 REFERENCES

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APPENDIX A
FRAMEWORK ACCESS ROAD SITING AND MANAGEMENT PLAN

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ACRONYMS

Applicant	TransWest Express LLC, also TransWest
AUMs	a unit of measure equal to the amount of forage needed to sustain one animal unit (or its equivalent) for one month
BLM	Bureau of Land Management
BMP	Best Management Practice
CDOT	Colorado Department of Transportation
EMM	Environmental Mitigation Measure
FSH	Forest Service Handbook
FSM	Forest Service Manual
IRAs	Inventories Roadless Areas
NDOT	Nevada Department of Transportation
NFS	National Forest System
NTP	Notice to Proceed
Plan	Access Road Siting and Management Plan
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
ROD	Record of Decision
ROW	right-of-way
SWPPP	Stormwater Pollution Prevention Plan
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
UDOT	Utah Department of Transportation
USACE	United States Army Corps of Engineers
USFS	United States Forest Service
WDOT	Wyoming Department of Transportation

A1.0 INTRODUCTION

This framework Access Road Siting and Management Plan (Plan) addresses regulatory compliance, access road management practices, design features and Best Management Practices (BMPs) to reduce environmental impacts related to construction of new access roads during construction of the TransWest Express Transmission Project (TWE Project or Project) by TransWest Express LLC (TransWest or Applicant) and its Construction Contractor(s).

A2.0 PLAN PURPOSE

The purpose of this plan is to provide the Bureau of Land Management (BLM), U.S. Forest Service (USFS) and other agencies with a description of the types and location of access roads associated with the construction, operation, and maintenance of the Project. The goal of this Plan is to establish management practices and mitigation measures that, when implemented, will avoid and minimize impacts from construction of the transmission line and any associated access roads. These practices and measures are intended to mitigate the effects of construction access on environmental resources.

A3.0 PLAN UPDATES

The initial layout of all access roads to each structure location for the selected Agency Preferred Alternative is provided on the TWE Project Constraints, Access Roads and Work Area Details map book in Appendix AA of this Record of Decision (ROD) Plan of Development (POD). Detailed mapping of existing improved roads, existing roads requiring improvement, and new roads are provided. The Notice to Proceed (NTP) POD will include final field verified access road layouts specific to each construction segment. TransWest will be responsible for developing the final Access Road Siting and Management Plan. Local BLM Field Offices may require field verification to approve the final Access Road Siting and Management Plan.

A4.0 REGULATORY

A number of agencies have jurisdiction over the transportation-related components of the Project. These include the BLM, the USFS, Wyoming Department of Transportation (WDOT), Colorado Department of Transportation Department (CDOT), Utah Department of Transportation (UDOT), Nevada Department of Transportation (NDOT), Federal Highway Administration, local law enforcement and road departments, and local highway districts in the counties crossed by the Project. The Construction Contractor must file encroachment and oversized vehicle permit applications with appropriate road agencies prior to construction for those areas where the transmission line crosses public roads or where oversized vehicles will be used on public roads.

Other permits and approvals not directly related to transportation could affect the construction, use, and/or maintenance of roads in certain areas. Persons responsible for Project transportation activities must be familiar with all relevant sections of the Project's POD, of which this Plan is a part.

Where new roads are required or where improvements to existing roads are required, access roads will be designed in accordance with standards and guidelines for Non-constructed Roads and Routes as described in "The Gold Book – Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development" (AASHTO 2006). Portions of the access road network requiring design and construction to a more stringent standard will be identified in this Access Road Siting and Management Plan to be submitted with the NTP POD.

On BLM-managed lands, new road construction and existing roads improved for Project use in some locations may be required to meet or exceed the minimum standards of width, alignment, grade,

surface, and other requirements presented in the BLM Travel Management Program and BLM Manual Section 9113 (BLM 1985). On USFS lands, road construction and existing roads improved for Project use in some locations may be required to comply with the Forest Service Manual (FSM) (USFS 1999a) and Forest Service Handbook (FSH) (USFS 1999b). Some example sections relative to the Project are FSH 7709.56 – *Road Preconstruction Handbook (Forest Service 2010)*, FSH 7709.57 – *Road Construction Handbook (Forest Service 1992)*, and 7709.58 – *Transportation System Maintenance Handbook (Forest Service 2009b).*

Existing travel and transportation networks identified in BLM and USFS land use plans or travel management plans were used as guidance for the identification and siting of access roads for the Project. These federal plans are designed to provide decision-makers with information to manage road systems that are safe and responsive to public needs and desires, are economically and efficiently managed, and have minimal negative ecological impacts on the land. The plans include designated areas for motorized use, prohibition of some uses to protect resources, or limitations on road use at certain times of the year for resource protection.

No new or improved access roads may be sited within USFS Inventoried Roadless Areas (IRA). IRAs are identified as areas of National Forest Service (NFS) land currently inventoried for planning purposes as roadless. The 2001 Roadless Area Conservation Rule does not prohibit special use developments, but generally does prohibit the construction or reconstruction of any roads associated with these uses within the boundaries of an IRA. Construction of any portions of the TWE Project which fall within IRA or other areas where access road construction is prohibited or restricted will follow the Roadless Construction Methods described in Section 5.7.3 of the ROD POD.

A5.0 ACCESS ROAD MANAGEMENT PRACTICES

With the exception of IRAs and other sensitive areas identified by land management agencies, the TWE Project will require surface access to all structures and work areas during construction to allow vehicles and equipment to access the location of each transmission structure. Existing public roads will be used as the backbone access road network to access the Selected Alternative. Construction of new access roads will be required only as necessary to access structure sites lacking direct access from existing roads, or where topographic conditions (e.g., steep terrain, rocky outcrops, and drainages) prohibit safe overland access to the site. New access road layouts will require the appropriate approvals from jurisdictional agencies.

A route-specific plan will be developed for the Selected Alternative and will be described within the Access Road Siting and Management Plan to be submitted with the NTP POD. The types of access including backbone access, existing access with improvements, overland access and proposed new access will be identified. A detailed map book will be provided showing the location of the 250-foot-wide transmission line right-of-way (ROW), proposed structure locations, backbone access network, and existing access that do not require improvements, existing access that require improvements, and new access to be constructed. The surface type (gravel, paved or other) and terrain type (flat, rolling, steep and mountainous) will also be defined. The detailed Plan for the Selected Alternative will be used to define location-specific mitigation measures, as needed.

Prior to construction, authorized access roads and associated limits of disturbance will be clearly delineated and marked in the field. The Construction Contractor(s) will review the location of approved access and will be responsible for ensuring construction travel is limited to those approved access roads and limits of disturbance.

All field personnel will attend an environmental training program. As part of this program, field personnel will be instructed to use only approved access roads, drive within the limits of disturbance,

obey posted and jurisdictional speed limits, and become familiar with the Flagging, Fencing and Signage Plan (Appendix I).

A6.0 DESIGN FEATURES AND BEST MANAGEMENT PRACTICES

In addition to applicable design and operational standards, regulations, laws and permit requirements, the following design features and BMPs are intended to help reduce impacts related to construction of new access roads.

> **TWE-5**: The POD will display the location of Project infrastructure (e.g.,. towers, access roads, substations) and identify short-term and long-term land and resource impacts and the mitigation measures that will be implemented for site-specific and resource-specific environmental impacts.
>
> **TWE-6:** The POD will include an Access Road Siting and Management Plan that incorporates relevant agency standards regarding road design, construction, maintenance, and decommissioning. The Access Road Siting and Management Plan will incorporate BMPs, stipulated by the agencies in their respective decision documents and permits.
>
> **TWE-8:** Crossings of streams and waterways will be done in compliance with federal, state, and local regulations. Roads will be built as near as possible at right angles to the streams and washes (Arizona crossing). Culverts will be installed where necessary. All construction and maintenance activities will be conducted in a manner that will minimize disturbance to vegetation, drainage channels, and intermittent or perennial stream banks. In addition, fugitive dust will be controlled during road construction as required by state and local permits. All existing roads will be left in a condition equal to, or better than, their condition prior to the construction of the transmission line. Structures will be sited with a minimum distance of 200 feet from streams, wherever possible.
>
> **TWE-9:** All construction vehicle movement outside the ROW will be restricted to pre-designated access or public roads.
>
> **TWE-12:** Except for repairs necessary to make roads passable, no widening or upgrading of existing access roads will be undertaken in the area of construction and operation, where soils or vegetation are sensitive to disturbance. In designated areas, structures will be placed to avoid sensitive features such as, but not limited to, riparian areas, water courses and cultural sites, or to allow conductors to clearly span the features within limits of standard structure design. This will minimize the amount of disturbance to the sensitive feature or reduce visual contrast.

For a list of additional mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

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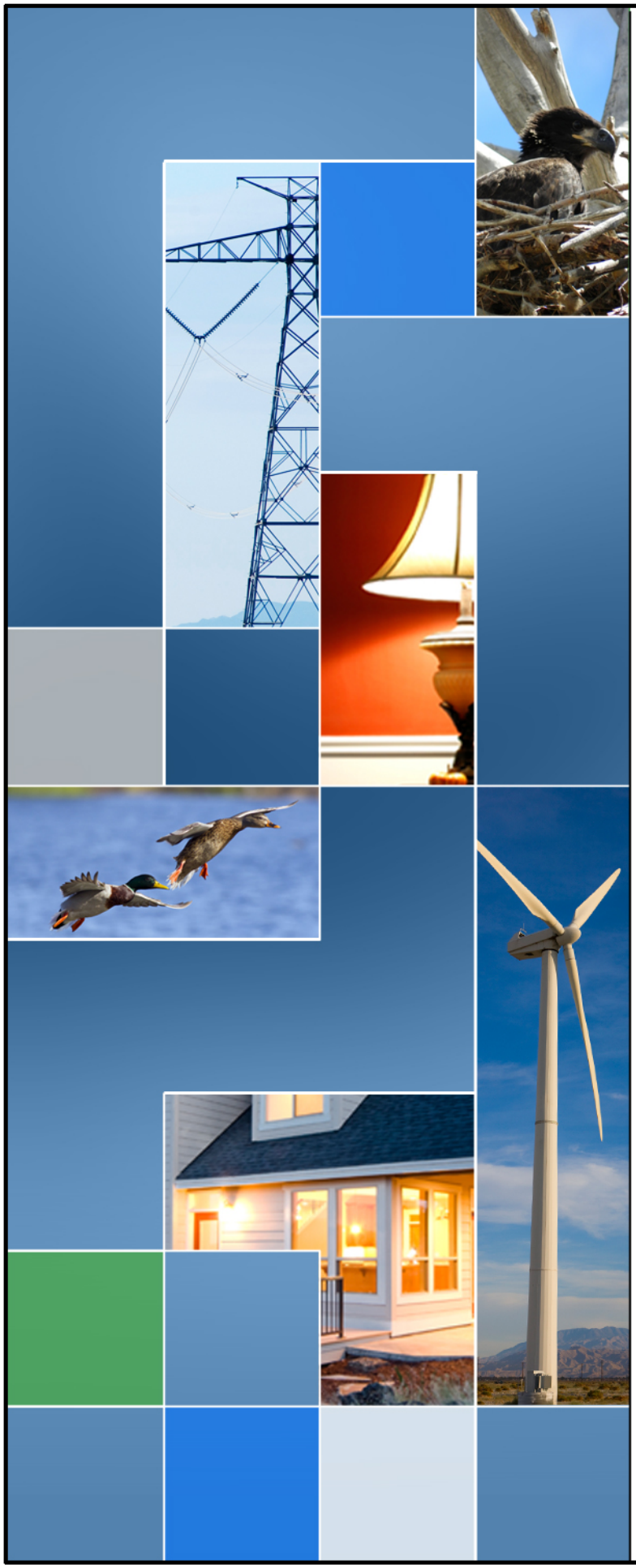
APPENDIX B
AVIAN PROTECTION PLAN



Avian Protection Plan

Prepared by

TRANSWEST EXPRESS LLC

November 2015

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1.0 INTRODUCTION

TransWest Express LLC (TransWest), based in Denver, Colorado, is an independent transmission developer committed to responsible practices across all aspects of transmission line siting, engineering, and operations. These practices are based on science and best guidelines and procedures from the electric transmission industry and are designed to avoid and minimize potential impacts on avian species while maintaining safe, reliable, cost effective bulk electric service.

TransWest is developing the TransWest Express Transmission Project (the TWE Project or Project), a ±600 kilovolt (kV) extra-high voltage (EHV) direct current (DC) regional electric transmission system extending from south-central Wyoming to southern Nevada. The TWE Project will reliably deliver cost-effective renewable energy produced in Wyoming to the Desert Southwest region (California, Nevada, Arizona), ultimately helping contribute to a cleaner world, strengthen the electric grid, and provide much-needed electricity to millions of homes and businesses every year. The TWE Project will deliver enough clean, sustainable energy to power nearly 2 million homes and reduce greenhouse-gas emissions equivalent to taking 1.5 million cars from the road.

The TWE Project begins at a northern terminal near Sinclair, Wyoming and terminates at a southern terminal at the Marketplace Hub in the Eldorado Valley near Boulder City, Nevada. At each of the terminals, there will be an alternating current/direct current (AC/DC) converter station designed to convert the DC current carried by the TWE Project to AC current to be carried on the western United States AC electrical grid (the northern and southern terminals). The TWE Project also has the option of constructing an AC/DC converter station near Delta, Utah depending on future market conditions. The TWE Project is planned to interconnect into the Eldorado Substation, the McCullough Switching Station, the Marketplace Substation and the Mead Substation. The TWE Project will also include, among other facilities, two ground electrode systems and a low voltage overhead line to connect the ground electrode system to each AC/DC converter. The low voltage overhead line will be similar to a 34.5 kV subtransmission line.

2.0 BACKGROUND

TransWest is committed to protecting avian species that occur within the vicinity of its facilities. This Avian Protection Plan (APP) has been developed to protect resident and migrant birds that may interact with the TWE Project. TransWest is committed to maintaining the reliability of the TWE Project in a cost effective manner while meeting the regulatory requirements to conserve avian species. The responsibility of effectively improving avian safety and minimizing avian risk at its facilities lies with both TransWest management and its employees.

To this end, TransWest will:

- Implement this APP;
- Ensure that its actions comply with the most recent applicable laws, regulations, and permits, and incorporate as applicable Avian Power Line Interaction Committee (APLIC) guidelines;
- Document bird mortalities; problem structures or locations; and problem nests;
- Provide information, resources, and training to improve its employees' knowledge and awareness of avian protection and the implementation of the TransWest avian protection program;
- Identify key TransWest personnel responsible for ensuring accountability and compliance with this APP;

- Identify key U.S. Fish and Wildlife Service (USFWS) personnel responsible for reporting and permitting; and
- Maintain the integrity of the transmission line and repair or retrofit structures as necessary if impacts to avian species are detected.

The purpose of this APP is to establish a program to manage avian safety on the TWE Project. This APP has been developed consistent with APLIC's principles of avian protection (APLIC 2005) to support TransWest's commitment to reduce impacts to avian resources. This APP supports compliance with the Migratory Bird Treaty Act (MBTA) of 1918 (16 United States Code [U.S.C.] §§703 – 712), the Bald and Golden Eagle Protection Act (BGEPA) of 1940 (16 U.S.C. §§668 – 668d), and the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. §§1531 – 1544), and appropriate state requirements. Plans, methods, and direction are outlined to ensure that birds are protected on TransWest facilities associated with the TWE Project, providing a framework for documenting the success of TransWest's good-faith efforts to protect avian species and to comply with the laws and regulations discussed in Section 2.1.

This APP has been written with consideration to and guidance from the data and suggestions presented in APLIC's Mitigating Bird Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012), Avian Protection Plan Guidelines (APLIC 2005) and Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 (APLIC 2006). In addition, existing information on bird use in the Project area will be combined with pre-construction Project-specific survey information to effectively address avian safety specific to the long-term operation of the TWE Project. The protective measures and methods described in this document provide a mechanism for implementing and tracking mitigation measures to operate the TWE Project in the most avian safe manner possible.

The key TransWest staff member responsible for ensuring accountability and compliance with this APP is the APP Program Coordinator. The APP Program Coordinator may be contacted at 303-298-1000.

The key USFWS personnel shall be the Region 6 Migratory Bird Program Office. The office may be contacted at 303-236-7905.

2.1 Scope and Limitations

This APP presents a program of specific actions implemented comprehensively to support avian safety on the TWE Project. It is not to be considered a delineation of legal requirements. Instead, it provides guidance for achieving and maintaining legal compliance under the regulations related to avian protection, minimizing avian-related interruptions in service, and documenting efforts to improve avian safety.

TransWest has set the overall goal of advancing progress toward an avian safe transmission system. Through a policy of avian protection, TransWest will improve its service to customers, ensure regulatory compliance, reduce costs, and document good-faith efforts to diminish risks to avian species. As such, this plan is considered a "living document" and is intended to be revised and updated as goals are achieved, innovative solutions are developed to mitigate impacts, agency guidance is adjusted, and conditions of the TWE Project warrant.

3.0 AVIAN PROTECTION PLAN PURPOSE AND NEED

Under certain conditions, power lines may present risk to avian species (APLIC 2006). However, empirical data is highly limited and usually site-specific, which allows for broad estimates of risk based on a series of assumptions. While the exact risk or level of impacts may be difficult to quantify,

the most obvious risks from power lines are associated with birds directly contacting facilities and being killed either by electrocution or impact. In addition, birds nesting on utility structures may face increased risk of mortality by regularly maintaining close contact with transmission structures. Such risks also become costly to the utility company because of the risk of outages due to fault-triggering electrocutions, contact of nesting material with energized elements, prey falling on live equipment, and flashover caused by bird waste (streamers). Regulatory agencies and utilities recognize that avian interactions can be ecologically significant events and have worked collaboratively (through organizations such as APLIC) for several decades to reduce both system and avian impacts.

One mechanism for utilities to cooperatively engage agencies on operational avian safety issues is the APP. This APP exclusively addresses TransWest's avian protection program for construction as well as operations and maintenance (O&M), and initiates an avian safety framework for the life of the TWE Project.

The TWE Project area spans approximately 730 miles of four western states. It passes through landscapes considered ecologically diverse because of their species' richness and endemicity. The extreme northeastern portion of the Project crosses the Central Flyway, a north south migration flyway along the eastern slope of the Rocky Mountains. The remainder of the Project occurs within the Pacific Flyway (USFWS 2012). Southern Utah and Nevada, with their mild climate, is a wintering destination for many migrant birds.

As a responsible corporation, TransWest strives to protect ecosystems and safeguard wildlife. Stewardship of the West's natural resources is the impetus for this avian protection program. There are four factors underlying the development of the program which are briefly presented in this section:

- Federal and State laws and regulations
- Conditions of approval and requirements identified in the right-of-way grants and special use authorizations for the Project
- Reliability
- Customer relations

3.1 Applicable Laws and Regulations

Most birds are protected under one or more state or federal regulations. Below is a brief summary of laws and other regulations governing avian protection applicable to the TWE Project. Special status avian species are listed in Attachment A.

3.1.1 Federal

Migratory Bird Treaty Act (MBTA)

The Migratory Bird Treaty Act (MBTA) is the cornerstone of migratory bird conservation and protection in the United States. The MBTA implements four treaties that provide for international protection of migratory birds. It has been described as a strict liability statute, meaning that proof of intent, knowledge, or negligence is not an element of an MBTA violation. The statute's language is clear that actions resulting in a "taking" or possession (permanent or temporary) of a protected species, in the absence of an USFWS permit or regulatory authorization, are a violation of the MBTA.

The MBTA states, "Unless and except as permitted by regulations . . . it shall be unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, kill . . . possess, offer for sale, sell . . . purchase . . . ship, export, import . . . transport or cause to be transported . . . any migratory bird, any part, nest, or eggs of any such bird . . . . [The Act] prohibits the taking, killing, possession, transportation, import and export of migratory birds, their eggs, parts, and nests, except when

specifically authorized by the Department of the Interior." *16 U.S.C. § 703.* The word "take" is defined by regulation as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." *50 C.F.R. § 10.12.*

USFWS maintains a list of all species protected by the MBTA at 50 C.F.R. § 10.13. This list includes over one thousand species of migratory birds, including eagles and other raptors, waterfowl, shorebirds, seabirds, wading birds, and passerines. The MBTA does not protect introduced species such as the house (English) sparrow, European starling, rock dove (pigeon), Eurasian collared-dove, and non-migratory upland game birds. The USFWS maintains a list of introduced species not protected by the Act. *See* 70 Fed. Reg. 12,710 (2005).

The MBTA provides criminal penalties for persons who commit any of the acts prohibited by the statute in Section 703 on any of the species protected by the statute. *See 16 U.S.C. § 707.*

Endangered Species Act

In addition to the MBTA, some at risk bird species in the United States receive further protection under the Endangered Species Act of 1973 (16 U.S.C. §§1531-1544, as amended) (ESA). The ESA protects federally listed threatened or endangered species and their habitats from unlawful take, where "take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." It also prohibits the illegal import, export, carrying, transport, or shipment of any listed species without authorization from the Secretary of the Interior. With a submitted conservation plan, the Secretary may permit exceptions for scientific purposes, the propagation or survival of the affected species, or for instances where "taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." Violations of the ESA can result in civil penalties or, criminal violations.

Bald and Golden Eagle Protection Act

Under the authority of the Bald and Golden Eagle Protection Act (BGEPA), 16 U.S.C. §§ 668–668d, bald eagles and golden eagles are afforded additional legal protection. BGEPA prohibits the "take, sale, purchase, barter, offer of sale, purchase, or barter, transport, export or import, at any time or in any manner of any bald or golden eagle, alive or dead, or any part, nest, or egg thereof." *See 16 U.S.C. § 668.* BGEPA also defines take to include "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb," 16 U.S.C. § 668c, and includes criminal and civil penalties for violating the statute. *See 16 U.S.C. § 668.* USFWS has further defined the term "disturb" as agitating or bothering an eagle to a degree that causes, or is likely to cause, injury, or either a decrease in productivity or nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior. *See 50 C.F.R. § 22.3*. BGEPA authorizes the USFWS to permit the take of eagles for certain purposes and under certain circumstances, including scientific or exhibition purposes, religious purposes of Indian tribes, and the protection of wildlife, agricultural, or other interests, so long as that take is compatible with the preservation of eagles. *See generally, 16 U.S.C. § 668a.*

3.1.2 State

State-specific regulations regarding species addressed in this APP have not been identified at this time.

3.2 Conditions of Approval and Requirements

TransWest will acquire all applicable federal, state, and local permits, licenses and agreements necessary to construct, operate and maintain the TWE Project. These authorizations that may be required for the TWE Project are listed in Section 1.7 of the TWE Project Plan of Development. TransWest has filed an application for Transportation and Utility Systems and Facilities on Federal Land (SF 299) for the TWE Project with the Bureau of Land Management (BLM) for the right-of-way grants necessary to construct, operate and decommission the TWE Project on federal land. The

BLM determined that responding to TransWest's right-of-way application required the preparation of an Environmental Impact Statement (EIS) under the National Environmental Policy Act of 1969, as amended (NEPA). Western Area Power Administration, a Federal power marketing administration within the United States Department of Energy (Western), is acting as a joint lead agency with the BLM in the preparation of the EIS. The other federal agencies that must authorize the TWE Project, i.e. the Bureau of Reclamation (BOR) and U.S. Forest Service (USFS), are cooperating agencies in the preparation of the EIS.

The EIS contains a description of the environment in which the TransWest Project will be built and discloses potential impacts to resources that may be affected by the construction, operation and development of the TWE Project, including avian species. The EIS presents general practices for wildlife protection as well as conservation measures specifically addressing issues of avian protection. The BLM, Western, USFS, and BOR Records of Decision for the TWE Project may impose additional avoidance, minimization and mitigation measures for avian species beyond those set forth in this APP, including conditions required by applicable BLM Resource Management Plans and USFS Land and Resource Management Plans. If so, this APP will be updated as appropriate.

3.3 Reliability

Avian interactions with transmission systems have the potential to cause outages, result in equipment failures, shorten the lifespan of equipment, increase maintenance costs, and create safety issues. An avian-safe system increases reliability, results in fewer outages, reduces the exposure to risks for company personnel that respond to outages, and leads to less replacement of expensive equipment.

3.4 Customer Relations

The public places a high value on reliable electric service. TransWest, through implementation of this APP, seeks to minimize potential service disruptions and outages caused by avian interactions with TWE Project facilities. Communicating a program of avian protection administered in a cost conscious manner improves customer relations and makes good business sense.

4.0 PRINCIPLES OF AVIAN PROTECTION

The roots of APLIC avian protection planning lie in the development of system-wide avian safety programs to direct new-builds, implement remedial actions and track success, expenditures and incidents. Under this framework, twelve elements of avian safety were identified (APLIC 2005):

- Corporate policy
- Training
- Permit compliance
- Construction design standards
- Nest management
- Avian reporting system
- Risk assessment methodology
- Mortality reduction measures
- Avian enhancement options
- Quality control
- Public awareness

- Key resources

As originally conceived by APLIC, these principles served as an outline for an effective plan. However, in accordance with APLIC guidance, not all APPs need to contain information about all twelve principles, as each document should be specific to an individual utility's operations, site-specific avian issues, and agency collaboration history.

The TWE Project is a new project constructed to current APLIC construction recommendations, sited and designed to ameliorate potential avian risk within the constraints of feasibility and the Project purpose and need. There are no elements of the Project involving rebuilding or retrofitting activities. In addition, there is neither history of avian safety issues nor mortality data from which to conduct a risk assessment. However, numerous mitigation measures have been developed for the TWE Project to avoid and minimize risks to avian species. For a list of mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

In the following sections, background information is provided where appropriate on how each component is relevant to the Project and how it will be implemented. As a "living document," as circumstances change, sections will be added to future revisions of this Plan.

5.0 AVIAN INTERACTIONS AND POTENTIAL ISSUES

Though power lines and associated facilities may provide some benefit to avian species through increased perching, roosting and nesting opportunities, the addition of power line structures with electrical elements also presents the potential risk of direct mortality through electrocutions and collisions. Risk of direct mortality to individual birds and local populations varies with project characteristics as well as a number of natural factors. These include bird size, flight characteristics, behavior, habitat, weather conditions, time of day, and topography. The TWE Project traverses a diverse landscape ranging from flat desert scrub, rolling chaparral, steep mountains, ridgelines, cliffs, large water bodies, streams, wetlands, and forests. In the resulting mosaic of habitats, a rich avian fauna is present with an assortment of resident and seasonally transient species. The potential exists for system elements, avian behavior, and environmental factors to interact in complex ways resulting in varying levels of risk to birds throughout the Project area. As a new project, TransWest considered risks to avian species and sought to enhance their safety through routing, siting, and design decisions. Through this APP, TransWest and agencies can continue to work collaboratively to actively minimize risk and adaptively manage the TWE Project to proactively respond to specific issues that may arise.

5.1 Avian Electrocutions

Avian electrocution may occur because of a combination of biological and electrical design factors (Janss and Ferrer 2001). Biological factors such as habitat, prey, and species, are those that influence avian use of structures. Raptors often use structures for perch-hunting, an energy-saving foraging behavior utilized by many species (APLIC 2006). Raptors and other species will use poles and towers for nesting, especially in open areas or areas where there are few natural nesting locations (Bevanger 1994; APLIC 2006).

Power lines electrocute birds when they simultaneously contact two conductors, or an energized conductor and a ground wire or grounded hardware (Bevanger 1998). Wet feathers raise the risk of electrocution for a bird by increasing conductivity. Wet feathers can conduct dangerous amperages

beginning at around 5 kV, whereas dry feathers require currents greater than 70 kV before they will begin conducting current (APLIC 2006).

Body size (wingspan and perching height) and behavior, such as perching and roosting on poles or wires, are the keys to understanding why and how birds become electrocuted. Generally speaking, some species are more prone to mortality from electrocution than from collision, primarily birds of prey and ravens (Bevanger 1998). Because of the greater vertical and horizontal spacing required on higher voltage lines, the majority of raptor electrocutions occur on lines that are energized at voltage levels of 69 kV and below. The risk of electrocution from lines energized above 69 kV is highly unlikely on properly designed and maintained facilities (APLIC 2006). An APLIC avian-safe line has horizontal spacing that has considered the "wrist-to-wrist" wingspan distance for the largest bird species likely to be at risk in the area (APLIC 2006). The TWE Project transmission line is a high voltage transmission line and therefore presents a low avian electrocution risk. Even for the largest avian species present in the Project area (California condor), the proposed vertical and horizontal separation distances between energized components and between energized components and grounded elements exceed APLIC recommendations of the "wrist-to-wrist" measurements.

The overhead ground electrode line will be designed to APLIC recommendations by ensuring that vertical and horizontal separation distances between energized components and between energized components and grounded elements meet or exceed APLIC recommendations of the "wrist-to-wrist" measurements of the largest bird that may occur within the local vicinity of the Project (golden eagles in the north and California condors in the south). The terminals for the TWE Project will also be designed to be avian safe.

Based on the above discussion, avian electrocutions on the TWE Project do not present a significant risk and will not be addressed further in this APP.

5.2 Avian Collisions

Avian collisions with transmission lines may be a major cause of avian mortality. Factors that influence collision risk can be divided into three categories: those related to the biology of the avian species, those related to the environmental conditions, and those related to the configuration and location of transmission lines (APLIC 2012, 2006; Savereno et al. 1996).

5.2.1 Biological Factors Related to Bird Collisions

Biological factors include body size, flight behavior, age, sex, habitat use, and flocking behavior. These relate to the bird's ability to detect and avoid a power line. Birds that spend an abundance of time in the air may face a greater risk of collision than those that are predominantly ground-based (Bevanger 1994). For example, swallows swarming after insects may be more likely to collide with a power line than grouse (Sporer et al. 2013). A bird's flight manner has been shown to be one of the most important factors determining the chances of collision with a transmission line, perhaps more important than the sheer frequency of birds flying near the lines (Janss 2000). Juvenile birds, which are not as familiar with their surroundings and are less experienced in both flight and landing can be expected to have a greater likelihood of colliding with transmission lines (Bevanger 1994, 1998; Dorin and Spiegel 2005). In general, birds are quick-moving, visual-orienting animals that are very adept at identifying and avoiding obstacles in their flight paths; however, large-bodied birds with low maneuverability and birds that are distracted by specific behaviors (e.g., foraging, flocking, territorial displays, competition, courtship, soaring) tend to be more likely to collide with power lines. In addition, birds that are unfamiliar with an area and its power lines (such as migrants) may be at elevated risk.

5.2.2 Environmental Conditions Related to Bird Collisions

Environmental factors influencing collision risk include the effects of weather and time of day; transmission line visibility; surrounding land use practices that may attract birds; and human activities that may flush birds toward transmission lines. Overcast weather and thick fog tends to cause birds to lower their flying altitudes. Likewise, headwinds generally cause birds to fly lower, whereas tailwinds may cause birds to fly higher (Bevanger 1994; Perdeck and Speek 1984). High winds may cause some species, especially waterfowl, to fly at lower elevations (Hunting 2002). If winds are blowing perpendicular to conductors, this can also increase collision possibility (Hunting 2002). Weather conditions may also make transmission lines more difficult to see, thus increasing the likelihood of a collision (Mathiasson 1992). Visibility can also be affected by the time of day. Additionally, lines become increasingly difficult to see at times with poor lighting, such as night, dawn, or dusk. Hunting (2002) observed increased transmission line strikes occurring at night or during poor weather. Further studies by Stout and Cornwell (1976) also emphasize the risk of power line collision that poor visibility poses to waterfowl.

Wetlands, lakes, and streams all have potential for avian risk if they are located near power lines. Because water is often used by birds for foraging, nesting and roosting activities, adjacent power lines can pose collision risks to birds that utilize these areas (APLIC 2012). Stout and Cornwell (1976) found that in a review of reported non-hunting mortality of wild waterfowl from 1930 to 1964, 65% of collision mortalities were due to telephone and power lines.

Disturbance of birds perched near power lines can pose a risk. If birds are startled into leaving a water body or feeding area adjacent to power lines, the likelihood of a bird flying into the lines increases. Wetlands tend to have a high concentration of birds nesting, feeding, roosting, and shuttling back and forth among use areas, thus adding to the collision risk with nearby transmission lines (Bevanger 1994).

Anthropogenic land use may attract birds into areas that contain transmission lines. For instance, a section of highway may be an attractant to vultures or similar scavenging species because of the presence of road-killed animals. Agriculture activities may attract birds and raptors to certain areas for foraging opportunities. Birds avoiding urban area may be funneled into transmission corridors and be exposed to the risk of collision.

5.2.3 Transmission Line Configuration and Location Related to Bird Collisions

Power line factors that may relate to avian collisions include the type of structures supporting the transmission line and their placement in the landscape. Equipment placed on the structure and the manner that conductors are arranged also influences risk. While it is believed that flat-line configurations are less of an avian risk than vertical configurations (Bevanger 1994), power line structure design has not been sufficiently analyzed to determine a specific correlation with bird collisions (Janss 2000). However, there seems to be a positive correlation between the presence of a static wire and the number of bird collisions (Bevanger 1994; Savereno et al. 1996; APLIC 2012). It is thought that when a bird sees the larger conductor wires, it increases its altitude to avoid them, and subsequently collides with the thinner, less-visible static wire. This has been supported by studies that have demonstrated an average mortality decline of 50 to 60% when markers are placed on static wires in relation to wires left unmarked (Savereno et al. 1996).

Transmission Line Location

Transmission line location may also influence the risk of collision for birds. Generally, there is more of a risk in placing a transmission line corridor in an open area than against an existing obstruction; however, the visual contrast of the conductors against the background is a consideration (Bevanger 1994). The risks to birds flying across a single corridor in an open space become dependent not only

on the line's visibility, but on the altitude of the bird and its ability to first see the transmission line wires, and then change its flight pattern to avoid them. On the other hand, lines are grouped with existing lines or against a landscape reference such as tall trees are theoretically easier to avoid. Multiple lines in one corridor allow birds to avoid several sets of lines at once (Bevanger 1994). The perpendicular placement of transmission line corridors relative to avian flyways can increase the risk posed by the lines. There is also a greater risk of collision when lines are in between areas used by birds, such as between foraging and roosting areas (APLIC 2012). The problem is compounded when the areas are close enough that only a short, low level flight is required (Bevanger 1994).

Lines placed near a ridgeline also can create a hazard. When horizontal winds get deflected upward by ridgelines, the resulting updrafts attract raptors that seek to gain elevation for gliding and soaring purposes (Pope et al. 2006). Passes or valleys may act as funnels for migrating birds crossing mountain ranges. River courses are also followed by migrants. Power lines spanning passes, valleys and rivers create a risk of collision.

It is difficult to predict the frequency of collision-caused bird mortality without long term information on bird species activity and both daily and seasonal movements in the Project area. These data are not available for the TWE Project; however, it is generally expected that collision mortality would be greatest where the movements of susceptible species are the greatest (e.g., near open bodies of water, wetlands, nesting habitats, ridgelines). It is possible that birds will strike the new transmission lines, but it is not expected to result in a substantial increase from current conditions. TransWest has also utilized existing transmission corridors to a large extent, including the West-Wide Energy Corridor (WWEC) and corridors identified in various BLM Resource Management Plans. By placing the Project in existing transmission corridors, collision-related impacts will be reduced.

Bird Collisions and Guy Wires

Because of the collision risk posed by guyed communication towers (e.g., Shire et al. 2000; Manville 2007a; Gehring et al. 2009; Gehring et al. 2011; Longcore et al. 2012), the question of collision risk associated with guyed power line structures has occasionally been asked. Guy wires on power line structures are used for support and stability especially where a line ends (deadend structure) or changes direction (e.g., makes a 90-degree turn). There is no published information to suggest that guyed power line structures pose a significant collision risk for birds. PacifiCorp has surveyed over 120,000 poles in six states and has not found collision victims at any of the guyed structures (S. Liguori, pers. comm.). (APLIC 2012)

Over a multi-year greater sage-grouse study begun by Power Company of Wyoming in 2009 and still continuing, there have been no observations of greater sage-grouse colliding with power pole structures or guy wires within a 750 square mile study area (J. Kehmeier, pers. comm.). The study involves monitoring of greater sage-grouse through the use of platform terminal transmitters (PTT) equipped with GPS. To date, over 360 greater sage-grouse have been tagged and over 500,000 data points obtained. Throughout the study area there are numerous power distribution lines and transmission lines (some of which have guyed structures), guyed communication towers, radio and television towers, and guyed meteorological towers. Not a single collision with any of the structures has been observed and there is no evidence in the recorded PTT data of a collision. By contrast, multiple greater sage-grouse collisions with fences have been observed (J. Kehmeier, unpublished data).

Based on exposure alone, the relative short lengths of the guy wires and the low heights on power lines pose much less risk to birds than do the longer, multiple guy wires on communication towers whose height can exceed 300 m (>1,000 ft; Gehring et al. 2011). In addition, some types of lighting on communication towers can attract birds into the collision zone in low visibility weather. Because transmission towers are, with very few exceptions, unlit, they are not expected to have the same risk.

(APLIC 2012) Tower heights proposed by TransWest are all under 200 feet; therefore, no lighting as required by the Federal Aviation Administration on structures 200 feet or taller is anticipated.

5.3 Raven Management

Common Ravens (*Corvus corax*) are the largest of all passerines and are widespread throughout large regions of the Northern Hemisphere. In North America, they are found in most of Canada and Alaska, the United States west of the continental divide, and throughout the Appalachian Mountains of the eastern United States. Ravens occur throughout the TWE Project area and are found in a wide range of natural habitat types, including coniferous and deciduous forests, prairies, grasslands, and deserts. They prefer areas with some vertical relief (e.g., cliffs, trees, human-made structures) to provide nesting and foraging sites (Boarman and Heinrich 1999). They thrive in many human-altered habitats, including agricultural areas (Engel and Young 1989a), roadsides and linear right-of ways, (Knight and Kawashima 1993, Sherman 1993), ranches (Roth et al. 1999), rangelands (Knight 1984), and near campgrounds and picnic areas (Wallen et al. 1998, 1999). Ravens are protected under the MBTA.

Some studies have identified ravens as a predation threat to species listed or considered candidates for listing under the Endangered Species Act (ESA). For instance, according to the USFWS, ravens are the most highly visible predator of small desert tortoises (*Gopherus agassizii*), while coyotes (*Canis latrans*) have been commonly implicated in deaths of adult tortoises. However, the population-level effects of these or other predators are unknown. (USFWS 2011) Boarman (2006) suggests that ravens nesting on transmission towers, where no other nesting substrate exists within about 800 meters (m) may significantly reduce juvenile tortoise populations within 400 m of the transmission corridor, but that this effect is quite localized. Boarman (2006) also cites unpublished data on the distribution of raven depredated juvenile tortoises that suggests that not all ravens nesting within tortoise habitat actually eat tortoises. Raven predation on juvenile desert tortoises alone may have little effect on the population levels of tortoises compared with other sources of mortality (Ray et al. 1993, Doak et al. 1994).

Other studies have suggested that powerlines can affect greater sage-grouse (*Centrocercus urophasianus)* through increased raven predation. However, the specific impact of raven predation on greater sage-grouse nest success and survival of chicks is unclear as indicated by a modeling study in Nevada which showed that American badger were just as likely to depredate greater sage-grouse nests (Coates and Delehanty 2004). The available data do not suggest that removal of ravens will increase counts of greater sage-grouse on leks. The recent paper by Robinson and Messmer (2013) indicated that greater sage-grouse survival rates, nest success, and brood success were greater in an area receiving less intense predator control and no raven control compared to an area with more overall predator control and raven removal. Dinkins' dissertation (2013) did not detect a significant increase in greater sage-grouse nesting success following a 61% reduction of a raven population by APHIS in Wyoming. Dinkins found that nesting success was positively correlated with the selection of rugged habitat. He did find that greater sage-grouse nesting success was 22% when ravens were detected within 550m of a sage-grouse nest, and 41% when no ravens were detected within 550m of a nest; however these relationships are correlative and do not show causation. Correlative relationships may exist because different species prefer different habitat.

The raven is protected under the MBTA and, as such, ravens and their eggs, parts, and nests may not be taken, killed, possessed, transported, imported and exported, except when specifically authorized by a USFWS permit or regulatory authorization. Post-construction monitoring by TransWest will be performed as a part of routine maintenance to determine if ravens are using transmission structures for nesting. Inspections for nesting will be done as part of annual line inspections and maintenance

operations. If evidence of raven nesting on transmission structures is observed by the inspection and maintenance crews, then the APP Program Coordinator will be notified. The APP Program Coordinator will have the nest site inspected by a qualified biologist and if there is evidence of raven predation on species listed or considered candidates for listing under the ESA, the APP Program Coordinator will notify the USFWS and collectively a decision on how to proceed will be determined and implemented (e.g., sending qualified personnel out to remove the raven nest). In addition to its post-construction raven monitoring program, TransWest has proposed a more specific Raven Monitoring and Management Plan to manage ravens in occupied desert tortoise habitat. The desert tortoise Raven Monitoring and Management plan was developed as part of the ESA Section 7 consultation process and is separate and distinct from the commitments in this APP.

6.0 CONSTRUCTION DESIGN STANDARDS

All aspects of the Project were designed to meet APLIC construction recommendations both in the State of the Art, 2006 and Reducing Avian Collisions, 2012 documents. No further action is directed in this APP. Attachment D, Design Standards includes the design specifications for the Project.

For areas TransWest identifies as posing a high-risk for avian collisions (e.g., near open bodies of water, wetlands, nesting habitats, ridgelines) or in areas of high collision mortality identified through post-construction reporting, TransWest may install flight diverters or line markers as appropriate. Preferred flight diverters and markers are shown in the attached Attachment D, Design Standards.

While there is no published information suggesting that guyed power line structures pose a significant risk for birds, nevertheless, on an experimental basis TransWest may install guy wire markers in select locations (e.g., near open bodies of water or wetlands) as determined by TransWest during final design of the Project or based upon a risk assessment conducted by TransWest. An example of a guy wire marker is shown in the attached Attachment D, Design Standards.

7.0 TRAINING / MONITORING, DEVELOP TRAINING MATERIALS

TransWest supervisors, construction crews, linemen, environmental contractors, and any other transmission-related field personnel will undergo avian protection awareness training prior to beginning work on the TWE Project. Ensuring that Project personnel are knowledgeable and aware of the protocols and methods outlined in this APP will decrease the likelihood of avian interactions with the transmission line and increase the likelihood of quick and efficient responses to incidents. Personnel will undergo an environmental training program that places emphasis on TransWest's avian protection policy. Also addressed will be any ongoing Project permits that may be issued for avian protection; special-status avian species that could occur and where they would be most likely to occur. Workers will be instructed in how to identify these species; their natural histories where relevant to areas of probable occurrence; and what steps to take should an avian injury or mortality occur. Training will also include a discussion of the law and the consequences for non-compliance with this APP and/or with applicable permits or regulations. All new transmission-related personnel will be required to undergo environmental training prior to conducting any construction or O&M work on any TWE Project components. As part of the training all workers will be instructed on the proper protocol for contacting the APP Program Coordinator for any assistance in circumstances of uncertainty. For a more explicit discussion of how newly discovered nests or avian incidents will be reported, see Section 9.0 Nest Management, and Section 10.0 Adaptive Management.

Summary

- All TransWest supervisors, construction crews, linemen, environmental contractors, and any other transmission-related field personnel will undergo an avian protection awareness training prior to beginning work on the Project.
- All TransWest on-site personnel will undergo environmental training with emphasis on avian protection prior to the start of construction.
- All new contractors will undergo environmental training before they begin work.

8.0 AREAS OF RESPONSIBILITY AND PERMIT COMPLIANCE

The APP will be administered by designated TransWest staff members under the direction of the APP Program Coordinator. A list of additional responsible persons, chain of responsibility, and contact information will be established prior to project construction and appended to this APP.

TransWest management tasks all line crews, field engineers, operators, foremen, and design personnel with understanding this plan and complying with its direction.

Currently, TransWest does not possess federal or state permits pertaining to migratory birds, eagles or federal ESA listed avian species. It is not authorized to capture injured birds, remove inactive eagle or colonial bird nests, disturb active nests of any bird species, or remove or store carcasses. Any such activity will be conducted by the USFWS or under their direct supervision. This APP will be modified if TransWest obtains a permit in the future.

Should it be warranted in the future, TransWest may apply for federal or state permits. The following permits are described to inform the APP Program Coordinator in making decisions regarding future permits. It does not imply that TransWest possesses these permits or may conduct any covered action described below.

- **Incidental Take Permits** – Incidental take permits are issued to allow the unintentional take of specified individuals per the conditions within each permit.
    - **Section 7 Incidental Take Statement** – None of the federally listed avian species known to be in the Project area are at an elevated risk for collision or mortality. Because of the voltage of TransWest transmission lines and the large separation distance that will be required, electrocution is highly unlikely.
    - **Bald and Golden Eagle Act Permit** – Based on known occurrences and activities in the vicinity of the Project area, both species could occur in various locations along the Project route. Should any eagle electrocution or collision incidents occur during construction or should an eagle nest be discovered that will be impacted by construction, TransWest construction crews will carry out measures described in Section 9.0, Nest Management, and Section 10.0, Adaptive Management, and immediately notify the APP Program Coordinator.
- **Collection/Salvage Permits** – These permits are required to collect, salvage, or handle birds.
    - **State Scientific Collecting Permit** – These permits are issued by state resource agencies and allow the collection, salvage, or capture and release of special-status species as allowed by the individual permit conditions. TransWest will seek this permit from the appropriate state agencies if any of these actions is required during Project construction.

  - **Federal Migratory Bird Permit** – These permits are issued by the USFWS under the MBTA and may be required if it is necessary to salvage and/or rehabilitate birds protected by the MBTA during construction. Fish and Game Code 3513 also prohibits the take or possession of any migratory nongame bird protected by the MBTA, except where allowed by the Secretary of the Interior.

- **Nest Removal and Relocation Permits** – Bird nests are protected by the MBTA and by the Fish and Game Code. Under the MBTA, it is illegal to possess, sell, purchase, barter, transport, import, export, or take—defined as collecting, for nests—or attempt any of those actions on a migratory bird nest (USFWS 2003). Under Fish and Game Code Sections 3503 and 3503.5, it is illegal to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by the Fish and Game Code or pursuant regulations. However, it is lawful to remove inactive nests or nests during the non-breeding season for most birds, excepting those of eagles. When it is necessary to remove a protected nest, then as dictated by the MBTA and Fish and Game Code TransWest will seek permits from the USFWS prior to taking any further actions other than those described under Section 9.0, Nest Management.

9.0 NEST MANAGEMENT

Nest management addresses both nests that may be constructed on facilities and nests near facilities that may be affected by construction or O&M activities. Under the MBTA, it is illegal to possess, sell, purchase, barter, transport, import, export, or take—defined as collecting, for nests—or attempt any of those actions on a migratory bird nest (USFWS 2003). In order to comply with these regulations, the various best management practices (BMPs) and protocols that will be utilized by TWE Project staff to avoid and minimize impacts to nesting avian species on structures or in the Project right-of-way (ROW) are discussed below. Additionally, on Public Lands administered by the BLM, and National Forest Lands administered by the U.S. Forest Service (USFS), spatial and timing stipulations regarding nesting birds will be followed as set forth in the right-of-way grants and special use authorizations for the TWE Project unless a waiver, modification or exception is granted. TransWest recognizes that it may be difficult at times to determine whether a nest is active or inactive, and that even checking on the status of a nest may result in disturbance. If in doubt, O&M personnel will contact the APP Program Coordinator who will have the nest checked by a qualified biologist as appropriate.

9.1 Definition of an Active Nest

Nests of native bird species are protected by the MBTA. The USFWS has clarified that the federal regulations only pertain to active nests except in the cases of listed species and eagle nests, which are protected under the Endangered Species Act and the Bald and Golden Eagle Protection Act, respectively, whether they are active or inactive. Regarding all other bird species however, the MBTA does not clearly define what an active nest is. This being the case, it is left to qualified biologists to determine what constitutes an active nest. For the TWE Project, a nest will be considered active when construction of a new nest or use of an existing nest commences, and its formal status will remain active as long as adults, viable eggs, and/or living young are present at the nest. A nest may be abandoned, fail, or fledge young and become inactive during the breeding season. Prior to removal of the buffer around an inactive nest, a qualified biologist will confirm that the nest is inactive using appropriate survey methods.

A number of species will utilize existing nests built in prior years. These include owls (Strigiformes) and diurnal raptors such as falcons, hawks, vultures, and eagles (Falconiformes). Because known nesting sites are likely to be utilized in the current year, each existing nest suitable for use by owls and diurnal raptors should be considered active when the designated seasonal avoidance period

begins. Its formal status should remain active until such time as a qualified biologist determines the nest is inactive.

9.2 Inactive Nests

Inactive nests may be removed and/or destroyed in compliance with the MBTA, unless they are nests of listed species or eagles as discussed above. In most cases, a previously active nest becomes inactive when it no longer contains viable eggs or young and is not being used by a bird as part of the reproductive cycle. According to the Migratory Bird Permit Memorandum regarding nest destruction, "the MBTA does not contain any prohibition that applies to the destruction of a bird nest alone (without birds or eggs), provided that no possession occurs during the destruction" (USFWS 2003).

Nests known to be used by ESA-listed species or bald or golden eagles will not be removed unless coordination with state or federal agencies has deemed it appropriate to remove them. Active nests will be protected through establishment of buffers determined by BLM and USFS and set forth in the right-of-way grants and special use authorizations for the TWE Project.

9.3 Operations and Maintenance Procedures

In order to properly assess and document any potential nesting issues, O&M activities occurring during the avian breeding season, generally from mid-February through late-July, will be subdivided into activities that strictly involve work on overhead structures and activities on the ground that involve ROW vegetation management. For activities strictly occurring on towers and other overhead structures, linemen and O&M personnel will conduct visual surveys of the maintenance area prior to beginning work to determine whether any bird nest are present in the work area. For activities involving ROW vegetation management, a qualified biologist would conduct a nesting bird survey not more than 14 days prior to the O&M activities to determine if active nests of any bird species are present within the work area. All active bird nests that are encountered are to be documented using the nest reporting form (Attachment B). All construction and O&M work that might disturb an active nest is to be halted immediately and the APP Program Coordinator contacted. The APP Program Coordinator will develop a treatment plan that will protect the active nest or contact the USFWS for guidance.

TransWest will comply with all federal and state laws regarding nest management or removal. Removal of an inactive, non-eagle nest outside the breeding season may be conducted for safety or maintenance issues without a take permit. When in doubt about the status of a nest (or type) field engineers will consult with the managing engineer who may seek a professional opinion from the APP Program Coordinator or an agency. Active problem nests will be addressed on a case-by-case basis and in coordination with the USFWS and appropriate state agencies.

While inactive bird nests—those without birds or eggs—are not protected from destruction by the MBTA, some inactive nests are protected by other regulations, including those of ESA-listed species or of bald and golden eagles. Nests of eagles cannot be altered, moved, or destroyed without specific authorization from the applicable agency (APLIC 2006). Recent legislation changes in 2009 allow take of eagle nests when there is a safety concern to people or eagles, when it is a public health and safety concern, when the nest prevents use of a human-engineered structure, or when the activity or its mitigation will have a net benefit to eagles; only inactive nests can be taken except in safety emergencies (50 Code of Federal Regulations [CFR] Part 22.27). However, permits are still required for nest removal and ground crews must notify the APP Program Coordinator if a problem nest is discovered. Therefore, determining the active or inactive status of a nest in the vicinity of planned work is paramount to protecting the birds that may be occupying it and protecting the Project by ensuring smooth and avian-safe construction.

If there is question as to whether an observed nest is active or inactive, the APP Program Coordinator is to be consulted for assistance, who may in turn consult with the applicable land management or

regulatory agency. Under no circumstances is an active nest to be disturbed until the APP Program Coordinator has been notified and applicable permits and/or regulatory agencies have been consulted for further action. The nest reporting form must be completed for all active nests. Construction may only proceed within an established distance of an active nest after the nest has been determined to be inactive or after approval has been given by the APP Program Coordinator or the applicable regulatory agency.

Should a nesting bald eagle be encountered prior to work, the USFWS has issued recommendations for avoiding or minimizing disturbance to the nest and its inhabitants (USFWS 2007). If the construction will be visible from the nest, the USFWS recommends a buffer of 660 feet if there is no similar activity occurring within one mile of the nest; if a similar activity is occurring within one mile of the nest, the USFWS recommends a construction buffer of 660 feet or as close as the other activity is allowed. Landscape buffers are recommended as available. If construction is not visible from the nest, the USFWS recommends a buffer of 330 feet from the nest if there is no similar activity within one mile of the nest; if a similar activity is occurring within a mile of the nest, the USFWS recommends a construction buffer of 330 feet or as close as the other activity is allowed. All clearing, external construction, and landscaping between 330 and 660 feet of the nest should be conducted outside of the breeding season. In the EIS and relevant Resource Management Plans, BLM has broadly identified the spatial buffers surrounding bald eagle nests at one mile on BLM managed lands. The USFWS recommends that the temporary use of loud machinery be restricted to outside of the breeding season. While the breeding season for bald eagles can range from January through August, the most critical time periods when bald eagles are most sensitive to disturbance—courtship, nest building, egg-laying, and incubation—are generally from January through May (USFWS 2007).

For active golden eagle nests, the USFWS recommends a spatial buffer in non-urban areas of 0.5 miles (USFWS 2008). In the EIS and relevant Resource Management Plans, BLM has broadly identified the spatial buffers surrounding golden eagle nests at one mile on BLM managed lands. Similar to the measures for bald eagle, it is recommended that use of loud machinery as well as all clearing, external construction, and landscaping within the spatial buffers for golden eagle nests should be conducted outside of the golden eagle breeding season.

9.4 Problem Nests

Many birds build nests on power poles. Nests that do not pose safety, reliability, outage, or bird electrocution risks will be left undisturbed. Nests that may present safety, reliability, outage, or bird electrocution risks are referred to as “problem nests”. Managing problem nests involves several components:

- Discouraging birds from nesting in problem areas
- Providing an alternative nest site
- Ensuring that surrounding utility facilities are avian-safe

Problem nests may be removed or relocated if inactive unless it is an ESA-listed species or a bald or golden eagle nest. If active, an ESA-listed species, or a bald or golden eagle nest then the APP Program Coordinator must be contacted before any further action is taken. If a problem with a specific nest is anticipated in the future, permit requirements may be minimized by taking appropriate action during the non-breeding season before the nest is active.

Summary

- If O&M efforts such as repairs, equipment replacement or routine vegetation removal are to occur during the avian breeding season, generally from mid-February through late-July, line maintenance crews will conduct a nesting bird survey prior to construction on above ground structures to determine if active nests of any bird species are present within the work area. If

any ROW vegetation management will occur, a qualified biologist will conduct a nest survey no more than 14 days prior to work. All active bird nests that are encountered are to be documented using the nest reporting form (Attachment B).

- If an active nest is present, then all construction and O&M work that might disturb the nest is to be halted immediately and the APP Program Coordinator contacted. The APP Program Coordinator will develop a treatment plan that will protect the active nest or contact the USFWS for guidance. Any active bald eagle nest will be given a 660-foot buffer if maintenance activity is visible from the nest or a 330-foot buffer if it is not, active golden eagle nests will be given a 0.5 mile buffer, and both eagle species will be given a one mile buffer on BLM managed lands (or less as directed or approved by BLM staff).
- All active nests will be documented with the attached Avian Nest Reporting Form (Attachment B).
- Active nests of any species protected under the MBTA, active or inactive eagle nests, or active nests of ESA listed species are not to be moved without approval from the APP Program Coordinator, who will first consult with the USFWS. When in doubt about the status of a nest (or type) field engineers will consult with the managing engineer who may seek professional opinion from the APP Program Coordinator or an agency. Active problem nests will be addressed on a case-by-case basis and in coordination with the USFWS and appropriate state agencies.
- Inactive nests of common species (i.e. non-eagles and non-ESA listed species) can be removed where they are in the path of the work.

10.0 ADAPTIVE MANAGEMENT

As stated previously, this APP will be a living document that will be revised and updated as goals are achieved, innovative solutions are developed to mitigate impacts, agency guidance is adjusted, and conditions of the TWE Project warrant. As such, TransWest will utilize an adaptive management approach to address issues with the Project as they arise. Through this process, TransWest will better be able to identify potential risk and avoid and minimize impacts to avian species. Set out below are examples of some areas where adaptive management will serve to benefit avian species as well as the TWE Project.

10.1 Retrofit/ Remedial Protective Measures

The TWE Project is a new build transmission line that will be built to APLIC construction recommendations, which eliminates the need for retrofit devices and remedial protection. However, if an area is identified where avian species are being impacted by the transmission line, the issue will be investigated, identified and corrected through the use of retrofit devices or other accepted protective measures which will again reduce the potential risk to avian species. General types of equipment that may be used for these situations include covers for hardware and conductors; perching dissuaders; flight path diverters; line marking devices; and other similar types of equipment. TransWest has preemptively considered and approved the use of a few market available products; specifications for these products are located in Attachment D, Design Standards. Records will be kept of the nature of any problems requiring avian protection equipment, bird species involved, site conditions, materials, performance characteristics of equipment and lifespan. The records will be reviewed on a semiannual basis by the APP Program Coordinator to ascertain patterns or developing conditions.

The APP will be reviewed annually and updated as needed based on field data on retrofitted equipment and monitoring of any system changes to improve avian safety. The overarching goal of the APP is to be a living document that will strive to protect avian species by reducing the potential risk created by the Project.

10.2 Incident Tracking

Avian incidents and mortalities will be documented during all phases of the TWE Project by supervisors, construction crews, linemen, environmental contractors, O&M personnel, and any other transmission-related field personnel. Personnel will undergo avian protection awareness training prior to beginning work on the TWE Project that will include recognition and effective documentation of observed avian issues and mortalities. All avian injuries or mortalities that are a result of collision or electrocution with the transmission lines or other Project components are to be documented and reported to the APP Program Coordinator. Following initial notification, the employee or contractor is to fill out the avian reports included as Attachment C. Avian incidents will also be recorded into a Geographic Information Systems (GIS) database for tracking purposes and to determine particular repeat problem areas.

If the affected bird is a special-status species or if it is discovered that a particular area or stretch of transmission line is a "hot spot" for avian safety issues, TransWest will investigate remedial measures to alleviate the issue, as discussed in Section 9.1.

TransWest will maintain an annual list of avian mortalities, including dates, locations, and the species involved, as well as a list of remedial measures implemented (e.g., retrofitting, avian safety devices installed), a shape file or map of the annual avian incident data, and an itemized breakdown of the annual cost of implementing this APP. This information will be internally maintained for use in any future permitting action or enforcement action.

TransWest management and the APP Program Coordinator will review the annual list of avian mortalities and the annual report for compliance with this APP and to insure that adequate measures are being taken to avoid and minimize risks to birds. Where areas of substantial concern are identified through the internal reporting described above, mortality surveys may be conducted to identify the location and scope of the problem, which will then inform the adaptive management process and result in the correction of aspects of the TWE Project that may be causing impacts to avian species. The adaptive management process will utilize the best available information, methods, and analysis techniques implemented by the utility industry. Currently the APLIC *Reducing Avian Collisions*, 2012 document provides up-to-date survey and data collection methods, as well as analysis information.

11.0 EXPENDITURE TRACKING

To determine the amount of investment being expending on measures set out in Section 9.0, TransWest will track its expenses in order to inform the agencies (e.g., USFWS) of these costs. Cost capture is a mechanism agencies use to track efforts utilities expend to improve and sustain avian safety of their systems. As a new project, no data exist to meaningfully prepare a scope and budget for mortality reduction measures. Within one year of commencement of Project operations, TransWest will establish an annual budget and cost tracking mechanism for remedial actions (purchase and installation of avian protection equipment), training, and other activities such as attendance of avian protection workshops.

Examples of potential work that will be tracked in the APP reporting system include the following:

1) Modification of poles associated with a raptor mortality

2) Installation of bird flight diverters/markers to prevent bird collisions

3) Proactive installation of bird guards to prevent squirrel/bird outages

4) Proactive modification of existing poles considered to have a high risk of electrocution.

12.0 QUALITY CONTROL

TransWest will implement quality control measures to ensure that this APP is accurate, up-to-date, and used effectively during the long-term operation of the Project. These measures will include the following:

- TransWest line crews, field engineers, operators, foremen, design personnel, and all contractors associated with the Project, are tasked with understanding and complying with this Plan.
- Quality control will be overseen by the APP Program Coordinator who will provide quarterly reports to TransWest's General Management.
- The APP Program Coordinator will review submitted nest reporting forms and avian incident reporting forms and ensure that they are properly and adequately completed. Any missing information will be obtained from the worker who completed the form. The APP Program Coordinator will ensure that a local (TransWest) incident database is kept up-to-date. Any problems with the reporting system will be reported to management for review and remedial action will be taken.
- Any transmission towers or sections of conductor that are retrofitted with avian safety measures as described under Section 10.0 Adaptive Management, will be monitored for effectiveness by checking for injured birds, carcasses, or signs of potentially risky nest-building weekly for the first month after the retrofitting. Any observed incidents of additional nesting, injury, or mortality will be investigated for further remedial actions, which will then be determined and implemented.
- TransWest will keep an internal database which tracks detected avian injuries or mortalities, a list of retrofitting operations over the last year, a shape file or map of the last year's avian incident data, and an itemized list of the operating costs associated with implementing the protective measures in this APP. TransWest management and the APP Program Coordinator will discuss and implement any necessary changes to this APP or avian protection methods based on this annual report.

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ATTACHMENT A
SPECIAL STATUS AVIAN SPECIES

TABLE A1 POTENTIAL SPECIAL STATUS AVIAN SPECIES IN TWE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE AND HABITAT REQUIREMENTS	NESTING STRUCTURE	POTENTIAL FOR OCCURRENCE2
American white pelican	*Pelecanus erythrorhynchos*	BLM; UT-SS Tier II	Range: The American white pelican breeds in widely distributed island colonies from Canada to northeastern California, Utah, Nevada, Wyoming, and Colorado. Habitat: The species breeds on islands in large bodies of water. It forages in marshes, lakes, and rivers. It constructs a scrape nest on flat, open ground, near water. It is a colonial nester.	Wetlands: ground nester	Regions I and II: High. The species has been documented within the 2-mile transmission line corridor in Millard County, Utah. It has also been documented within 5 miles of the reference line in Iron, Juab, Millard, Sevier, Uintah, and Washington counties, Utah. No suitable habitat for the American white pelican is crossed by the project alternatives in Region III. A breeding colony has been documented within 5 miles of the reference line in Carbon County, Wyoming.
Least bittern	*Ixobrychus exilis*	BLM; NV-P	Range: The least bittern nests throughout the eastern United States and in select areas of Oregon, California, Colorado, Arizona, New Mexico, Texas, Utah, Nebraska, Nevada, Mexico, and South America. Habitat: The species breeds and forages in freshwater marshes. It nests on a platform of marsh vegetation with a canopy.	Wetlands: ground nester	Regions I, III, and IV: Moderate. The species has been documented within 5 miles of the reference line in Clark County, Nevada. Probable breeding records exist for the Pahranagat National Wildlife Refuge in Lincoln County, Nevada.
White-faced ibis	*Plegadis chihi*	BLM	Range: The white-faced ibis nests from central Mexico to coastal Texas and Louisiana and through the Great Basin. Isolated colonies exist in Alberta, New Mexico, California, Montana, North Dakota, Iowa, Kansas, and South America. Habitat: The species breeds in tall emergent vegetation growing as “islands”, surrounded by water (at least 18 inches deep). It forages in wet hay meadows and flooded agricultural croplands, marshes, shallow ponds, lakes, and reservoirs. It constructs a nest of emergent vegetation in bulrushes, cattails, or reeds; on floating mats; or in low trees.	Wetlands: ground nester	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Carbon County, Wyoming. It has also been documented within 5 miles of the reference line in Sweetwater County, Wyoming. Possible breeding colonies exist in northwestern Colorado and in Clark County, Nevada.

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE AND HABITAT REQUIREMENTS	NESTING STRUCTURE	POTENTIAL FOR OCCURRENCE2
Barrow's goldeneye	*Bucephala islandica*	BLM	Range: The Barrow's goldeneye breeds in the western mountains of North America, from Alaska to central California. Habitat: The species breeds near densely vegetated water bodies with abundant aquatic vegetation. It forages in water bodies. It nests in cavities, usually in dead trees close to cold-water lakes, pools, or rivers. The species exhibits high nest fidelity.	Wetlands: cavities	Region I: Low. The species is a confirmed breeder in Sweetwater and Carbon counties, Wyoming.
Trumpeter swan	*Cygnus buccinator*	BLM	Range: The trumpeter swan was once distributed across most of North America and currently occurs locally from Alaska south to Oregon and east to Michigan. Habitat: The species breeds in areas with stable, quiet, and shallow waters where small islands, muskrat houses, or dense emergent vegetation provide nesting and loafing habitat. It forages in shallow marshes, ponds, lakes, and river oxbows with nutrient-rich waters, and dense aquatic plants and invertebrates. It constructs a nest of aquatic and emergent vegetation, often on a muskrat house surrounded by water.	Wetlands: ground nester	Region I: High. The species has been documented within the 2-mile transmission line corridor in Sweetwater County, Wyoming.
Bald eagle	*Haliaeetus leucocephalus*	BLM; USFS; CO-ST; UT-SS Tier I; NV-P	Range: The bald eagle occurs throughout the United States and Canada, south into central Mexico. Habitat: The species breeds near large lakes and rivers, in forested habitat where adequate prey and large, old cottonwood or conifer trees are available for nesting. It constructs a large stick nest, and exhibits high nest fidelity.	Raptor: trees	Regions I, II, III, and IV: High. This species has been documented throughout Wyoming, Colorado, Utah, and Nevada. Bald eagles nest and winter along major waterbodies in mature riparian woodlands.

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE AND HABITAT REQUIREMENTS	NESTING STRUCTURE	POTENTIAL FOR OCCURRENCE2
Ferruginous hawk	*Buteo regalis*	BLM; UT-SS Tier II; NV-P	Range: The ferruginous hawk occurs in Canada, eighteen western and central states, and Mexico. Habitat: The species breeds in semiarid open country, primarily grasslands, basin prairie shrublands, and badlands, typically near prairie dog colonies. It requires large tracts of relatively undisturbed rangeland for foraging habitat. It constructs a large stick nest on rock outcrops, knolls, cutbanks, cliff ledges, or trees, and exhibits high nest fidelity.	Raptor: cliffs/trees	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming; in Beaver, Duchesne, Emery, Grand, Iron, Juab, Millard, Uintah, and Washington counties, Utah; and in Lincoln County, Nevada. Suitable habitat also occurs within the study area in Clark County, Nevada.
Golden eagle	*Aquila chrysaetos*	BLM	Range: The golden eagle occurs throughout North America, from Alaska to central Mexico. Habitat: The species breeds and forages in a variety of habitats, including large expanses of grasslands, sagebrush, agricultural lands, and tundra. It constructs a large stick nest on cliffs and in large trees, and exhibits high nest fidelity.	Raptor: cliffs/trees	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming, and in White Pine and Lincoln counties, Nevada. Suitable habitat also occurs within the 2-mile transmission line corridor in Colorado, Utah, and Nevada.
Northern goshawk	*Accipiter gentilis*	BLM; USFS; UT-SS Tier I; NV-P	Range: The northern goshawk occurs in Alaska, Canada, and south through the southern Rocky Mountains and Mexico. Habitat: The species breeds and forages in mixed coniferous forest and mature aspen stands with tall trees, intermediate canopy coverage for nesting, and small open areas for foraging. It constructs a stick and twig nest on a large horizontal limb, usually against or near the truck.	Raptor: trees	Regions I and II: High. The species is known to occur within the 2-mile transmission line corridor in Sweetwater County, Wyoming and in Emery and Millard counties, Utah. It has also been documented within 5 miles of the reference line in Carbon County, Wyoming; Garfield and Rio Blanco counties, Colorado; in Daggett, Duchesne, Emery, Millard, Sanpete, Sevier, Uintah, Utah, and Wasatch counties, Utah; and in Lincoln County, Nevada. No suitable habitat for the northern goshawk is crossed by the project alternatives in Region III.
Peregrine falcon	*Falco peregrinus*	BLM; USFS; NV-P	Range: The peregrine falcon occurs throughout most of North America. Habitat: The species breeds and forages in a	Raptor: cliffs	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Sweetwater County, Wyoming, Uintah

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE AND HABITAT REQUIREMENTS	NESTING STRUCTURE	POTENTIAL FOR OCCURRENCE2
			variety of open habitats, including woodlands, forests, shrub-steppe, grasslands, marshes, and riparian habitats. It nests on cliffs and rarely on tall buildings near habitats with abundant prey. It constructs a well-rounded scrape nest of accumulated debris on a ledge.		County, Utah, and Clark County, Nevada. It has also been documented within 5 miles of the reference line in Carbon County, Wyoming, and in Utah (Daggett, Duchesne, Emery, Sevier, and Washington counties).
Prairie falcon	*Falco mexicanus*	BLM	Range: The prairie falcon occurs throughout western North America from Canada to Mexico. Habitat: The species breeds and forages in open terrain, including sagebrush, grasslands, and other arid habitats. It nests on cliff ledges facing open habitat.	Raptor: cliffs	Regions I, II, III, and IV: High. Potential habitat for this species occurs in the 2-mile transmission line corridor. It has been documented within 5 miles of the 2-mile transmission line corridor in Lincoln County, Nevada, and in Colorado.
Swainson's hawk	*Buteo swainsoni*	BLM	Range: The Swainson's hawk breeds in western North America, from Alaska south into northern Mexico, and east to Oklahoma and Iowa. The species range includes Wyoming, Colorado, Utah, and Nevada. Habitat: The species breeds and forages in arid grasslands, desert, and agricultural areas with scattered trees and shrubs. It constructs a modest nest in trees and exhibits moderate nest fidelity.	Raptor: trees	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Utah. Suitable habitat is present along the 2-mile transmission line corridor in Wyoming, Colorado, Utah, and Nevada.
Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*	BLM; USFS; UT-SS Tier II	Range: The Columbian sharp-tailed grouse occurs locally from Canada, south to Nevada and east to Colorado. It has been extirpated from Oregon, California, and Nevada. Habitat: The subspecies inhabits mountain-foothill shrub communities, sagebrush, grassland, and riparian habitats. Leks are located in flat areas with low, sparse vegetation. Nests occur within 0.6 mile of the lek area.	Shrublands: ground nester	Regions I and II: Low. The subspecies occurs in suitable habitat in isolated locations in south-central Wyoming, and northwestern Colorado.

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE AND HABITAT REQUIREMENTS	NESTING STRUCTURE	POTENTIAL FOR OCCURRENCE2
Greater sage-grouse	*Centrocercus urophasianus*	FC; BLM; USFS; UT-SS Tier II;	Range: The greater sage-grouse is found throughout the western United States. Habitat: The species breeds and forages in sagebrush grasslands. Leks are located in open areas (e.g., ridges, knolls, dry lake beds, burned areas) in close proximity to taller sagebrush which is used as escape cover. Most nests are located under sagebrush plants, typically within 4 miles of the lek. Brooding habitat consists of grassy areas near sagebrush. Winter habitat consists of south and east facing slopes with minimal snow cover.	Shrublands: ground nester	Regions I, II, and III: High. Active leks occur within the 2-mile transmission line corridor in Wyoming, Colorado, and Utah. Suitable nesting, brooding, and wintering habitat also occurs within the 2-mile transmission line corridor in these states. The 2-mile transmission line corridor includes greater sage-grouse core habitat areas in Wyoming.
Black tern	*Chlidonias niger*	BLM	Range: The black tern occurs locally in Canada and the northern two-thirds of the United States. Habitat: The species breeds in large marshes, usually greater than 50 acres and forages in marshes and aquatic areas. It nests in small, loose colonies, in still water. It constructs a floating nest of dead rushes in marshes, or on grass tufts in wetlands	Wetlands: ground nester	Regions I and II: High. Breeding colonies of this species have been documented within the 2-mile transmission line corridor in Carbon County, Wyoming and within 5 miles of the 2-mile transmission line corridor in Sweetwater County, Wyoming. The species has been documented within 5 miles of the reference line in Uintah County, Utah. Suitable habitat occurs at Pelican Lake, and on sandbars in the Green River, Utah.
Long-billed curlew	*Numenius americanus*	BLM; UT-SS Tier II	Range: The long-billed curlew occurs from southern Canada into most of the western United States. Habitat: The species breeds and forages in a variety of grassland habitats, including moist meadow grasslands, agricultural areas, and dry prairie uplands, usually near water. It nests in grass less than 12 inches tall, with bare ground, shade, abundant invertebrate prey.	Grasslands: ground nester	Regions I, II, and III: High. This species has been documented within the 2-mile transmission line corridor in Carbon County, Wyoming and Juab, Millard, and Uintah counties, Utah. It has also been documented within 5 miles of the reference line in Beaver, Grand, and Iron counties, Utah.

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE AND HABITAT REQUIREMENTS	NESTING STRUCTURE	POTENTIAL FOR OCCURRENCE2
Mountain plover	*Chardrius montanus*	BLM; USFS; UT-SS;	Range: The mountain plover occurs in dry short-grass prairies from south-central Canada to Texas. Habitat: The species breeds and forages in flat, short-grass prairie habitat and fallow agricultural fields with sparse vegetation. It constructs a ground nest of cow manure chips, grass, and roots.	Grasslands: ground nester	Regions I and II: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming. It has been documented within 5 miles of the reference line in Grand County, Utah. Historic records also exist for mountain plovers in Duchesne and Uintah counties, Utah.
Yellow-billed cuckoo (western)	*Coccyzus americanus*	FC; BLM;UT-SS Tier I; NV-P	Range: The western yellow-billed cuckoo occurs west of the continental divide in North America. Habitat: The species breeds and forages in dense woodlands along riparian corridors in otherwise arid areas. It requires a multi-storied canopy, and dense, shrubby vegetation, adequate invertebrate prey, cover, and water. It constructs twig nests, in shrubs.	Wetlands: trees	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Utah county, Utah. It has also been documented within 5 miles of the reference line in Emery, Grand, Uintah, and Washington counties, Utah. The species is documented in Meadow Valley Wash in Lincoln County, Nevada. It is also a confirmed breeder along the Muddy River in Nevada.
Boreal owl	*Aegolius funereus*	USFS	Range: The boreal owl occurs from Alaska, south through the Rocky Mountains to northern New Mexico. Habitat: The species breeds and forages in mature, high elevation (above 9,000 feet amsl) coniferous forests, interspersed with mature aspen stands for nesting cavities. It requires large areas of forested habitat. It nests in large woodpecker holes or natural cavities in trees.	Raptor: cavities	Regions I and II: Moderate. The species is documented within 5 miles of the reference line in Carbon County, Wyoming.

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE AND HABITAT REQUIREMENTS	NESTING STRUCTURE	POTENTIAL FOR OCCURRENCE2
Burrowing owl	*Athene cunicularia*	BLM; CO-ST; UT-SS Tier II	Range: The burrowing owl occurs from Canada, south through most of the western United States to central Mexico. Habitat: The species breeds and forages in a wide variety of arid and semiarid environments, including grassland, desert, and shrub-steppe habitats, and agricultural areas. It generally nests in burrows excavated by small mammals, particularly prairie dogs and ground squirrels.	Raptor: burrow nester	Regions I, II, III, and IV: High. The species is documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming, Moffat County, Colorado, throughout Utah, and in Clark and Lincoln counties, Nevada.
Flammulated owl	*Otus flammeoulus*	BLM; USFS	Range: The flammulated owl breeds from Canada, south through Washington, Oregon, California, Nevada, Utah, Wyoming, Colorado, Arizona, New Mexico, western Texas, and Mexico. Habitat: The species breeds and forages in montane forests, especially ponderosa pine where it feeds on moths. It nests in cavities, especially abandoned woodpecker holes.	Raptor: cavities	Regions I and II: Moderate. The species is known to occur in Colorado, Utah, and Nevada. Suitable habitat occurs in Rio Blanco County, Colorado, Daggett, Sevier, and Uintah counties, Utah, and Carbon County, Wyoming. It has been documented within 1 mile of the reference line. No suitable habitat for the flammulated owl is crossed by the project alternatives in Region III.
Long-eared owl	*Asio otus*	BLM	Range: The long-eared owl occurs from southern Canada through most of the United States, except in the southeast. Habitat: The species breeds and forages in dense, woody vegetation for roosting, and open country for hunting. It nests in abandoned corvid nests in trees or brush.	Raptor: trees	Regions I, II, III, and IV: Low. The species is known to occur in Wyoming, Colorado, Utah, and Nevada. Suitable habitat occurs along the 2-mile transmission line corridor.

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE AND HABITAT REQUIREMENTS	NESTING STRUCTURE	POTENTIAL FOR OCCURRENCE2
Short-eared owl	*Asio flammeus*	BLM; UT-SS Tier II	Range: The short-eared owl occurs from Alaska and Canada, south to central California and east to Maryland. Habitat: The species breeds and forages in broad expanses of open habitat, with dense, low vegetation, including grasslands, meadows, marshes, and open sagebrush shrublands. It is strongly associated with ungrazed and undisturbed native grasslands and wetlands that support dense small mammal populations. It constructs a grass nest in low vegetation.	Raptor: ground nester	Regions I, II, and III: High. The species is documented within the 2-mile transmission line corridor in Millard County, Utah and Carbon and Sweetwater counties, Wyoming. It has also been documented within 5 miles of the reference line in Beaver, Juab, and Uintah counties, Utah.
Black swift	*Cypseloides niger*	BLM; UT-SS Tier II	Range: The black swift occurs in scattered colonies throughout western North America, from southeast Alaska to central Mexico. Habitat: The species breeds and forages in a variety of habitats, foraging far from nesting areas. It nests on vertical rock faces, near waterfalls, or in dripping caves. Nests are constructed of ferns and algae in small colonies.	Cliffs	Regions I and II: High. Nesting colonies are known to occur in Utah County, Utah. The species has been documented within the 2-mile transmission line corridor in Duchesne County, Utah. It has also been documented within 5 miles of the reference line in Uintah County, Utah.
Lewis's woodpecker	*Melanerpes lewis*	BLM; UT-SS Tier II	Range: The Lewis's woodpecker occurs from southern Canada, to south-central California and New Mexico. Habitat: The species breeds and forages in open country with scattered trees, usually below 9,000 feet amsl. Habitat includes open ponderosa pine forests, burned-out coniferous stands, riparian and oak woodlands, and deciduous forests. It excavates cavities for nests in trees.	Forests: cavities	Regions I, II and III: High. The species has been documented within the 2-mile transmission line corridor area in Juab and Utah counties, Utah. It has also been documented within the 2-mile transmission line corridor in Millard and Uintah counties, Utah.

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE AND HABITAT REQUIREMENTS	NESTING STRUCTURE	POTENTIAL FOR OCCURRENCE2
Red-naped sapsucker	*Sphyrapicus nuchalis*	BLM	Range: The red-naped sapsucker occurs from the Rocky Mountains, west to eastern California and Oregon, and from southern Canada to Arizona and New Mexico. Habitat: The species breeds and forages in aspen, cottonwood riparian stands, and mixed aspen/coniferous forests from 5,000 to 9,000 feet amsl. It nests in tree cavities and exhibits some nest fidelity.	Forests: cavities	Regions I, II, III, and IV: Low. The species is known to occur in Wyoming, Colorado, Utah, and Nevada.
American three-toed woodpecker	*Picoides dorsalis*	BLM; USFS; UT-SS Tier II	Range: The American three-toed woodpecker occurs from Canada and Alaska, south through the Rocky Mountains to New Mexico. Habitat: The species is a high elevation spruce-fir forest obligate. It breeds and forages in coniferous forests, particularly in burned and beetle killed areas where it scales off bark in search of prey. It nests in tree cavities.	Forests: cavities	Regions I and II: Moderate. The species has been documented within 5 miles of the reference line in Emery and Sevier counties, Utah. Suitable habitat is present within the 2-mile transmission line corridor in Wyoming, Colorado, and Utah. No suitable habitat for the American three-toed woodpecker is crossed by the project alternatives in Region III.
Bobolink	*Dolichonyx oryzivorus*	BLM; UT-SS Tier II	Range: The bobolink occurs from Canada, south to eastern Oregon, central Colorado, central Illinois, and western North Carolina. Habitat: The species breeds and forages in large grassland expanses. It constructs a grass nest in a depression in wet meadows, flooded pastures, and fields.	Grasslands: ground nester	Regions I, II, and III: Moderate. The species has been documented within 5 miles of the reference line in Carbon County, Wyoming; Uintah County, Utah; and Moffat County, Colorado. Suitable habitat occurs within the 2-mile transmission line corridor in Wyoming, Colorado, and Utah.
Baird's sparrow	*Ammodramus bairdii*	BLM	Range: Baird's sparrow occurs from Canada south through the northern Great Plains. Habitat: The species breeds and forages in shortgrass prairie. It constructs a ground nest in a depression.	Grasslands: ground nester	Region I: Low. This species may be found in grasslands and weedy fields in the Rawlins Field Office, but likely outside of the Special Status Bird Analysis Area.

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE AND HABITAT REQUIREMENTS	NESTING STRUCTURE	POTENTIAL FOR OCCURRENCE2
Brewer's sparrow	*Spizella breweri*	BLM	Range: The Brewer's sparrow occurs from southeastern Alaska south to southern California and southwestern Kansas. Habitat: The species is a sagebrush obligate. It breeds and forages in sagebrush shrublands with abundant, scattered shrubs and short grasses. It constructs a nest of grass, forbs, and roots in a shrub or low tree.	Shrublands: shrubs/trees	Regions I, II, and III: High. The species has been documented within the 2-mile transmission line corridor in Lincoln County, Nevada. It has been documented within 5 miles of the reference line in Carbon and Sweetwater counties, Wyoming. Suitable habitat occurs throughout the 2-mile transmission line corridor in Wyoming, Colorado, Utah, and Nevada. No suitable habitat for the Brewer's sparrow is crossed by the project alternatives in Region IV.
Grasshopper sparrow	*Ammodramus savannarum*	BLM; UT-SS Tier II	Range: The grasshopper sparrow occurs from Canada east to southern Maine, and south to southern California and central Georgia. The main population occurs in the Great Plains. Habitat: The species breeds and forages in mid- and long-grass prairie, mixed grasslands, meadows, and open sagebrush-grasslands. It constructs a grass nest in a depression.	Grasslands: ground nester	Region I: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming.
Gray vireo	*Vireo vicinior*	BLM	Range: The gray vireo occurs in Arizona, New Mexico, Colorado, Utah, Nevada, and southern California. Habitat: The species breeds and forages in hot, arid mountains, in desert scrub, pinyon-juniper, pine-oak scrub, and high plains scrubland. It constructs a deep, rounded grass nest, suspended in a forked twig in a shrub.	Shrublands: shrubs	Regions I, II, III, and IV: High. This species has been documented within the 2-mile transmission line corridor in Lincoln County, Nevada. It has been documented within 5 miles of the reference line in Moffat, and Rio Blanco counties, Colorado. Suitable habitat occurs throughout the 2-mile transmission line corridor in Utah and Nevada.

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE AND HABITAT REQUIREMENTS	NESTING STRUCTURE	POTENTIAL FOR OCCURRENCE2
Juniper titmouse	*Baeolophus griseus*	BLM	Range: The juniper titmouse occurs in western North America, from southern Oregon west to Wyoming, and south to Arizona, western Texas, and Mexico. Habitat: The species breeds and forages in juniper woodlands interspersed with sagebrush and other shrubs. It nests in a natural cavity or in an abandoned woodpecker hole.	Woodlands: cavities	Region I and II: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming, and Lincoln County, Nevada. Suitable habitat occurs throughout the 2-mile transmission line corridor in Colorado, Utah, and Nevada. No suitable habitat for the juniper titmouse is crossed by the project alternatives in Regions III and IV.
Loggerhead shrike	*Lanius ludovicianus*	BLM	Range: The loggerhead shrike occurs from south-central Canada, throughout the United States, and Mexico. Habitat: In the western U.S., the species breeds and forages in arid, open country with scattered small trees and shrubs or hedgerows. It constructs a twig nest in a thorny tree or shrub.	Shrublands: shrubs/trees	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming, and Lincoln County, Nevada. Suitable habitat occurs throughout the 2-mile transmission line corridor in Wyoming, Colorado, Utah, and Nevada.
Pinyon jay	*Gymnorhinus cyanocephalus*	BLM	Range: The pinyon jay occurs from central Oregon, Montana, and South Dakota, south to Baja California, Arizona, and New Mexico. Habitat: The species breeds and forages in ponderosa pine savannah, pinyon-juniper, and montane shrublands. It constructs a bulky twig nest in a juniper or pine tree.	Woodlands: trees	Regions I, II, and III: High. The species has been documented within the 2-mile transmission line corridor in Lincoln County, Nevada. It is known to occur in Wyoming, Colorado, Utah, and Nevada. No suitable habitat for the pinyon jay is crossed by the project alternatives in Region IV.
Sage sparrow	*Amphispiza belii*	BLM	Range: The sage sparrow occurs from central Washington, east to northwestern Colorado and south to Baja California and northwestern New Mexico. Habitat: The species is a sagebrush obligate. It breeds and forages in habitat with tall shrubs (3 to 6 feet tall) and low grass cover, and requires large blocks of unfragmented habitat. It constructs a twig nest in sagebrush.	Shrublands: shrubs	Regions I, II, and III: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming, Moffat County, Colorado, and Lincoln County, Nevada. It has also been recorded within 5 miles of the reference line in Rio Blanco County, Colorado. Suitable habitat occurs throughout the 2-mile transmission line corridor in Wyoming, Colorado, Utah, and in Lincoln County, Nevada.

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE AND HABITAT REQUIREMENTS	NESTING STRUCTURE	POTENTIAL FOR OCCURRENCE2
Sage thrasher	*Oreoscoptes montanus*	BLM	Range: The sage thrasher occurs from Canada, south through the Great Basin, to Arizona and New Mexico. Habitat: The species is a sagebrush obligate. It breeds and forages in habitat with tall shrubs (3 to 6 feet tall) and low grass cover. It constructs a bulky, twig nest in sagebrush.	Shrublands: shrubs	Regions I, II, and III: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming, and Lincoln County, Nevada. Suitable habitat occurs in Wyoming, Colorado, Utah, and in Lincoln County, Nevada.
Vesper sparrow	*Pooecetes gramineus*	BLM	Range: The vesper sparrow occurs from southern Canada to the Appalachian Mountains, along the Ohio River, and in much of the western United States. Habitat: The species breeds and forages in a variety of open, grass habitats, including sagebrush steppe, meadows, pastures, and roadsides. It constructs a grass nest in a depression.	Grasslands: ground nester	Regions I, II, and III: Low. The species is known to occur in Wyoming, Colorado, Utah, and in Lincoln County, Nevada.
Yellow-breasted chat	*Icteria virens*	BLM	Range: The yellow-breasted chat occurs throughout the United States and northern Mexico. Habitat: The species breeds and forages in riparian shrub and marshes below 7,000 feet amsl. It constructs a large leaf and weed nest in a deciduous shrub.	Woodlands: trees	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Lincoln County, Nevada. It is known to occur in Wyoming, Colorado, Utah, and Nevada.

[1]Status:
FE = Federally Endangered; FT = Federally Threatened; FC = Federal Candidate; FP = Federal Proposed; EXP/NE = Experimental Non-essential population; BLM = BLM Sensitive; USFS = USFS Sensitive; CO-E = Colorado State Endangered; CO-T = Colorado State Threatened; NV-P = Nevada State Protected; UT-SS = Utah Sensitive Species (Tier I and Tier II species are defined in Utah's Comprehensive Wildlife Strategy)

[2]Potential for Occurrence
High = The species is known to occur within suitable habitat within the 2-mile transmission line corridor.
Moderate = The species is known to occur within 5 miles of the study area and suitable habitat for the species occurs within the 2-mile transmission line corridor.
Low = The known geographic range of the species is within the 2-mile transmission line corridor.
None = The geographic range of the species is outside the 2-mile transmission line corridor.

ATTACHMENT B
AVIAN NEST AND INCIDENT REPORTING FORM

Avian Nest Reporting Form

Discoverer's Name

Discoverer's Phone Number

Date of Nest Discovery

Nest Location (circle one) Tower/Pole Tree Shrub Ground

Line Name, Voltage, and Closest Tower/Pole ID

Other Specific Location Information

Surrounding Habitat (circle all that apply)

Agricultural	Chaparral/Shrubs	Desert Scrub
Disturbed/Developed	Grassland	Riparian

Nest Condition (circle one) Active Inactive, Intact Inactive, Partial Deterioration Inactive, Heavy Deterioration

Describe any Bird Signs Around the Nest (feathers, scat, prey remains)

Are Birds Present? (circle one) Yes No

Number of Birds Visible

Age of Bird(s) (circle all that apply) Adult Juvenile Nestling Eggs Unknown

Bird Species (if known)

Type of Bird (circle one if species unknown)

Raptor (hawk, falcon, eagle) Owl Crow/Raven

Passerine (small bird) Unknown

Risk to Birds/Construction (circle one)

No Risk Potential Risk – Imminent Potential Risk – Not Imminent

Additional Comments

ATTACHMENT C
AVIAN INCIDENT REPORTING FORM

Avian Incident Reporting Form

Discoverer's Name

Discoverer's Phone Number

Date of Nest Discovery

Date of Incident/Discovery

Time of Incident/Discovery

Line Name, Voltage, and Tower/Pole ID

GPS Coordinates of Incident (if available)

Species (if known)

Type of Bird (circle one if species unknown)

Raptor (hawk, falcon, eagle)	Owl	Crow/Raven
Passerine (small bird)	Waterfowl	Unknown

Number of Birds

Age of Bird(s) (circle all that apply) Adult Juvenile Nestling Eggs Unknown

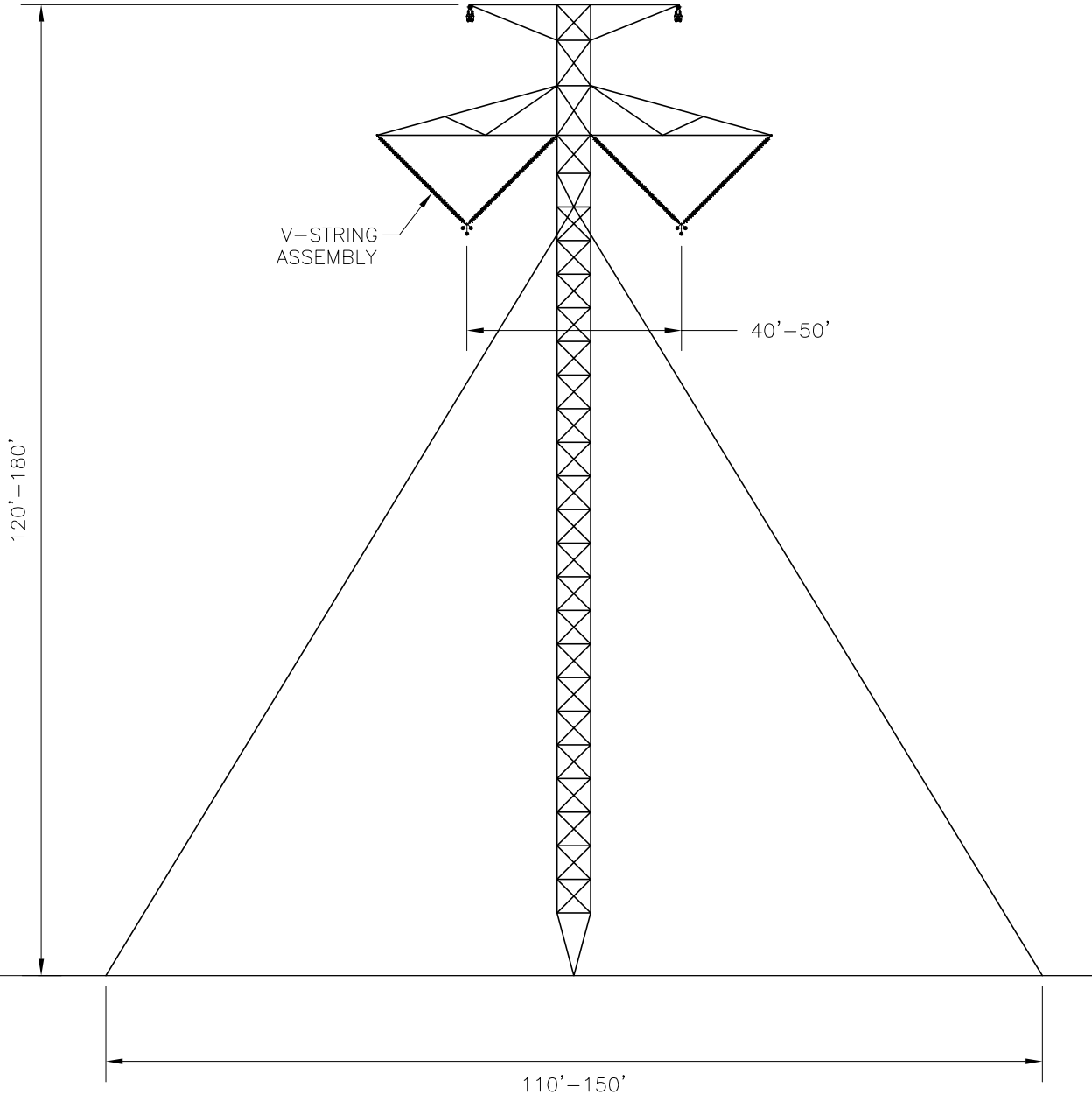
Surrounding Habitat (circle all that apply)

Agricultural	Chaparral/Shrubs	Desert Scrub
Disturbed/Developed	Grassland	Riparian

Type of Incident (circle one) Injury Mortality

Description of Incident. Include condition of bird, circumstances of incident and cause of injury or mortality, and any damage or impacts to construction.

ATTACHMENT D
DESIGN STANDARDS



NOTES

1. DIMENSIONS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.
2. TOWER OUTLINE AND BRACINGS ARE INDICATIVE ONLY.

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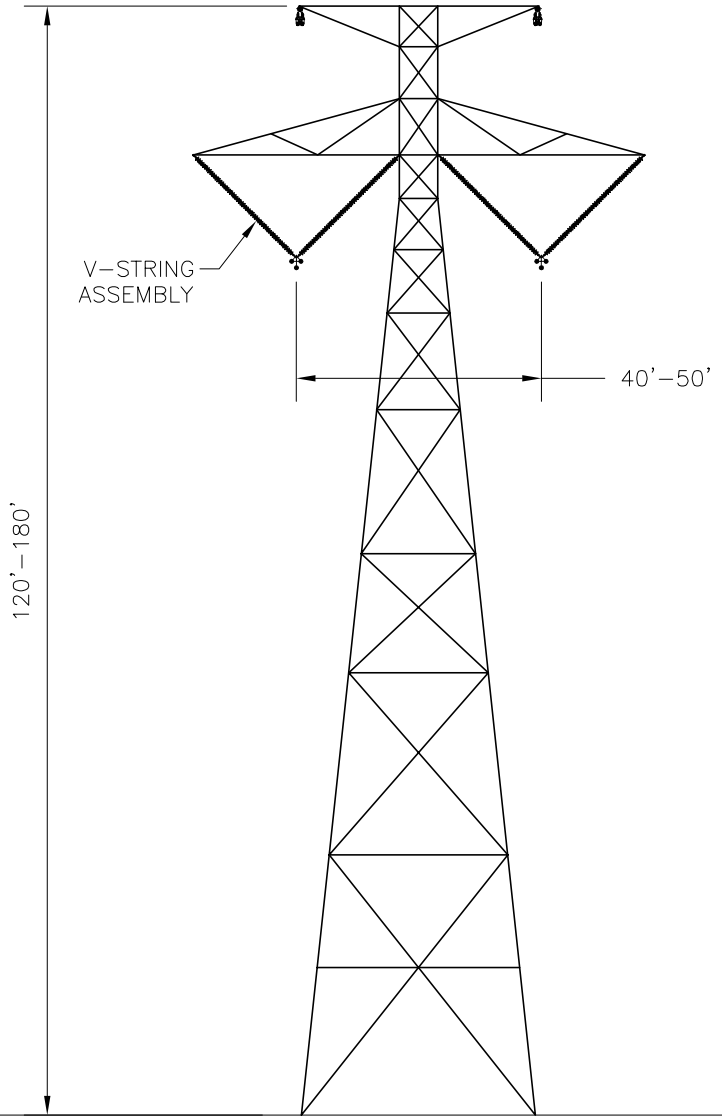
TRANSWEST EXPRESS TRANSMISSION PROJECT

FIGURE 1

TYPICAL ±600kV DC
GUYED V–STRING
LATTICE STRUCTURE



NOTES

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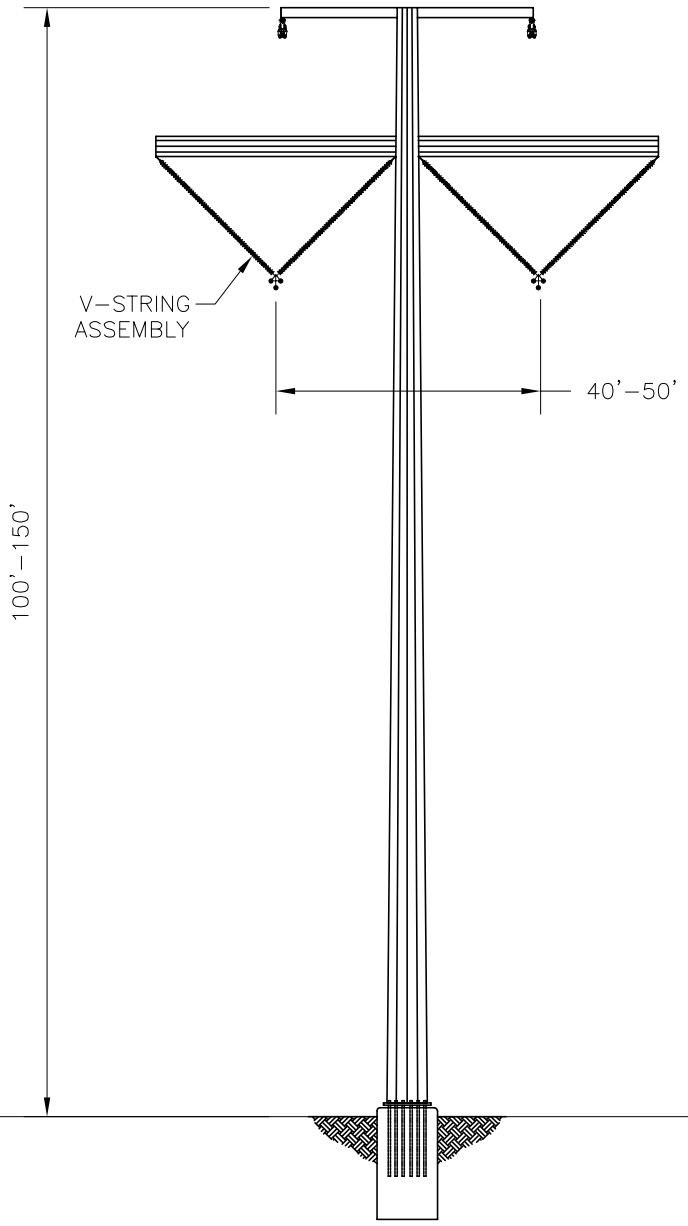
TRANSWEST EXPRESS TRANSMISSION PROJECT

FIGURE 2

TYPICAL ±600kV DC
SELF SUPPORTING LATTICE
V–STRING STRUCTURE



NOTES

1. DIMENSIONS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.

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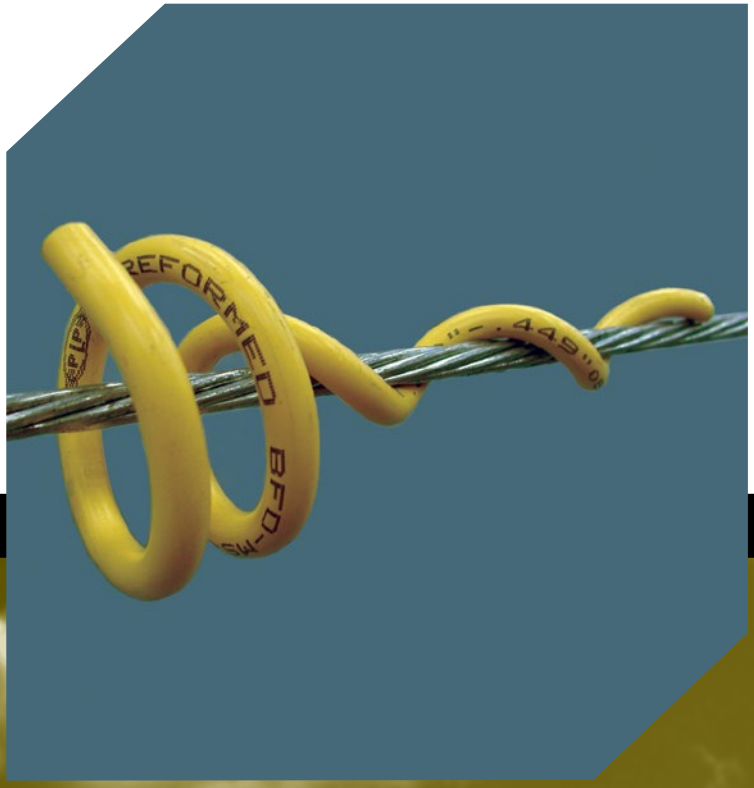
TRANSWEST EXPRESS TRANSMISSION PROJECT

FIGURE 3

TYPICAL ±600kV DC
TUBULAR STEEL POLE
V–STRING STRUCTURE

EFORMED LINE PRODUCTS
The connec ion you can count o .

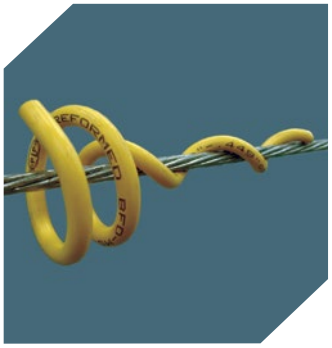
BIRD-FLIGHT™ DIVERTER



COMMUNICATIONS ENERGY SPECIAL INDUSTRIES SOLAR

PLP® Special Industries Products

BIRD-FLIGHT™ Diverter



General Information

The BIRD-FLIGHT Diverter is designed to make overhead lines and guyed structures visible to birds and provides an economical means of reducing the hazard to both lines and birds.

The BIRD-FLIGHT Diverter is lightweight, offers little wind resistance and is easily and quickly applied by hand. The positive grip of the fitting on the cable ensures that it remains in the applied position and cannot move along the span under aeolian vibration or other conditions.

Visibility

The diverter section increases the visible profile of the cable and is designed to ensure safety, but avoid an undesirably bulky outline.

Material

Manufactured from rigid high impact polyvinyl chloride (PVC), the BIRD-FLIGHT Diverter possesses excellent chemical and strength properties and will retain good physical characteristics within a range of extreme temperatures. The performance of the BIRD-FLIGHT Diverter is not deteriorated in severe weather conditions. Industrial fumes and salt water cannot seriously degrade the properties of rigid PVC.

Product Characteristics

BIRD-FLIGHT Diverters are designed to offer the following advantages:

- Increased conductor/strand profile to provide enhanced visibility where bird flight paths are present
- Economical and easily applied
- Lightweight
- Long service life without deterioration of material properties
- Minimal wind resistance
- Manufactured from gray or yellow high impact PVC with UV protection (Contact PLP for other color/voltage options).

Application Notes

Ensure the correct size BIRD-FLIGHT Diverter is used. For a detailed installation description, refer to the application procedure SP2805.

Spacing

For optimum results the recommended spacing distances are 15 foot intervals depending upon local conditions. Since wind resistance is limited, more BIRD-FLIGHT Diverters can be used to ensure adequate visibility without creating stresses on the line.

Product Data

Catalog Number (Yellow)	Catalog Number (Gray)	Conductor Ranger (in) Min	Conductor Ranger (in) Max	Overall Length	Internal Diameter of Diverter Coil	Diameter of PVC Rod	Approx. Weight (lbs)	Color Code
BFD-MS-3331	BFD-MS-3346	.175	.249	8.00	1.50	.375	.090	Black
BFD-MS-3155	BFD-MS-2921	.250	.349	8.50	1.75	.375	.100	Blue
BFD-MS-3164	BFD-MS-3355	.350	.449	9.50	2.00	.375	.110	Brown
BFD-MS-11135	BFD-MS-11060	.350	.449	12.37	4.50	.500	.240	Brown
BFD-MS-3341	BFD-MS-3366	.450	.599	11.00	2.25	.375	.140	Green
BFD-MS-3344	BFD-MS-3371	.600	.770	13.00	2.75	.500	.300	Purple
BFD-MS-3345	BFD-MS-3376	.771	.858	15.00	3.25	.500	.330	Red
BFD-MS-3405	BFD-MS-11699	.859	.942	16.50	3.75	.500	.360	Orange
BFD-MS-11111	BFD-MS-12290	.971	1.121	15.50	4.25	.438	.420	Pink
BFD-MS-11430		1.122	1.306	16.25	4.38	.438	.450	Gray
BFD-MS-11110		1.307	1.530	17.00	4.70	.438	.450	Black
BFD-MS-12351		1.531	1.786	20.00	4.88	.438	.520	White
BFD-MS-11566		1.787	2.100	23.00	5.25	.438	.600	Purple
BFD-MS-12603		2.101	2.500	26.00	5.25	.438	.650	Orange

PREFORMED LINE PRODUCTS

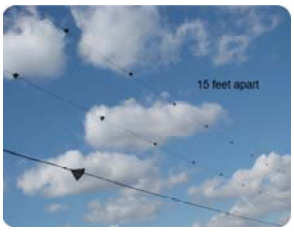
Raptor, Guard, coverup, cover up, sage grouse, eagle, whooping crane, endangered, RUS, USFW, mitigation, wildlife, redtail, squirrel, woodpecker, power line, pole, cross-arm, crossarm, cross arm, raccoon, nest, nest diverter, spike, perch, perch excluder, excluder, insula insulator, golden eagle, bald eagle, windfarm, flight diverter, bird flight diverter, line marker, glow marker, kaddas, cantega, tyco, salisbury hose, salisbury

Avian Flight Diverters

The Patented shape is designed to provide excellent visibility at any angle of approach...day or night. This profile is based on research that found contrast in low light conditions is the most important aspect to alert birds of the oncoming power lines, guy and static wires.

Specifications

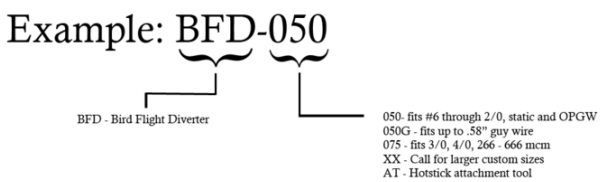
- UV resistant RPVC
- Florescent reflective yellow prism tap
- 24 hour glow tape for improved dawn, dusk, and night visibility
- Withstands > 100 mph winds for sustained periods
- Patented "V" shape design for maximum constrast at all angles
- Hotstick or Extended Stick capable
- Recommend Spacing: 30 feet apart in normal areas and 15 feet apart in high priority zones
- Size: .08" thick by 6.0" by 4" tall
- Weight: 4.7 oz.
- Patent No. 8,438,998



Flight Diverter and Line Marker Sizes

Product Number	Description	Wire Size	Box Qty
BFD-050	Line Marker for .20" - .56" total diameter wire	#6, #4, #2, #1, 1/0, 2/0, static, OPGW	50
BFD-075	Line Marker for .57" - 1.10" total diameter wire	3/0, 4/0, 266 mcm - 666 mcm	50
BFD-XX	Larger sizes available - Call for quotation		
BFD-AT	Hotstick and Extending stick attachment tool	All Sizes	1

Raptor Guard Part Number Chart



Contact

Power Lne Sentry, LLC
432 WCR 66, Fort Collins, CO 80524
Phone: 970-599-1050
Email: info@powerlinesentry.com

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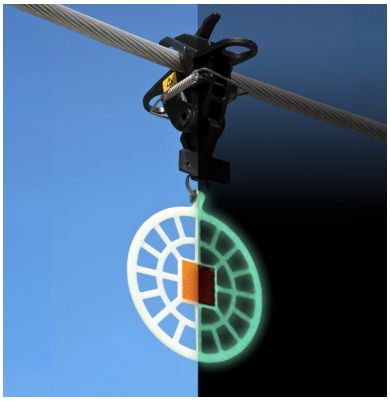
BirdMark BM-AG Bird Diverter



Helping Birds See Hazards Day or Night

Birds large and small—including swans, eagles, hawks, ducks, geese, and many others—often cannot see power lines near the horizon, and they lack the maneuverability to avoid them when they get close enough to see them. Over one million birds are killed annually in North America! BirdMark BM-AG (After Glow) diverters are designed to prevent collisions between birds and hard-to-see power lines day or night.

Easy to See

The BirdMark BM-AG offers a low cost, permanent solution for helping endangered species avoid power lines in traditional flight paths. BirdMarks stand out like a beacon against background features, letting birds see where the power lines are. When swaying in the wind, BirdMarks also make a noise that birds can hear. Highly reflective orange and yellow tape is positioned in the center of each BirdMark to further assist in warning birds.

Night Glow Capability

Other types of bird diverters are usually designed to help birds avoid obstructions during daylight, but recent studies indicate that most bird collisions happen during low light situations such as fog, rain, and the hours before and after dusk. The BirdMark BM-AG glows up to 10 hours after the sun has set, providing extended protection for at risk birds.

Easy to Install

The BirdMark BM-AG can be installed and removed from the ground without interrupting power. Our patented SnapFast mounting clamp securely prevents line slippage on single or bundled cables 0.375"–2.75" in diameter. (Clamp for smaller lines available by special order.) Once in position, the grip is such that the BirdMark BM-AG stays in position, even in a Force 8 gale.

Features

- Highly visible day and night
- Sways and reflects in the wind to alert birds of obstructions
- Glows up to 10 hours after dusk and in other low light conditions
- Fully tested and developed by biologists
- Rugged spring-loaded clamp prevents line slippage
- Quick installation by hot stick
- Easily moved for seasonal flight path variations
- Also hazes birds from buildings and structures

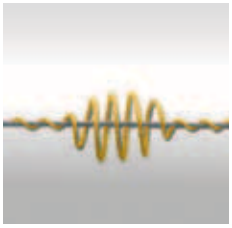
Dimensions

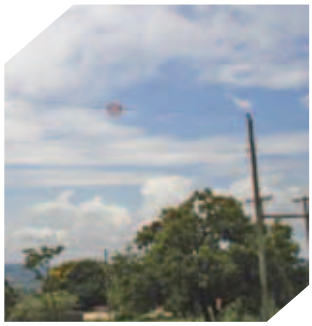
- 11½" total length
- 5⅜" diameter white disk
- Use 15ft spacing for best results

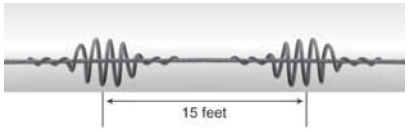
EFORMED LINE PRODUCTS
The connec ion you can count o .

SWAN-FLIGHT™ DIVERTER

COMMUNICATIONS ENERGY SPECIAL INDUSTRIES SOLAR







PLP® Distribution Products

SWAN-FLIGHT™ DIVERTER

Description

The Preformed Line Products SWAN-FLIGHT Diverter is designed for use on overhead conductors to create greater visibility for avian flight paths on overhead lines and tower down guys. Offering little wind resistance, it reduces hazards to both lines and birds. For low and medium voltage construction, apply the SWAN-FLIGHT Diverter to phase conductors (bare or jacketed). For high voltages, it is typically used on shield wire.

The SWAN-FLIGHT Diverter is lightweight, offers little wind resistance and is easily and quickly applied by hand or hot stick. The positive grip on the conductor is designed to ensure that the SWAN-FLIGHT Diverter remains in the applied location and does not move along the span under Aeolian vibration or other conditions.

Materials

Manufactured from rigid high impact polyvinyl chloride (PVC), the SWAN-FLIGHT Diverter possesses excellent chemical resistance, strength properties and will retain good physical characteristics within a range of extreme temperatures. Industrial fumes and salt water cannot seriously degrade the properties of rigid PVC.

Spacing

For optimal results, spacing distances are generally recommended at 15' intervals, depending upon local conditions. Since wind resistance is very limited, sufficient SWAN-FLIGHT Diverters can be used to ensure adequate visibility without creating stresses on the line. When marking adjacent spans, overall visibility is improved by staggering the placement between the spans.

Features

SWAN-FLIGHT Diverters are designed to offer the following advantages:

- Increased conductor profile to provide increased visibility where large, slow moving bird flight paths are present
- Economical and easily applied
- Lightweight
- Long service life without deterioration of material properties
- Minimal wind resistance
- Manufactured from gray or yellow high impact PVC with UV protection

Visibility

The diverter section increases the visible profile of the cable or conductor to ensure safety, but avoids an undesirable bulky outline.

Application

Ensure the correct size SWAN-FLIGHT Diverter is used. For detailed installation description, refer to the application procedure. Hot stick application is fast and simple with standard equipment.

SWAN-FLIGHT Diverter - Product Data

PLP Catalog Number	Conductor Range (Inches)		Overall Length (Inches)	Diameter of Diverter Coil (Inches)	Diameter of PVC Rod (Inches)	Approx. Weight (lbs)	Color Code
	Min	Max					
SFD-0445	0.175	0.249	20	7.0	0.375	0.40	Black
SFD-0635	0.250	0.349	23	7.0	0.375	0.46	Blue
SFD-0890	0.350	0.449	25	7.5	0.375	0.50	Brown
SFD-1140	0.450	0.599	35	8.0	0.375	0.70	Green
SFD-1520	0.600	0.770	38	8.0	0.500	1.40	Purple
SFD-1960	0.771	0.858	38	8.0	0.500	1.40	Red
SFD-2220	0.859	0.942	40	8.0	0.500	1.50	Orange
SFD-2460	0.943	1.121	40	8.0	0.500	1.50	Pink
SFD-2700	1.122	1.306	40	8.0	0.500	2.00	Gray*
SFD-3035	1.307	1.530	46	8.0	0.500	2.00	Black

*Gray is the standard color. For yellow add "-Y" after the catalog number.
For voltage over 230kv, add "-B" for black semi-conductive material.

PREFORMED LINE PRODUCTS

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Printed in U.S.A.
EN-SS-1076-1
09.11.00

EXAMPLE GUY WIRE MARKER

APPENDIX C
FRAMEWORK BLASTING PLAN

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ACRONYMS

Applicant	TransWest Express LLC, also TransWest
ATF	Bureau of Alcohol, Tobacco, Firearms, and Explosives
BLM	Bureau of Land Management
BMP	Best Management Practice
CFR	Code of Federal Regulations
CIC	Compliance Inspection Contractor
FEIS	Final Environmental Impact Statement
NESC	National Electrical Safety Code
NTP	Notice to Proceed
OSHA	Occupational Safety and Health Administration
Plan	Blasting Plan
POD	Plan of Development
PPE	Personal Protective Equipment
Project	TransWest Express Transmission Project, also TWE Project
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
USDOT	United States Department of Transportation
USFS	United States Forest Service

C1.0 INTRODUCTION

This framework Blasting Plan (Plan) outlines the contents, procedures, safety measures, and environmental protection measures that will go into a final Blasting Plan for the TransWest Express Transmission Project (TWE Project or Project) where blasting activities are required during construction. The final Blasting Plan will be prepared by the Construction Contractor(s) prior to construction of the Project. The TWE Project is being developed by TransWest Express LLC (TransWest or Applicant).

C2.0 PLAN PURPOSE

The purpose of the Blasting Plan is to provide safe procedural practices, environmental protection measures, and other specific stipulations and methods to minimize the environmental impact of blasting during Project construction. The final Blasting Plan will provide construction crews, environmental monitors, and the Compliance Inspection Contractor (CIC) with Project-specific information concerning blasting procedures. The primary objective of this Plan is to prevent adverse impacts to human health and safety, property, and the environment that could potentially occur as a result of construction of the TWE Project. This Plan incorporates Best Management Practices (BMPs) and Mitigation Measures identified in the Final Environmental Impact Statement (FEIS) for the TWE Project.

C3.0 REGULATORY

The Construction Contractor(s) will be responsible for preparing and implementing the Blasting Plan in compliance with all local, state, and federal regulations pertaining to blasting. No blasting operations will be undertaken until approval and appropriate permits have been obtained from the applicable agencies. The Construction Contractor(s) will use qualified, experienced, and licensed professionals that will perform blasting using current and professionally accepted methods, products, and procedures to maximize safety during blasting operations.

C4.0 BLASTING PLAN GUIDANCE

Prior to blasting, the Construction Contractor(s) will prepare a final Blasting Plan for review by the Bureau of Land Management (BLM), CIC, and any other relevant jurisdictional organization as applicable. The final Blasting Plan will address blasting operations and safety and include full details of the drilling and blasting patterns, as well as the procedures the Construction Contractor(s) proposes to use for both production and controlled blasting. If at any time changes are proposed to the final Blasting Plan, the Construction Contractor(s) will submit them to BLM and CIC for review. The following items should be addressed in a Blasting Plan:

1. Identify proposed methods to achieve the desired excavations using individual shot plants (where the explosives are planted).

2. Address the proposed methods for controlling fly rock, blasting warnings, and use of non-electrical blasting systems.

3. Map explosive storage locations and areas where blasting will occur, including identification of blasting within 0.25 mile of a known sensitive resource; as well as blasting in the vicinity of pipelines, and wells and springs that may be impacted.

4. Identify blasting procedures including safety, use, storage, and transportation of explosives that will be employed where blasting is needed, and will specify the locations of needed blasting.

5. Require that all blasting will be performed by current registered licensed blasters who will be identified and required to secure all necessary permits and comply with regulatory requirements in connection with the transportation, storage, and use of explosives, and blast vibration limits for nearby structures, utilities, and wildlife.

6. Appropriate flags, barricades, and warning signals will be used to ensure safety during blasting operations. Blast mats will be used when needed to prevent damage and injury from fly rock.

7. Blasting near buildings, structures, and other facilities susceptible to vibration or air blast damage will be carefully planned by the contractor and controlled to eliminate the possibility of damage to such facilities and structures. The Blasting Plan will include provisions for control to eliminate vibration, fly rock, and air blast damage.

8. Blasting in the vicinity of pipelines will be coordinated with the pipeline operator, and will follow operator-specific procedures, as necessary.

9. Damages that result from blasting will be repaired and/or the owner of the damaged facility fairly compensated.

C5.0 BLASTING PLAN CONTENTS

The Blasting Plan will include at a minimum the following information:

1. Blast officer
    a. Other personnel who will be present
2. Site and location of planned blasting
    a. Date of planned blasting
3. Environmental protection Measures
4. Safety Considerations
5. Explosives
    a. Type
    b. Quantity
    c. Detonator device
6. Means of transporting explosives
    a. Provisions for storing and securing explosives on site
7. Minimum acceptable weather conditions
    a. If electrical initiation to be used – considerations for stray radio frequency energy and electrical currents
8. Procedures
    a. Handling explosive charges
    b. Setting explosive charges
    c. Wiring explosive charges
    d. Firing explosive charges

9. Required Personal Protective Equipment (PPE)
10. Minimum standoff distances
    a. Procedures for clearing and controlling access to blast danger
11. Procedures for handling misfires or other unusual occurrences
12. Emergency action plan
    a. Phone numbers
        i. Ambulance
        ii. Fire department
        iii. Police
    b. Location and phone number of nearest medical services facility
    c. Actions to be taken when a person is injured
13. Attach a copy of material safety data sheet for each explosive or other hazardous material expected to be used

C6.0 SAFETY MEASURES

C6.1 Transportation

Transportation of explosives will comply with all applicable federal, state, and local laws, including Title 49 of the Code of Federal Regulations (CFR), Chapter III. These regulations are administered by the U.S. Department of Transportation (USDOT) and govern the packaging, labeling, materials compatibility, driver qualifications, and safety of transported explosives. In general, these regulations require vehicles carrying explosive materials must be well-maintained, properly marked with placards, and have a non-sparking floor. Materials in contact with the explosives will be non-sparking, and the load will be covered with a fire- and water-resistant tarpaulin. Vehicles also must be equipped with fire extinguishers and a current copy of the USDOT and Transport Canada's 2012 *Emergency Response Guidebook*. Every effort will be made to minimize the transportation of explosives through congested or heavily populated areas.

Prior to loading an appropriate vehicle for carrying explosives, the vehicle shall be fully fueled and inspected to ensure its safe operation. Refueling of vehicles carrying explosives shall be avoided. Smoking shall be prohibited during the loading, transporting, or unloading of explosives. In addition, the following specific restrictions apply to transport of other items in vehicles carrying explosives:

- Tools may be carried in the vehicle, but not in the cargo compartment.
- Detonation devices can, in some cases, be carried in the same vehicle as the explosives, but they must be stored in a specially constructed compartment(s).
- Batteries and firearms shall never be carried in a vehicle with explosives.
- Vehicle drivers must comply with the specific laws related to the materials being transported.
- Vehicles carrying explosives shall not be parked or left unattended except in designated parking areas with approval of the State Fire Marshall. When traveling, vehicles carrying explosives will avoid congested areas to the maximum extent possible.

C6.2 Storage

Explosives must be stored in an approved structure (magazine) and kept cool, dry, and well-ventilated. The Construction Contractor will provide the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) Cheyenne Wyoming, Denver Colorado, Salt Lake City Utah, and Las Vegas Nevada Field Offices with a list of dates and locations for the explosives and blasting agent storage facilities to be used on the Project at least 14 days before the establishment of such storage facilities.

At a minimum, the following storage requirements will be implemented:

- Explosives must be stored in an approved structure (magazine), and storage facilities will be bullet-resistant, weather-resistant, theft-resistant, and fire-resistant.
- Magazine sites will be located in remote (out-of-sight) areas with restricted access; kept cool, dry, and well ventilated; and will be properly labeled and signed.
- Detonators will be stored separately from other explosive materials.
- The most stringent spacing between individual magazines will be determined according to the guidelines contained in the ATF publication or state or local explosive storage regulations.
- Both the quantity and duration of temporary on-site explosives storage will be minimized.
- The Construction Contractor will handle and dispose of dynamite storage boxes in accordance with relevant federal, state, and local laws.

C6.3 Fire Safety

The presence of explosive materials on the Project site could potentially increase the risk of fire during construction. Special precautions will be taken to minimize this risk in conjunction with Appendix H - Fire Protection Plan, including but not limited to:

- Prohibiting ignition devices within 50 feet of explosives storage areas;
- Properly maintaining magazine sites so they are clear of fuels and combustible materials, well ventilated, and fire-resistant;
- Protecting magazines from wildfires that could occur in the immediate area;
- Posting fire suppression personnel at the blast site during high fire danger periods; and
- Prohibiting blasting during extreme fire danger periods.

C6.4 Noise

The Applicant will notify nearby residents and grazing permittees in advance of blasting during construction as required by local, state, and federal laws, rules or ordinances.

C7.0 DESIGN FEATURES AND BEST MANAGEMENT PRACTICES

In addition to applicable design and operational standards, regulations, laws and permit requirements, the following design features and BMPs have been developed to avoid or minimize potential blasting

related impacts. Note that the Notice to Proceed (NTP) Plan of Development (POD) will provide detailed construction plans and specifications and construction practices and procedures.

TWE-51: The TWE Project will be designed, constructed, and operated to meet or exceed the requirements of the National Electrical Safety Code (NESC), U.S. Department of Labor, Occupational Safety and Health Administration standards, and the Applicant's requirements for safety and protection of landowners and their property.

TWE-53: The POD will include a Blasting Plan, which will identify methods and mitigation measures to minimize the effects of blasting, where applicable. The Blasting Plan will document the proposed methods to achieve the desired excavations, proposed methods for blasting warning, use of non-electrical blasting systems, and provisions for controlling fly rock, vibrations, and air blast damage.

TWE-56: As part of the POD, the Applicant will provide a Health and Safety Plan, which will outline measures to protect workers and the general public during construction, operation, and decommissioning of the TWE Project. The Health and Safety Plan will identify applicable federal and state occupational safety standards, establish safe work practices, and define safety performance standards.

TWE-64: The POD will include a Fire Protection Plan. The Applicant or its Contractor(s) will notify the BLM of any fires and comply with all rules and regulations administered by the BLM and USFS concerning the use, prevention, and suppression of fires on federal lands, including any fire prevention orders that may be in effect at the time of the permitted activity. The Applicant or its Contractor(s) may be held liable for the cost of fire suppression, stabilization, and rehabilitation. In the event of a fire, personal safety will be the first priority of the Applicant or its Contractor(s). The Applicant or its Contractor(s) will:

- Operate all internal and external combustion engines on federally-managed lands per 36 CFR Part 261.52(j), which requires all such engines to be equipped with a qualified spark arrester that is maintained and not modified;

- Carry shovels, water, and fire extinguishers that are rated at a minimum as ABC-10 pound on all equipment and vehicles. If a fire spreads beyond the suppression capability of workers with these tools, all workers will cease fire suppression action and leave the area immediately via pre-identified escape routes;

- Initiate fire suppression actions in the work area to prevent fire spread to or on federally-administered lands. If fire ignitions cannot be prevented or contained immediately, or it may be foreseeable that a fire would exceed the immediate capability of workers, the operation must be modified or discontinued. No risk of ignition or re-ignition will exist upon leaving the operation area;

- Notify the appropriate fire center immediately of the location and status of any escaped fire;

- Review weather forecasts and the potential fire danger prior to any operation involving potential sources of fire ignition from vehicles, equipment, or other means. Prevention measures to be taken each work day will be included in the specific job briefing. Consideration will be given to additional mitigation measures or temporary discontinuance of the operation during periods of extreme wind and dryness;

- Operate all vehicles on designated roads. Vehicle parking to be restricted to areas free of vegetation on roads or within the permitted ROW and designated work areas;

- Operate welding, grinding, or cutting activities in areas cleared of vegetation within range of the sparks for that particular action. A spotter will be required to watch for ignitions; and

- Use only diesel-powered vehicles in areas where excessive heat from vehicle exhaust systems could start brush or grass fires.

For a list of additional mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

APPENDIX D
CULTURAL RESOURCES PROTECTION AND MANAGEMENT PLAN

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ACRONYMS

ACHP	Advisory Council on Historic Preservation
AHPA	Archaeological Historic Preservation Act of 1974
AIRFA	American Indian Religious Freedom Act of 1978
Applicant	TransWest Express LLC, also TransWest
ARPA	Archaeological Resources Protection Act of 1979
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
CRS	Colorado Revised Statutes
NAGPRA	Native American Grave Protection and Repatriation Act of 1990
NHPA	National Historic Preservation Act
NPS	National Park Service
NRS	Nevada Revised Statutes
NTP	Notice to Proceed
PA	Programmatic Agreement
Plan	Cultural Resources Protection and Mitigation Measures Plan
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
Reclamation	Bureau of Reclamation
ROD	Record of Decision
ROW	right-of-way
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
U.S.C.	United States Code
UCA	Utah Code Annotated
USFS	United States Forest Service
USFWS	United State Fish and Wildlife Service
Western	Western Area Power Administration
WS	Wyoming Statutes

D1.0 INTRODUCTION

This Cultural Resources Protection and Management Plan (Plan) outlines the contents, procedures, and environmental protection measures that will be taken by TransWest Express LLC (TransWest or Applicant) and its Construction Contractor(s) for the TransWest Express Transmission Project (TWE Project or Project). This Plan is largely related to the development of a Programmatic Agreement (PA) between TransWest and various agencies and consulting parties.

D2.0 PLAN PURPOSE

The Bureau of Land Management (BLM) has determined that issuance of the right-of-way (ROW) grant for the TWE Project and related authorizations is an undertaking as defined at 36 Code of Federal Regulations (CFR) 800.16(y) that triggers the requirements of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA Section 106) on affected federal and non-federal lands during the planning, construction, operation, maintenance and decommissioning of the Undertaking. For purposes of the Undertaking, the BLM Wyoming State Office is lead federal agency for compliance with NHPA Section 106 on behalf of the involved federal agencies. Because the effects on historic properties are multi-jurisdictional in scope and cannot be fully determined prior to approval of the Undertaking, the BLM, in consultation with the Consulting Parties has determined to use a phased process to identify historic properties (36 CFR 800.4(b)(2)) and assess the effects on those properties (36 CFR 800.5(a)(3)); such that completion of the identification and evaluation of historic properties, determinations of effect on historic properties, and consultation concerning measures to avoid, minimize, or mitigate any adverse effects will be carried out in phases as part of planning for and prior to any Notice to Proceed (NTP) and Undertaking implementation. Therefore, the BLM has determined that a PA documenting the terms and conditions for compliance with Section 106 will be entered into among Consulting Parties according to 36 CFR 800.14(b)(1)(ii).

Signatories to the PA may include the BLM, Western Area Power Administration (Western), the United States Forest Service (USFS), the National Park Service (NPS), the Bureau of Reclamation (Reclamation), the Bureau of Indian Affairs (BIA), the U.S. Army Corps of Engineers (USACE) - Sacramento District, the Advisory Council On Historic Preservation (ACHP), the Wyoming State Historic Preservation Officer, the Colorado State Historic Preservation Officer, the Utah State Historic Preservation Officer, and the Nevada State Historic Preservation Officer. TransWest is an Invited Signatory to the PA. Tribes may be Signatories to the PA if the Project is located on Tribal Lands or may be Invited Signatories or Concurring Parties if the Project is located outside Tribal Lands. Other interested parties may be Concurring Parties to the PA.

Execution and implementation of the PA satisfies the federal agencies' Section 106 responsibilities for the Project. As an Invited Signatory, TransWest has certain responsibilities under the PA and will comply with the terms and conditions of the PA.

D3.0 REGULATORY REQUIREMENTS

The TWE Project will require the issuance of ROW grants and special use authorizations; and therefore, qualifies as a federal undertaking and must comply with Section 106 of the NHPA. Other federal and state laws concerning the protection of cultural resources that must be complied with include:

- American Indian Religious Freedom Act of 1978 (AIRFA) (42 United States Code [U.S.C.] §1996)
- Antiquities Act of 1906 (16 U.S.C. §431-433)

- Archaeological Resources Protection Act of 1979 (ARPA) (16 U.S.C. §470 aa-mm)
- Archeological and Historic Preservation Act of 1974 (AHPA) (16 U.S.C. §469)
- Federal Cave Resource Protection Act of 1988 (16 U.S.C. §4301)
- National Trails System Act of 1968, as amended (16 U.S.C. §§1241-1249)
- Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (25 U.S.C. §3001)
- Executive Order 11593, Protection and Enhancement of the Cultural Environment
- Executive Order 13007, Indian Sacred Sites
- Executive Order 13175, Consultation and Coordination with Indian Tribal Governments
- Executive Order 13287, Preserve America
- Wyoming Antiquities Act of 1935 (Wyoming Statutes [WS] 35-1-114 to 116)
- Wyoming State Archaeologist Statute, 1967 (WS 36-4-106)
- Colorado Historical, Prehistorical, and Archaeological Resources Act of 1973 (Colorado Revised Statutes [CRS] 24-80-401 to 410)
- Colorado Unmarked Human Graves (CRS 24-80-1301 to 1305)
- Utah State Antiquities Act (Utah Code Annotated [UCA] 9-8-301 to 308)
- Utah Native American Grave Protection and Repatriation Act (UCA R456-1-1 to 17)
- Utah Heritage and Arts, History (UCA Title R455)
- Utah Protection of Human Remains (UCA 76-9-704)
- Utah Ancient human remains on nonfederal lands that area not state lands (UCA 9-8-309)
- Utah Archaeological Vandalism Statutes 76-6-901, 76-6-902, 76-6-903
- Nevada Preservation of Prehistoric and Historic Sites (Nevada Revised Statutes [NRS] 381.195 to 381.227)
- Nevada Protection of Indian Burial Sites (NRS 383.150, NRS 383.190)
- Nevada Protection of Historic and Prehistoric Sites (NRS 383,400-440)

D4.0 MITIGATION MEASURES

For a list of mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

D5.0 PROGRAMMATIC AGREEMENT

When finalized, a copy of the Programmatic Agreement for cultural resources will be attached to this Plan along with any exhibits, attachments or appendices to the Programmatic Agreement. Attachments to the Programmatic Agreement may include other plans related to the protection and management of cultural

resources, such as a Historic Properties Treatment Plan, Monitoring Plan, or Unanticipated Discovery Plan.

APPENDIX E
FRAMEWORK DUST CONTROL AND AIR QUALITY PLAN

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ACRONYMS

Applicant	TransWest Express LLC, also TransWest
BLM	Bureau of Land Management
BMP	Best Management Practice
CFR	Code of Federal Regulations
CWA	Clean Water Act
FEIS	Final Environmental Impact Statement
EPA	United States Environmental Protection Agency
FLPMA	Federal Land Policy and Management Act of 1976
mph	miles per hour
NDEP	Nevada Division of Environmental Protection
NPDES	National Pollutant Discharge Elimination System
NTP	Notice to Proceed
Plan	Dust Control and Air Quality Plan
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
ROD	Record of Decision
ROW	right-of-way
SWPPP	Stormwater Pollution Prevention Plan
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
WDEQ	Wyoming Department of Environmental Quality

E1.0 INTRODUCTION

This framework Dust Control and Air Quality Plan (Plan) to be implemented by TransWest Express LLC (TransWest or Applicant) and its Construction Contractor(s) addresses regulatory compliance, environmental concerns, mitigation recommendations, and monitoring. This Plan will be utilized for the construction of the TransWest Express Transmission Project (TWE Project or Project) to ensure impacts associated with construction activities are minimized as they relate to soil conservation and air quality.

E2.0 PLAN PURPOSE

This Plan provides measures to be utilized by TransWest and its Construction Contractor(s) to ensure protection of the soils and air quality that will be affected by the Project. This Plan is to be implemented during the construction, operation, and maintenance phases of the Project. These measures are intended to: 1) address soil erosion and sedimentation; and 2) minimize dust and air emissions from construction-related activities. This document provides direction for the detailed final Dust Control and Air Quality Plan to be developed by the Construction Contractor(s).

E3.0 PLAN UPDATES

This Plan will be updated for the Notice to Proceed (NTP) POD as required based on final design and engineering of the Selected Alternative. The Construction Contractor(s) will be responsible for preparing and implementing the final Plan in compliance with all local, state, and federal regulations pertaining to air quality.

E4.0 REGULATORY

Construction, operation, and maintenance activities for the Project are subject to various regulations designed to protect environmental resources and the public from erosion, dust, and other possible effects to air quality. The following federal, state and local permits and documents are required for preventing accelerated erosion and minimizing dust and air emissions. These documents should be referred to along with this Plan, when assessing which mitigation measures are appropriate for a specific area. At a minimum, TransWest and the Construction Contractor(s) will need to adhere to or obtain the following permits, as applicable:

E4.1 Federal Permits

- BLM – Right-of-way (ROW) grant and temporary use permit: Federal Land Policy and Management Act of 1976 (FLPMA) (Public Law 94-579); 43 United States Code (U.S.C.) §§1761-1771; 43 Code of Federal Regulations (CFR) Part 2800

- U.S. Forest Service (USFS) special use authorization or easement: 36 CFR Part 251

- U.S. Army Corps of Engineers (USACE) – Clean Water Act (CWA), Section 401: CWA (33 U.S.C. §1344)

- U.S. Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Construction General Permit

E4.2 State Permits

- Wyoming Department of Environmental Quality (WDEQ) – Air Quality Division Construction Permit to control fugitive dust emissions during construction.

- WDEQ – Sections 401, 402, and 404, CWA, Water Quality Certification (State implementation of the USACE permits for water quality and stormwater discharges).

- Colorado Department of Public Health and Environment, Water Quality Control Division- Stormwater Permit.

- Utah Department of Environmental Quality, Air Quality Board- Notice of Construction.

- Nevada Division of Environmental Protection (NDEP) - Stormwater Pollution Prevention Plan (SWPPP), Water Quality Certification.

- NDEP Bureau of Air Pollution Control - Authority to construct, permit to operate.

E4.3 Local Permits

- Clark County, Department of Air Quality and Environmental Management - Dust Control Permit, Stationary Source Permit.

- County conditional use permits, temporary use permits for staging areas, road crossing permits and/or encroachment permits. May have erosion or air quality considerations. Requirements vary by county.

E5.0 AIR QUALITY AND DUST CONTROL

Soil conservation for the Project includes minimizing impacts that will affect soils from the construction and operation of the Project, such as minimizing wind and water erosion, surface disturbance, and construction activities in highly erodible soils. Erosion potential is the result of several factors including slope, vegetation cover, climate, and the physical and chemical characteristics of the soil. Increased soil erosion may occur when vegetation is removed during construction, or in areas where the surface is disturbed by heavy equipment. Wind is also an erosion factor throughout portions of the Project area.

Where disturbance is anticipated in areas of steep terrain with high potential for erosion, vegetation clearing and grading will be conducted in a manner to minimize these effects. Soil stabilization and reclamation practices will also be implemented to reduce erosion. In areas of soil disturbance or compaction (e.g., temporary work areas) soil treatment and reclamation will be implemented as directed in Appendix Q –Framework Reclamation Plan.

Construction of the Project may temporarily increase fugitive dust particularly in areas with high winds and fragile soils. Ambient levels of nitrogen oxides, hydrocarbons, and carbon monoxide near the construction zone may also be temporarily increased due to emissions from heavy construction equipment. Related facilities may cause a minimal increase in fugitive dust.

Air quality control measures are intended to minimize fugitive dust and air emissions, and to maintain conditions as free from air pollution where practical. All requirements of those entities having jurisdiction over air quality matters will be adhered to, and any permits needed for construction activities will be obtained. The Construction Contractor(s) will not proceed with any construction activities without taking reasonable precautions to prevent excessive particulate matter from becoming airborne and creating nuisance conditions.

Excessive exhaust emissions from vehicles and heavy equipment will be prevented by proper maintenance, and no open burning of construction trash or other open fires will be allowed.

Where necessary, water may be used as Bureau of Land Management (BLM) approved dust control methods during construction, including the grading of roads or the clearing of vegetation in the ROW, and will be applied on unpaved roads, material stockpiles, and other surfaces, which can create airborne dust. Where application of water is not possible, material stockpiles will be enclosed or covered. In addition, open bodied trucks transporting materials likely to become airborne will be covered. Soil tracks or other materials that may become airborne will promptly be removed from paved roads. Techniques to minimize and control dust during rock blasting operations can be found in Appendix C – Blasting Plan Framework.

E6.0 DESIGN FEATURES AND BEST MANAGEMENT PRACTICES

In addition to applicable design and operational standards, regulations, laws and permit requirements, the following design features and Best Management Practices (BMPs) have been identified to avoid or minimize potential air quality related impacts.

TWE-8: (Excerpt) In addition, fugitive dust will be controlled during road construction as required by state and local permits.

TWE-21: The Applicant will obtain a National Pollutant Discharge Elimination System (NPDES) permit from the Environmental Protection Agency (EPA) prior to construction.

TWE-47: The POD will include a Dust Control and Air Quality Plan. Requirements of those entities having jurisdiction over air quality matters will be adhered to and dust control measures will be developed. Open burning of construction trash will not be allowed unless permitted by local authorities.

TWE-48: The Contractor and Subcontractor(s) will be required to have and use air emission control devices on construction machinery, as required by federal, state or local regulations or ordinances.

TWE-53: The POD will include a Blasting Plan, which will identify methods and mitigation measures to minimize the effects of blasting, where applicable. The Blasting Plan will document the proposed methods to achieve the desired excavations; proposed methods for blasting warning; use of non-electrical blasting systems; and provisions for controlling fly rock, vibrations, and air blast damage.

For a list of additional mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP’s for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

APPENDIX F
EMERGENCY PREPAREDNESS AND RESPONSE PLAN

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ACRONYMS

ACGIH	American Conference of Industrial Hygienists
AMA	American Medical Association
ANSI	American National Standards Institute
Applicant	TransWest Express LLC, also TransWest
BLM	Bureau of Land Management
BMPs	Best Management Practices
CIC	Compliance Inspection Contractor
CSA	Council on Scientific Affairs
NESC	National Electrical Safety Code
NTP	Notice to Proceed
OSHA	Occupational Safety and Health Administration
Plan	Emergency Preparedness and Response Plan
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
ROD	Record of Decision
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
USFS	United States Forest Service

F1.0 INTRODUCTION

This Environmental Emergency Preparedness and Response Plan (Plan) provides an overview of methods to be implemented by TransWest Express LLC (TransWest or Applicant) and its Construction Contractor(s) if emergency management is necessary during the construction, operation, and maintenance of the TransWest Express Transmission Project (TWE Project or Project). This document discusses the existing support structure, chain of command, and emergency communication protocols to be used by TransWest and its Construction Contractor(s), as approved by the Bureau of Land Management (BLM) and U.S. Forest Service (USFS). More specific emergency procedures for blasting, fire, and hazardous materials management and spills are included in Appendix C Blasting Plan, Appendix H Fire Protection Plan, Appendix L Hazardous Materials Management Plan, Appendix M Health and Safety Plan, and Appendix S Spill Prevention and Response Plan.

Emergency response procedures apply to the following potential or similar events:

- Downed transmission lines, structures, or equipment failure
- Fires
- Sudden loss of power
- Natural disasters
- Serious personal injury

F2.0 PLAN PURPOSE

The purpose of the Emergency Preparedness and Response Plan is to provide clear procedures and information to enable TransWest, the Construction Contractor(s), the Compliance Inspection Contractor (CIC), BLM and USFS Project Manager(s) to prepare for and effectively respond to emergency situations. The primary objective of this Plan is to prevent adverse impacts to human health and safety, property, and the environment that could potentially occur as a result of the construction, operation, and maintenance of the TWE Project.

F3.0 REGULATORY COMPLIANCE

Health and safety guidelines related to high-voltage transmission lines are provided by a number of sources, including the National Electrical Safety Code (NESC), American National Standards Institute (ANSI), American Conference of Governmental Industrial Hygienists (ACGIH), American Medical Association (AMA), Council on Scientific Affairs (CSA), various state regulatory agencies and other organizations. In addition, the Occupational Safety and Health Administration (OSHA) provides regulations for construction activities.

F4.0 RESPONSIBILITIES

TransWest and the Construction Contractor(s) are responsible for the effective response to emergency situations or events related to the construction, operation, and maintenance of the TWE Project. To ensure a coordinated and effective response, a chain of command will be developed as part of this Plan and followed in the event of an emergency.

In the establishment of a chain of command, considerations such as the level of activation and the participation necessary to respond to specific situations are to be taken into account. The following are factors for the establishment of a chain of command:

- Type of event (natural, environmental, electrical supply/outage, external forces)
- Severity and geographic area (multiple or combination of events)
- Anticipated duration
- Multi-division/discipline response required
- External agency coordination

F5.0 RESPONSE COORDINATION

The amount of resources and coordination required for response to a specific hazard or emergency is determined by the type, severity, location, and duration of the event. Most hazards or emergencies require management at the field operations level. This approach to emergency management is included as part of this Plan and provides increasing levels of resources and the coordination necessary to support immediate or escalating hazards or emergencies.

In the event of an emergency, crews will be dispatched quickly to repair or replace any damaged equipment. Public health and safety and the health and safety of workers will have priority under emergency conditions. Repair of the transmission line and restoration of electric service is a public health and safety concern and will proceed as rapidly as possible under the circumstances. All reasonable efforts will be made to protect plants, wildlife, property, and other resources. Reclamation procedures following completion of repair work will follow the applicable provisions of the TWE Project Reclamation Plan (Appendix Q to the Plan of Development).

F6.0 EMERGENCY COMMUNICATIONS

Effective communication and exchange of information is essential in every emergency response. Misdirected, incorrect, or untimely information can be detrimental and can increase the threat to life or property. As an emergency event escalates, the rapid increase of information creates chaos and confusion. Simple communication diagrams can help alleviate this situation and are included in this Plan.

F6.1 Emergency Contact

IN CASE OF EMERGENCY, ON-SITE PERSONNEL WILL CALL 911 FIRST. Additional potential emergency contacts are listed in Table F1 and should be called as appropriate, depending on the situation (e.g., fire, personal injury). The emergency contacts in Table F1 will be populated with specific personnel immediately prior to construction and will be kept up to date for the life of the Project. Further guidance on emergency response, notification, and reporting protocols are included in Appendix C Blasting Plan, Appendix H Fire Protection Plan, Appendix L Hazardous Materials Management Plan, Appendix M Health and Safety Plan, and Appendix S Spill Prevention and Response Plan.

The following emergency contact list will be populated for each county that the TWE Project crosses at the beginning of construction and will be updated throughout the Project by the Construction Contractor(s) to ensure accurate contact information.

TABLE F1 EMERGENCY CONTACT LIST

IN CASE OF EMERGENCY, CALL 911		
	Fire	
County:	BLM Field Office(s): TBD	State Interagency Fire Center:

Primary Contact: TBD Secondary Contact: TBD	USFS Ranger District(s): TBD	TBD
Law Enforcement		
County Sheriff: TBD	State Highway Patrol: TBD	
Poison Control		
National Poison Control Center: 1.800.222.1222	State Poison Control Center: TBD	
Hospitals and Clinics		
County and Municipal as Applicable: TBD		
Hazardous Spill Response and Notification – Call 911 After 911 notification, notify the Compliance Inspection Contractor who will make the following notifications, as appropriate, based on type of spill and the geographic location of the spill.		
Compliance Inspection Contractor: TBD	State Divisions of Emergency Services and Homeland Security: TBD	National Response Center: 1.800.424.8802
State Departments of Environmental Quality: TBD	County: TBD	
Other Numbers		
County Fire Dispatch: TBD	BLM Authorized Officer or Representative: TBD	Construction Contractor Manager: TBD

F6.2 Hazard Identifications and Key Response Criteria

The Project's construction activities can pose potential hazards or threats and cause emergencies. Identifying hazards and threats and their potential effects and consequences will help Project personnel respond appropriately to emergency situations. Listing potential hazards and a detailed response to each is not appropriate for this Plan. Reponses to different events may vary as the event evolves, but reasonable response methods and responsibilities will be determined in future updates to this Plan. Scenarios that may be considered are electrocution; fatality; massive equipment failure; structure failure; and extreme weather conditions, including natural disasters.

F6.3 Mitigation Measures

For a list of mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

APPENDIX G
ENVIRONMENTAL COMPLIANCE AND MONITORING PLAN

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ACRONYMS

Applicant	TransWest Express LLC, also TransWest
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
CIC	Compliance Inspection Contractor
ECMP	Environmental Compliance and Monitoring Plan, also Plan
EMM	Environmental Mitigation Measure
FEIS	Final Environmental Impact Statement
NTP	Notice to Proceed
Plan	Environmental Compliance and Monitoring Plan, also ECMP
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
Reclamation	Bureau of Reclamation
ROD	Record of Decision
ROW	right-of-way
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
USFS	United States Forest Service
Western	Western Area Power Administration
WSO	Work Stoppage Order

G1.0 INTRODUCTION

This Environmental Compliance and Monitoring Plan (ECMP or Plan) provides an overview of how TransWest Express LLC (TransWest or Applicant) will manage compliance with all laws, regulations and agreements related to the TransWest Express Transmission Project (TWE Project or Project). This Plan may be updated, revised and changed as roles and responsibilities are further refined throughout the Project.

The BLM, the USFS, the Bureau of Reclamation (Reclamation) and other federal agencies issuing right-of-way (ROW) grants or special use authorizations on federal lands will be responsible for enforcement of the terms and conditions of those grants and authorizations. As the lead federal land management agency during construction of the Project, the BLM will engage a third-party Compliance Inspection Contractor (CIC) to act on behalf of the federal land management agencies to provide construction oversight and monitor compliance with the terms and conditions of the federal grants and authorizations.

G2.0 PLAN PURPOSE

The ECMP is the primary guide for documentation and management of compliance with the federal grants and authorizations for the Project. This ECMP contains information on the following items:

- Roles and responsibilities of the Compliance Team
- Procedures for assessing Project compliance and process for implementing corrective actions
- Procedures for submitting, evaluating, and approving/denying variance requests
- Communications
- Training
- Reporting and documentation
- Project closeout

Because there is the potential for the Project to affect sensitive environmental resources, environmental mitigation measures (EMMs) have been developed to minimize potential impacts on these resources. For a list of EMMs, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD. The ECMP is intended to be a guidance document to facilitate compliance and the effective implementation of the EMMs. As needed, the ECMP will be updated and revised.

A third party CIC will be engaged by the BLM to enforce terms and conditions of the federal grants and authorizations. The CIC will be responsible for assuring that the Plan of Development (POD) and all associated permitting documents have been distributed to the Compliance Team for their review prior to construction being initiated. The CIC will also review all environmental requirements with key construction managers and environmental monitors at the initial construction kickoff meeting. At that time a document control system, which may be used to manage the submittal and distribution of Project compliance information and documentation, may be presented and demonstrated. Environmental inspectors and monitors will also be retained by TransWest and/or by

the Construction Contractor(s) to implement EMMs, provide specific resource monitoring, and to prepare daily reports on those construction activities monitored.

G3.0 ROLES AND RESPONSIBILITIES

The following section describes the roles and responsibilities of the Compliance Team in executing the ECMP and describes their reporting relationships. The Compliance Team includes the BLM and other federal agencies, CIC, TransWest, Construction Contractor(s), and Environmental inspectors and monitors. Subject to the requirements of the site health and safety plan, the Compliance Monitoring Team shall have access to all Project work areas to inspect construction and reclamation activities in accordance with the terms and conditions of the federal grants and authorizations. Access to work areas will not be unreasonably withheld provided that the members of the Compliance Monitoring Team have received all required safety training necessary to enter the work area.

G3.1 Bureau of Land Management and Other Federal Agencies

The role of the BLM and other federal agencies is to ensure that all stipulations and requirements of the federal grants and authorizations are implemented and complied with during the construction, operation, and maintenance of the Project. Oversight will be provided by both federal Authorized Officers and by Project Managers for each federal agency. Authorized Officers will have ultimate authority and be the decision makers for issues pertaining to ROW grants and authorizations. The Authorized Officers will supervise the federal Project Managers to verify that environmental compliance is meeting the requirements of all applicable laws, permits, regulations, and agreements. The Authorized Officers, in coordination with others, will determine if noncompliance events for which TransWest is accountable qualify as violations to the terms and conditions of any ROW grant or authorization. Only the Authorized Officers, in accordance with 43 Code of Federal Regulations (CFR) Part 2807 and 36 CFR Part 251.60, will have the authority to suspend or terminate a ROW grant or authorization if TransWest and/or its Construction Contractor(s) do not comply with their stipulations, conditions, or with other applicable laws and regulations. The Authorized Officers will be the primary federal agent to issue decisions unless otherwise delegated to a federal Project Manager.

Federal Project Managers will be primarily responsible for enforcing TransWest's day-to-day compliance with environmental laws and regulations, the POD, and all stipulations and conditions of the federal grants and authorizations. They will ensure that compliance during construction is done in a manner which facilitates timely and efficient construction while protecting the public interest and the environment. They will also be responsible for ensuring that environmental impacts do not exceed those analyzed in the Final Environmental Impact Statement (FEIS) and will manage the third-party CIC. Federal Project Managers will coordinate with agency resource specialists for their technical expertise and input when needed. Federal Project Managers will be responsible for notifying TransWest of any grant or authorization violations due to noncompliance, issuing work stoppage orders (WSOs) if needed, issuing work continuation notices (or lifting work stoppage orders) and enforcing corrective actions as needed. Non-compliance will be reported to the appropriate Authorized Officer(s). Each federal Project Manager will be responsible for maintaining an accurate and complete administrative record for their respective agency.

All Level 2 or Level 3 variance requests described in Section G4.3 below, will require approval by either the appropriate federal Project Manager or Authorized Officer.

G3.2 Compliance Inspection Contractor

TransWest and the federal agencies will agree to use of a third-party CIC to act on the BLM and other federal agencies' behalf to ensure adequate oversight during the construction and reclamation phases of the Project. The CIC will report directly to each federal Project Manager and will be authorized to enforce the stipulations of the federal grants and authorizations. It is not the role of the CIC to direct the work of either TransWest or its Construction Contractor(s). Rather the CIC's primary role is to observe work activities and bring non-compliant situations to the attention of the appropriate party and offer recommendations on how to prevent or rectify non-compliance. Additional responsibilities of the CIC include:

- Track all Project construction disturbances by type and jurisdiction during inspections, for inclusion in an End of Construction Project Report.
- Report if construction disturbance exceeds levels analyzed in the FEIS.
- Prepare and maintain a project compliance contact list containing the names, titles, phone numbers and email addresses of all federal Authorized Officers and federal Project Managers, TransWest Project Managers, Construction Contractor(s) field supervisors and construction managers, environmental inspectors, monitors and any other individuals or agencies who will be involved with environmental compliance for the Project.
- Participate in pre-construction meetings, safety meetings, safety training, environmental training and other meetings attended by the BLM, TransWest, and Construction Contractor(s) as appropriate that involve environmental compliance aspects of the Project.
- Prepare and distribute weekly summary report.
- Review all applicable environmental documents and requirements, including the FEIS, ROD, POD, ROW grants, and special use authorizations.
- Maintain a complete copy of the POD and associated environmental documents while in the field.
- Verify that construction occurs as outlined in the POD, FEIS, ROD, ROW grants, special use authorizations, and NTPs.
- Perform compliance monitoring in areas of active construction or reclamation.
- Maintain records that assure all required environmental training of construction personnel has been conducted.
- Respond to inquiries by TransWest or its Construction Contractor(s) concerning environmental compliance.
- Discuss any potential compliance issues with Construction Contractor(s), environmental inspectors, and environmental monitors.
- Provide recommendations to federal Project Managers on ways to resolve or prevent non-compliance.
- At a minimum, meet weekly with the federal Project Managers (or designees), in person or by telephone, to review status of construction and compliance.
- Meet with TransWest and Construction Contractor(s) project managers, construction managers, environmental inspectors, or environmental monitors as needed.
- Support and coordinate the preparation, submittal, and review of all variance requests.

- Approve or deny Level 1 variance requests described below.
- Participate in and support Project safety.
- Work with TransWest and Construction Contractor(s) to support the Project's safe, timely, and effective construction.
- If warranted, issue an immediate temporary suspension or WSOs for any construction activity determined to be in non-compliance.
- As warranted, rescind any temporary suspension or WSOs in a timely fashion following determination that non-compliance issue has been adequately addressed.
- Conduct field reviews and inspections with agency personnel as needed.
- Conduct a final route review and prepare End of Construction Project Report documenting the status of the ROW and the final amount of construction disturbance.
- Document completion of all reclamation activities (excluding reclamation monitoring).
- Document instances of non-compliance through mapping and photography and complete non-compliance report.
- Review environmental inspector and environmental monitor daily logs.
- Prepare meeting notes that highlight any decisions made during key project meetings.

The CIC will deploy an adequate number of field personnel to work with the Environmental Inspectors and Monitors to sufficiently monitor construction activities and fulfill the responsibilities listed above. It is important to note that it is not the role of the CIC to direct work of either TransWest or the Construction Contractor(s).

G3.3 TransWest

TransWest will be the holder of all ROW grants, authorizations, and easements, both public and private. As such, TransWest is ultimately accountable for adherence to the environmental permit requirements and is responsible for ensuring that environmental impacts do not exceed those analyzed in the FEIS and approved in the ROD. To facilitate this goal, TransWest will employ environmental inspectors and monitors who will work with the Construction Contractor(s) and will support the efforts of the CIC. TransWest will also maintain regular and consistent communication with the Construction Contractor(s) to track the success of environmental protection, mitigation, and compliance efforts before, during, and after construction. TransWest is responsible for assuring that all instances of non-compliance are corrected.

G3.4 Construction Contractor(s)

As part of TransWest's commitment to environmental compliance, the Construction Contractor(s) will be contractually bound to comply with all relevant laws, regulations, and permits, including the ECMP, POD, EMMs, and other specific stipulations set forth in the federal grants and authorizations. All construction personnel and employees entering work areas will be required to participate in environmental training before starting work. Construction crews will also be required to cooperate and support the work of the Compliance Team to build the Project safely and in compliance with all terms and conditions; federal, state, and local laws and regulations; and all landowner agreements. If a non-compliance event occurs, it will be the responsibility of the Construction Contractor(s) to notify TransWest and the CIC and to cooperate fully in developing and implementing a solution as soon as possible to resolve the non-compliance. The Construction Contractor(s) will be expected to involve the CIC in key Project management meetings and the Project safety program.

G3.5 Environmental Inspectors and Monitors

TransWest and its Construction Contractor(s) will employ a team of environmental inspectors and monitors to monitor compliance with the federal grants and authorizations. The duties and responsibilities of the environmental inspectors and monitors will include:

- Daily inspections and monitoring of construction activities as required.
- Coordinate and communicate with the CIC.
- Support and participate in field inspections by federal agency personnel as needed.
- Deliver environmental training and provide CIC with a current list of all personnel who have received training.
- Confirm on the ground the location of sensitive resources and areas of concern prior to construction activities commencing.
- Verify that construction work areas, access roads, and sensitive resources or areas of concern have been properly marked and flagged prior to work commencing in those areas.
- Communicate and coordinate with construction crews and act as a resource to explain environmental regulations and requirements.
- Attend safety meetings.
- Prepare daily logs/reports to be provided to the CIC.
- Support the preparation of variance requests and review by the federal agencies and CIC.
- Inform Construction Contractor(s) and CIC of all potential and existing compliance issues and support implementation of corrective actions.
- Stop-work authority when construction activities violate the environmental conditions of the federal grants and authorizations or when sensitive resources are threatened.
- Participate in and support the implementation of corrective actions for non-compliance violations.
- Monitor, inspect, and document reclamation and revegetation activities as needed.

G4.0 PROCEDURES

This section describes the procedures that will be followed to assess compliance levels, responses to non-compliance, and for the submittal, review, and tracking of variance requests.

G4.1 Compliance Levels

Each separate activity that is inspected and documented in a daily report will be assigned one of the following compliance levels:

- Acceptable
- Problem area
- Non-compliance

Environmental inspectors, monitors, and the CIC will assess potential non-compliant activities based on the extent and nature of actual impacts on a resource, the potential for additional impacts on a

resource, the intent behind the action, and the history of the occurrence. Failure by TransWest or the Construction Contractor(s) to disclose in a timely manner or accurately characterize an impact will result in an automatic non-compliance and temporary suspension of work in the area where the impact has occurred. Each compliance level is described below.

G4.1.1 Acceptable

All activities that are in compliance with the Project's federal grants and authorizations will be documented as acceptable.

G4.1.2 Problem Area

A problem area is a location or activity that does not meet the definition of acceptable but no impacts to sensitive resources have occurred. Examples include:

- An incident that is accidental or unforeseeable, where no sensitive resources were damaged, is reported in a timely manner, and is repaired quickly.
- A location where the CIC, environmental inspector, or monitor has determined that damage to a sensitive resource could occur if corrective actions are not taken.
- Implementation of mitigation measures is occurring too slowly to be fully effective.

The Construction Contractor(s) will be notified of the problem area and it will be documented in the daily report, as well as the corrective actions that will be applied. If a problem area is corrected in a timely manner it will not be considered non-compliance. If a problem area is found to be a repeat situation, or has happened in multiple locations, or is not corrected within an agreed upon timeframe, the CIC, environmental inspector, or monitor may document the situation as non-compliance.

G4.1.3 Non-Compliance

Non-compliance occurs when one or more of the following take place:

- Requirements or stipulations contained within the Project's federal grants or authorizations are not followed or implemented properly.
- Damage to sensitive resources has occurred.
- Problem areas consistently reoccur and threaten sensitive resources.
- Corrective actions for problem areas are not implemented.
- Construction Contractor(s) display direct disregard for Project requirements.

G4.2 Responses to Non-Compliance

Depending on the circumstances of the non-compliance and if sensitive resources are threatened, the CIC may orally issue a temporary suspension of construction activities within a localized area. All non-compliance will be documented in a non-compliance report. The non-compliance report will be prepared by the CIC based on personal observations or information provided by the environmental inspectors, monitors or other parties. In all cases when non-compliance occurs the CIC will be informed immediately.

Once prepared, the CIC will provide a copy of the non-compliance report to TransWest, the Construction Contractor(s), and the applicable federal Project Manager(s). Upon review, the

appropriate federal Project Manager(s), in consultation with the Authorized Officer as needed, will direct the CIC to take one or more of the following actions:

- Work with the Construction Contractor(s) and TransWest to develop a written plan to address the cause of the non-compliance and actions to avoid its reoccurrence.
- Work with the Construction Contractor and TransWest to develop a written plan to repair any impacts to resources.
- Issue a temporary suspension to halt specific activities or all activities within in a localized work area.
- Issuance of a WSO to temporarily suspend all activities within a given construction area of the Project (requires written authorization by either the federal Project Manager or the Authorized Officer).
- ROW grant or authorization suspension (requires written authorization by the Authorized Officer).
- ROW grant or authorization termination (requires written authorization by the Authorized Officer).

In cases where construction activities have been halted, TransWest, the Construction Contractor(s), appropriate federal Project Manager (s), and the CIC will meet to discuss the corrective actions that must be implemented before work will be allowed to resume. Prior to any ROW grant or authorization suspension or termination, TransWest will be notified in writing and allowed a reasonable opportunity to correct any non-compliance pursuant to 43 CFR Part 2807.18(a), and if applicable, provided a hearing pursuant to 43 CFR Part 2807.18(b) and 36 CFR Part 251.

G4.3 Variances

It is expected that during the construction of the TWE Project circumstances will arise requiring a change, or variance, in how the Project will be constructed, or how mitigation measures or stipulations will be implemented. Under such circumstances TransWest will follow the procedures for variances, exceptions and modifications set forth in the applicable BLM Resource Management Plan. Where such procedures are not described in detail, TransWest will follow the procedures described in this ECMP.

The first step in the variance process is the preparation of a variance request form. It is important that the form is complete, accurate, and contains sufficient information for the CIC and agency to adequately assess the request and reach a decision on its approval or denial. The Construction Contractor(s) will be responsible for preparing the request with the prior approval of TransWest.

A completed variance request form, with any required attachments, will be submitted to the CIC in electronic format. The CIC will conduct an initial assessment of the request for completeness and will determine a variance level based on the following definitions:

- Level 1: minor field adjustment within an approved/granted area that was previously analyzed in the Project's environmental documents, does not result in greater impacts to resources, and does not result in an increase in the estimated acres of disturbance contained in the FEIS.
- Level 2: changes in procedures or adjustments located outside of an approved/granted work area but still within an area analyzed in the Project's environmental documents, do not result in greater impacts to resources, and does not result in an increase in the estimated acres of disturbance contained in the FEIS.

- Level 3: changes in procedures or adjustment located outside of an approved/granted work area and outside area analyzed in the Project's environmental documents, results in greater impacts to resources, and/or results in an increase in the estimated acres of disturbance contained in the FEIS.

Incomplete or inadequate submittals will be returned within 24 hours with an explanation. Level 1 variance requests will be approved, approved with conditions, or denied by the CIC within 48 hours. Level 2 variance requests will be forwarded on to the appropriate federal Project Manager and will be approved, approved with conditions, or denied within a specified time to be determined. If denied, the federal Project Manager will provide a written explanation for the denial. Level 3 variances will be forwarded to the appropriate federal Project Manager and Authorized Officer. The timeframe for approval or denial of a Level 3 variance will depend on the scope of any additional studies and consultations that may be required and will take place within a specified time to be determined. If denied the Authorized Officer or federal Project Manager will provide a written explanation for the denial.

The CIC will be responsible for tracking all variance requests and will provide a summary of these in the End of Construction Project Report.

G5.0 COMMUNICATIONS

Effective communication and the sharing of information between the Compliance Team will be critical to achieving and maintaining environmental compliance throughout the construction of the Project. It is especially important for construction crews to communicate daily with environmental monitors concerning work schedules and locations. The Construction Contractor(s), CIC, environmental inspectors and monitors will maintain a communications network that consists of two-way radios and/or cellular phones. The Construction Contractors(s) will be responsible for assuring that field crews have the ability to communicate effectively and will implement solutions if communication problems arise.

Given the scope and complexity of the Project, it is critical that all communications involving key decisions, safety, approvals, non-compliance, or variances be documented in writing. Oral communication will not substitute for written approvals.

The CIC will be responsible for developing and maintaining a Project compliance contact list containing the names, titles, phone numbers and email addresses of all agency Authorized Officers, federal Project Managers, TransWest project managers, Construction Contractor(s) field supervisors and construction managers, environmental inspectors, monitors and any other individuals or agency personnel who will be involved with environmental compliance for the Project. The CIC will also be responsible for developing appropriate distribution lists for weekly compliance reports, non-compliance notifications, and variance requests.

The Construction Contractor(s) will hold daily morning meetings that will include the CIC or the CIC's compliance monitors, environmental inspectors and monitors to review the day's construction activities, discuss safety, and if needed discuss any compliance problem areas. The Construction Contractor(s) will also schedule periodic meetings with the CIC, lead environmental staff, and construction managers to discuss such topics as safety, communication, compliance, schedule, staffing, or other issues related to keeping the Project safe, on schedule, and in compliance.

G6.0 TRAINING

All personnel, including agency personnel, entering work areas are required to receive environmental and safety training prior to entering. Safety training will be provided by the Construction Contractor(s) following the requirements found in the Health and Safety Plan (Appendix M).

Environmental training will be provided by environmental inspectors and/or monitors. Training will emphasize compliance with all Project-wide environmental requirements including stipulations in the ROW grant, special use authorizations, POD, and NTP(s). Requirements pertaining to a particular construction spread, such as requirements for the protection of threatened and endangered species or cultural resources, will be addressed as necessary. Roles and responsibilities will be reviewed and the authority of the CIC, environmental inspectors, and monitors will be emphasized.

The CIC will be provided with a list of all personnel who successfully completed the environmental training. Each trainee will receive proof of certification that must be carried at all times. At the discretion of the CIC, they may ask any personnel on the ROW to produce their training certification card. Any personnel present in work area that is found to have not gone through the training will result in non-compliance. The individual will be required to leave the work area immediately and will not be allowed back onto the Project until training has been completed.

G7.0 REPORTING AND DOCUMENTATION

Effective management of the Project will require the completion of multiple forms and reports to be submitted on a regular basis during the course of construction. These will include:

- Daily inspection reports
- Weekly compliance reports
- End of Construction Project Report
- Non-compliance report
- Variance request forms
- Environmental training list

The CIC will be responsible for compiling and distributing these reports to the appropriate federal Project Managers. The federal Project Managers will be responsible for assuring that documents are incorporated into the official administrative record for the Project.

G8.0 PROJECT CLOSEOUT

Once all construction has been completed, the Project energized, and reclamation activities completed, the CIC will coordinate final on-the-ground inspections with the federal Project Managers. The purpose of these final inspections will be to document compliance with the requirements contained within the ROW Preparation and Vegetation Management Plan (Appendix R) and the Reclamation Plan (Appendix Q). After the inspections are completed, the federal Project Managers will determine if any further work is required. If no further work is required, the CIC will prepare the End of Construction Project Report.

The End of Construction Project Report will contain the following information:

- Record of final reports and documentation.

- Number of days of construction.
- Number of CIC monitors employed.
- Number of environmental inspectors and monitors employed.
- Number of personnel who received environmental training.
- Number of safety incidents that occurred during construction.
- Final acres of permanent and temporary disturbance compared to amounts contained in the FEIS.
- Number of non-compliance reports issued.
- A summary of causes for non-compliance.
- A summary of corrective actions taken for non-compliance.
- Number and duration of temporary suspensions of construction activities.
- Number and duration of WSOs.
- Number of variances submitted, approved, and denied.
- A summary of special status animals or plants taken (including number of captures, displacements, mortalities, injuries, or harassment).
- Overall assessment of Construction Contractor(s) support of and compliance with requirements.
- A summary of lessons learned that could be applied to future projects.

Once the report is drafted, the CIC will coordinate a construction closeout meeting with the Compliance Team. At this meeting the End of Construction Project Report will be reviewed to ensure that all requirements have been met and any issues have been satisfactorily resolved. If no further actions are needed the work of the CIC will be deemed complete and the post-construction reclamation monitoring period will begin, as described in the Reclamation Plan (Appendix Q).

APPENDIX H
FRAMEWORK FIRE PROTECTION PLAN

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ACRONYMS

Applicant	TransWest Express LLC, also TransWest
BLM	Bureau of Land Management
BMP	Best Management Practice
CFR	Code of Federal Regulations
CIC	Compliance Inspection Contractor
FEIS	Final Environmental Impact Statement
EMF	Electromagnetic Field
NESC	National Electrical Stately Code
NIFC	National Interagency Fire Center
NTP	Notice to Proceed
OSHA	Occupational Safety and Health Administration
Plan	Fire Protection Plan
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
ROW	right-of-way
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
USFS	United Stated Forest Service
WSFD	Wyoming State Forestry Division

H1.0 INTRODUCTION

This framework Fire Protection Plan (Plan) describes the measures to be taken by TransWest Express LLC's (TransWest or Applicant) and its Construction Contractor(s) to ensure fire prevention and suppression measures are carried out in accordance with federal, state, and local regulations for the TransWest Express Transmission Project (TWE Project or Project). Measures identified in this Plan apply to work within the Project area defined as the right-of-way (ROW); access roads; temporary work and storage areas; and other areas used during construction and operation of the TWE Project. This document provides direction for the detailed final Plan to be developed by the Construction Contractor(s).

H2.0 PLAN PURPOSE

The purpose of the Fire Protection Plan is to provide safe procedural practices, environmental protection measures, and other specific stipulations and methods to prevent and respond to fires during construction and operation of the Project. The final Plan will provide construction crews, environmental monitors, and the Compliance Inspection Contractor (CIC) with Project-specific information concerning fire protection procedures. The detailed final Plan will define fire prevention practices, establish fire protection requirements, control of combustible materials and flammable liquids and establish communication for agency responses in the event of a fire.

H3.0 PLAN UPDATES

This framework Plan will be updated for the Notice to Proceed (NTP) Plan of Development (POD) and will include a restricted operations section, complete notifications section, and updated relevant mitigation measures to ensure regulation compliance and safety. The Plan will include updates as needed based on final design and engineering and per agency requirements. The Construction Contractor(s) will be responsible for preparing and implementing the final Plan in compliance with all local, state, and federal regulations pertaining to fires.

H4.0 REGULATORY

H4.1 Wyoming's Wildfire Protection System

The prevention and suppression of wildfires in southern Wyoming is carried out by the Bureau of Land Management (BLM), U.S. Forest Service (USFS), and local fire districts and agencies. The agencies' activities are closely coordinated, primarily through the National Interagency Fire Center (NIFC) in Boise, Idaho, and Regional Interagency Dispatch Centers in Casper and Rawlins, Wyoming. Individual fire crews from BLM Field Offices and Forest Service Ranger Districts coordinate fire suppression activities on federal land within their jurisdictions. The Wyoming State Forestry Division (WSFD) is responsible for fire suppression on Wyoming state lands. Local fire districts and agencies provide fire prevention and suppression activities on private land, and may assist with fires on state or federal lands as requested by those agencies.

H4.2 Colorado's Wildfire Protection System

The prevention and suppression of wildfires in northwest Colorado is carried out by the BLM, USFS, Colorado Division of Fire Prevention and Control, and local fire districts and agencies. The agencies' activities are closely coordinated, primarily through NIFC in Boise, Idaho, and Regional Interagency Dispatch Center in Craig, Colorado. Individual fire crews from BLM Field Offices and Forest Service Ranger Districts coordinate fire suppression activities on federal land within their jurisdictions. Local fire districts and agencies provide fire prevention and suppression activities on private land, and may assist with fires on state or federal lands as requested by those agencies. County Sherriff offices coordinate fire suppression activities in the counties as well as un-incorporated portions of counties.

H4.3 Utah's Wildfire Protection System

The prevention and suppression of wildfires in Utah is carried out by the BLM, USFS, Utah Division of Forestry, Fire and State Lands, and local fire districts and agencies. The agencies' activities are closely coordinated, primarily through NIFC in Boise, Idaho, and the Eastern Great Basin Geographic Area Coordination Center in Salt Lake City, Utah. Individual fire crews from BLM Field Offices and Forest Service Ranger Districts coordinate fire suppression activities on federal land within their jurisdictions. The Utah Division of Forestry, Fire and State Lands provide fire suppression activities on state and private lands. Local fire districts and agencies provide fire prevention and suppression activities on private land, and may assist with fires on state or federal lands as requested by those agencies.

H4.4 Nevada's Wildfire Protection System

The prevention and suppression of wildfires in southern Nevada is carried out by the BLM, USFS, Nevada Division of Forestry, and local fire districts and agencies. The agencies' activities are closely coordinated, primarily through NIFC in Boise, Idaho, and Western Great Basin Geographic Area Coordination Center in Reno, Nevada. Individual fire crews from BLM Field Offices and Forest Service Ranger Districts coordinate fire suppression activities on federal land within their jurisdictions. The Nevada Division of Forestry provides fire suppression activities on state and private lands and may assist with fires on state or federal lands as requested by those agencies. Local fire districts and agencies provide fire prevention and suppression activities on private land, and may assist with fires on state or federal lands as requested by those agencies.

H5.0 FIRE PROTECTION PLAN CONTENTS

The Fire Protection Plan will include information on the following topics:

1. Worker Training
2. Smoking Restrictions
3. Spark Arresters
4. Parking, Vehicle operation, and Storage Areas
5. Equipment
6. Road Closures
7. Refueling
8. Burning
9. Flammable Liquids and Explosives
10. Communications
11. Welding
12. Fire Suppression
13. Restricted operations
14. Monitoring

H6.0 FIRE PREVENTION PLAN GUIDANCE

Components of this Plan will include, but are not limited to: requiring work vehicles to carry shovels, water, and fire extinguishers; operating all vehicles on designated roads; parking in designated areas

or areas free of vegetation; and operating welding, grinding, or cutting activities in areas cleared of vegetation. To minimize the occurrence of fire from the power line, safety measures would be taken that include brush-clearing within the corridor prior to work, enforcing red flag warnings, providing appropriate training to all pertinent personnel, and keeping vehicles on or within designated roads or work areas.

The presence of explosive materials on the Project site could potentially increase the risk of fire during construction. Special precautions will be taken to minimize this risk in conjunction with the Appendix C - Blasting Plan Framework, including but not limited to:

- Prohibiting ignition devices within 50 feet of explosives storage areas;
- Properly maintaining magazine sites so they are clear of fuels and combustible materials, well ventilated, and fire-resistant;
- Protecting magazines from wildfires that could occur in the immediate area;
- Posting fire suppression personnel at the blast site during high fire danger periods; and
- Prohibiting blasting during extreme fire danger periods.

H7.0 DESIGN FEATURES AND BEST MANAGEMENT PRACTICES

In addition to applicable design and operational standards, regulations, laws and permit requirements, the following design features and best management practices (BMPs) have been developed to avoid or minimize potential fire-related impacts.

TWE-51: The TWE Project will be designed, constructed, and operated to meet or exceed the requirements of the National Electrical Safety Code (NESC), U.S. Department of Labor, Occupational Safety and Health Administration standards, and the Applicant's requirements for safety and protection of landowners and their property.

TWE-53: The POD will include a Blasting Plan, which will identify methods and mitigation measures to minimize the effects of blasting, where applicable. The Blasting Plan will document the proposed methods to achieve the desired excavations, proposed methods for blasting warning, use of non-electrical blasting systems, and provisions for controlling fly rock, vibrations, and air blast damage.

TWE-56: As part of the POD, the Applicant will provide a Health and Safety Plan, which will outline measures to protect workers and the general public during construction, operation, and decommissioning of the TWE Project. The Health and Safety Plan will identify applicable federal and state occupational safety standards, establish safe work practices, and define safety performance standards.

TWE-64: The POD will include a Fire Protection Plan. The Applicant or its Contractor(s) will notify the BLM of any fires and comply with all rules and regulations administered by the BLM and USFS concerning the use, prevention, and suppression of fires on federal lands, including any fire prevention orders that may be in effect at the time of the permitted activity. The Applicant or its Contractor(s) may be held liable for the cost of fire suppression, stabilization, and rehabilitation. In the event of a fire, personal safety will be the first priority of the Applicant or its Contractor(s). The Applicant or its Contractor(s) will:

- Operate all internal and external combustion engines on federally-managed lands per 36 CFR Part 261.52(j), which requires all such engines to be equipped with a qualified spark arrester that is maintained and not modified;

- Carry shovels, water, and fire extinguishers that are rated at a minimum as ABC-10 pound on all equipment and vehicles. If a fire spreads beyond the suppression capability of workers with these tools, all workers will cease fire suppression action and leave the area immediately via pre-identified escape routes;

- Initiate fire suppression actions in the work area to prevent fire spread to or on federal-administered lands. If fire ignitions cannot be prevented or contained immediately, or it may be foreseeable that a fire would exceed the immediate capability of workers, the operation must be modified or discontinued. No risk of ignition or re-ignition will exist upon leaving the operation area;

- Notify the appropriate fire center immediately of the location and status of any escaped fire;

- Review weather forecasts and the potential fire danger prior to any operation involving potential sources of fire ignition from vehicles, equipment, or other means. Prevention measures to be taken each work day will be included in the specific job briefing. Consideration will be given to additional mitigation measures or temporary discontinuance of the operation during periods of extreme wind and dryness;

- Operate all vehicles on designated roads except in designated “drive and crush” areas. Vehicle parking to be restricted to areas free of vegetation on roads or within the permitted ROW and designated work areas;

- Operate welding, grinding, or cutting activities in areas cleared of vegetation within range of the sparks for that particular action. A spotter will be required to watch for ignitions; and

- Use only diesel-powered vehicles in areas where excessive heat from vehicle exhaust systems could start brush or grass fires.

For a list of additional mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP’s for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

APPENDIX I
FRAMEWORK FLAGGING, FENCING, AND SIGNAGE PLAN

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ACRONYMS

Applicant	TransWest Express LLC, also TransWest
BLM	Bureau of Land Management
BMP	Best Management Practice
CIC	Compliance Inspection Contractor
FEIS	Final Environmental Impact Statement
NTP	Notice to Proceed
Plan	Flagging, Fencing, and Signage Plan
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
ROD	Record of Decision
ROW	right-of-way
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
USFS	United States Forest Service

I1.0 INTRODUCTION

This framework Flagging, Fencing, and Signage Plan (Plan) describes the methods that will be used in the field by TransWest Express LLC (TransWest or Applicant) and its Construction Contractor(s) to delineate the TransWest Express Transmission Project (TWE Project or Project) limits of disturbance and protect sensitive environmental and cultural resources during Project construction. These methods are intended to ensure TransWest personnel, Construction Contractor(s), Bureau of Land Management (BLM), U.S. Forest Service (USFS), Compliance Inspection Contractor (CIC), and environmental investigators and monitors on the Project construction sites stay on approved access routes and within approved work areas. The measures described in this Plan are an integral part of the environmental compliance program for avoiding and minimizing impacts on sensitive resources.

I2.0 PLAN PURPOSE

The purpose of this Plan is to describe the methods that will be used in the field to delineate the Project limits of disturbance and protect sensitive environmental and cultural resources during Project construction. The objective of this Plan is to provide information on the field markings (i.e., flagging, fencing, and signage) that will be used to identify approved Project travel and work areas, as well as environmentally sensitive areas where construction or travel is to be excluded.

I3.0 PLAN UPDATES

The Plan for the Notice to Proceed (NTP) POD will be updated as needed based on final design and engineering. The Construction Contractor(s) will be responsible for preparing and implementing the final Plan.

I4.0 REGULATORY REQUIREMENTS

No federal, state or local laws, rules or regulations specifically address flagging, fencing, and signage protocols for construction projects. However, some of the mitigation measures identified in the Final Environmental Impact Statement (FEIS) for the Project are dependent on adequate field marking of work areas and/or of sensitive resource areas to avoid and minimize impacts to environmental resources. These mitigation measures include flagging or fencing requirements to help protect vegetative cover, water quality, cultural resources, and special status species and minimize the spread of noxious weeds.

I5.0 METHODS

I5.1 Demarcating Project Facilities

Standard survey flags and stakes will be installed before the start of Project construction. Structure sites (e.g., transmission structure locations, anchor points and reference points) will be marked by the Construction Contractor(s). Designated Project access roads, parking areas and pullout areas will be marked to facilitate travel to and from the right-of-way (ROW). Temporary work areas at structure sites, wire pulling/tensioning/splicing sites, material storage yards, fly yards/staging areas, and batch plants will be demarcated as necessary to indicate the limits of approved work areas. The Construction Contractor(s) will stake the boundaries of the maximum area needed for work areas and will provide the dimensions to the CIC. If the delineated work areas exceed the approved dimensions for the Project facilities, the Construction Contractor(s) will coordinate with the CIC for approval and a variance may be required.

I5.2 Environmental Exclusion Areas

Signs, flags and/or fencing will be used to establish exclusion areas to protect sensitive environmental resources (e.g., biological, cultural, wetland, and paleontological resources) in the vicinity of construction activities. A system of standardized and simplified exclusion markings will be used to reduce potential

confusion during construction and minimize the risk of highlighting types of sensitive resources that could be targeted by vandals (e.g., if exclusion areas protecting archaeological sites were marked differently than those protecting sensitive natural resource areas, the sties would be at a higher risk of unauthorized artifact collecting or other disturbances). In extremely sensitive areas identified by the BLM Authorized Officer, the work area limits may be flagged or fenced for protection of the resource from destruction, harassment or pillaging.

I5.2.1 Signage

Signs will be used to help identify TWE Project facilities such as approved access roads and temporary work areas. Signs will be a minimum of 8.5 inches by 11 inches on laminated color paper. Signs will be installed on metal posts and wooden stakes or attached to exclusion fencing/roping as appropriate. Background colors will vary to enhance sign recognition from a distance.

Table I1 provides standards for marking Project features that will be needed during construction. The attachments at the end of this Plan framework show the size and configuration of typical sign layouts. Signs for sensitive resource areas will be oriented for visibility from both directions of likely travel. Table I1 may be updated, changed, or revised in future revisions of this Plan.

TABLE I1 SIGNAGE STANDARDS

FEATURE	FLAGGING OR SIGN COLOR	SIGN TEXT	WHAT TO DO
Project access roads	To be determined by Construction Contractor(s)	Project Access Road – Road No. (e.g., Road 3) – TransWest Express Transmission Project	To be located at points of intersection, additional intermittent flagging may be required. Construction Contractor(s) to verify that right-of-entry has been obtained before marking these areas.
Temporary work areas (structure sites, material yards, etc.)	To be determined by Construction Contractor(s)	Not applicable	Construction Contractor(s) to verify that right-of-entry has been obtained before marking these areas.
Protected animals/plants or sensitive environmental areas.	Yellow	Sensitive Resource Area Keep Out	Avoid these items/areas – do not drive vehicles or equipment near flagging or within flagged areas.
Reclamation project areas	Brown	Restoration in Progress – No Vehicle Traffic Allowed	Avoid these items/areas – do not drive vehicles or equipment near flagging or within flagged areas.
Noxious weed cleaning stations	Blue	Weed Cleaning Station	Signs will be posted at entry points into weed cleaning stations.
Proposed structure locations	To be determined by Construction Contractor(s)	Not applicable	Do not disturb survey stakes.
Structure offsets	To be determined by Construction Contractor(s)	Not applicable	Do not disturb survey stakes.
Outside edge of permitted ROW or centerline	To be determined by Construction Contractor(s)	Not applicable	Do not drive vehicles or equipment outside of designated corridor.
Cadastral survey monument	To be determined by Construction Contractor(s)	Not applicable	Protect in place.
Non-authorized access roads	To be determined by Construction Contractor(s)	Do Not Enter Not An Authorized Access Road	Do not drive vehicles or equipment on unauthorized roads.

FEATURE	FLAGGING OR SIGN COLOR	SIGN TEXT	WHAT TO DO
Existing and Temporary Gates	To be determined by Construction Contractor(s)	Close Gate	Post at appropriate locations along the ROW in coordination with the appropriate land management agency or landowner.

NOTES:

- Staking, flagging and signage will be conducted by the Construction Contractor(s) and verified by the CIC, including sensitive resource areas and exclusion areas.
- Construction Contractor(s) shall stake all proposed tower center hub and footer locations, structure locations and associated reference points and mark the centerline with inter-visible stakes not to exceed 500 feet and at all road crossings.
- Construction Contractor(s) shall use staking intervals appropriate to the conditions observed in the field. For example, areas of rough terrain or dense vegetation may require staking intervals less than 500 feet. In all cases, field staking intervals shall be done at a frequency such that each adjacent stake can be easily discernable.
- Maintain, refurbish and replace staking as necessary over time as conditions require.

I5.2.2 Flagging

Survey flagging (i.e., surveyor's ribbon tied to wooden stakes, metal posts or appropriate vegetation) will be used to delineate the disturbance limits of temporary work areas, access roads, etc., unless existing fencing or other features clearly indicate the limits of the area. Survey flagging may be used to demarcate sensitive resource locations situated a safe distance from planned construction activities but generally will not be used to define resource exclusion areas close to planned construction activities due to concerns about the visibility and stability of flagging during construction.

The BLM and USFS Authorized Officers or CIC, as needed, will determine whether flagging or fencing is the appropriate marking and protection device for a given location. Flagging color will conform to the requirements of Table I1.

I5.2.3 Fencing

To delineate the limits of construction near sensitive resources requiring a high level of protection from Project disturbance, a combination of one or more of the following fencing materials will be installed by the Construction Contractor(s):

- Rope (0.25 inch in diameter colored yellow or orange),
- Plastic or fabric tape; and/or
- Safety fencing (plastic orange or red mesh at least 24 inches wide and at least 18 inches off the ground to facilitate travel by small animals).

Rope with periodic marking by exclusionary signs or lengths of tape is a highly visible and effective exclusion device. Rope, tape, and safety fence will be installed using metal posts for increased durability and in areas with compact or rocky soils. If construction within a wetland is necessary, the boundaries of the approved disturbance areas will be demarcated so impacts are limited to the area authorized. In most cases, it is anticipated the exclusion device will be installed at the boundaries of the sensitive resource (including any required buffers), rather than at the edge of the work area. If a buffer zone encroaches into the work area, only the portions that overlap with the work area will be delineated and signed as an exclusion zone.

I6.0 INSTALLATION, MONITORING, AND MAINTENANCE

The objectives of this Plan are dependent on the proper installation, monitoring, and maintenance of protective devices. The Construction Contractor(s) will be responsible for the installation and maintenance of the field marking of Project features as described above. These markings will be installed in advance of construction activities in the area, maintained during the course of construction (as

necessary), and removed after Project cleanup and reclamation activities. Environmental exclusion signs, flags and fencing will be installed by the Construction Contractor(s) in coordination with the CIC and with the assistance of appropriate environmental inspectors and monitors (e.g., botanists, biologists, archaeologists). These environmental exclusions will be installed prior to the start of construction within a Project work area. The CIC will be consulted if there is uncertainty as to the type or location of needed exclusion devices for botanical, wildlife, wetlands, streams or archaeological sites.

Routine Project monitoring by the CIC and Construction Contractor's environmental inspectors and monitors will include an on-going assessment of the need for replacement or repair of exclusionary signs, flagging or fencing. Maintenance needs related to exclusionary devices will either be corrected at the time of observation by the CIC or will be documented as a future maintenance need. If maintenance of an exclusionary device is needed within an active construction area, corrective action will be taken within one workday. Maintenance of signs, flagging and fencing within inactive work areas will be implemented as necessary.

I7.0 DESIGN FEATURES AND BEST MANAGEMENT PRACTICES

In addition to applicable design and operational standards and designation of sensitive ecological areas, the following design features and Best Management Practices (BMPs) have been identified.

TWE-10: The area limits of construction activities will be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents will be applied to rocks or vegetation to indicate survey or construction activity limits.

TWE-15: The POD will include a Flagging, Fencing, and Signage Plan. Except for permanent survey markers and material that locate proposed facilities, stakes, pins, rebar, spikes, and other material will be removed from the surface and within the top 15 inches of the topsoil as a part of final clean-up. The Applicant will adhere to BLM fencing standards where required. Fences on ROW will be removed where necessary and replaced to the original condition or better when the work is finished. Where existing fences are removed to facilitate the work, temporary fence protection for lands adjacent to the ROW will be provided at all times during the continuation of the Contract. Such temporary fence protection will be adequate to prevent public access to restricted areas. Temporary fencing constructed on the ROW will be removed by the Contractor as part of the clean-up operations prior to final acceptance of the completed work.

TWE-33: Prior to the start of construction, the Applicant will provide training to all Contractor and Subcontractor personnel and others involved in construction activities where/if there is a known occurrence of protected species or habitat in the construction area. Sensitive areas will be considered avoidance areas. Prior to any construction activity, avoidance areas will be marked on the ground and maintained through the duration of the Contract. The Applicant will remove markings during or following final inspection of the Project.

TWE-43: The POD will include a Flagging, Fencing, and Signage Plan. The Applicant will adhere to BLM fencing standards where required. Fences and gates will be repaired or replaced to their original pre-disturbed condition as required by the landowner or the land management agency if they are damaged or destroyed by construction activities. Temporary gates will be installed only with the permission of the landowner or the land management agency, and will be restored to their original pre-disturbed condition following construction. Cattle guards will be installed where new permanent access roads cut through fences, at the request of the land management agency.

For a list of additional mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

Project Access Road

Road No.

Sensitive
Resource Area

Keep Out

Restoration In Progress – No Vehicle Traffic Allowed

No Refueling Within 100 Feet of Wetlands and Streambanks

Do Not Enter
Not an
Authorized
Access Road

Weed Cleaning Station No.

APPENDIX J
FRAMEWORK GEOTECHNICAL PLAN

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ACRONYMS

4WD	four-wheel drive
Applicant	TransWest Express LLC, also TransWest
BMP	Best Management Practice
BLM	Bureau of Land Management
FEIS	Final Environmental Impact Statement
gvm	gross vehicle mass
PI	Point of Intersection (angle point in the transmission line)
Plan	Geotechnical Plan
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
psi	pounds per square inch
ROD	Record of Decision
ROW	right-of-way
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
USCS	Unified Soil Classification System

J1.0 INTRODUCTION

This framework Geotechnical Plan (Plan) generally describes the procedures required by TransWest Express LLC (TransWest or Applicant) and its Construction and Geotechnical Contractors to gather geotechnical information to allow for design and construction of the TransWest Express Transmission Project (TWE Project or Project).

J2.0 PLAN PURPOSE

This Plan provides a sequence of events to be utilized by TransWest and its Construction and Geotechnical Contractor(s) to accomplish the necessary geotechnical exploration and sampling to facilitate design of the Project. This Plan is to be implemented after the receipt of the Record of Decision (ROD) and during the final engineering phase of the Project. These measures are intended to provide the required engineering parameters for design while staying within the disturbance limits as defined by the ROD Plan of Development (POD).

Placement of Project structures and other Project related disturbance would avoid geologic hazards and active mining the maximum extent practicable. Where avoidance is not possible a site specific geotechnical investigation and engineering design would be implemented during construction and operation of the Project. Depending on the type of potential geologic hazard, the designs may vary and should address specific needs for enhanced structural supports. Site specific assessment of geologic hazards shall include review of available information concerning areas of hazards, and consultation with appropriate government agency personnel who are knowledgeable about the hazards. Assessment also shall include, if necessary, field surveys and gathering of geotechnical information to determine what engineering design methods would mitigate or lessen potential risks. If active mines cannot be avoided, Applicant will conduct similar due diligence in regard to hazards from underground and historic mining to ensure that Project facilities will not hinder access to mineral resources or create dangers to mining activities. The Geotechnical Plan will address this measure as it is further developed.

J3.0 PLAN UPDATES

All geotechnical field activities will be performed following the ROD and all ground disturbing activities associated with geotechnical studies will be contained within the disturbance limits as described in the ROD POD. The final Geotechnical Plan will be prepared by TransWest and its Geotechnical Contractor(s) and approved by the Bureau of Land Management (BLM) or the land management agency as appropriate prior to initiation of any surface disturbing activities. Field surveys for sensitive plant species, Class III cultural resource inventories, and other required resource surveys will be conducted as necessary for the final Geotechnical Plan.

J4.0 TYPICAL PROCEDURES

A geotechnical exploration program may be prepared for the Project. This program will describe specific boring locations, access, landowner/agency notifications, schedule, in-field testing and boring depth requirements. The program may consider borings at every point of interest and at 3 mile maximum spacing along tangents. Points of interest are defined as structures with a line angle greater than 1-5 degrees, exceptionally long spans, line crossings, potential landslide areas or other areas of geologic instability, or a change in geologic setting. All boring locations will be located within the Project right-of-way (ROW) and will avoid sensitive resources to the maximum extent practicable. The Applicant will consider other investigative techniques for determining the engineering properties of the soil needed for foundation design as is appropriate and practical for the soil conditions and types. Access to each of the drill sites will be considered in selecting geotechnical exploration locations. Locations that can be accessed with existing roads will be chosen when available to avoid

even elementary road construction. Some locations will require overland travel (i.e. “drive and crush”) from existing access roads.

The drilling equipment needed to perform the drilling and sampling activities will include truck mounted, track mounted or all-terrain drill rigs, water truck, four-wheel drive (4WD) support vehicle including an air compressor, and a 4WD vehicle for the field engineer. The type of rig used will depend on accessibility of boring locations, and practicality of using continuous flight hollow-stem auger, mud rotary, or ODEX drilling techniques to advance the borings. Possible types of drilling equipment are listed below:

- Conventional two-ton or larger truck with a drill rig mounted on the chassis.
- A 30,000 gross vehicle mass (gvm) 6-wheeled truck, about 30 feet long, with or without 4WD capabilities.
- All-terrain vehicle consisting of a similar drilling rig mounted on a lighter framed, shorter vehicle equipped with oversized low-pressure tires. Track mounted drilling rigs use a wide variety of drilling machinery on tracked vehicles with low (about 10 pounds per square inch [psi]) ground pressure.

Soil samples will be collected by driving a sampling device into the undisturbed soils just below the augers. Where necessary, rock core samples will also be taken using a rock coring barrel. Laboratory testing will be conducted on soil/rock samples to define the Unified Soil Classification System (USCS) soil type, strength parameters and corrosion characteristics. Upon completion and before leaving each site, soil borings will be backfilled, securely covered and all cuttings will be removed from the site. No open holes will be left unattended, and all holes will be backfilled to near the ground surface before moving to the next boring.

Boring diameter will be 6 to 8 inches and the boring depth requirements will vary based on structure type and foundation loading. However, an average soil boring depth is anticipated to be 40 feet unless bedrock is encountered, in which case, up to 15 feet of rock core will be accomplished.

J5.0 MITIGATION MEASURES

For a list of mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP’s for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

APPENDIX K

GREATER SAGE-GROUSE HABITAT MITIGATION PLAN

Mitigation Plan to Offset Effects of the TransWest Express Transmission Project to Greater Sage-Grouse Habitat

Prepared by

TransWest Express LLC

September 2016

Mitigation Plan to offset Effects of the TransWest Express Transmission Project to Greater Sage-Grouse Habitat

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1.0 Project Overview

TransWest Express LLC's (TransWest) TransWest Express Transmission Project (TWE Project, Project) is a proposed extra high voltage, direct current (DC) transmission system extending from south-central Wyoming to southern Nevada. The proposed transmission line would cross four states (Wyoming, Colorado, Utah, and Nevada) on lands owned or administered by the Bureau of Land Management (BLM), U.S. Forest Service, National Park Service, Bureau of Reclamation, Utah Reclamation Mitigation and Conservation Commission, various state agencies, Native American tribes, municipalities, and private parties. The TWE Project would provide the transmission infrastructure and capacity necessary to deliver cost-effective renewable energy produced in Wyoming to the Desert Southwest region (California, Nevada, Arizona), ultimately helping contribute to a cleaner world, strengthen the electric grid, and provide much-needed electricity to millions of homes and businesses every year. The TWE Project would deliver enough clean, sustainable energy to power nearly 2 million homes and reduce greenhouse-gas emissions equivalent to taking 1.5 million cars from the road.

The ±600 kilovolt (kV) DC transmission line would be approximately 725 to 750 miles in length (depending upon the alternative selected), located within a 250-foot-wide right-of-way (ROW). The TWE Project includes ground-disturbing activities associated with the construction of above-ground transmission lines and includes transmission tower locations, access roads, a ground electrode line, a ground electrode site, fly yards, material yards, two alternating current (AC)/DC converter stations (a northern terminal and a southern terminal), pulling/tensioning areas, and work areas. The TWE Project has been sited to avoid and minimize impacts to greater sage-grouse (*Centrocercus urophasianus*, sage-grouse) leks and occupied habitat. However, complete avoidance of impacts is unachievable and portions of the TWE Project would cross designated habitat for greater sage-grouse (BLM's Priority Habitat Management Area [PHMA] and General Habitat Management Area [GHMA]) in Wyoming, Colorado, and Utah. As a result, TransWest has coordinated with the BLM, Western Area Power Administration (WAPA), U.S. Fish and Wildlife Service (USFWS), Wyoming Game and Fish Department (WGFD), Colorado Parks and Wildlife (CPW), and Utah Division of Wildlife Resources (UDWR) to develop a mitigation strategy to compensate for the unavoidable loss of greater sage-grouse habitat that would potentially occur as a result of the TWE Project construction, operation, and maintenance.

2.0 Document Purpose

The compensatory mitigation (hereafter compensatory mitigation or mitigation) approach that TransWest will implement for the TWE Project is consistent with the greater sage-grouse mitigation approach described in BLM's "Record of Decision and Approved Resource Management Plan Amendments for the Rocky Mountain Region Greater Sage-Grouse Sub-Regions of: Lewistown, North Dakota, Northwest Colorado, and Wyoming, and the Approved Resource Management Plans (RMPs) for Billings, Buffalo, Cody, HiLine, Miles City, Pompeys Pillar National Monument, South Dakota, and Worland" (Rocky Mountain Regional ROD) and its "Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region including the Greater Sage-Grouse Sub-Regions of: Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah" (Great Basin Regional ROD). Collectively, these documents provide a framework for greater sage-grouse habitat management and mitigation for pending transmission line ROWs in greater sage-grouse habitat. The greater sage-

grouse mitigation requirements for the TWE Project are specifically addressed in the Rocky Mountain Regional ROD and the Northwest Colorado and Wyoming Approved Resource Management Plan Amendments (ARMPA), as well as the Great Basin Regional ROD and the Utah ARMPA.

The BLM, working in concert with the U.S. Fish and Wildlife Service (USFWS), developed a Framework for Sage-grouse Impacts Analysis (Framework for Impacts Analysis; January 2011), which was applied to the Energy Gateway West Project. The BLM and TransWest decided that the Framework for Impacts Analysis will be revised for application to the TWE Project. The Framework for Impacts Analysis addresses project-related impacts to sage-grouse habitat that bear directly on listing factors considered by the USFWS when evaluating the need to provide full listing protection under the Endangered Species Act (ESA). According to the Framework for Impacts Analysis, mitigation is addressed after the NEPA-mandated impacts analysis has been conducted, resulting in an adequate understanding of impacts to sage-grouse populations and habitat, which is described in the EIS. The Framework for Impacts Analysis specifies the use of Habitat Equivalency Analysis (HEA), conducted by the project proponent, as a replicable method for determining mitigation that is scaled to project-related permanent and interim habitat losses. Subsequent to the development of the Framework for Impacts Analysis, TransWest convened a technical group of sage-grouse experts and species managers (Technical Advisory Group, [TAG]) to evaluate the HEA mitigation approach as well as to assist in the development of methods to quantify and mitigate for indirect effects of transmission lines.

The mitigation approach TransWest will implement for the Project will follow the guidance provided by BLM Instruction Memorandums (IMs) IM 2013-142 (Interim Policy, Draft - Regional Mitigation Manual Section – 1794), 2012-043 (Greater Sage-Grouse Interim Management Policies and Procedures), and 2012-044 (BLM National Greater Sage-Grouse Land Use Planning Strategy), the Department of Interior Secretarial Order 3330 (Order 3330; Improving Mitigation Policies and Practices of the Department of the Interior), and the USFWS Greater Sage-grouse Range-Wide Mitigation Framework (Range-Wide Mitigation Framework; USFWS 2014). Collectively, these provide guidance for greater sage-grouse habitat management and mitigation for pending transmission ROWs in PHMA and GHMA. These policies state that transmission ROWs having disturbances greater than 1 linear mile or 2 acres require cooperation between the BLM, project proponents, and other appropriate agencies to develop and consider implementation of appropriate regional mitigation to avoid or minimize habitat and population-level effects to greater sage-grouse.

Under these policies, offsite and onsite mitigation can include in-kind or out-of-kind mitigation. In-kind is defined as the replacement or substitution of resources that are of the same type and kind of those being impacted. Out-of-kind is defined as replacement or substitutions of resources that while related are of equal or greater overall value to public lands. In addition, IM 2013-142 also identifies that the BLM may accept monetary contributions, how they may be used, and that mitigation may be conducted on non-federal lands.

In compliance with IM 2012-43, IM 2013-142, IM 2012-044, Order 3330, the Range-Wide Mitigation Framework, the Framework for Impacts Analysis, and the Project Environmental Impact Statement (EIS; BLM 2015), TransWest will complete an HEA as described in this document to determine the amount of compensatory mitigation necessary to offset potential direct effects and indirect effects to greater sage-grouse habitat resulting from the construction, operation, and maintenance of the final engineered Project. A separate HEA will be conducted to quantify and mitigate direct impacts to sagebrush in Wyoming,

where the Project is sited in the Wyoming Governor's Transmission Line Corridors and has different mitigation requirements.

The HEA will produce an estimate of the permanent and interim loss of greater sage-grouse habitat services that may potentially result from direct disturbances (vegetation loss) and indirect disturbances (habitat avoidance due to noise and human presence, behavioral avoidance of structures, decreased population growth) anticipated with Project construction and operation. The HEA will also model mitigation measures that may be implemented to enhance habitat service levels and offset Project effects.

The following sections provide overviews of HEA, the HEA process for the Project, the methods used for the HEA, and types of mitigation measures that could be used to compensate for habitat loss.

3.0 Overview of Habitat Equivalency Analysis

A HEA is a science-based, peer-reviewed method of quantifying interim and permanent habitat injuries, measured as a loss of habitat services from pre-disturbance conditions, and scaling compensatory habitat requirements to those injuries (King 1997; Dunford et al. 2004; Allen et al. 2005; Kohler and Dodge 2006; National Oceanic and Atmospheric Administration [NOAA] 2006, 2009). Habitat services include those ecosystem features (i.e., physical site-specific characteristics of an ecosystem) and ecosystem functions (i.e., biophysical processes that occur within an ecosystem) that support wildlife and human populations (King 1997).

Habitat services are generally quantified using a metric that represents the functionality or quality of habitat (i.e., the ability of that habitat to provide wildlife "services" such as nest sites, forage, cover from predators, etc.). When wildlife habitat is the primary service of interest, areas with the highest habitat service levels are those areas with highest habitat quality. Interim (or short-term) habitat injuries are those services that are absent during certain phases of the project that would have been available if that disturbance had not occurred (e.g., temporary vegetation losses, temporary soil partitioning, temporary displacement of wildlife populations). Permanent habitat injuries are those habitat injuries remaining after project completion and interim reclamation and recovery are complete (e.g., permanent vegetation loss, permanent loss of wildlife or fisheries populations, irrecoverable impacts to soils or water as a result of contamination).

HEA uses a service-to-service approach to scaling. HEA does not assume a one-to-one trade-off in resources (e.g., number of acres). Rather, HEA balances the number of services lost with those that are gained as a result of conservation activities (NOAA 2006). For example, 1 acre of land with a diverse vegetative structure and abundant tree canopy can support higher numbers of nesting songbirds (an example of a habitat service of interest) than 1 acre of land with few trees and little vegetative diversity. The two land parcels, although equal in size, provide unequal habitat services.

3.1 What Does Habitat Equivalency Analysis Do?

HEA is an economics model that:

- quantifies current habitat services provided in a project area or landscape (commonly referred to as the baseline habitat service level);
- quantifies the interim and permanent injuries to the baseline habitat service level; and
- determines appropriately scaled restoration and conservation activities to offset habitat services lost as a result of project impacts.

3.1.1 Benefits of Habitat Equivalency Analysis

The following are benefits of HEA.

- High credibility – the approach has been evaluated and documented in scientific peer-reviewed literature and has held up in numerous court cases.
- Analyses are quantitative rather than qualitative in nature.
- Equations are straightforward, but have enough input variables to allow flexibility in project design.
- Provides a replicable method for negotiation of mitigation ratios, acceptable compensatory restoration, and/or fines.
- Valuable planning tool; can be used to evaluate the cost of multiple compensatory mitigation measures.
- Applicable to any ecosystem type where an appropriate habitat services metric can be defined.
- Currently the most commonly used method by natural resource trustees to assess damages to ecosystems.
- Used by federal regulatory agencies, such as the USFWS, NOAA, BLM, Environmental Protection Agency, Department of Interior, and U.S. Army Corps of Engineers.

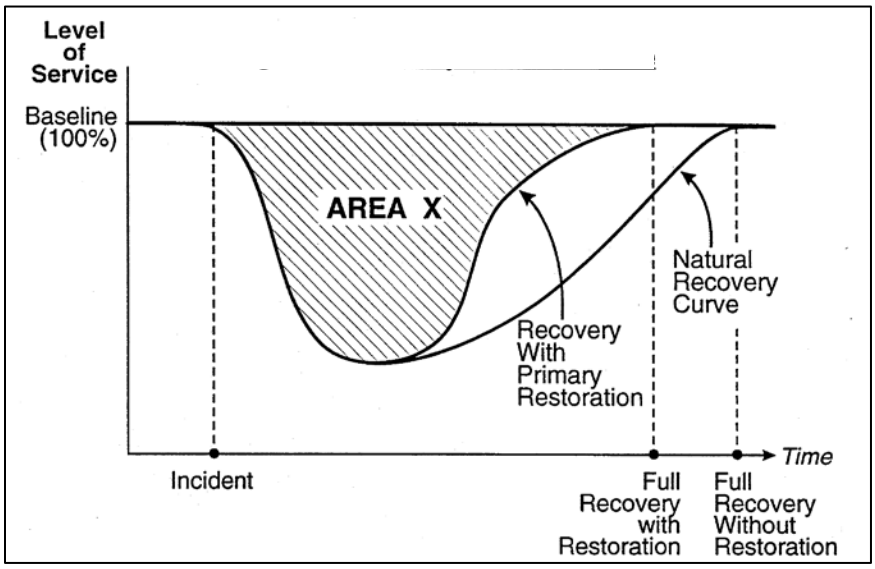
3.1.2 When Habitat Equivalency Analysis Should Be Used

Based on Chapman (2004), HEA is an appropriate tool for scaling mitigation when:

- habitat services can be defined or modeled;
- quantification of project impacts is possible;
- replacement of services lost is feasible; and
- conservation methods are sufficiently known.

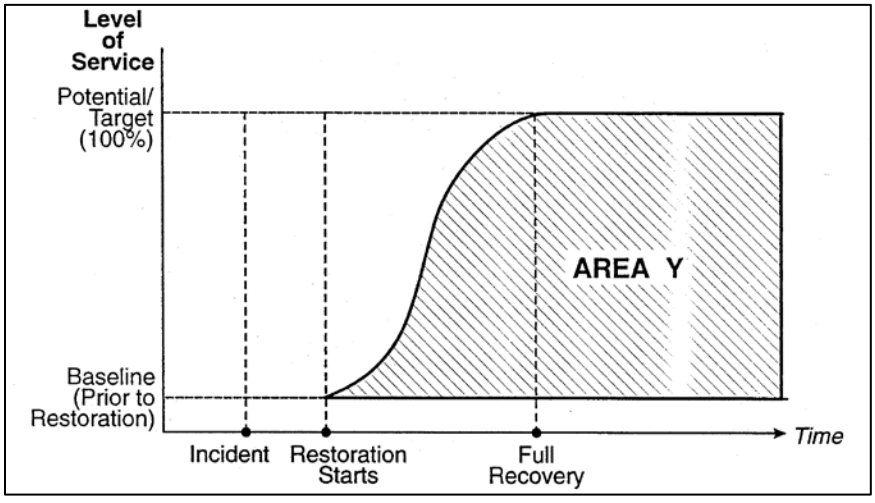
3.2 Compensation Components

Compensation for impacts includes two components: 1) recovery of the injured area (primary restoration) (Figure 1); and 2) compensation for the interim loss of habitat services occurring prior to full recovery (compensatory restoration) (Figure 2).



Area X represents the services lost at an injury site with Primary Restoration expressed as percent of baseline (King 1997).

Figure 1. Changes in habitat service level compared to the baseline service level during construction and restoration.



Area Y represents the services gained at the compensatory restoration site expressed as percent of potential/target level less baseline (pre-restoration) percent (King 1997).

Figure 2. Changes in habitat service level with compensatory restoration.

HEA quantifies the habitat services lost during the lifetime of a project compared to baseline (Area X in Figure 2) and scales the compensatory project (mitigation project) so that it provides services that are

equal to that loss (Area Y in Figure 3). Baseline refers to the condition of the resources and quantity of habitat services that would have existed had the disturbance not occurred. The quantity of services lost (Area X) depends on the extent of the injury and the time required for restoration; actions taken to accelerate the rate of primary restoration would decrease the interim loss of habitat services, requiring less compensatory restoration. In some cases, full restoration of the lost services may not be feasible, in which case the area required for compensation (Area Y) would be larger. Compensatory restoration may occur off-site (e.g., the purchase of additional habitat), or on-site through habitat improvements that increase habitat services above baseline.

3.3 Measuring Habitat Services (Ecological Economics)

Quantifying the services provided by an ecosystem is a complex task. This complexity can be reduced through the use of an attribute, or metric, that provides a measure of the services of interest. The metric must be able to capture the relative differences in the quality and quantity of services being provided before and after restoration and between primary and compensatory sites (NOAA 2009).

Measurements of habitat services over the lifetime and area of a project are used in the HEA. These measurements have three components: land area, service level, and time. The relative service level can be quantified using a metric that measures or scores one or more key habitat elements for a species or wildlife community of interest (e.g., vegetation stem density, vegetation type, nest density, percentage of canopy cover, proximity to critical habitat, etc.). Habitat services are commonly expressed in service-acres (1 year) or service-acre-years (multiple years).

4.0 Overview of the Habitat Equivalency Analysis Process for the Project

The HEA process for the Project has been developed in close coordination with the TAG, which is comprised of appropriate agencies and stakeholders. Such coordination ensures that the best available scientific data is used, the habitat service metric is appropriate for resources in the Project area, the results of the HEA are understood, and the compensation will offset the interim and permanent loss of habitat services modeled. The following steps will be completed as part of the development of the HEA for the Project.

1. **Establishing baseline habitat services prior to disturbance.**

   TransWest worked closely with the TAG to finalize a habitat services metric that quantified the baseline greater sage-grouse habitat services available prior to Project construction. Appendix A provides information related to the development of the habitat services metric that served as the basis for quantifying baseline habitat services and determining Project impacts and appropriate mitigation. Appendix B presents information related to how this metric will be applied to establish baseline habitat services for the Project area. Appendix C describes the subsequent adjustments made to the baseline habitat service score to account for the indirect effects of existing transmission lines prior to Project construction. The baseline habitat service metric presented in Appendix A is the best available scientific information regarding greater sage-grouse habitat and average response to disturbance. The TAG decided that same metric will be applied to all states, assuming that high value habitat looks the same and has the same value to sage-grouse along the entire length of the project. Insufficient

baseline grouse population data are available to model more nuanced effects to the populations affected.

2. **Quantifying the permanent and interim losses to the baseline service level that result from the Project disturbance.**

   Permanent and interim losses of habitat services anticipated with the construction and operation of the Project will be quantified as described in Appendices C (indirect disturbances), D and E (direct disturbances). These are the habitat losses (measured in discounted service-acre-years) that remain after accounting for reclamation efforts and vegetation recovery in the ROW over the life of the Project, and they will provide the basis for assessing the adequacy of mitigation proffered by TransWest for the TWE Project. The TAG decided that the habitat service losses modeled for specific Project impact types were the same in all states.[1]

3. **Identifying appropriate mitigation measures that may be used to compensate for lost services.**

   TransWest worked with the TAG to identify types of mitigation measures that may be used to compensate for the permanent and interim losses of habitat services. Appendix F describes the methods that will be used to quantify habitat service gains resulting from these mitigation measures. Mitigation measures incorporated into TransWest's mitigation package will be subject to appropriate land management agency or landowner approval, permits, and planning prior to implementation.

   The benefits of mitigation measures must be quantifiable using the habitat services metric in order for them to be modeled in the HEA. Additional mitigation measures with benefits that cannot be modeled in the HEA (e.g., brood-rearing habitat improvement and understory improvement measures) may be considered by TransWest and their compensatory value determined in coordination with the lead agencies and other stakeholders.

4. **Quantifying the amount of mitigation necessary to compensate for the losses to baseline services that remain after the Project implementation.**

   The average habitat service gain will be quantified for each of the final mitigation measures identified by the TAG. The sizes of mitigation projects that would fully offset Project effects will be calculated by dividing habitat services lost due to Project effects by the habitat services gained per acre through the application of a proposed mitigation project mix.

5.0 Overview of the Habitat Equivalency Analysis Methods Used

The following sections provide an overview of methods used to develop the HEA models that will be applied to assess the loss of greater sage-grouse habitat services associated with the Project development and the benefits of various conservation project types that may be proposed for mitigation.

[1] The value of the habitat services present at baseline and the value of the habitat services lost due to the Project does not reflect the number of birds using that habitat (except measured as proximity to a lek). In some cases, the habitat may be overvalued or undervalued with regard to the population's relative management value.

5.1 Quantification of Baseline Conditions

To quantify the habitat services (e.g., greater sage-grouse habitat functionality) provided by an ecosystem, a habitat service metric was developed that scores key habitat elements for the species. Scoring habitat services is a critical step in the HEA process because it provides a way to quantitatively measure the quality of specific habitat functions in a specific area. The habitat metrics used in the HEA had to be able to capture the relative differences in the quantity of services provided before and after construction and conservation-focused activities. Habitat services often have three components—land area, service level, and time—and are commonly expressed in service-acres (1 year) or service-acre-years (service-acres summed over multiple years).

The greater sage-grouse habitat services metric for the Project was developed collaboratively by the TAG. The focus of the metric was to capture changes in greater sage-grouse habitat services over time with vegetation removal and recovery. Using this approach, lost habitat services (decreases in habitat quality) must be replaced with like services. The HEA does not assume a one-to-one trade-off in resources (e.g., number of acres of greater sage-grouse habitat affected), but instead determines compensation based on the habitat services those acres provide (e.g., development in high-quality greater sage-grouse habitat would have higher compensation levels than development in lower-quality habitat that provides fewer services).

The habitat service metric developed for the Project included variables identified by the peer-reviewed literature as having influence on the quality of greater sage-grouse habitat, including dominant vegetative components and anthropogenic influences (Table 1). The variables included were limited to those for which reliable and consistent data were available across the Project area. For each of the variables, a habitat service score ranging from 0 to 3 (zero to high services) was assigned for categories like those defined in the *Sage-grouse Habitat Assessment Framework* multi-scale habitat assessment tool (Stiver et al. 2010, 2015). Categorical variables were more appropriate than continuous variables due to the resolution of the remotely sensed vegetation data available for the length of the Project. The breaks between scores were primarily based on information contained in the literature regarding greater sage-grouse habitat use and selection. When literature did not allow for direct quantification of the HEA scores, professional judgments of the TAG informed by the available peer-reviewed literature were used. When a particular variable matched literature-based optimal conditions, that variable was given a service score of 3.

Table 1. Anthropogenic and Habitat Variables Used as a Metric of Greater Sage-grouse Habitat Services

Variable Number	Variables	3	2	1	0	Primary Citations
VAR01	Distance to high-traffic (>6,000 AADT) road, such as an interstate, federal, or state highway (meters)	>1,000	650–1,000	100–650	N/A*	Craighead Beringia South (2008); Johnson et al. (2011); Pruett et al. (2009)
VAR02	Distance to low-traffic (<6,000 AADT) paved roads, heavily travelled gravel roads, well pads, mine footprints, transmission substations (meters)	>200	50–200	25–50	N/A*	Connelly et al. (2004); Craighead Beringia South (2008); Johnson et al. (2011); Pruett et al. (2009)
VAR03	Percent slope	<10	10–30	30–40	>40	Beck (1977); Lincoln County Sage Grouse Technical Review Team (2004)
VAR04	Distance to occupied lek† (kilometers)	0–6.4	6.4–8.5	>8.5	N/A	Cagney et al. (2009); Connelly et al. (2000); Connelly et al. (2011); Holloran and Anderson (2005)
VAR05	Sagebrush abundance index (% of vegetation that is sagebrush within a 1-square-kilometer moving window)	50–100	30–50	10–30	0–10	Carpenter et al. (2010); Walker et al. (2007); Aldridge and Boyce (2007); Aldridge et al. 2008; Wisdom et al. (2011)
VAR06	Percent sagebrush canopy cover	15–35	5–15 or >35	1–5	<1	Cagney et al. (2009); Connelly et al. (2000); Stiver et al. (2010)
VAR07	Sagebrush canopy height (centimeters)	30–80	20 to <30 or >80	5–20	<5	Crawford et al. (2004); Connelly et al. (2000); Stiver et al. (2010)
VAR08	Distance of habitat to sage or shrub dominant (meters)	<90	90–275	275–1,000	>1,000	BLM et al. (2000); Connelly et al. (2000); Lincoln County Sage Grouse Technical Review Team (2004)

* Lands less than 100 meters from a high traffic road and less than 25 meters from a low traffic paved road or high traffic gravel road were given a total metric score of 0 (provides no habitat services), not just a score of 0 for these individual variables. This is referred to as the road "width" in the direct impacts, although it is larger than the actual physical width of the road.

† Considers leks classified as active, occupied, undetermined, or unknown.

AADT = annual average daily traffic

Greater sage-grouse habitat suitability publications vary in their descriptions of the baseline environmental conditions affecting a particular study site. Even studies within a single state may describe different suitable habitat conditions depending on elevation, precipitation zone, and other geographic or climatic factors affecting each study site. The habitat metric relies on generalizations presented in BLM et al. (2000), Cagney et al. (2009), Connelly et al. (2011), Connelly et al. (2000), Stiver et al. (2010), and other summary publications. The same metric of habitat services will be applied to the entire Project area.

The metric for greater sage-grouse habitat services is an additive model (Table 1) with score adjustments for the presence of fences posing a high collision risk to greater sage-grouse during the lekking season and proximity to transmission line. To calculate the baseline score, each cell in the analysis area is scored separately by summing the scores of Variables 01 through 08. The summed score is then multiplied by a factor that reduces the score where high risk fences are present (Appendix A) and by one or more factors that reduce the score to account for the indirect effects of existing transmission lines (Appendix C).

All variables are weighted evenly. Weights are not applied because there is not adequate information in the literature to support the use of one specific weight over another. The importance of sagebrush is already intrinsically weighted higher than other vegetation types due to the number of variables that measure an aspect of sagebrush vegetation (for which non-sagebrush vegetation types would score low). Comparisons of baseline habitat service maps prepared using the metric to maps of known greater sage-grouse use indicated that the metric performed well to distinguish between high-quality and low-quality greater sage-grouse habitat across the length of the Project without adjusting the variable weights.

The HEA metric will be used to score habitat services for all areas on and within 10 kilometers (km) of the Project footprint, including access roads and other infrastructure (Assessment Area). None of the habitat service losses to be modeled extend beyond 10 km. The Assessment Area will be partitioned by state.

The HEA metric will only be applied to sage-grouse habitat. The Assessment Area will be clipped to PHMA and GHMA prior to habitat service scoring. The PHMA and GHMA layers encompass the BLM's greater sage-grouse occupied habitat layer, so the Assessment Area will include only those areas that are recognized as known sage-grouse habitats. Land cover types typically avoided by greater sage-grouse are assigned a habitat service score of 0 (provides no habitat services) before the metric is applied to the remaining areas. These avoided land cover types include all forest types, urban areas, open water, some introduced vegetation types, roadways, well pads, mine footprints, areas <100 meters (m) from roadways with >6,000 annual average daily traffic (AADT), and <25 m of paved roads with <6,000 AADT and heavily traveled gravel roads (multiple sources per U.S. Fish and Wildlife listing decision in Federal Register; Johnson et al. 2011). The specific GAP vegetation classifications included in these avoided land cover types are listed in Appendix G. Disturbances to lands outside PHMA/GHMA and in other land cover types scoring 0 will require no mitigation in the HEA.

Ideally, the baseline habitat service level would account for all habitat service losses associated with existing environmental disturbances. This was done to the extent possible with the existing data for the Assessment Area. In some cases, existing habitat disturbances were not mapped in the baseline service level because they were not detected by the chosen habitat services metric or because the data were unavailable for use in the baseline analysis. Omission of these disturbances is a conservative approach to the analysis of the Project-related habitat service losses. When baseline disturbances are omitted, the

analysis assumes that the habitats affected by the Project are of higher-quality than they actually are and thus require a greater amount of mitigation to offset the Project-related habitat service losses.

5.2 Quantification of Habitat Service Losses

The following sections describe the methods to evaluating direct and indirect losses of habitat services that would likely occur as a result of the Project construction and operation. Habitat service losses (debits) and mitigation gains (credits) will be quantified prior to the Notice to Proceed for construction of the Project using the final engineered design.

5.2.1 Description of Changing Habitat Service Level by Project Milestone

The habitat services provided by the Assessment Area will be calculated at Project milestones that reflect varying levels of disturbance. The Project milestones modeled with GIS data for the HEA are listed below.

1. **Baseline**—the baseline milestone quantifies habitat services available to greater sage-grouse before Project disturbance.
2. **Construction**—the construction milestone quantifies habitat services available to greater sage-grouse during the construction of the transmission line and ancillary facilities. Magnitude of the loss of habitat services during construction is dependent on proximity to the Project and the amount of new surface disturbance.
3. **Restoration**—the restoration milestone quantifies habitat services available to greater sage-grouse after construction is complete and some services return with the reduction in noise and human presence.
4. **Recovery**—the recovery milestone quantifies habitat services available to greater sage-grouse after a vegetation type has recovered to the greatest extent expected after the Project restoration is complete. Habitat services return to baseline conditions in restored areas with the time to recovery being dependent on the vegetation type and the disturbance condition. Recovery periods for each disturbance condition and vegetation type are described in Appendix B.
5. **ROW Term**—the Right-of-Way (ROW) term milestone quantifies the habitat services available to greater sage-grouse after expiration of the ROW Grant issued by BLM, but while the disturbance to the sagebrush vegetation is still recovering. As described in Section 6.1 of this document, for purposes of the HEA model only, the assumption is made that the transmission structures will be dismantled and removed, thereby ending the Project's indirect effects.

Snapshots of the changing habitat services over time will be modeled using GIS-based tools for each of the milestones identified above for incorporation into the HEA. The HEA calculates the total interim and permanent habitat service losses that will result from the Project. Specifics of the GIS and HEA methods for the direct effects are provided in Appendix E.

5.2.2 Timing

Habitat service losses will be calculated based on final engineered footprints, construction schedule, and operations timeline for the Project Table 2 provides an example of the approximate timing of each project milestone based on current Project plans.

Table 2. Project Milestone Years

Project Year	Project Milestone
0	Baseline
1	Construction
2	Construction
3	Construction
4	Restoration
5	Recovery 1
9	Recovery 2
14	Recovery 3
19	Recovery 4
24	Recovery 5
30	ROW Term
54	Recovery 6
104	Recovery 7; End of Analysis

The relative timing of projects events is an important element of the HEA model. HEA calculates the present value of future changes to the baseline habitat service level with time caused by losses of habitat services with Project development and gains of habitat services with mitigation projects. Economists call this process discounting and it is a standard part of the HEA model. Discounting converts services being provided in different time periods into current time period equivalents (Allen et al. 2005). Discounting results in a gradual increase in the service-acres provided by injured habitats over time (the habitat service loss is discounted), and the same rate of decrease in service-acres gained by habitat conservation over time (the habitat service gain is discounted). Consequently, credit for mitigation in the form of habitat conservation is greater when implemented early in the lifetime of the Project or prior to Project construction rather than when implemented late in the lifetime of the Project. This encourages early mitigation to offset habitat service losses, to ensure that long-term impacts to the resource are minimal. The discount rate used in the Project HEA is 3%.

5.2.3 Direct Effects

The final engineered footprint of the Project will be provided electronically by the Company for modeling Project-related disturbances (milestones Construction through Recovery). The footprint files will specify the final engineered locations and disturbance footprints of all Project disturbances. The direct disturbance assumptions used in the HEA are described in detail in Appendix D by Project facility/component, disturbance area, disturbance condition, disturbance duration.

During Construction

The scores of cells (30 m x 30 m) that intersect the project footprint during construction are set to 0, assuming they provide no habitat services. Using this approach, the model overestimates the habitat services lost to direct effects during construction as the Project features do not fully cover the cells they intersect. Note that the model does not capture temporal restrictions on the Project construction required by the BLM, which may result in higher estimates of service losses than may actually occur.

During Restoration and Recovery

Disturbances may be permanent or interim. Interim disturbances occur in areas that will be restored to their baseline vegetation type and condition. Habitat services in cells intersecting interim direct disturbances return at different rates depending on baseline vegetation type and disturbance condition (Table 3). There are four vegetation types: 1) agriculture and wetland; 2) grassland and riparian, 3) shrubs other than sagebrush; 4) low sagebrush; and 5) big sagebrush. There are three vegetation disturbance conditions affect the vegetation-specific recovery rates: 1) cleared; 2) mowed; and 3) drive and crush. The assignment of the GAP vegetation types to the four vegetation recovery endpoints identified in Table 3 is described in Appendix G. The TAG intended for the vegetation growth rates to be conservative, overestimating the average time to recovery. Conservative growth rates offset the potential for mitigation project failure in the model. The TAG also identified that distinguishing between low sagebrush and big sagebrush communities may be appropriate for purposes of defining vegetation recovery endpoints. The recovery endpoints presented in Table 3 reflect the collective professional opinion of the TAG.

Permanent direct disturbances, such as substations/terminal locations and the transmission structure foundations, result in a 100% loss of habitat services for the lifetime of the project. In the special case of transmission structure foundations, the model does not assume a 100% loss of services in cells intersected except during the construction and restoration milestones. During the recovery milestones, habitat services in cells containing transmission structures return per the rate associated with the baseline vegetation type and disturbance condition (Table 3) minus the habitat services that occurred in the footprint of the structures at baseline. For example, if the baseline score was 20 and the footprint hypothetically covers 5% of the area of a cell, the maximum habitat service score achieved with full restoration would be 19 (20 - 0.05*20 = 19). This approach motivates the use of structures that minimize permanent surface disturbances.

HEA calculates the habitat services lost to direct effects over the lifetime of the project based on the calculation of habitat service level at each project milestone. The expansion of the habitat service calculation over the entire Assessment Area and project lifetime and the application of standard economic discount rates are described in detail in Appendix E.

Table 3. Vegetation recovery curves for interim direct impacts.

Project Milestone	Percent of Baseline Services Present at Each Milestone by Disturbance Condition and Vegetation Recovery Endpoint		
	Cleared	**Mowed**	**Drive and Crush**
Baseline	• 100% of agricultural and wetland • 100% of grassland and riparian • 100% shrub • 100% of low and big sagebrush	• 100% of agricultural and wetland • 100% of grassland and riparian • 100% shrub and low sagebrush • 100% of big sagebrush	• 100% of agricultural and wetland • 100% of grassland and riparian • 100% shrub and low sagebrush • 100% of big sagebrush
Construction	• 0% of agricultural and wetland • 0% of grassland and riparian • 0% shrub • 0% of low and big sagebrush	• 0% of agricultural and wetland • 0% of grassland and riparian • 0% shrub and low sagebrush • 0% of big sagebrush	• 0% of agricultural and wetland • 0% of grassland and riparian • 0% shrub and low sagebrush • 0% of big sagebrush
Restoration	• 0% of agricultural and wetland • 0% of grassland and riparian • 0% shrub • 0% of low and big sagebrush	• 100% of agricultural, wetland, grassland, and riparian • 0% shrub and low sagebrush • 0% of big sagebrush	• 100% of agricultural, wetland, grassland, and riparian • 0% shrub and low sagebrush • 0% of big sagebrush
Recovery 1 (1 year after Restoration)	• 100% of agricultural and wetland • 20% of grassland and riparian • 5% shrub • 1% of low and big sagebrush	• 100% of agricultural, wetland, grassland, and riparian • 10% shrub and low sagebrush • 2% of big sagebrush	• 100% of agricultural, wetland, grassland, and riparian • 20% shrub and low sagebrush • 7% of big sagebrush
Recovery 2 (5 years after Restoration)	• 100% of agricultural, wetland, grassland, and riparian • 25% shrub • 5% of low and big sagebrush	• 100% of agricultural, wetland, grassland, and riparian • 50% shrub and low sagebrush • 10% of big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush • 33% of big sagebrush
Recovery 3 (10 years after Restoration)	• 100% of agricultural, wetland, grassland, riparian, and shrub • 10% of low and big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush • 20% of big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush • 67% of big sagebrush
Recovery 4 (15 years after Restoration)	• 100% of agricultural, wetland, grassland, riparian, and shrub • 15% of low and big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush • 30% of big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush, big sagebrush
Recovery 5 (20 years after Restoration)	• 100% of agricultural, wetland, grassland, riparian, and shrub • 20% of low and big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush • 40% of big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush, big sagebrush
Recovery 6 (50 years after Restoration)	• 100% of agricultural, wetland, grassland, riparian, and shrub • 50% of low and big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush, big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush, big sagebrush
Recovery 7 (100 years after Restoration)	• 100% of agricultural, wetland, grassland, riparian, shrub, and low and big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush, big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush, big sagebrush

5.2.4 Indirect Effects

Indirect effects of the Project will be modeled in the Construction (habitat avoidance due to noise, vibration, human presence) milestone and in the Restoration through ROW Term milestones (behavioral avoidance of structures, decreased population growth). The approach to modeling the indirect effects of operating transmission lines is described in detail in Appendix C of this document.

During Project Construction

During the two to three years of Project construction, indirect effects will be modeled by classifying all areas identified in the final engineered project footprint as a secondary road as described in Appendix D. Habitat services in cells within 25 m of the footprint will reduced to 0 the scores in adjacent cells will be reduced per VAR02 in Table 1. These habitat service reductions account for the effects of noise, vibration, and human presence. Avian predators of sage-grouse and sage-grouse nests, which are the mechanisms for the indirect impacts modeled during transmission line operation, are not expected to occur in higher numbers in proximity to the Project during the construction milestone.

During Project Operation

The indirect effects of the Project will be applied to the Restoration through ROW Term milestones (anticipated to be 30 years). For purposes of the model only, the assumption is made that the transmission structures will be dismantled and removed, thereby ending the Project's indirect effects The methods for modeling indirect effects during Project operation are described in detail in Appendix C for single transmission lines, transmission lines co-located within 1,000 m, and transmission lines located more than 1,000 m apart.

HEA calculates the habitat services lost to indirect effects over the lifetime of the Project based on the calculation of habitat service level at each Project milestone. The expansion of the habitat service calculation over the entire Assessment Area and Project lifetime and the application of standard economic discount rates is described in detail in Appendix E.

5.3 Quantification of Habitat Services Gained From Mitigation Measures

Habitat mitigation measures were selected by the TAG to be considered in the final Project mitigation plan (Table 4). These measures have been identified to improve greater sage-grouse habitat services and produce a benefit that is measurable by the habitat service metric used in this HEA. These mitigation measures serve as a "toolbox" from which mitigation options may be selected by TransWest for inclusion in a mitigation package.[2] The benefit (in service-acres) of each mitigation project identified in TransWest's final mitigation package will be quantified using the same habitat service metric as is used to calculate habitat service losses.

[2] Proposed mitigation may not be limited to the identified measures. The benefit of some measures could not be measured using the habitat service metric (e.g., improvement of brood rearing habitat, improvement of understory vegetation). Additionally, it is anticipated that new mitigation measures may be identified prior to Project construction and operation. Any new measures would be considered in coordination with state and federal agencies and appropriate stakeholders.

The same conservative vegetation growth rates that will be used to model vegetation recovery in the Project footprint will be applied to the measures proposed for mitigation. Conservative growth rates offset the potential for mitigation project failure in the model.

The benefit of each mitigation project will be evaluated using the HEA to quantify the habitat services gained. Appendix F describes the calculations that will be used to quantify the benefit of the mitigation projects compared to baseline condition.

Table 4. Potential mitigation projects that may be considered as part of the final mitigation package.

Mitigation Project Type	Brief Project Description	Anticipated Benefits
Fence removal and marking with flight diverters	Fences would be removed or marked in: 1) sections of fence known to cause greater sage-grouse collisions; 2) within 3 km (1.2 miles) of leks (Stevens et al. 2013) or other high risk areas; 3) in areas with low slope and terrain ruggedness (Stevens 2011); and 4) where segments are bounded by steel t-posts with spans greater than 4 m (Stevens 2011).	• Reduce mortality due to greater sage-grouse collisions • Increase visibility of fences, where diverters are used • Increase contiguous patches of shrub-steppe habitat • Remove localized grazing pressure where fences are removed, thereby increasing local habitat quality (e.g., bunchgrass cover)
Sagebrush restoration and improvement projects	Seeding, planting seedlings, or transplanting containerized sagebrush plants (one plant per 5 m^2).	• Create contiguous patches of shrub-steppe habitat with optimal sagebrush cover and height • Increase availability of high-quality nesting, brood rearing, and winter habitats
Juniper/conifer removal	Mechanical removal (lop and scatter, cut-pile-cover, or mastication) of juniper/confer adjacent to areas with optimal sagebrush cover and height.	• Reverse juniper/conifer encroachment on shrub-steppe habitat to increase contiguous patches of greater sage-grouse habitat • Increase light penetration to support a forb and grass understory
Conservation easements	Removes threat of specific land uses to sensitive wildlife populations.	• Prevent greater sage-grouse habitat destruction or degradation near urban areas and oil and gas development • Reduce future fragmentation of shrub-steppe habitat

km = kilometer
m = meter

5.4 Consistency with Mitigation Standards and Objectives

TransWest and BLM will evaluate the services returned per habitat mitigation measure, compare those services gained to the services lost as a result of the Project, and develop an appropriate mitigation package to compensate for services lost.

Habitat conservation and mitigation measures will be identified to fully compensate for the direct and indirect habitat service losses quantified for each segment. Projects will be selected in accordance with the requirements of the BLM Resource Management Plans (RMPs), state greater sage-grouse management plans, and the USFWS Range-Wide Mitigation Framework including principles, standards, and recommendations for mitigation. Standards that will be evaluated as part of the final mitigation plan include:

5.4.1 Siting Standard

Each mitigation project will be evaluated to ensure that it addresses the conservation objectives of the management plans applying to the area of impact. This approach achieves the goal of siting mitigation measures in areas that will be most likely to benefit sage-grouse by considering the overall habitat quality and habitat services provided across the landscape.

5.4.2 Duration Standard

Each mitigation project will be evaluated to ensure that it achieves and maintains conservation objectives for no less than the duration of the Project including any residual impacts that may occur after the permit term has expired when vegetation recovery is still ongoing.

5.4.3 Additionality Standard

Each mitigation project will be evaluated to ensure that conservation uplift is achieved beyond what would already be expected if the mitigation action was not implemented. Additionality may be met by enhancing or restoring disturbances that would not otherwise be restored, providing land-tenure agreements to protect suitable habitat that would not otherwise be protected, or by removing identified threats to the population (e.g., conifer encroachment and management) that would not be removed without some conservation action.

5.4.4 Timeliness Standard

Each mitigation project will be evaluated to ensure that it achieves and maintains conservation objectives in a timely manner that offset the schedule and duration of project impacts. When possible, advanced conservation may be applied to achieve the timeliness standard.

5.4.5 Effectiveness Standard

Mitigation measures used to mitigate for project impacts will be supported by appropriate scientific documentation, monitoring data, and management plans to confirm benefits to greater sage-grouse populations. Implementing agency-recognized mitigation measures (e.g., conservation easements, conservation banks, habitat exchanges, conifer removal, sagebrush restoration, fence marking, etc.) will ensure that the measures identified in the mitigation plan are effective. Effectiveness will be evaluated for each mitigation project that is selected as part of the final mitigation plan and as required in BLM's TWE Project Record of Decision.

5.4.6 Durability Standard

Each mitigation project will be evaluated to ensure that the actions that are taken are durable and supported by appropriate financial, legal, and management assurances. Mitigation measures such as conservation easements or conifer removal may have different durability assurance standards than other

mitigation measures such as sagebrush planting or enhancement. These differences will be clearly described and documented in the final mitigation plan.

5.4.7 Metrics Standard

Metrics that will be used to demonstrate the avoidance, minimization, and compensatory migration benefits will be included for each mitigation project identified in the final mitigation plan. A benefit of the Project HEA is that it provides a reliable, repeatable, and quantitative science-based metric based on biological conditions and habitat requirements for greater sage-grouse. This will be used to ensure that mitigation projects fully compensate for the interim and permanent losses of habitat services.

6.0 Application of the Mitigation Plan

6.1 ROW Grant Term

TransWest anticipates that, should BLM approve issuance of a ROW Grant for the TWE Project, such grant would be for a term of 30 years subject to renewal. If renewed, TransWest understands that the ROW Grant would be subject to the regulations existing at the time of renewal and any other terms and conditions that the authorized officer deems necessary to protect the public interest. Upon expiration of the ROW Grant, TransWest intends to apply for a ROW Grant renewal as transmission facilities typically remain in use beyond 30 years with some transmission facilities remaining in service well in excess of 50 years.3 However, for the purposes of calculation of compensatory mitigation required during the initial term of the ROW Grant, the HEA model assumes that the structures are dismantled and removed from the landscape so that the calculation of habitat services lost (debits) is limited to effects of Project construction and operation during the initial ROW Grant term. If BLM should authorize a renewal of the ROW Grant upon expiration of the initial term, then TransWest assumes that any necessary compensatory mitigation for greater sage-grouse and its habitat will be addressed in such ROW Grant renewal.

6.2 Application within Wyoming, Colorado and Utah

In September 2015, BLM amended its RMPs to address greater sage-grouse habitat management through issuance of the Rocky Mountain Regional ROD (applies to those portions of the TWE Project in Wyoming and Colorado) and the Great Basin Regional ROD (applies to those portions of the TWE Project in Utah). Greater sage-grouse mitigation requirements are specifically addressed in the Approved Resource Management Plan Amendments (ARMPAs) for Wyoming, Northwest Colorado, and Utah. Within these three states, TransWest will implement its greater sage-grouse mitigation plan as described below.

6.2.1 Wyoming

The TWE Project is being developed and has been sited consistent with the State of Wyoming Core Area Strategy (BLM 2015b; Wyoming Executive Order [EO] 2011-5, updated by EO 2015-4, Core Area Strategy). As such, no compensatory mitigation is required under Wyoming's Core Area Strategy. The Wyoming ARMPA is built upon and is complementary to the foundation for greater sage-grouse

[3] For example, the power lines associated with the Hoover Dam were placed in service in 1937 and continue to remain in service and be used to this day. http://www.usbr.gov/lc/hooverdam/index.html accessed on September 13, 2016

management established by the Core Area Strategy and establishes similar conservation measures and management actions as those identified in the Core Area Strategy (BLM 2015b). Therefore, in Wyoming no compensatory mitigation for greater sage-grouse is required for TWE Project impacts in GHMA and within the Governor's Transmission Line Corridors identified in the Core Area Strategy. For any direct or indirect impacts in Core Area (equivalent to PHMA) that occur or extend outside the Governor's Transmission Line Corridors, TransWest will apply the HEA as described in this document to determine the amount of compensatory mitigation necessary to offset potential direct and indirect effects to greater sage-grouse habitat in such areas.

6.2.2 Colorado and Utah

For Colorado and Utah, TransWest will apply the HEA as described in this document to determine the amount of compensatory mitigation necessary to offset potential direct and indirect effects to greater sage-grouse habitat as required by the Northwest Colorado ARMPA and the Utah ARMPA, respectively. A separate HEA model will be run for each state to calculate the temporary and long-term loss of greater sage-grouse habitat services that may potentially result from direct and indirect disturbances (debits). Compensatory mitigation projects as described in Appendix F of this document will be implemented within each state to offset Project impacts based upon the state-specific HEA calculation of debits. The mitigation projects will be designed to benefit the greater sage-grouse populations affected within each state through coordination with BLM and the appropriate state wildlife management agencies and cooperating agencies.

6.3 Application for Co-Located Facilities

Through the National Environmental Policy Act (NEPA) review of the Project, BLM and its cooperating agencies have emphasized the importance of co-location of the TWE Project with both existing and planned facilities, and in particular existing and reasonably foreseeable future transmission lines.4 Throughout the development of the TWE Project, TransWest, at the request of BLM, has coordinated closely with PacifiCorp, the project proponent of the Energy Gateway West Transmission (GWW) Project and the Energy Gateway South Transmission (GWS) Project, concerning siting and co-location issues. Within areas of co-location in Wyoming, the GWW Project has received its ROW Grant from BLM. The GWS Project is planned to be co-located with the TWE Project through much of the TWE Project's route in Wyoming and Colorado and to a lesser extent in Utah. The Record of Decision for the GWS Project is expected in 2016. In addition to the GWW and GWS Projects, other transmission projects have been proposed that could use the utility corridors selected for the TWE Project in the future. Therefore, to account for the GWW, GWS and other reasonably foreseeable future projects, TransWest has developed the following process for implementing compensatory mitigation in areas of co-location:

> TransWest will quantify habitat service losses (debits) as set forth in this document for the entire term of the ROW Grant prior to the Notice to Proceed (NTP) being issued for the Project. This calculation

[4] As set forth in the TWE Project Final Environmental Impact Statement (BLM 2015), the first criteria BLM cited in developing the Agency Preferred Alternative was to identify an alternative that "Maximizes the use of appropriate (e.g., non-underground-only) existing utility corridors by locating within or paralleling areas of existing utility ROWs." Page 2-73 Section 5.2.5 of the TWE Project FEIS (page 5-19) states that "Many of the Project alternative corridors have the potential to be shared by reasonably foreseeable transmission lines that propose similar or identical routes. This possibility for shared corridors was one of the criteria used by the BLM FOs and USFS National Forests for determining the plan amendments that needed to be proposed and analyzed in this EIS."

will be made accounting for all existing facilities and those that have initiated construction activities at the time of the calculation. An advantage of the HEA is that the model can calculate debits on an annual basis. Using this feature, TransWest will quantify the amount of debits incurred on an annual basis for the first five years of the Project beginning in the year construction commences. TransWest will then provide compensatory mitigation to offset the first five years of Project impacts following the procedures set forth in this document. At the end of the first five year period, following commencement of construction, TransWest will either:

(1) Implement mitigation projects sufficient to offset the remaining debits for the remaining term of the TWE Project ROW Grant if no new transmission, pipeline, or other facilities have been constructed or have initiated construction activities within the Assessment Area; or
(2) Recalculate debits for the TWE Project if new transmission, pipeline, or other facilities have been constructed or have initiated construction activities within the Assessment Area. In such event, TransWest will implement mitigation projects sufficient to offset the recalculated debits minus the initial five years of debits (for which TransWest has already provided compensation) for the remaining term of the TWE Project ROW Grant.

6.4 Application in Areas where Special Structures May be Required

BLM has indicated that it may require in its ROD for the TWE Project that TransWest install tubular steel monopole structures in certain PHMAs in Colorado to reduce indirect effects on greater sage-grouse by eliminating perching and nesting opportunities of the common raven and raptors.[5] Should BLM require tubular steel monopole structures or similar in its TWE Project ROD, then TransWest will not apply the indirect effects portion of the HEA model in its calculation of debits for those areas where such monopoles are required as the indirect effect will be mitigated.

[5] Ravens are thought to be the main avian predators of greater sage-grouse and the cause of the avoidance effect that was identified by the indirect effects sub-group (See Appendix C of this document).

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APPENDIX A

Greater Sage-grouse Habitat Service Metric for the TransWest Express Transmission Project

A. Development of Habitat Service Metric for Habitat Equivalency Analysis

A habitat service metric was developed for the greater sage-grouse (*Centrocercus urophasianus*) using variables identified in the peer-reviewed literature as representative of greater sage-grouse habitat. Habitat service levels are intended to reflect both the quality of the habitat and the ability of the birds to use the habitat. For each of the eight metric variables, a habitat service score ranging from 0 to 3 (no services [contributing no value to habitat] to high services [optimal habitat]) was assigned, similar to the greater sage-grouse habitat assessment framework developed by Stiver et al. (2010) and the greater sage-grouse habitat suitability index developed by LaGory et al. (2012). Scoring habitat services is a critical step in the habitat equivalency analysis (HEA) process because it provides a way to measure the relative quality of specific habitat functions in a specific area.

The scores for this HEA are primarily based on information contained in the literature regarding greater sage-grouse habitat use and selection. When literature did not allow for direct assignment of value ranges for HEA scores, professional judgments were used. Professional judgments are associated with specific literature references when possible and/or confirmed with academic and agency biologists.

When a basic life requisite of greater sage-grouse is absent (vegetation is absent, the area is forested, or high levels of disturbance are present), the cell being scored is assigned a total service value of 0. When a measurements for particular variable within the metric (e.g., Variable 06, % sagebrush canopy cover) matches literature-based descriptions of sub-optimal conditions, that variable is given a service score of 0 (contributing no value to habitat), 1 (poor habitat), 2 (moderate habitat), or 3 (optimal habitat). For example, sagebrush canopy cover <1% would score a 0, canopy cover of 1% to 5% would score a 1, canopy cover of 5% to 15% or >35% would score a 2, and 15% to 35% canopy cover would score a 3 for that variable.

Scoring of the variables is categorical and each variable is given the same weight in the model. This approach is based on the best available data and is consistent with the general approach of LaGory et al. (2012, page 8) which is described as follows.

> In general, there was insufficient information in existing studies to determine relationships among variables and habitat suitability or relative contributions between variables/components. Therefore, for simplicity, we developed piecewise linear functions of suitability based on the assumption that all variables are of equal weight and applied these functions to geospatial layers to generate indices ranging from 0 (poor) to 100 (optimal). This approach is similar to that used for many of the U.S. Fish and Wildlife Service (USFWS) Habitat Suitability Index models in their Habitat Evaluation Procedure (available at http://www.fws.gov/policy/ESMindex.html).

While the individual variables are not weighted, the number of variables relating to a habitat attribute (e.g., six for vegetation vs. one for slope) and the size of the buffers (e.g., 1,000 meters [m] for high traffic roads vs. 200 m for low traffic roads) give some attribute categories more influence than others. In the metric, there are three variables that score sagebrush characteristics (sagebrush abundance index, sagebrush % canopy cover, and sagebrush canopy height), so areas that are not dominated by sagebrush will score low for these three variables, resulting in a lower overall score.

Greater sage-grouse habitat suitability publications vary in their baseline environmental conditions affecting a particular study site. Even studies within the same state may describe different suitable habitat conditions depending on elevation, precipitation zone, and other geographic or climatic factors affecting each study site.

The habitat metrics described below rely primarily on information presented in Bureau of Land Management (BLM) et al. (2000), Cagney et al. (2009), Connelly et al. (2000), Connelly et al. (2011), and other summary publications. Specific citations are given to support the habitat model framework when applicable.

A single habitat service metric is applied to the entire Project corridor in order to standardize results. This approach assumes that optimal habitat or poor habitat for greater sage-grouse looks the same (that is, measures the same for the variables in the metric) regardless of its location, despite regional differences in habitat features and availability.

As a result, the best available habitat at the edge of the species' range may not score as high as the best available habitat in the center of the species' range, unless they have the same measurements for the variables in the metric. The following sections describe the development of the habitat service model variables.

A.1 METRICS OF GREATER SAGE-GROUSE HABITAT SERVICES

The metric is only applied to areas that contain greater sage-grouse habitat by first only analyzing those areas that fall within the BLM's General Habitat Management Area (GHMA) and Priority Habitat Management Area (PHMA). Next, land cover types that are typically avoided by greater sage-grouse, also known as excluded lands, were assigned an overall metric score of 0 before the additive metric is applied to the remaining areas. Because these excluded lands have an HEA value of zero, disturbances of these lands require no mitigation in the HEA. These land cover types include all forest types, urban areas, open water, some introduced vegetation types, roadways and those areas <100 m from roadways with >6,000 annual average daily traffic (AADT) and <25 m of paved roads with <6,000 AADT), as well as well pads and mine footprints plus areas <25 m from the footprints (multiple sources per U.S. Fish and Wildlife Service listing decision in *Federal Register*; Johnson et al. 2011).

The metric for greater sage-grouse habitat services used in this HEA is an additive model (Table A.1) with a score adjustment for the presence of fences posing a high collision risk to greater sage-grouse during the lekking season. Each 30- by 30-m cell in the analysis area (within 2-kilometer [km] buffer from the project centerline) is scored separately by summing the scores of Variables 01 through 08 in that cell. The summed score is then multiplied by a factor that reduces the score where high risk fences are present. Each of the variables and the fence score adjustment is described in detail below.

Table A.1. Anthropogenic and Habitat Variables Used as a Metric of Greater Sage-grouse Habitat Services

Variable Number	Variables	3	2	1	0	Primary Citations
VAR01	Distance to high-traffic (>6,000 AADT) road, such as an interstate, federal, or state highway (meters)	>1,000	650–1,000	100–650	N/A*	Craighead Beringia South (2008); Johnson et al. (2011); Pruett et al. (2009)
VAR02	Distance to low-traffic (<6,000 AADT) paved roads, heavily travelled gravel roads, well pads, mine footprints, transmission substations (meters)	>200	50–200	25–50	N/A*	Connelly et al. (2004); Craighead Beringia South (2008); Johnson et al. (2011); Pruett et al. (2009)
VAR03	Percent slope	<10	10–30	30–40	>40	Beck (1977); Lincoln County Sage Grouse Technical Review Team (2004)
VAR04	Distance to occupied lek† (kilometers)	0–6.4	6.4–8.5	>8.5	N/A	Cagney et al. (2009); Connelly et al. (2000); Connelly et al. (2011); Holloran and Anderson (2005)
VAR05	Sagebrush abundance index (% of vegetation that is sagebrush within a 1-square-kilometer moving window)	50–100	30–50	10–30	0–10	Carpenter et al. (2010); Walker et al. (2007); Aldridge and Boyce (2007); Aldridge et al. 2008; Wisdom et al. (2011)
VAR06	Percent sagebrush canopy cover	15–35	5–15 or >35	1–5	<1	Cagney et al. (2009); Connelly et al. (2000); Stiver et al. (2010)
VAR07	Sagebrush canopy height (centimeters)	30–80	20 to <30 or >80	5–20	<5	Crawford et al. (2004); Connelly et al. (2000); Stiver et al. (2010)
VAR08	Distance of habitat to sage or shrub dominant (meters)	<90	90–275	275–1,000	>1,000	BLM et al. (2000); Connelly et al. (2000); Lincoln County Sage Grouse Technical Review Team (2004)

* Lands less than 100 meters from a high traffic road and less than 25 meters from a low traffic paved road or high traffic gravel road were given a total metric score of 0 (provides no habitat services), not just a score of 0 for these individual variables. This is referred to as the road "width" in the direct impacts, although it is larger than the actual physical width of the road.

† Considers leks classified as active, occupied, undetermined, or unknown.

AADT = annual average daily traffic

A.1.1 VAR01 and VAR02: Distance to Roads and Highways

Research into the effects of roads on greater sage-grouse is varied. For instance, in Colorado, Rogers (1964) mapped 120 leks with regard to distance from roads and found that 42% of leks were over 1.6 km (1 mile) from the nearest improved road, but that 26% of leks were within about 90 m (about 100 yards) of a county or state highway, and two leks were on a road. Connelly et al. (2004) also noted sage-grouse using roads for lek sites. In contrast, Craighead Beringia South (2008) reported results from a 2007 to 2009 study of greater sage-grouse seasonal habitat use in Jackson Hole, Wyoming. Results indicate that greater sage-grouse avoid areas within approximately 100 m of paved roads. Similarly, Pruett et al. (2009) found that lesser prairie-chickens (*Tympanuchus pallidicinctus*) avoided one of the two highways in the study by 100 m; however, some prairie-chickens crossed roads and had home ranges that overlapped the highways, thus roads did not completely exclude them from neighboring habitat. Johnson et al. (2011) examined the correlation between trends in lek attendance and the environmental and anthropogenic features within 5- and 18-km buffers around leks. They found that lek attendance declined over time with length of interstate highway within 5 km, although the authors note that this trend was based on relatively few data points and no pre-highway data were available for comparison. Interstate highways >5 km away and smaller state and federal highways had little or no effect on trends in lek attendance. Thresholds less than 5 km were not examined.

In the habitat services metric, Variable 01 is high-traffic road (>6,000 AADT), such as an interstate or U.S. highway, or state highway, and Variable 02 is low-traffic (<6,000 AADT) paved or unpaved roads. Those habitats within 100 m of Variable 01 roads and within 25 m of Variable 02 roads were considered to be excluded lands and therefore were given an overall score of 0 in the additive HEA model. In addition, in order to characterize the disturbance of mining, oil and gas, and other commercial vehicles, mine footprints and well pad footprints were classified and scored as if they were Variable 02 low-traffic roads making habitats within 25 m of these areas excluded lands as well. Finally, the Series Compensation Station will also be classified and scored as if it is a Variable 02 low-traffic road in the model and habitats within 25 m of this area will also be considered excluded lands to help account for the noise and human presence associated with this facility.

Those habitats located farther than 1,000 m and 200 m of Variable 01 and Variable 02 roads, respectively, were considered the most serviceable to greater sage-grouse (that is, exhibited no decrease in lek attendance) and were given a score of 3. A logarithmic curve was fit between the highest and lowest categories so that score increased with distance from the road to estimate the distance breaks associated with scores 1 and 2. A logarithmic rate of change simulates sound attenuation rates better than a linear rate of change (Crocker 2007). Conflicting research results regarding greater sage-grouse use near and on unpaved resource/collector roads (e.g., two-track roads) did not allow for quantification of the disturbance caused by these roads in the model.

While the application of distances to all scores (0–3) is not perfectly supported in the peer-reviewed literature, the TransWest approach degrades habitats that are bisected by all types of large roadways. Degradation is higher for roads that typically have higher traffic levels and risk to greater sage-grouse (e.g., mortality from collision, noise disturbance) than less-utilized secondary roads that generally have less traffic and implied risk.

A.1.2 VAR03: Percent Slope

Slope was used to refine greater sage-grouse habitat potential. Greater sage-grouse generally use flat or gently sloping terrain (Connelly et al. 2011; Eng and Schladweiler 1972; Nisbet et al. 1983; Rogers 1964). Beck (1977) plotted the distribution of 199 greater sage-grouse flocks in Colorado and found that 66% of flocks were on slopes less than 5% and only 13% of flocks were on slopes greater than 10%. Areas with slopes greater than 40% are unsuitable for nesting habitat (Lincoln County Sage Grouse Technical Review Team 2004), but still have some value to greater sage-grouse and should be retained in the model (professional judgment of the TAG). Therefore, areas with less than 5% slope were assigned a habitat service score of 3, and those exceeding 10% subjectively received incrementally lower habitat service scores. Slopes >40% did not add value to the habitat and received a score of 0 for this variable, but these areas may provide habitat services depending on the scores for the other variables.

A terrain roughness index was evaluated for use in place of the slope variable, as some studies have shown that it is a better indicator of greater sage-grouse use (Carpenter et al. 2010; Doherty et al. 2008; Doherty et al. 2010; Dzialak et al. 2011). However, there was substantial variation in the methods used to calculate the terrain roughness index (e.g., measure of roughness used and analysis window size) and region evaluated (e.g., Alberta, Canada, vs. Powder River Basin, Wyoming) by these studies. Given this variation, it was not possible to identify literature-supported cutoffs between scores for use in the model.

A.1.3 VAR04: Distance to Lek (10-year Average Count >0 Males)

Current greater sage-grouse habitat management guidance uses occupied leks, a gathering of males for mating purposes, as focal points for nesting habitat management (Connelly et al. 2000; Connelly et al. 2011); therefore, distance to lek was used as a variable in the habitat services metric. These guidelines recommend protecting sagebrush communities within 3.2 km (2 miles) of a lek in uniformly distributed habitats and 5.0 km (3.1 miles) in non-uniformly distributed habitats. Holloran and Anderson (2005) studied nesting greater sage-grouse at 30 leks in central and western Wyoming and determined that 45% and 64% of female greater sage-grouse nested within 3.2 km and 5.0 km of the lek where the hen was radio-collared, respectively. Moreover, statistical analyses suggested that the area of interest for nesting greater sage-grouse should be truncated at 8.5 km (5.3 miles) from a lek. Similar frequencies are reported in Cagney et al. (2009)—66% within 5.0 km and 75% within 6.4 km (4 miles) of a lek where the female bred.

Female greater sage-grouse do nest at distances greater than 8.5 km (the farthest distance reported in Holloran and Anderson [2005] was 27.4 km [17 miles]), so all distances >8.5 km from occupied leks were given a service score of 1 to reflect some potential use by nesting greater sage-grouse. Areas within 6.4 km of a lek provide the highest service level, because they provide female grouse with forage, roost sites, and cover from predators or inclement weather during the lekking season, in addition to containing lekking habitat and nesting habitat (Cagney et al. 2009), and were assigned a service score of 3 for this variable. Areas between 6.4 and 8.5 km were assigned a score of 2 for this variable.

A.1.4 VAR05: Sagebrush Abundance Index

Sage-grouse are sagebrush obligates, thus sagebrush abundance and quality are strong predictors of sage-grouse use and persistence. Walker et al. (2007) found that the proportion of habitat that was sagebrush within a 6.4 km moving window was a strong predictor of lek persistence in the Powder River Basin of Wyoming. The moving window is an analysis area that is larger than and centered on the cell being scored; in this case, the window is a 6.4-km buffer that moves as the cell being scored is changed. Areas with less than 30% of sagebrush within 6.4 km of the lek center had a lower probability of lek persistence. Aldridge and Boyce (2007) also used a moving window (1 km^2) to measure sagebrush cover and abundance. Their resource selection function found that greater sage-grouse selected nesting habitat that contained large patches (1 km^2) of sagebrush with moderate canopy cover and moderate sagebrush abundance (i.e., heterogeneous distribution of sagebrush). Carpenter et al. (2010) found similar results in Alberta, Canada. Their top resource selection functions included a quadratic function for sagebrush abundance, which indicates that areas of moderate sagebrush abundance were selected more frequently than areas of homogenous sagebrush.

Aldridge et al. (2008) (per Wisdom et al. [2011]) found that at least 25% of the landscape in a 30.77-km (19.1-mile) analysis area needed to be dominated by sagebrush for greater sage-grouse persistence, with 65% being preferred. Wisdom et al. (2011) found that landscapes with less than 27% sagebrush were not different from landscapes from which greater sage-grouse have been extirpated. Similar to Aldridge et al. (2008), Wisdom et al. (2011) found that 50% sagebrush across a landscape was a good indicator of greater sage-grouse persistence.

Participants in the TAG indicated that greater sage-grouse prefer higher sagebrush abundance in the southern part of their range than is indicated by these studies. For example, the Colorado Parks and Wildlife (CPW) Avian Research Center has generally found a positive linear relationship between sagebrush abundance and measures of habitat selection (Brian Holmes, Colorado Parks and Wildlife, personal communication with Jon Kehmeier, SWCA Environmental Consultants [SWCA], on February 13, 2013). CPW has not observed an upper inflection point in the proportion of the landscape covered in sagebrush where use or selection begins to drop, and suggest that the difference may be due to the structure and composition of the sagebrush community (that is, silver sagebrush mixed grassland rangelands of Alberta [Aldridge and Boyce 2007; Carpenter et al. 2010] vs. big sagebrush steppe [Project area]).

Sagebrush covering 50% to 100% of the landscape scored a 3 for this variable (Aldridge et al. 2008; Wisdom et al. 2011; professional judgment of TAG). Sagebrush covering 30% to 50% scored a 2 for this variable (Aldridge et al. 2008). Sagebrush covering 10% to 30% scored a 1 (Walker et al. 2007; Wisdom et al. 2011) and sagebrush covering less than 10% scored a 0 for this variable (professional judgment of TAG).

A.1.5 VAR06: Sagebrush Canopy Cover

Recommended sagebrush canopy cover (the proportion of land area covered by sagebrush crowns, as viewed from the air) for greater sage-grouse habitat varies seasonally. Seasonal habitats were not modeled, but seasonal differences in the selection for sagebrush cover were considered when developing habitat services metrics. The seasonal habitat needs of greater sage-grouse are described below, followed by scoring of percent sagebrush cover in the habitat services metric.

Seasonal Habitat Use

Nesting

Connelly et al. (2000) cite 13 references to sagebrush coverage that range from 15% to 38% mean canopy cover surrounding the nest. Citations contained within Crawford et al. (2004) reported 12% to 20% cover and 41% cover in nesting habitat. In their species assessment, Connelly et al. (2000) conclude that 15% to 25% canopy cover is the recommended range for productive greater sage-grouse nesting habitat. This is also the range identified in the greater sage-grouse habitat assessment framework (Stiver et al. 2010) as providing the highest service level for greater sage-grouse based on a review of the available literature. Wallestad and Pyrah (1974) reported that successful nests were in stands where sagebrush cover approximated 27%. This cover range is used as a goal in some greater sage-grouse management guidelines (Bohne et al. 2007; BLM et al. 2000). Cagney et al. (2009) guidelines for grazing in grouse habitat, which use information synthesized from over 300 sources, state that hens tend to select an average 23% live sagebrush canopy cover when selecting nesting sites.

Greater sage-grouse in Utah use habitats with higher sagebrush canopy cover than is observed in the northern and eastern portions of the species range, possibly due to the relative scarcity of understory grasses in Utah (Renee Chi, BLM, personal communication with Ann Widmer, SWCA, on March 22, 2013). Nest sites in Wildcat Knoll (part of the Emery-Sanpete population of Utah) were located in areas with an average of 33% shrub canopy cover for successful nests and 22% for unsuccessful nests (Perkins 2010). Nests in Parker Mountain were located at sites with an average canopy cover of 35.5% for big sagebrush and 32% for big sagebrush mixed with black sagebrush (Chi 2004; Renee Chi, BLM, personal communication with Ann Widmer, SWCA, on March 22, 2013). In the Sheeprock greater sage-grouse population, nest site shrub canopy cover measured an average of 62% in 2005 and 83.5% in 2006 (Robinson 2007).

Brood Rearing

Connelly et al. (2000) found that productive brood-rearing habitat should include 10% to 25% cover of sagebrush. This is the range used as a goal in greater sage-grouse management guidelines (Bohne et al. 2007; BLM et al. 2000). While sagebrush is a vital component of greater sage-grouse habitat, very thick shrub cover may inhibit understory vegetation growth and reduce the birds' ability to detect predators (Wiebe and Martin 1998).

Again, greater sage-grouse in Utah may use areas with higher canopy cover than is typical throughout the northern and eastern parts of their range. Grouse in the Sheeprock population were documented using areas with an average shrub canopy cover of 73% during brood rearing in 2005 and 2006 (Robinson 2007).

Winter

Connelly et al. (2000) cite 10 references to sagebrush coverage in winter-use areas that range from 15% to 43% mean canopy cover (Crawford et al. [2004] also cite two of these references in their assessment); however, they considered a canopy of 10% to 30% cover above the snow as a characteristic of sagebrush needed for productive greater sage-grouse winter habitat. This is the cover range used as a goal in greater sage-grouse management guidelines (Bohne et al. 2007; BLM et al. 2000). Greater sage-grouse in Utah may prefer higher cover in winter. In Emma Park, areas of high

sagebrush cover were used disproportionally to their availability on the landscape, with an average of 38.3% sagebrush canopy cover in winter-use areas (Crompton and Mitchell 2005).

Scoring in Habitat Services Metric

In general, the recommended sagebrush cover for nesting habitats was intermediate to, and overlapped that of, brood-rearing and winter habitats. Thus, favorable conditions for nesting were given the highest scores for percent sagebrush cover in the greater sage-grouse habitat services metric.

This variable used the scores assigned by Stiver et al. (2010) for sagebrush cover categories in greater sage-grouse nesting habitat, with a slight adjustment to account for use of higher canopy cover in Utah. This adjustment is also consistent with the Colorado Greater Sage-Grouse Conservation Plan (Colorado Division of Wildlife et al. 2008). Sagebrush percent canopy cover of 15% to 35% was assumed to provide the highest level of services (score of 3) to nesting greater sage-grouse. This includes canopy covers that are 10% higher than the average ranges provided in Connelly et al. (2000) and Cagney et al. (2009). Areas with slightly less or more cover than this (55%–15% or >35%) were given a habitat services score of 2. Habitats with 1% to 5% cover received a score of 1 and those habitats with <1% cover received a score of 0.

A.1.6 VAR07: Sagebrush Canopy Height

Sagebrush canopy height is an important component of nesting and winter habitat, because it affects how well nests are concealed from predators and how much food is available above the snow. As described above, seasonal habitat models will not be developed for the Project. However, seasonal habitat requirements were considered when developing habitat metric values. The seasonal habitat preferences of greater sage-grouse are described below and followed by the scoring of sagebrush height in the habitat services metric.

Seasonal Habitat Use

Nesting

Gregg et al. (1994, cited in Crawford et al. 2004) found that the area surrounding successful nests in Oregon consisted of medium-height (40 to 80 centimeters [cm]) sagebrush. Connelly et al. (2000) cite 11 references to sagebrush height that range from 29 to 79 cm mean height. In their assessment, Connelly et al. (2000) conclude that sagebrush with a height of 30 to 80 cm is needed for productive greater sage-grouse nesting habitat in arid sites and 40 to 80 cm in mesic (temperate) sites. These ranges are supported by Stiver et al. (2010) who recommend a range of 30 to 80 cm and BLM et al. (2000) who state that optimum greater sage-grouse nesting habitat consists of sagebrush stands containing plants 40 to 80 cm tall.

Winter

Important structural components in winter habitat include medium to tall (25–80 cm) sagebrush stands (Crawford et al. 2004). Connelly et al. (2000) cite 10 references for sagebrush height in winter habitat that range from 20 to 46 cm above the snow. Two studies measured the entire plant height and provided a range from 41 to 56 cm. In their assessment, Connelly et al. (2000) conclude that characteristics of productive winter habitat include sagebrush that is 25 to 35 cm in height above the snow. This is the height range used as a goal in greater sage-grouse management guidelines (Bohne et al. 2007; BLM et al. 2000).

Scoring in Habitat Services Metric

Sagebrush canopy heights that provided high-quality nesting habitat generally also provided high-quality winter habitat for greater sage-grouse. Thus, favorable conditions for nesting were given the highest scores for sagebrush canopy height in the greater sage-grouse habitat services metric.

The sagebrush cover scores assigned for nesting habitat in the greater sage-grouse habitat assessment framework by Stiver et al. (2010) to different sagebrush cover categories were assigned to this variable. Areas of sagebrush with a height of 30 to 80 cm were assigned a habitat services score of 3. As sagebrush canopy height decreases, the value of a sagebrush plant to provide cover for nesting females and their nests is diminished. Additionally, low-lying sagebrush is less available to greater sage-grouse during the winter due to snow cover. Areas with canopy heights greater than 80 cm provided intermediate levels of services because they may provide relatively poor cover for nesting greater sage-grouse and have foliage that is difficult for greater sage-grouse to access during mild and moderate winters. Consistent with Stiver et al. (2010), sites with sagebrush from 20 to 30 cm or >80 cm in height received a score of 2. Areas with minimal sagebrush canopy heights were considered to have the lowest habitat service value so sagebrush that ranged from 5 to 20 cm in height received a score of 1 and sagebrush that was <5 cm in height received a score of 0.

A.1.7 VAR08: Distance to Vegetation Dominated by Sagebrush or Shrub

Greater sage-grouse use shrubby habitats including sagebrush during the brood-rearing season (Connelly et al. 2000) and for grouse movement and dispersal (Stiver et al. 2010). Close proximity to shrubby vegetation increases the service value of all vegetation types modeled because shrubby vegetation provides cover from predators, facilitates grouse movement, and supports population connectivity.

The Lincoln County Sage Grouse Technical Review Team (2004) identified proximity to sagebrush cover as an important component in habitat suitability of non-sagebrush, brood-rearing habitats (e.g., mesic lowland habitats, hay meadows). The Team considered brood-rearing areas within <100 yards (91 m), 100 to 300 yards (275 m), and >300 yards of sagebrush cover as suitable, marginal, and unsuitable habitat, respectively. Similarly, Stiver et al. (2010) considered mesic habitats <90 m, 90 to 275 m, and >275 m of sagebrush to be suitable, marginal, and unsuitable late brood-rearing/summer habitat, respectively. These categorizations support the concept of increasing service level with proximity to shrubs, particularly sagebrush.

The distance to vegetation dominated by sagebrush or shrub variable (VAR08) measured the distance of the cell being scored (regardless of its vegetation type) to the next nearest cell that was dominated by sagebrush or a shrub species, including willows. For this variable, cells <90 m, 90 to 275 m, 275 to 1,000 m, and >1,000 m to a cell dominated by a shrub species were assigned scores of 3, 2, 1, and 0, respectively. The scoring was based on the breakpoints identified in the literature for distances up to 275 m and professional judgment by the TAG for distances >275 m. The scores were applied to all vegetation types, because this variable is relevant to bird movement and dispersal from all habitat types.

A.1.8 Score Adjustment Factor: Fences that Pose a High Risk for Collision

Habitat within and surrounding the Project transmission line corridor is currently influenced by fences used for livestock management. These fences are typically constructed from barbed wire and are used

to control livestock movements and vegetation use within grazing allotments and pastures, to delineate or protect private property and agricultural croplands, and to restrict livestock from improved and unimproved roadways.

Fence collisions have been reported as a cause of significant injury and mortality to grouse species (greater sage-grouse [Braun 2006; Call and Maser 1985; Connelly et al. 2004; Christiansen 2009; Danvir 2002; Stevens, Connelly, et al. 2012]; lesser prairie-chicken [Wolfe et al. 2007]; ptarmigan [*Lagopus lagopus* and *L. mutus*] [Bevanger and Broseth 2000]; and red grouse [*Lagopus lagopus scoticus*], black grouse [*Tetrao tetrix*], and white capercaillie [*T. urogallus*] [Baines and Summers 1997; Catt et al. 1994; Petty 1995]). In addition to direct mortality, fences provide corridors for mammalian predators increasing the opportunity for predation of hens and broods (Braun 1998). Unlike the additive variables in the metric, which are primarily meant to characterize use and avoidance of habitat by greater sage-grouse, the distance to high risk fences was added to account for the potential direct loss of greater sage-grouse and not the greater sage-grouse avoidance of fences.

In Wyoming, Christiansen (2009) reported preliminary results of a multiple-year study (2005–ongoing) near Farson on greater sage-grouse fence strikes and mortalities and the utility of fence markers on reducing collisions. After installation of fence markers on portions of high-risk fences, grouse mortality decreased by 70%. Although the study did not compare the number of strikes with regard to distance to lek, the author recommends that fences should not be located within 0.25 mile (0.4 km) of leks.

In Idaho, Stevens (2011), Stevens, Connelly, et al. (2012), and Stevens, Reese, et al. (2012) evaluated the environmental features associated with greater sage-grouse fence collision risk and tested the efficacy of reflective vinyl fence markers to reduce collision rates at eight study sites. Modeling of these data predicted marking fences reduced collision rates by 74% to 83% at the mean lek size and fence distance from the lek during the breeding season. However, it should be noted that collision probability varied by region, topography, fence type, fence density, and lek proximity. Areas with high slope or terrain ruggedness generally showed lower collision risk than flat areas. Collisions were also more common on fence segments bound by steel t-posts with spans between posts exceeding 4 m. Collision probability increased with fence length per km^2 and proximity to nearest active lek.

For this variable, fences segments having a high risk for collision were identified using the model by Stevens et al. (2013), which is determines the fence-collision risk from proximity to lek and a terrain roughness index (Equation A.1).

Equation A.1

$$\hat{y} = 78 * \exp(\beta_0 + \beta_1 * TRI + \beta_2 * distance)$$

Where:

$\hat{y}$ is an estimate of the total number of greater sage-grouse collisions over a 78-day lekking season for each $900m^2$ pixel if a fence is present;

β_0 = -3.325 (regression intercept per Bryan Stevens, University of Idaho, personal communication with Ann Widmer, SWCA, on February 14, 2014);

β_1= -0.25;

β_2 = -0.0006;

TRI is a terrain roughness index calculated using ArcInfo; and

$distance$ is the distance from each 900m^2 pixel to the nearest greater sage-grouse lek in GIS using the Euclidean distance function (up to 3 km).

The additive metric score (the sum of VAR01 through VAR08) for a cell was multiplied by an adjustment factor that reduced if a fence intersected the cell and the cell was located within 3 km of a greater sage-grouse lek (i.e., it was scored by the Stevens et al. 2013 model). The adjustment factor for each probability of collision is provided in Table A.2. Allotment boundaries were used as a surrogate for fence lines. Following the convention established by Stevens et al. 2013, the arbitrary threshold of 1 grouse collision per lekking season was used as the breaking point between our score adjustment categories. The other category break was established based on a natural break in the data distribution.

Table A.1. Cell Score Adjustment for the Presence of Fences Posing a High Collision Risk

$\hat{y}$ (predicted total number of greater sage-grouse collisions per lekking season)	Score Adjustment Factor
0.00–<0.40	0.75
≥0.40–<1.00	0.50
≥1.00	0

Here are three examples of the application of the fence score adjustment factor. In the first, there is a cell with an additive score of 10 (the sum of VAR01–VAR08) that is located within 3 km of a lek and has a fence running through it. The Stevens et al. 2013 model predicts 0.2 collision per lekking season for a fence in that cell, so the additive score of 10 is multiplied by 0.75 for a final metric score of 7.5 for that cell. In the second example, there is another cell with an additive score of 10 that is located within 3 km of a lek and has a fence running through it. The Stevens et al. 2013 model predicts 1.4 collisions per year a fence in this cell, so the additive score of 10 is multiplied by 0 to produce a final metric score of 0 (no habitat services). In the third example, there is a cell with an additive score of 10 that has a fence running through it, but the cell is located 4 km from a lek. The Stevens et al. 2013 model does not produce an estimated number of collisions for this cell because it is located more than 3 km from a lek so the fence is considered to have a relatively low collision risk during the lekking season and the cell retains its full value (no adjustment).

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APPENDIX B

Quantification of Baseline Habitat Service Level for the TransWest Express Transmission Project

B. Quantification of Baseline Habitat Service Level

The pre-construction baseline of the habitat services will be based on existing datasets to the extent possible. The baseline service level is determined by applying the habitat service metrics described in Appendix A to the Assessment Area that is identified for the TransWest Express Transmission Project (Project). The Assessment Area included the footprint of the Project and a 10-kilometer (km) buffer around the footprint. No modeled effects to greater sage-grouse (*Centrocercus urophasianus*) extend beyond 10 km. The buffered footprint is clipped to the Bureau of Land Management's (BLM's) BLM's Priority Habitat Management Areas (PHMA) and General Habitat Management Areas (GHMA) prior to habitat service scoring. The PHMA and GHMA layers encompass the BLM's greater sage-grouse occupied habitat layer, so the Assessment Area will include only those areas that are recognized as known sage-grouse habitats.

ESRI ArcGIS 10.2 software and tools were used to conduct analyses. To facilitate calculations across the entire Assessment Area, all data were converted to a raster format that contained 30- by 30-m cells (900 m^2). This was done because raster processing is significantly faster for an analysis of this size as opposed to leaving the data raw (shapefiles).

B.1 PREPARATION OF GIS MODEL INPUT LAYERS

Habitats within and surrounding the corridor for the preferred alternative will be summarized in a series of representative raster layers for the eight additive metric variables and the fence adjustment factor (see Appendix A). These eight variables consist of data representations within the Project area for human disturbance, landscape characteristics, proximity to greater sage-grouse lek locations, and vegetation characteristics that may influence the use of habitat by greater sage-grouse. A spatial resolution of 900 m^2 is sufficient to capture a landscape level perspective of habitat across the Assessment Area. The data that may be used in the habitat equivalency analysis (HEA) are summarized in Table B.1, although new datasets may be considered. All data will be georeferenced to the same projected coordinate system, NAD 1983 UTM Zone 12N.

Table B.2. Suitable GIS Data Sources

Variable	File Name	Description	File Type	Source
Fence Adjustment	BLM_Grazing_Allotments	Grazing Allotments	Shapefile	BLM
excluded lands, VAR07, VAR08	gaplndcov_co	30m National Gap Analysis Program land cover data - version 2	Raster	USGS
excluded lands, VAR07, VAR08	gaplndcov_ut	30m National Gap Analysis Program land cover data - version 2	Raster	USGS
excluded lands, VAR07, VAR08	gaplndcov_wy	30m National Gap Analysis Program land cover data - version 2	Raster	USGS
VAR01	ROADWAY.Major_Roads	Colorado Major Roads	SDE Feature Class	CDOT
VAR02	PermitData	Permitted Mines - Colorado	Shapefile	COGCC
VAR02	Wells_WY_20140107	Oil & Gas Wells - Wyoming	Shapefile	WOGCC
VAR02	DNROilGasWells	Oil & Gas Wells - Utah	Shapefile	CDNR
VAR02	Wells	Oil & Gas Wells - Colorado	Shapefile	COGCC
VAR02	Minerals	Mines and Minerals - Utah	Geodatabase	UDNR
VAR02	facilities	Open pit mines - Colorado	Shapefile	CDNR
VAR02	mineplant_fUS08	Mines - Colorado	Shapefile	USGS
VAR02	mineplant_fUS49	Mines – Utah	Shapefile	USGS
VAR02	mineplant_fUS56	Mines - Wyoming	Shapefile	USGS
VAR02	tl_2013_08081_roads	All roads where MTFCC = S1100, S1200, S1400, S1630, S1640, S1740. County, St	Shapefile	US Census
VAR02	tl_2013_08103_roads	All roads where MTFCC = S1100, S1200, S1400, S1630, S1640, S1740. County, St	Shapefile	US Census
VAR02	tl_2013_49007_roads	All roads where MTFCC = S1100, S1200, S1400, S1630, S1640, S1740. County, St	Shapefile	US Census
VAR02	tl_2013_49013_roads	All roads where MTFCC = S1100, S1200, S1400, S1630, S1640, S1740. County, St	Shapefile	US Census
VAR02	tl_2013_49023_roads	All roads where MTFCC = S1100, S1200, S1400, S1630, S1640, S1740. County, St	Shapefile	US Census
VAR02	tl_2013_49039_roads	All roads where MTFCC = S1100, S1200, S1400, S1630, S1640, S1740. County, St	Shapefile	US Census
VAR02	tl_2013_49047_roads	All roads where MTFCC = S1100, S1200, S1400, S1630, S1640, S1740. County, St	Shapefile	US Census
VAR02	tl_2013_49049_roads	All roads where MTFCC = S1100, S1200, S1400, S1630, S1640, S1740. County, St	Shapefile	US Census
VAR02	tl_2013_49051_roads	All roads where MTFCC = S1100, S1200, S1400, S1630, S1640, S1740. County, St	Shapefile	US Census
VAR02	tl_2013_56007_roads	All roads where MTFCC = S1100, S1200, S1400, S1630, S1640,	Shapefile	US

Variable	File Name	Description	File Type	Source
		S1740. County, St		Census
VAR02	tl_2013_56037_roads	All roads where MTFCC = S1100, S1200, S1400, S1630, S1640, S1740. County, St	Shapefile	US Census
Fences, VAR03, VAR05, VAR06, VAR07, VAR08	ned30_utm83	30 m resolution digital elevation data	Raster	USGS
Fence Adjustment, VAR04	CPW_GrSGLekCnt2013	Colorado Leks	Shapefile	CPW
VAR01	WYDOT_LRS	Wyoming Highways	Shapefile	WYDOT
VAR01	AADT	Utah Highways	Shapefile	UDOT
VAR05, VAR06, VAR07, VAR08	US_VDIST2008	Vegetation Distribution	Raster	USGS
VAR05, VAR06, VAR07, VAR08	US_110VDEP	Vegetation Development	Raster	USGS
VAR05, VAR06, VAR07, VAR08	US_110EVT	Exisisting Vegetation Type	Raster	USGS
VAR05, VAR06, VAR07, VAR08	US_110CBD	Canopy Bulk Density	Raster	USGS
VAR05, VAR06, VAR07, VAR08	US_110VCC	Canopy Cover	Raster	USGS
VAR05, VAR06, VAR07, VAR08	US_110FLM	Fuel Loading Model	Raster	USGS
VAR05, VAR06, VAR07, VAR08	US_110EVH	Exisisting Vegetation Height	Raster	USGS
VAR05, VAR06, VAR07, VAR08	US_110CBH	Canopy Bulk Height	Raster	USGS
VAR05, VAR06, VAR07, VAR08	US_FDIST2008	Vegetation Disturbance	Raster	USGS
VAR05, VAR06, VAR07, VAR08	US_110SCLASS	Succession Class	Raster	USGS
VAR05, VAR06, VAR07, VAR08	US_110MFRI	Mean Fire Return Interval	Raster	USGS
VAR05, VAR06, VAR07, VAR08	US_110BPS	Biophyisical Setting	Raster	USGS
VAR05, VAR06, VAR07, VAR08	US_110EVC	Existing Vegetation Cover	Raster	USGS
Fence Adjustment, VAR04	1383occleks	Wyoming Leks	Shapefile	WGFD
Fence Adjustment, VAR04	1383undetleks	Wyoming Leks	Shapefile	WGFD
Fence Adjustment, VAR04	Sage_Grouse_Leks_Occupied_Utah	Utah Leks	Shapefile	UNHP
Fence Adjustment, VAR04	Sage_Grouse_Leks_Price_Utah	Utah Leks	Shapefile	UNHP
Fence Adjustment, VAR04	Sage_Grouse_Leks_Utah_BLM_Vernal	Utah Leks	Shapefile	UNHP

B.2 LANDS ASSIGNED NO HABITAT VALUE

As described in Appendix A, land cover types and terrain features that do not provide suitable habitat for greater sage-grouse will be removed from the HEA model. All vegetation types and landforms that potentially provide habitat for greater sage-grouse will remain in the model (listed in Appendix G). Vegetation cover for the analysis will be identified using the National Gap Analysis Program (GAP) Vegetation Classifications.

B.2.1 VAR 01 and VAR 02: Distance to Roads

Road layers used in developing the baseline HEA model are available from the state departments of transportation and from TIGER data from the U.S. Census Bureau. Road layers will be compared between states to ensure consistency in classification prior to using them in the HEA model development. HEA model scores will be applied to 30- by 30-m raster cells according to the process described in Table A.1.

In Variable 01, all cells that are more than 1,000 m from road centerlines with >6,000 annual average daily traffic (AADT) were given a score of 3; those between 650 and 1,000 m were given a score of 2; those between 100 and 650 m were given a score of 1; and those cells within 100 m were assigned a value of 0 habitat services in the model per the description provided in Appendix A (Metric of Greater Sage-grouse Habitat Services).

For Variable 02, all cells that are more than 200 m from road centerlines with <6,000 AADT were given a score of 3; those between 50 and 200 m were given a score of 2; those between 25 and 50 m were given a score of 1; and those cells within 25 m were assigned a value of 0 habitat services in the model per the description provided in Appendix A (Metric of Greater Sage-grouse Habitat Services).

B.2.2 VAR03: Percent Slope

The slope will be calculated using 30- by 30-m digital elevation models obtained using 30-m National Elevation Dataset.

B.2.3 VAR04: Distance to Lek (10-year Average Count >0 Males)

Preliminary lek data were obtained from the wildlife management agencies in each state, but updated data will be requested when the final engineered Project design becomes available. The state lek data indicated the location and status of each lek; leks that are classified as active, occupied, unknown, or undetermined will be included in the HEA model. Those that are labeled as unoccupied or inactive were not included. Cells surrounding leks will be scored according to the methods described in Appendix A with cells closest to leks receiving the highest scores.

B.2.4 VAR05: Sagebrush Abundance Index

A sagebrush abundance index will be calculated from available vegetation layers using Landfire data from the USGS by calculating the proportion of sagebrush in a 1 km^2 area surrounding each 30- by 30-m cell in the Assessment Area. Scores will be applied using the methods described in Appendix A. Areas with a high proportion of sagebrush in the landscape will score higher than areas with little or no sagebrush.

B.2.5 VAR06 and VAR 07: Sagebrush Cover, Sagebrush Canopy Height

When possible, percent cover and height will be determined directly from the vegetation attribute data included in the GAP and Landfire vegetation datasets. Where data are not available, attributes for percent cover and height will be determined using other data sources. Sampling data from GAP/Landfire datasets as well as datasets obtained from BLM and the state agencies will be used to attribute vegetation percent cover and height for segments of the landscape with the most similar characteristics. Once vegetation values are applied to the 30-m grid, HEA scores will be applied using the methods described in Appendix A.

B.2.6 VAR08: Distance to Vegetation Dominated by Sagebrush or Shrub

The distance from each cell to the nearest sagebrush- or shrub-dominated cell will be calculated. Cells within or closest to sagebrush or shrub landscapes will score higher than those that are distant from shrub-dominated cells.

B.3 SCORE ADJUSTMENT FACTOR: FENCES THAT POSE A HIGH RISK FOR COLLISION

A raster file will be produced by running the Stevens et al. (2013) model as described in Appendix A, Section A.1.8, to estimate the greater sage-grouse collision risk during the lekking season within 3 km of leks. The Stevens et al. (2013) model does not consider actual fence locations, so a separate fence location dataset will be intersected with the results of the model to identify actual locations of high collision risk.

Fence locations will be used if the data are available for the entire assessment area. In the event that fence data not available, grazing allotment boundaries will be used as surrogates for fence layers in the HEA baseline model development.

After the model results and fence layer are intersected, cells in the resulting raster file will be assigned to different score adjustment factors as described in Appendix A. Every cell with a fence running through it that is located within 3 km of a lek had an estimated number of collisions per lekking seasons. If the estimate was between 0 and 0.39, the adjustment factor is 0.75. If the estimate was between 0.40 and 0.99, the adjustment factor is 0.50. If the estimate was 1.0 or above, the adjustment factor is 0 (i.e., cells containing the highest risk fences have no habitat value).

B.4 SCORE ADJUSTMENT FACTOR: INDIRECT EFFECTS OF EXISTING TRANSMISSION LINES

After the metric habitat service scores are adjusted for proximity to high-risk fences, the scores are adjusted by one or more adjustment factors for the indirect effects of existing transmission lines following the approach described in Appendix C. Using this approach existing transmission lines up to 20 km from the Project may decrease habitat services in the Assessment Area due to modeled behavioral avoidance and decreased population growth effects. The indirect effects of existing transmission lines and new transmission lines are assumed to be the same in the post-construction phases. The approach models avoidance as a habitat service loss that decreases linearly from 75% loss (adjustment factor of 1 - 0.75 = 0.25) immediately below the line to 0% loss (adjustment factor of 1 – 0 = 1) 600 m from the line. The approach models decreased population growth as a habitat service

loss that decreases linearly from 3% loss (adjustment factor of 1 – 0.03 = 0.97) directly below the line to 0% loss (adjustment factor of 1 – 0 = 1) 10 km from the line. Details on the calculation of adjustment factors where the effects overlap are provided in Appendix C.

B.5 SUMMATION OF BASELINE SERVICES IN THE HEA MODEL

Below is a summation of the steps that will be taken to produce a final HEA Service Raster for analysis in the HEA.

1. Rasters for each of the eight additive variables are added together to create an additive variable raster layer.
2. The additive variable raster layer is multiplied by a value of 0 or 1 to remove all excluded lands. 0 was used to represent an excluded land, which would therefore make the overall HEA value for any cell intersecting it to be zero, while a 1 represents any areas that are not excluded lands which would retain the additive HEA value for any cell crossing it.
3. The raster created in step 2 is multiplied by the Fence Collision Adjustment Factor.
4. The raster created in step 3 is multiplied by the percent habitat services remaining after indirect effects of transmission lines are accounted for. The final numeric value for each cell is the habitat services provided to greater sage-grouse by that cell.

The resulting habitat service values and the number of acres associated with each of the habitat service values are multiplied together and summed across the Assessment Area to calculate the total habitat services (expressed in service acres) (Equation 1). The total habitat services provided by the Assessment Area (those habitats within a 10-km buffer from the Project centerline and within BLM PHMA and GHMA) are calculated and serve the baseline for the Project.

Equation B.2.

$$VJ = \sum_{1}^{i} (V_i * J_{V_i})$$

where:

VJ is the habitat services (service-acres) provided by the Assessment Area;

V is the habitat service score (i.e., the sum of the variable scores in the habitat service metric);

i is the number of possible unique values for *V*; and

J_{V_i} is the number of acres for each value of V_i , where $\sum_{1}^{i} J_{V_i}$ would equal the total acreage of the Assessment Area (*J*).

B.6 LITERATURE CITED

Stevens, B.S., D.E. Naugle, B. Dennis, J.W. Connelly, T. Griffiths, and K.P. Reese. 2013. Mapping sage-grouse fence-collision risk: Spatially-explicit models to target conservation implementation. *Wildlife Society Bulletin* 37(2):409–415.

APPENDIX C

Disturbance Assumptions for Indirect Effects of Transmission Lines

C. Indirect Effects Modeling Approach

Six members of the Technical Advisory Group (TAG) for the TransWest Express Transmission Projects (TWE Project) and Energy Gateway South Transmission Line Project (GWS Project) were selected to form a sub-group to develop a science-based approach to quantify indirect effects to greater sage-grouse *(Centrocercus urophasianus*, sage-grouse) for the TWE and GWS Projects.

The U.S. Fish and Wildlife Service (USFWS) and Bureau of Land Management (BLM) had previously developed an Indirect Effects Whitepaper (*Assessing Indirect Effects of Transmission Lines on Greater Sage-Grouse*; hereafter, Whitepaper), which they provided to TransWest Express LLC and PacifiCorp in June 2015. The approach described in the Whitepaper was updated by the sub-group to incorporate new science and site-specific data, as well as to make the analytical approach compatible with the Habitat Equivalency Analysis (HEA) approach. Two authors of the Whitepaper, Heather McPherron and Jason Sutter, participated in the sub-group.

The sub-group reviewed the indirect effects literature for sage-grouse, reaching out to the authors of relevant literature for clarification as needed. For each effect identified, the sub-group identified the mechanism, seasonal timing, extent, magnitude, and affected population (e.g., males/females, adults/chicks, nests/broods) to develop an analytical approach. The sub-group relied on the scientific literature for this information to the greatest extent possible, and then applied professional judgment where appropriate.

The TAG reviewed drafts of the approach developed by the sub-group and met with the sub-group to discuss the details of its application. After the comments from the TAG were addressed, the TAG reviewed the application of the approach to the HEAs for both Projects. This document is consistent with the collective professional opinion of the TAG.

C.1 INDIRECT EFFECTS OF TRANSMISSION LINES

The Whitepaper identifies and describes three indirect effects: 1) avoidance (reduced use); 2) increased avian predator presence and predation; and 3) decreased productivity and survival. The sub-group elected to combine the latter two effects because the mechanisms of impact were the same (i.e., increased predator presence and predation affecting vital rates including productivity and survival). The two indirect effects evaluated by the sub-group were avoidance and increased avian predator presence and predation, which are the same effects identified in the Whitepaper. Consistent with the flexibilities identified in the Whitepaper, the sub-group updated the recommended methodology for quantifying the magnitude of indirect effects of transmission lines based on the best available scientific information combined with site-specific datasets and expert opinion. The following sections describe the subgroup's review of the literature and the mechanisms for indirect impacts from transmission lines.

C.1.1 Avoidance

There is evidence for decreased use of habitat (avoidance) by sage-grouse near power lines and transmission lines (e.g., Braun 1998)[6], however the specific mechanism, magnitude, and extent of

[6] In this document, 115 kilovolts was used as the threshold to differentiate between transmission lines and distribution (power) lines.

avoidance is unknown. A spatial analysis of sage-grouse telemetry data from west-central Idaho detected significantly fewer occurrences of sage-grouse within 600-m of power lines than was predicted by the null model (Gillan et al. 2013); however the change in the magnitude of use was not evaluated (J. Gillan, New Mexico State University, personal communication with A. Widmer, SWCA, 7/7/2015). Models of sage-grouse scat (i.e., pellets) locations in the Wyoming Basin Ecoregional Assessment areas that considered biotic, abiotic, and anthropogenic effects identified distance to power line (POWER500 variable = e[Euclidean distance to feature in km/-500]) to be a significant predictor of sage-grouse habitat use (Hanser et al. 2011). The results of the study indicate an avoidance effect that decreases with distance from the line. However, the size, number, location, and configuration of power lines evaluated were not described by Hanser et al. (2011), creating uncertainty in how to incorporate other aspects of the results to the model of a new transmission line.

Expert opinion-based models of sage-grouse movement developed in Washington state predicted that power lines would significantly reduce sage-grouse movement to distances greater than 500-m; spatial patterns in gene flow and lek activity were consistent with model predictions (WHCWG 2012; Shirk et al. 2015). These results provide evidence of power line impacts suggesting that avoidance behavior has the potential to result in a population-level effect.

C.1.2 Increased Avian Predator Presence and Predation

Where perching opportunities on structures or other substrates (i.e. trees) are sparse or unevenly distributed, a new transmission line may attract avian predators and decrease sage-grouse population growth (Gibson et al. in review, Boarman 1993; Howe et al. 2014; Coates et al. 2014, Gregg et al. 1994; Schroeder and Baydack 2001; Holloran 2005; Lockyer et al. 2013, Knight and Kawashima 1993, Boarman and Heinrich 1999). In sagebrush habitats, which are typically devoid of many types of natural vertical structures (e.g. trees), ravens, and raptors have been shown to select power lines as perching, roosting, and nesting substrates (Kristan and Boarman 2007, Howe et al. 2014). In areas/habitats Where perching or nesting opportunities are readily available (e.g., adjacent to forested habitats, other transmission line structures, or other tall infrastructure, etc.), the impacts of a new transmission line would not be expected to result in a substantial increase in perching opportunities or avian predators.

In sagebrush habitats, which are typically devoid of many types of natural vertical structures (e.g. trees), ravens, and raptors have been shown to select power lines as perching, roosting, and nesting substrates (Kristan and Boarman 2007, Howe et al. 2014). Corvids, particularly ravens, have been documented as the most common avian nest predators (Vander Haegen et al. 2002), accounting for almost 50% of depredations in some locations (Lockyer et al. 2013). Nest depredation is the primary cause of sage-grouse nest failure (Gregg et al. 1994; Holloran 2005; Lockyer et al. 2013), and predation-related sage-grouse chick and fledgling mortality have a significant influence on sage-grouse population growth rate (Guttery et al. 2013; Gibson et al. In Review).

Gibson et al. (In Review) quantified the effects of the Falcon-to-Gondor 345 kV Transmission Line in Nevada on two sage-grouse populations over 10 years of operation. This study provides strong evidence of transmission line effects to sage-grouse demographic parameters (female survival, nest site selection and success, and brood survival), largely in part because of the length of the study, the large number of data points collected (sage-grouse locations and habitat measurements), and the statistical analysis that isolated the effects of the transmission line from the effects of habitat quality and other covariates. The

authors identified several demographic parameters that were affected by the transmission line, and variation in the magnitude of the effect was largely explained by raven abundance (Table 1). The authors also took the analysis a step further to estimate the impact that transmission lines have on females, nests, and chicks at the population level. Using lek attendance as a surrogate for population size, the authors estimated that population growth was reduced by 3% directly below the transmission line and the effect decreased linearly with distance to 0% at 10 km from the Falcon-to-Gondor transmission line. The authors recommended that the 3% linear decay function be used as a method to quantify the impacts of transmission lines on greater sage-grouse.

The review of increased avian presence and predation is consistent with the recommendations made in the Whitepaper. The sub-group found that the information contained in the Gibson et al. (In Review) manuscript is the best available scientific information and can be used to update the recommendations contained in the Whitepaper.

Table 1. Summary of the transmission line effects to sage-grouse demographic parameters evaluated by Gibson et al. (In Review). **All numbers are provisional pending peer review and publication.**

Demographic Parameter Evaluated	Effect of the Falcon-Gondor Transmission Line (FG)	Correlation of Effect With Raven Abundance
Nesting propensity (locations of female grouse during the breeding season)	• First nests: no significant effect • Second nests: nesting propensity decreased 0.038 per km with distance from FG	None noted
Nest site selection (locations of nests)	• Landscape scale: evidence for an effect dissipating at 10.5 km • Local scale: probability of nest site selection increases from approximately 0.5 adjacent to FG to approximately 0.69 at 10.5 km from FG	Raven abundance explained significant annual variation in the effect
Nest survival	• Nests within 9.2 km of FG had reduced probability of hatching • Nest survival increased by 0.011 for each additional km a nest was located from FG	Raven abundance explained significant annual variation in the effect
Brood site selection	• Landscape scale: no effect • Local scale: Some evidence of avoidance, attributed by authors to patterns in nest placement.	Raven abundance explained significant annual variation in the effect
Pre-fledging chick survival (first two weeks)	• Survival increased 0.017 for every 1 km moved from FG. • Effect dissipated with age (>2 weeks)	Raven abundance explained significant annual variation in the

Demographic Parameter Evaluated	Effect of the Falcon-Gondor Transmission Line (FG)	Correlation of Effect With Raven Abundance
		effect
Female survival	• Survival increased 0.003 for every 1 km moved from FG (weak effect)	None noted
Male survival	• No effect	None noted
Lek recruitment and population growth rates	• Leks further from FG had higher population growth rates as measured by lek attendance • Population growth rates increased 0.003 per 1 km moved from the FG to 10 km (i.e., there was a 3% reduction in population growth beneath FG which decreased linearly to 0% at 10 km from FG)[1]	Raven abundance explained significant annual variation in the effect

[1] Larger in magnitude than the effect of the FG alone, population growth rates increased 0.008 per 1 km moved from the lines for all power lines (transmission lines and distribution lines) to 10 km.

C.2 INDIRECT EFFECTS ANALYTICAL APPROACH

The following sections describe the analytical approach developed by the sub-group to quantify indirect effects of transmission lines on greater sage-grouse for the TWE and GWS Projects. The approach is based on the sub-group's review of the best available scientific literature while also considering site-specific datasets and expert knowledge of the habitats and populations that could be impacted by these transmission line projects.

C.2.1 Baseline Habitat Services Map

Transmission line indirect effects for the TWE and GWS Projects would be measured in habitat service losses to be compatible with the HEAs the projects are using for mitigation planning. Advantages of using the HEA process include: 1) the effects assessment can account for variations in habitat quality (i.e., an impact to high quality habitat would result in more mitigation than the same impact to low quality habitat); 2) the habitat service loss is modeled over time; 3) habitat improvement projects suitable for mitigation have already been identified and their benefit quantified in habitat service gains.

Baseline maps of habitat services have been developed for both projects at a 30 m^2 grid cell resolution using a sage-grouse habitat service metric (BLM 2015 at Appendix D at Appendix K, BLM 2016 at Appendix K), where every cell is scored independently. The habitat service score for each cell is a measure of habitat quality adjusted for anthropogenic influences and other disturbances; however, the baseline habitat services modeled to date do not account for the indirect effects of existing transmission lines. The sub-group's approach applies the effects of the existing transmission lines to the baseline maps to create "new" baseline maps to which the modeled project effects would be applied, assuming that existing transmission lines have the same level of effect as the proposed transmission lines.

C.2.2 Habitat Service Reduction Effect Zones

Two indirect effect zones were identified:

- Avoidance (0-600 m)
- Decreased Population Growth (0 m to 10,000 m)

Avoidance is a behavioral response by sage-grouse that that has been documented in proximity transmission lines, although the mechanism for avoidance is unknown. It results in decreased use of habitat in areas within 600 meters of a transmission line. Using professional judgment, the sub-group decided that avoidance effect would increase with the number of transmission lines, where the lines are sited less than 600 m apart.

Decreased population growth is not behavioral and instead is a result of changes in population demographics (e.g., nest success, brood survival, etc.) that lead to the population level impact described in Gibson et al. (In Review). Raven abundance is the primary mechanism identified by the sub-group for decreased population growth.

Both effects occur across all seasons; apply to both sexes and all age groups; and occur for the operating lifetime of the project. The magnitude of the indirect effect is described for each zone below.

Avoidance (0-600 m)

The sub-group concluded that reduced use (avoidance) near transmission line is greatest directly under the line, decreasing out to 600 m based on peer-reviewed literature. The subgroup's approach models the avoidance effect only in cells with relatively high habitat service scores, which represents the high quality habitat where sage-grouse telemetry data from Wyoming, Colorado, and Utah indicate the majority of sage-grouse habitat use occurs. The sub-group determined that this approach was appropriate because the impacts of avoidance would primarily occur where sage-grouse use is consistently observed. Marginal or unsuitable habitats would not have the avoidance impact applied because, although these areas are occasionally used by sage-grouse, use is often associated with movement patterns between patches of high quality, suitable habitat. These movement patterns include use of habitats within and adjacent to transmission line corridors and other energy corridors.

The sub-group's approach models avoidance as a habitat service loss that decreases linearly from 75% loss immediately below the line to 0% loss 600 m from the line[7]. This is expressed [1.25(0.6 - x)*habitat service score], where 'x' is the distance from the transmission line (in km)[8]. The sub-group's approach applies avoidance effects to the range of scores that contain 85% of sage-grouse re-locations in site-specific telemetry datasets provided for each state (Figures 1-3)[9]. Because of the relatively small sample size in Utah (N = 6,300), the data from Colorado and Utah were pooled (N = 35,300) to determine the range of scores that would be included. For consistency purposes, 85% was also used in Wyoming although this resulted in a slightly broader distribution of habitat service scores. Where this avoidance effect zone overlaps the decreased population growth zone described below, the highest level of habitat service loss is applied.

[7] Professional judgment was used by the sub-group to develop the 75% reduction in use immediately below the line with the likelihood of use increasing with increasing distance from the transmission line. Gaussian, negative exponential and linear decay curves were considered by the sub-group. The sub-group recommends using the linear decay function because it falls in between the other two curves and is straightforward to apply in the model.

[8] 1.25 is calculated by dividing 0.75 by 0.6. The equation produces a line that crosses the x axis at 0.6 and has a y intercept of 0.75.

[9] The use of an 85% confidence level is consistent with the literature. Gibson et al. (In Review) considered an effect to be significant if the 80% confidence intervals on the effect estimate did not overlap zero. The use of 85% would be more conservative than the thresholds recommended by Gibson et al (In Review). In Wyoming, avoidance zone impacts would be applied to all habitat service scores between 17 and 24 (Figure 1). In Colorado and Utah, avoidance zone impacts would be applied to all habitat service scores between 20 and 24 (Figures 2 and 3).

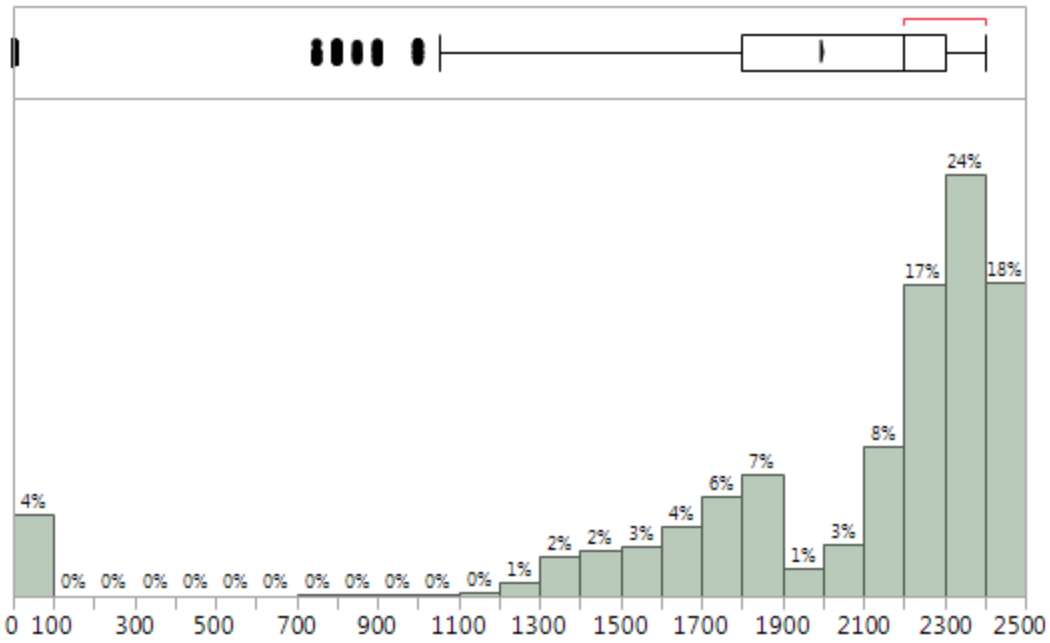

Figure 1. Histogram and outlier box plot of HEA scores extracted to 356,000 sage-grouse locations for Wyoming using data collected in support of the Chokecherry and Sierra Madre Wind Energy Project in Carbon, County, Wyoming. X axis is HEA score* 100, Y axis is percentage of total.

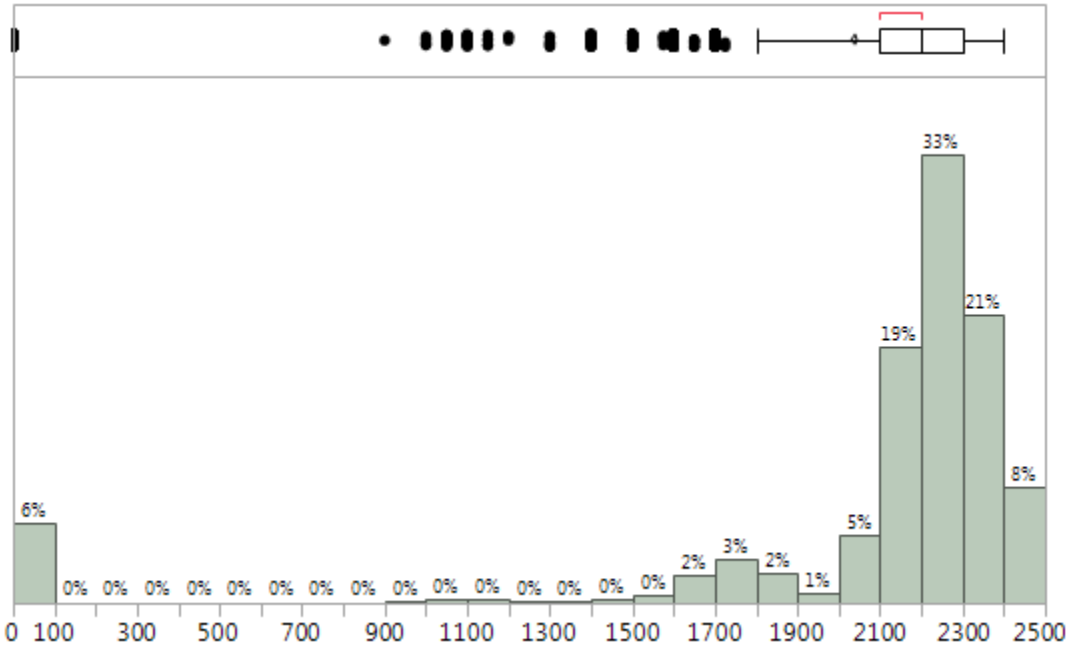

Figure 2. Histogram and outlier box plot of HEA scores extracted to 29,000 sage-grouse locations collected by Colorado Parks and Wildlife. X axis is HEA score* 100, Y axis is percentage of total.

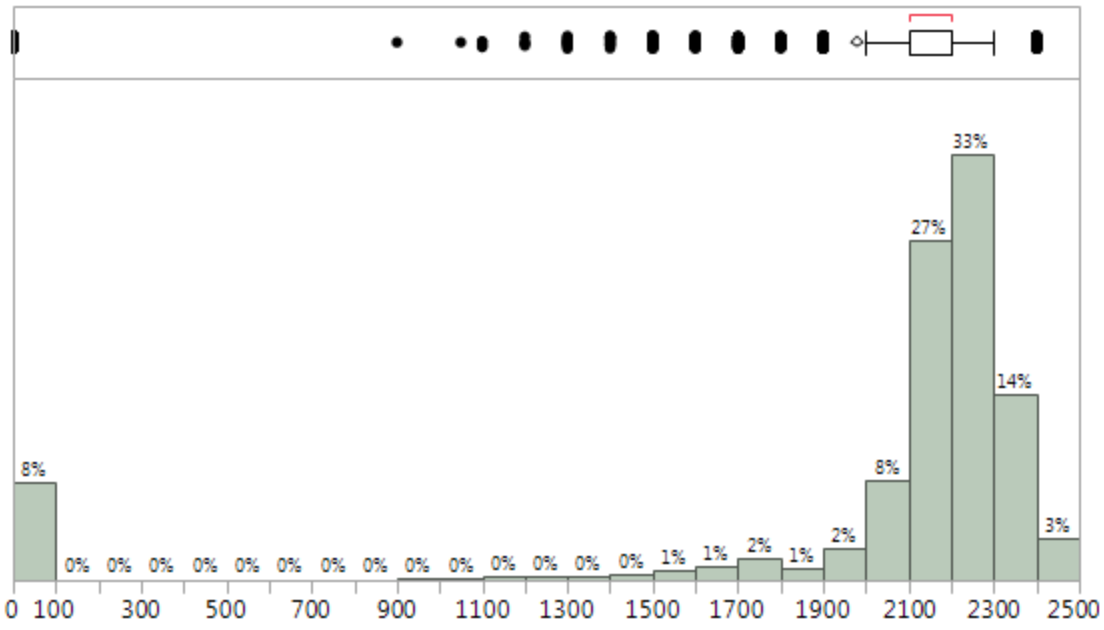

Figure 3. Histogram and outlier box plot of HEA scores extracted to 6,300 sage-grouse locations collected by Brigham Young University. X axis is HEA score* 100, Y axis is percentage of total.

Decreased Population Growth (0 m to 10,000 m)

The sub-group's approach models decreased population growth in all occupied habitat, regardless of habitat service score. For the purposes of the approach, occupied habitat is defined as the BLM's Priority Habitat Management Area (PHMA) and General Habitat Management Area (GHMA) boundaries as defined in BLM's 2015 Approved Resource Management Plan Amendment for greater sage-grouse issued for each state, which closely matches each state's sage-grouse management area boundaries. The sub-group reviewed the boundaries with representatives from each state wildlife management agency and concluded that use of the BLM PHMA and GHMA boundaries adequately captures the known occupied range of sage-grouse in each state.

The sub-group's approach models decreased population growth as a habitat service loss that decreases linearly from 3%[10] directly below the line to 0% loss 10,000 m (10 km) from the line[11]. This is expressed [0.003(10-x)*habitat service score], where 'x' is the distance from the line (in km). The extent of the impact would be 10 km to either side of the transmission line to be consistent with recommendations made by Gibson et al. (In Review) for the Falcon-to-Gondor Transmission Line.

C.3 APPLICATION OF THE INDIRECT EFFECTS ANALYTICAL APPROACH

The following sections describe how the sub-group's Indirect Effects Analytical Approach would be applied for a number of scenarios including new transmission line rights-of-way and co-location with existing lines.

C.3.1 Service Reductions to Account for Single Transmission Lines

Calculation of the indirect effects of a single transmission line would follow the approach illustrated in Figure 4. In this example, the avoidance impacts and population level impacts described above would be applied where the indirect effects of other transmission lines have not already resulted in decreases to baseline habitat conditions, or where only the decreased population growth buffers overlap. The baseline habitat service score is the habitat quality adjusted for anthropogenic influences and other disturbances, excluding transmission lines, as calculated using the metric described in BLM 2015 and BLM 2016. Calculation examples are provided in Attachment A.

[10] This value is provisional until Gibson et al. (In Review) is published, because it has the potential to change during the peer review process.

[11] Another magnitude of effect was considered by the sub-group which corresponded with the decreased population growth measured by Gibson et al. (In Review) around all transmission and distribution lines ("all power lines"). This effect was a combined 8% decreased population growth when considering all transmission and distribution lines on the landscape, including FG. Ultimately, the sub-group decided that application of the all power lines level effect was not appropriate for these projects because distribution line data is not available for the entire project area. Without accurate and complete distribution line data, the baseline condition with existing power lines could not be accurately characterized and the baseline habitat service scores would be inaccurate.

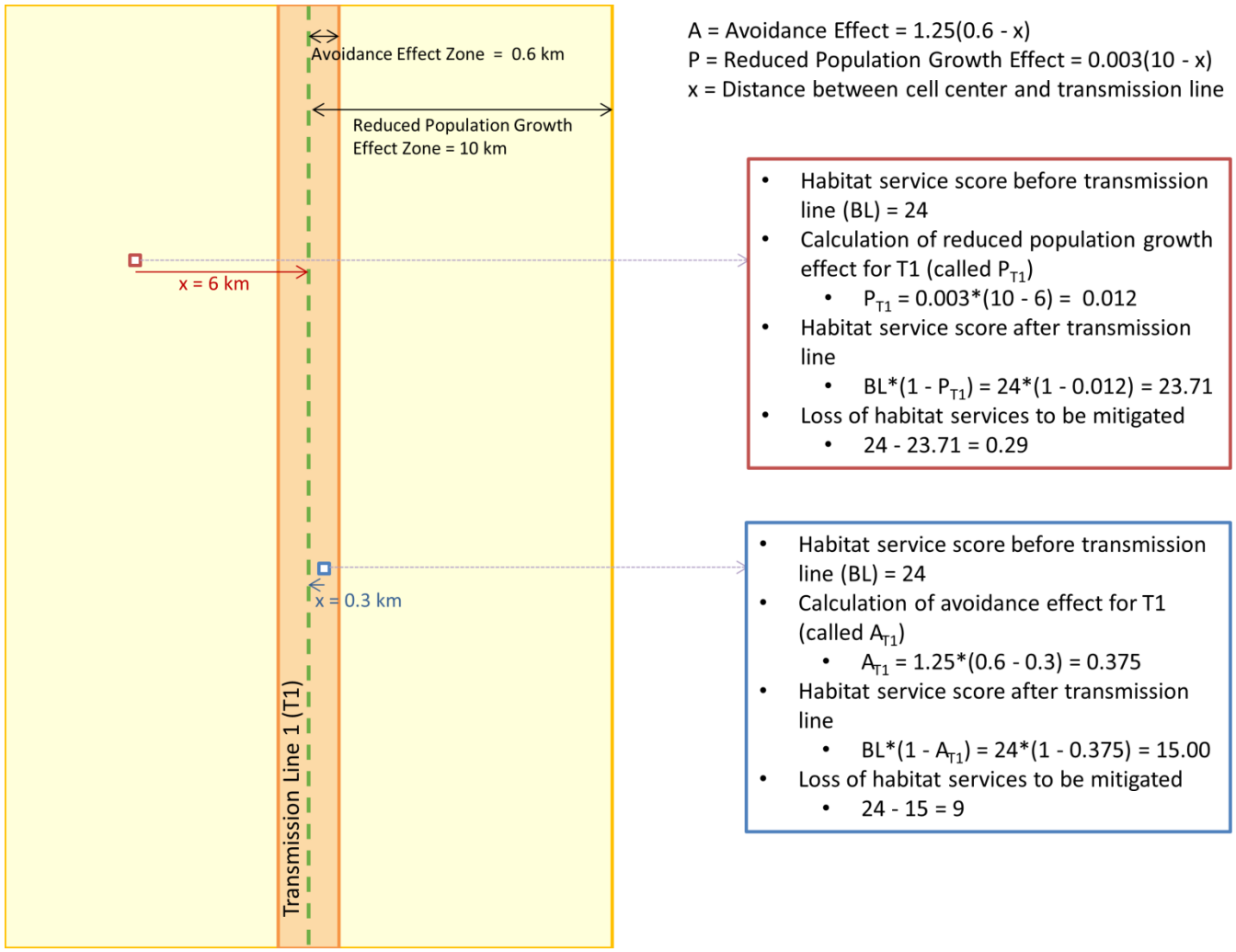

Figure 4. Calculation of the habitat service loss with the construction of a single transmission line in each of the indirect impact zones. Note that impacts in the avoidance zone would only be applied to the state-specific range of habitat service values that account for 85% of tagged bird locations.

C.3.2 Service Reductions Where Transmission Lines are Co-located

Co-location of transmission lines is an important factor considered by the sub-group in developing its approach for quantifying indirect effects. Where transmission lines[12] are located within 10 km of one another, the indirect effect zones would overlap. The sub-group's approach calculates the cumulative impact of the avoidance and decreased population growth zones differently depending on the distance between the transmission lines and which zones are overlapping.

Ravens use transmission structures for perching and nesting (Howe et al. 2014), and the predation pressure by nesting ravens accounts for a large proportion of sage-grouse nest depredation (Lockyer et al. 2013). Nesting ravens are territorial and generally nest more than 1,000 m apart (Burton and Mueller 2006). Where the transmission lines are located less than 1,000 m apart, this territorial behavior is expected to largely exclude new ravens and prevent a substantial increase in local predation pressure. Where the transmission lines are located more than 1,000 m apart, new potential nesting territories could be created and the predation pressure would be expected to increase in the overlap between the two 10-km effect zones. This same approach would be used when the transmission line is proximate to forested habitats. Where the transmission lines are located less than 1,000 m from forested habitats[13], existing territorial behavior is expected to largely exclude new ravens and prevent a substantial increase in local predation pressure. Where the transmission lines are located more than 1,000 m from forested habitats, new potential nesting territories could be created and the predation pressure would be expected to increase in the overlap between the two 10-km effect zones.

Overlapping Zones Where the Transmission Lines are Spaced <1,000 m Apart

This section describes the sub-group's approach for modeling the cumulative impact of transmission lines that are less than 1,000 m apart, where nesting ravens on the first line are expected to territorially exclude new ravens and prevent a substantial increase in local avian predation pressure. While a substantial increase in avian predation pressure is not anticipated, the addition of a new transmission line to an existing transmission line corridor is still expected to increase the impact of the corridor on sage-grouse at some level and increase the habitat services lost.

Avoidance Zone (0 m to 600 m)

Where the avoidance zone of a new transmission line overlaps the avoidance zone or the decreased population growth zone of an existing transmission line, the service level would be proportionally reduced.

Decreased Population Growth Zone (0 m to 10,000 m)

Where the decreased population growth zone of one transmission line overlaps an avoidance zone or a decreased population growth zone of another, the service level would be adjusted to reflect the largest level effect (i.e., the effect of the closest transmission line) and the change in the habitat service level with the addition of the new transmission line would be calculated. Where the habitat service reduction for a new transmission line is less than the habitat service reduction for the existing transmission line (when the

[12] These rules apply to all transmission lines on the landscape, not just TWE and GWS.

[13] Treed habitats found within the sage-grouse landscape, excluding pinion-juniper.

existing transmission line is closer to the habitat being impacted), the effect would be attributable to the existing transmission line so that no additional mitigation would be due for the new transmission line.

The calculation of habitat service scores to account for the indirect effects of two transmission lines spaced <1,000 m apart are described in Attachment B. The baseline habitat service score is the habitat quality adjusted for anthropogenic influences and other disturbances, excluding transmission lines, as calculated using the metric described in BLM 2015 and BLM 2016.

Overlapping Zones Where the Transmission Lines are Spaced >1,000 m Apart

This section describes the sub-group's approach for modeling the cumulative indirect effects of transmission lines that are more than 1,000 m apart, where ravens are expected to nest on both transmission lines and increase the local predation pressure and the associated population level impact.

Avoidance Zone (0 m to 600 m)

The calculation method would be the same as described for transmission lines spaced <1,000 m apart.

Decreased Population Growth Zone (0 m to 10,000 m)

Where the decreased population growth zone overlaps an avoidance zone or a decreased population growth zone, the service level is proportionally reduced.

The calculation of habitat service scores that have been adjusted for the indirect effects of two transmission lines co-located spaced >1,000 m apart are described in Attachment C. The baseline habitat service score is the habitat quality adjusted for anthropogenic influences and other disturbances, excluding transmission lines, as calculated using the metric described in BLM 2015 and BLM 2016.

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ATTACHMENT A: Calculation of Habitat Service Reductions to Account for Single Transmission Lines

This attachment provides the equations and examples for the calculation of habitat service losses due to indirect effects of a single transmission line. Habitat service losses at any one point in time are calculated as the difference between the habitat services present at that milestone (M_1) and those that were present at baseline (M_0). The equations for the habitat services present are provided in Figure A-1. In the case of a single transmission line, the baseline condition includes no existing transmission line effects and is quantified using the HEA metric published in the Project EIS.

Example A-1. Cell is 5 km from the transmission line (T1) and falls within the reduced population growth zone. The baseline habitat service score is 20.

$M_0 = 20$

$M_1 = BL*(1 - P_{T1}) = 20*(1 - 0.003*[10 - 5]) = 19.7$

$M_0 – M_1 = 20 - 19.7 = 0.3$ habitat services lost due to T1

Example A-2. Cell is 0.3 km of the transmission line (T1) and falls within the avoidance zone. The baseline habitat service score is 20. Note that the avoidance zone impacts would only be applied using the state-specific habitat service score thresholds (20-24 in Colorado and Utah and 17-24 in Wyoming).

$M_0 = 20$

$M_1 = BL*(1 - A_{T1}) = 20*(1 – 1.25*[0.6 – 0.3]) = 12.5$

$M_0 – M_1 = 20 – 12.5 = 7.5$ habitat services lost due to T1

These calculations of habitat services lost are completed for every 30x30-meter cell within 10 km of the project footprint for every year of the lifetime of the project to produce the input for the HEA that is used to calculate the mitigation due for indirect effects.

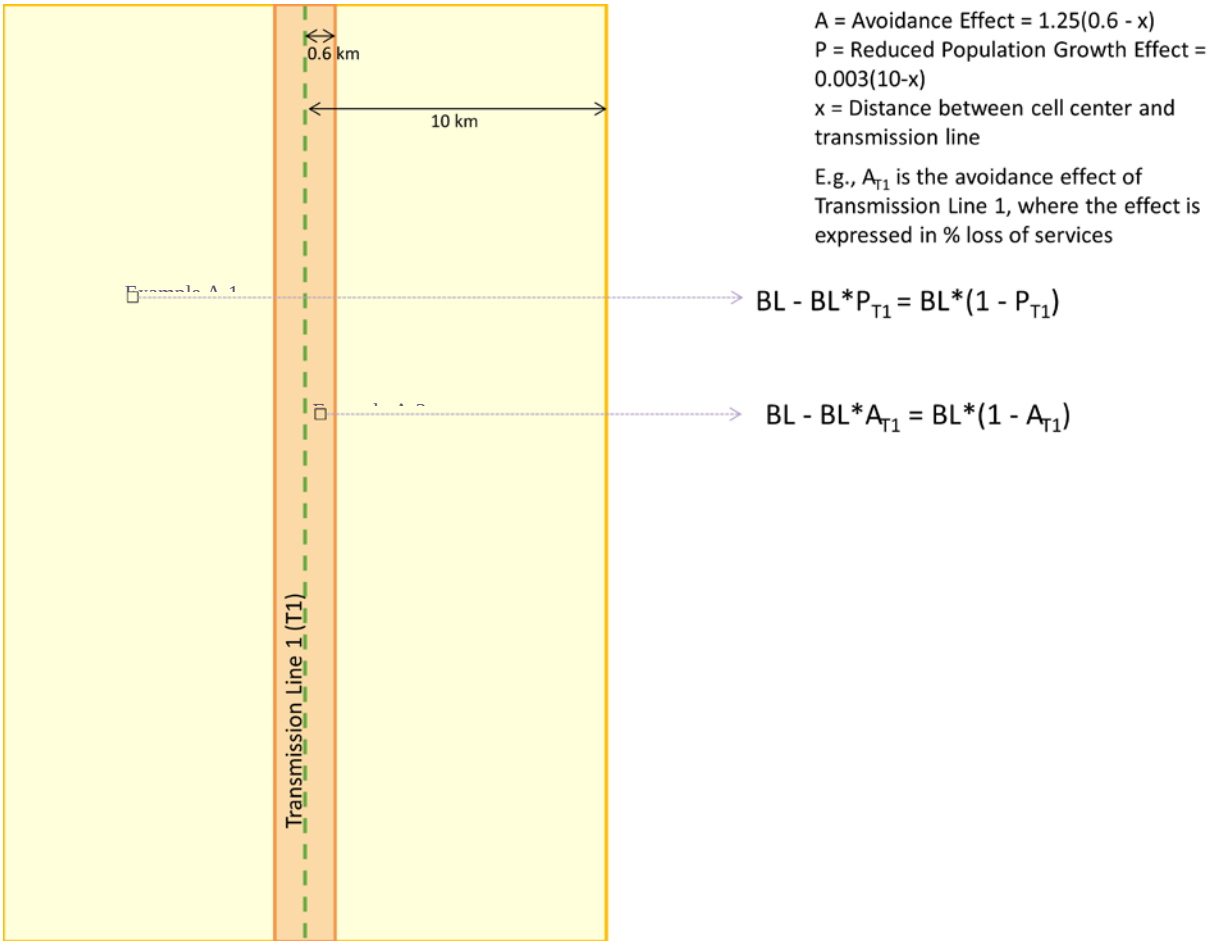


Figure A-1. Calculation of remaining habitat service score by applying the indirect effects of one transmission line to the baseline service score. Note that impacts in the avoidance zone would only be applied to the state-specific range of habitat service values that account for 85% of tagged bird locations. This approach would be used for all existing transmission lines to establish new baseline habitat services and would be applied for new transmission lines where they are not located within 10 km of an existing transmission line.

ATTACHMENT B: Calculation of Habitat Service Reductions Where Transmission Lines are Co-located and Spaced <1,000 m Apart

This attachment provides the equations and examples for the calculation of habitat service losses due to indirect effects of two or more transmission lines located less than 1,000 m apart. Habitat service losses at any one point in time are calculated as the difference between the habitat services present at that milestone (M_1) and those that were present at baseline (M_0). In the case of two transmission lines, as illustrated in Figure B-1, the habitat services at M_0 account for the effects of an existing transmission line (T1) and the effect of that single transmission line is calculated using the equations in Figure A-1. The equations in Figure B-1 are used to calculate the habitat services present after the addition of a second transmission line (T2) at M_1 or more than one transmission line at M_0.

Example B-1. Cell is 9.5 km from the existing transmission line (falls within the reduced population growth zone of T1) and greater than 10 km from the new transmission line (no effect of T2). The unadjusted metric habitat service score is 20.

$M_0 = BL*(1 - P_{T1}) = 20*(1 - 0.003*[10 – 9.5]) = 19.97$

$M_1 = BL*(1 - P_{T1}) = 20*(1 - 0.003*[10 – 9.5]) = 19.97$

$M_0 – M_1 = 0$ habitat services lost with the addition of T2

Example B-2. Cell is 5 km from the existing transmission line (falls within the reduced population growth zone of T1) and 5.8 km from the new transmission line (falls within the reduced population growth zone of T2, but the addition of T2 does not increase the effect). The unadjusted metric habitat service score is 20.

$M_0 = BL*(1 - P_{T1}) = 20*(1 - 0.003*[10 – 5.0]) = 19.7$

$M_1 = BL*(1 - P_{T1}) = 20*(1 - 0.003*[10 – 5.0]) = 19.7$

$M_0 – M_1 = 0$ habitat services lost with the addition of T2

Example B-3. Cell is 0.3 km from the existing transmission line (falls within the avoidance zone of T1) and 1.1 km from the new transmission line (falls within the reduced population growth zone of T2, but the addition of T2 does not increase the effect). The unadjusted metric habitat service score is 20. Note that the avoidance zone impacts would only be applied using the state-specific habitat service score thresholds (20-24 in Colorado and Utah and 17-24 in Wyoming).

$M_0 = BL*(1 - A_{T1}) = 20*(1 – 1.25*[0.6 – 0.3]) = 12.5$

$M_1 = BL*(1 - A_{T1}) = 20*(1 – 1.25*[0.6 – 0.3]) = 12.5$

$M_0 – M_1 = 0$ habitat services lost with the addition of T2

Example B-4. Cell is 0.4 km from the existing transmission line (falls within the avoidance zone of T1) and 0.4 km from the new transmission line (falls within the avoidance zone of T2, and the services are proportionally reduced). The unadjusted metric habitat service score is 20. Note that the avoidance zone impacts would only be applied using the state-specific habitat service score thresholds (20-24 in Colorado and Utah and 17-24 in Wyoming).

$M_0 = BL*(1 - A_{T1}) = 20*(1 – 1.25*[0.6 – 0.4]) = 15$

$M_1 = BL*(1 - A_{T1})*(1-A_{T2}) = 20*(1 – 1.25*[0.6 – 0.4]) *(1 – 1.25*[0.6 – 0.4]) = 11.25$

$M_0 – M_1 = 15 – 11.25 = 3.75$ habitat services lost with the addition of T2

Example B-5. Cell is 0.9 km from the existing transmission line (falls within the reduced population growth zone of T1) and 0.1 km from the new transmission line (falls within the avoidance zone of T2, and the effect is increased). The unadjusted metric habitat service score is 20. Note that the avoidance zone impacts would only be applied using the state-specific habitat service score thresholds (20-24 in Colorado and Utah and 17-24 in Wyoming).

$M_0 = BL*(1 - P_{T1}) = 20*(1 - 0.003*[10 – 0.9]) = 19.454$

$M_1 = BL*(1-A_{T2}) = 20*(1 – 1.25*[0.6 – 0.1]) = 7.5$

$M_0 – M_1 = 19.454 – 7.5 = 11.954$ habitat services lost with the addition of T2

Example B-6. Cell is 5.8 km from the existing transmission line (falls within the reduced population growth zone of T1) and 5 km from the new transmission line (falls within the reduced population growth zone of T2, and the effect is increased). The unadjusted metric habitat service score is 20.

$M_0 = BL*(1 - P_{T1}) = 20*(1 - 0.003*[10 – 5.8]) = 19.748$

$M_1 = BL*(1 - P_{T2}) = 20*(1 - 0.003*[10 – 5.0]) = 19.70$

$M_0 – M_1 = 19.748 – 19.70 = 0.048$ habitat services lost with the addition of T2

Example B-7. Cell is 10.3 km from the existing transmission line (no effect of T1) and 9.5 km from the new transmission line (falls within the reduced population growth zone of T2). The unadjusted metric habitat service score is 20.

$M_0 = 20$

$M_1 = BL*(1 - P_{T2}) = 20*(1 - 0.003*[10 – 9.5]) = 19.97$

$M_0 – M_1 = 20 – 19.97 = 0.03$ habitat services lost with the addition of T2

These calculations of habitat services lost are completed for every 30x30-meter cell within 10 km of the project footprint for every year of the lifetime of the project to produce the input for the HEA that is used to calculate the mitigation due for indirect effects.

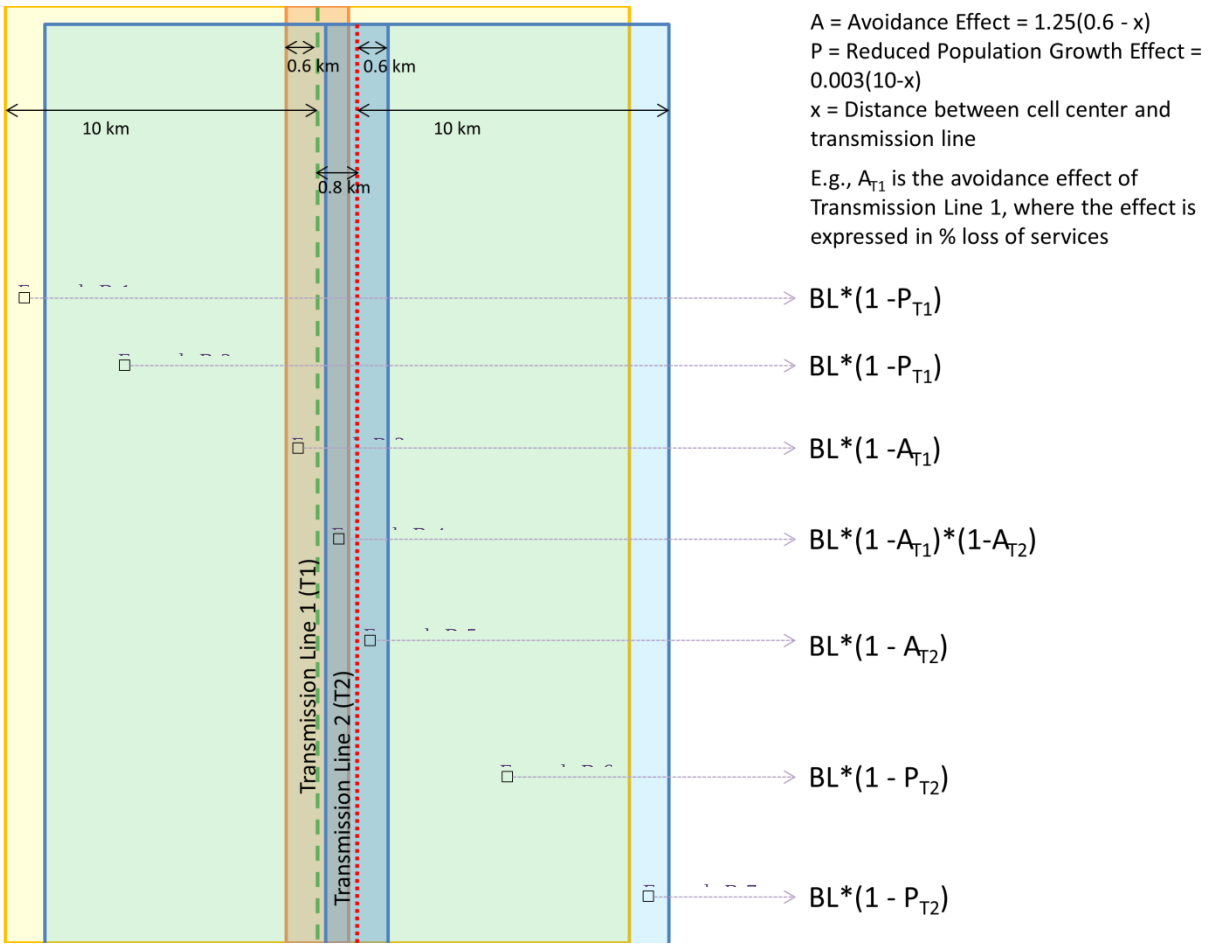


Figure B-1. Calculation of remaining habitat service score by applying the indirect effects of two transmission lines spaced <1,000 m apart to the baseline service score. Note that impacts in the avoidance zone would only be applied to the state-specific range of habitat service values that account for 85% of tagged bird locations. This approach would be used for all existing transmission lines to establish new baseline habitat services and would be applied for new transmission lines when they are located within 1 km of an existing transmission line(s). In this example, T2 represents a new transmission line being co-located with the existing T1 line.

ATTACHMENT C: Calculation of Habitat Service Reductions Where Transmission Lines are Co-located and Spaced >1,000 m Apart

This attachment provides the equations and examples for the calculation of habitat service losses due to indirect effects of two or more transmission lines located greater than 1,000 m apart. Habitat service losses at any one point in time are calculated as the difference between the habitat services present at that milestone (M_1) and those that were present at baseline (M_0). In the case of two transmission lines, as illustrated in Figure C-1, the habitat services at M_0 account for the effects of an existing transmission line (T1) and the effect of that single transmission line is calculated using the equations in Figure A-1. The equations in Figure C-1 are used to calculate the habitat services present after the addition of a second transmission line (T2) at M_1 or more than one transmission line at M_0.

Example C-1. Cell is 9.5 km from the existing transmission line (falls within the reduced population growth zone of T1) and greater than 10 km from the new transmission line (no effect of T2). The unadjusted metric habitat service score is 20.

$M_0 = BL*(1 - P_{T1}) = 20*(1 - 0.003*[10 – 9.5]) = 19.97$

$M_1 = BL*(1 - P_{T1}) = 20*(1 - 0.003*[10 – 9.5]) = 19.97$

$M_0 – M_1 = 0$ habitat services lost with the addition of T2

Example C-2. Cell is 3 km from the existing transmission line (falls within the reduced population growth zone of T1) and 5.5 km from the new transmission line (falls within the reduced population growth zone of T2, and the services are proportionally reduced). The unadjusted metric habitat service score is 20.

$M_0 = BL*(1 - P_{T1}) = 20*(1 - 0.003*[10 – 3.0]) = 19.58$

$M_1 = BL*(1 - P_{T1})*(1 - P_{T2}) = 20*(1 - 0.003*[10 – 3.0])*(1 - 0.003*[10 – 5.5]) = 19.316$

$M_0 – M_1 = 0.264$ habitat services lost with the addition of T2

Example C-3. Cell is 0.3 km from the existing transmission line (falls within the avoidance zone of T1) and 2.8 km from the new transmission line (falls within the reduced population growth zone of T2, and the services are proportionally reduced). The unadjusted metric habitat service score is 20. Note that the avoidance zone impacts would only be applied using the state-specific habitat service score thresholds (20-24 in Colorado and Utah and 17-24 in Wyoming).

$M_0 = BL*(1 - A_{T1}) = 20*(1 – 1.25*[0.6 – 0.3]) = 12.5$

$M_1 = BL*(1 - A_{T1})*(1 - P_{T2}) = 20*(1 – 1.25*[0.6 – 0.3])*(1 - 0.003*[10 – 2.8]) = 12.23$

$M_0 – M_1 = 12.5 - 12.23 = 0.27$ habitat services lost with the addition of T2

Example C-4. Cell is 1.2 km from the existing transmission line (falls within the reduced population growth zone of T1) and 1.3 km from the new transmission line (falls within the reduced population growth zone of T2, and the services are proportionally reduced). The unadjusted metric habitat service score is 20.

$M_0 = BL*(1 - P_{T1}) = 20*(1 - 0.003*[10 – 1.2]) = 19.472$

$M_1 = BL*(1 - P_{T1})*(1 - P_{T2}) = 20*(1 - 0.003*[10 – 1.2])*(1 - 0.003*[10 – 1.3]) = 18.964$

$M_0 – M_1 = 19.472 - 18.964 = 0.508$ habitat services lost with the addition of T2

Example C-5. Cell is 2.4 km from the existing transmission line (falls within the reduced population growth zone of T1) and 0.1 km from the new transmission line (falls within the avoidance zone of T2, and the services are proportionally reduced). The unadjusted metric habitat service score is 20. Note that the avoidance zone impacts would only be applied using the state-specific habitat service score thresholds (20-24 in Colorado and Utah and 17-24 in Wyoming).

$M_0 = BL*(1 - P_{T1}) = 20*(1 - 0.003*[10 – 2.4]) = 19.544$

$M_1 = BL*(1 - P_{T1})*(1 - A_{T2}) = 20*(1 - 0.003*[10 – 2.4])*(1 – 1.25*[0.6 – 0.1]) = 7.329$

$M_0 – M_1 = 19.544 – 7.329 = 12.215$ habitat services lost with the addition of T2

Example C-6. Cell is 4.5 km from the existing transmission line (falls within the reduced population growth zone of T1) and 2 km from the new transmission line (falls within the reduced population growth zone of T2, and the services are proportionally reduced). The unadjusted metric habitat service score is 20.

$M_0 = BL*(1 - P_{T1}) = 20*(1 - 0.003*[10 – 4.5]) = 19.67$

$M_1 = BL*(1 - P_{T1})*(1 - P_{T2}) = 20*(1 - 0.003*[10 – 4.5])*(1 - 0.003*[10 – 2.0]) = 19.198$

$M_0 – M_1 = 19.67 – 19.198 = 0.472$ habitat services lost with the addition of T2

Example C-7. Cell is 12 km from the existing transmission line (no effect of T1) and 9.5 km from the new transmission line (falls within the reduced population growth zone of T2). The unadjusted metric habitat service score is 20.

$M_0 = 20$

$M_1 = BL*(1 - P_{T2}) = 20*(1 - 0.003*[10 – 9.5]) = 19.97$

$M_0 – M_1 = 20 – 19.97 = 0.03$ habitat services lost with the addition of T2

These calculations of habitat services lost are completed for every 30x30-meter cell within 10 km of the project footprint for every year of the lifetime of the project to produce the input for the HEA that is used to calculate the mitigation due for indirect impacts.

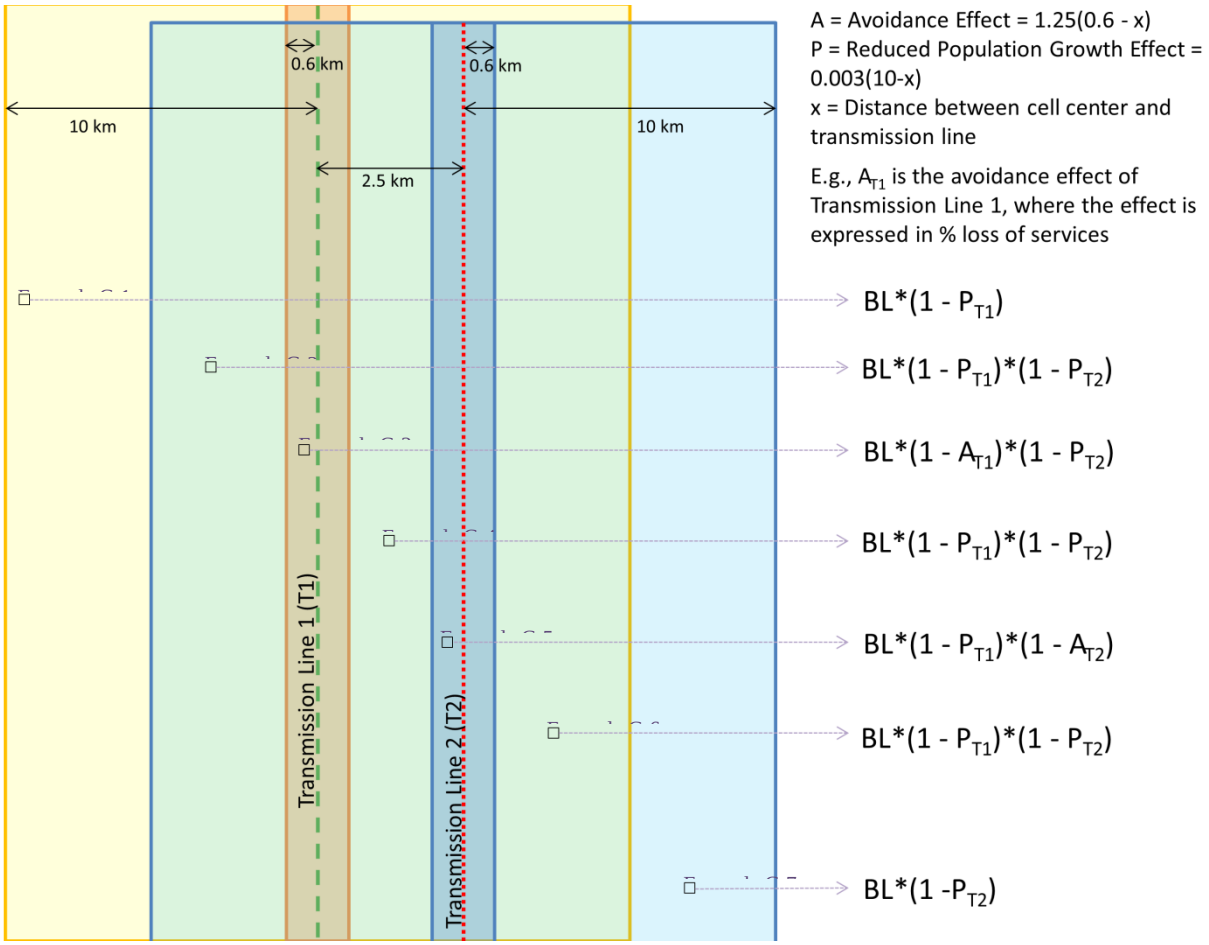


Figure C-1. Calculation of remaining habitat service score by applying the indirect effects of two transmission lines spaced >1,000 m apart to the baseline service score. Note that impacts in the avoidance zone would only be applied to the state-specific range of habitat service values that account for 85% of tagged bird locations. This approach would be used for all existing transmission lines to establish new baseline habitat services and would be applied for new transmission lines when they are located more than 1 km from an existing transmission line(s) and less than 10 km from an existing transmission line(s). In this example, T2 represents a new transmission line being co-located more than 1 km from the existing T1 line.

APPENDIX D

Disturbance Assumptions for Direct Effects of the TransWest Express Transmission Project

D. Habitat Equivalency Analysis Model Assumptions for Direct Impacts

TransWest Express LLC (TransWest) convened a Technical Advisory Group (TAG) to review the approach to mitigation of impacts to greater sage-grouse from the TransWest Express Transmission Project (TWE Project), including the methods for addressing direct impacts to greater sage-grouse and its habitat.

The following is a list of assumptions to quantify direct effects in future habitat equivalency analyses (HEA) for the TWE Project. For the purposes of these analyses, direct effects were defined as those areas where habitat would be physically altered, e.g. vegetation removal or soil disturbance. These assumptions represent typical disturbances as determined by TransWest in consultation with its owner engineer, POWER Engineers, and are consistent with the assumptions used in the TWE Project Final Environmental Impact Statement prepared by the Bureau of Land Management (BLM) and the Western Area Power Administration (WAPA). For the final HEA analyses, calculation of direct disturbances will be based upon final engineering design prepared for the Notice to Proceed.

The following table describes the direct effects from the TWE Project and the modeling approach that will be used for each infrastructure type and construction practice proposed for the project (Table D-1).

Vegetation disturbance types described in the table are defined as follows:

- **Cleared**. Cleared of all vegetation, no intact root structure.
- **Mowed**. Mowed or bladed, root structure intact.
- **Drive and Crush**. Vegetation and soil left intact, root structure and seed bank remain in place.

Temporary disturbance refers to short-term disturbances incurred during construction of the Project. Permanent disturbance refers to long-term disturbance incurred for the duration of the ROW Grant term and, in some cases, longer until full vegetation recovery has been achieved.

Table D-1. Direct Disturbance Assumptions for Typical Disturbance Types Associated with the TransWest Express Transmission Line Project.

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
Access Roads General[15]						
Existing, No Improvements	No New Disturbance	Paved/ Cleared/ Two-track	Permanent	Same as Baseline – Zero additional effect	Same as Baseline – Zero additional effect	Same as Baseline – Zero additional effect
Existing, Improved	No New Disturbance	Cleared w/ improvements in existing disturbance	Permanent	Same as Baseline – Zero additional effect	Same as Baseline – Zero additional effect	Same as Baseline – Zero additional effect
Existing, Improved	New Cleared Areas	Cleared w/ improvements outside existing disturbance	Permanent	Total loss of vegetation in new disturbed footprint (0 services)	Total loss of vegetation in new disturbed footprint (0 services)	All reclaimed areas return to baseline conditions following vegetation recovery timelines
Existing, Improved, all terrain types	16-24 feet wide	Two-track improved to Cleared	Temporary and permanent	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines

[14] Reclaimed areas will return to baseline conditions using the following the vegetation recovery assumptions, unless otherwise stated: Agricultural lands return to baseline habitat values in 1 year; grass dominated and wetland vegetation types return to baseline habitat values in 5 years; non-sagebrush shrub vegetation types return to baseline habitat values in 20 years; sagebrush vegetation types return to baseline habitat values in 100 years.

[15] Access roads general are those roads used to access the transmission line right-of-way

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
New, all terrain types	16 feet	Drive and Crush	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-big sagebrush shrubs return to baseline habitat values 5 years post-construction. Big sagebrush returns to baseline habitat values 15 years post construction
Access Roads Where Not Co-located with Existing Transmission Line(s)[16]						
New, flat terrain, 0-8% slope	16 feet wide, 1.2 miles of road per one mile of transmission lines	Cleared	Permanent	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines

[16] Access Roads Where Not Co-located with Existing Transmission Line(s) are roads used to access transmission structures in areas that do not have existing transmission infrastructure.

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
	16 feet wide, 1.2 miles of road per one mile of transmission lines	Cleared	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines
	16 feet wide, 1.2 miles of road per one mile of transmission lines	Mowed	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-sagebrush shrub vegetation and sagebrush vegetation types return to baseline habitat values on accelerated timeframe[17]
New, rolling terrain, 8-15% slope	18 feet wide, 1.3 miles of road per one mile of transmission lines	Cleared	Permanent	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines

[17] Non-sagebrush shrub vegetation types return to baseline habitat values in 10 years; sagebrush vegetation types return to baseline habitat values in 50 years

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
	18 feet wide, 1.3 miles of road per one mile of transmission lines	Cleared	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines
	18 feet wide, 1.3 miles of road per one mile of transmission lines	Mowed	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-sagebrush shrub vegetation and sagebrush vegetation types return to baseline habitat values on accelerated timeframe[18]
New, steep terrain, 15-25% slope	22 feet wide, 1.8 miles of road per one mile of transmission lines	Cleared	Permanent	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines

[18] Non-sagebrush shrub vegetation types return to baseline habitat values in 10 years; sagebrush vegetation types return to baseline habitat values in 50 years

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
	22 feet wide, 1.8 miles of road per one mile of transmission lines	Cleared	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines
	22 feet wide, 1.8 miles of road per one mile of transmission lines	Mowed	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-sagebrush shrub vegetation and sagebrush vegetation types return to baseline habitat values on accelerated timeframe[19]
New, mountainous terrain, greater than 25% slope	24 feet wide, 2.7 miles of road per one mile of transmission lines	Cleared	Permanent	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines

[19] Non-sagebrush shrub vegetation types return to baseline habitat values in 10 years; sagebrush vegetation types return to baseline habitat values in 50 years

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
	24 feet wide, 2.7 miles of road per one mile of transmission lines	Cleared	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines
	24 feet wide, 2.7 miles of road per one mile of transmission lines	Mowed	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-sagebrush shrub vegetation and sagebrush vegetation types return to baseline habitat values on accelerated timeframe[20]

[20] Non-sagebrush shrub vegetation types return to baseline habitat values in 10 years; sagebrush vegetation types return to baseline habitat values in 50 years

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
Access Roads Where Co-located with Existing Transmission Line(s)[21]						
New, flat terrain, 0-8% slope	16 feet wide, 0.8 miles of road per one mile of transmission lines	Cleared	Permanent	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines
	16 feet wide, 0.8 miles of road per one mile of transmission lines	Cleared	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines

[21] Access Roads Where Co-located with Existing Transmission Line(s) are roads where existing transmission line infrastructure is present. These roads are shorter than Access Roads Where Not Co-located with Existing Transmission Line(s) because they take advantage of the existing roads to reduce surface disturbance.

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
	16 feet wide, 0.8 miles of road per one mile of transmission lines	Mowed	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-sagebrush shrub vegetation and sagebrush vegetation types return to baseline habitat values on accelerated timeframe[22]
New, rolling terrain, 8-15% slope	18 feet wide, 1.1 miles of road per one mile of transmission lines	Cleared	Permanent	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines
	18 feet wide, 1.1 miles of road per one mile of transmission lines	Cleared	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines

[22] Non-sagebrush shrub vegetation types return to baseline habitat values in 10 years; sagebrush vegetation types return to baseline habitat values in 50 years

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
	18 feet wide, 1.1 miles of road per one mile of transmission lines	Mowed	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-sagebrush shrub vegetation and sagebrush vegetation types return to baseline habitat values on accelerated timeframe[23]
New, steep terrain, 15-25% slope	22 feet wide, 1.6 miles of road per one mile of transmission lines	Cleared	Permanent	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines
	22 feet wide, 1.6 miles of road per one mile of transmission lines	Cleared	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines

[23] Non-sagebrush shrub vegetation types return to baseline habitat values in 10 years; sagebrush vegetation types return to baseline habitat values in 50 years

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
	22 feet wide, 1.6 miles of road per one mile of transmission lines	Mowed	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-sagebrush shrub vegetation and sagebrush vegetation types return to baseline habitat values on accelerated timeframe[24]
New, mountainous terrain, greater than 25% slope	24 feet wide, 2.4 miles of road per one mile of transmission lines	Cleared	Permanent	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines
	24 feet wide, 2.4 miles of road per one mile of transmission lines	Cleared	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services)	Reclaimed areas return to baseline conditions following vegetation recovery timelines

[24] Non-sagebrush shrub vegetation types return to baseline habitat values in 10 years; sagebrush vegetation types return to baseline habitat values in 50 years

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
	24 feet wide, 2.4 miles of road per one mile of transmission lines	Mowed	Temporary	Total loss of vegetation in 30x30 meter cells intersected by road centerline (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-sagebrush shrub vegetation and sagebrush vegetation types return to baseline habitat values on accelerated timeframe[25]
Transmission Line Structures						
600kV Guyed Lattice Tangent for DC transmission line	0.0014 acres 5 ft X 5 ft center mast 3 ft X 3 ft per guy location (4 locations)	Cleared at mast foundation and anchor locations	Permanent	Total loss of vegetation in footprint of disturbance (0 services)	Total loss of vegetation in footprint of disturbance (0 services)	Total loss of vegetation in footprint of disturbance (0 services)
600 kV Self-supporting Lattice Tangent for DC transmission line	0.021 acres[26] 30 ft X 30 ft	Cleared around foundation	Permanent	Total loss of vegetation in footprint of disturbance (0 services)	Total loss of vegetation in footprint of disturbance (0 services)	Total loss of vegetation in footprint of disturbance (0 services)

[25] Non-sagebrush shrub vegetation types return to baseline habitat values in 10 years; sagebrush vegetation types return to baseline habitat values in 50 years

[26] Irrespective of structure height

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
600 kV Self-supporting Tubular Steel Tangent for DC transmission line	0.00092 acres[26] (40 ft^2) 7 ft diameter drilled pier	Cleared around foundation	Permanent	Total loss of vegetation in footprint of disturbance (0 services)	Total loss of vegetation in footprint of disturbance (0 services)	Total loss of vegetation in footprint of disturbance (0 services)
600 kV Self-supporting lattice angle for DC transmission line	0.028 acres[26] 35 ft X 35 ft	Cleared around foundation	Permanent	Total loss of vegetation in footprint of disturbance (0 services)	Total loss of vegetation in footprint of disturbance (0 services)	Total loss of vegetation in footprint of disturbance (0 services)
600 kV Self-supporting lattice dead end for DC transmission line	0.037 acres[26] 40 ft x 40 ft	Cleared around foundation	Permanent	Total loss of vegetation in footprint of disturbance (0 services)	Total loss of vegetation in footprint of disturbance (0 services)	Total loss of vegetation in footprint of disturbance (0 services)
600 kV Self-supporting Tubular Steel dead end / angle for DC transmission line	0.0023 acres[26] (100 ft^2) Two poles with 8 ft diameter drilled pier	Cleared around foundation	Permanent	Total loss of vegetation in footprint of disturbance (0 services)	Total loss of vegetation in footprint of disturbance (0 services)	Total loss of vegetation in footprint of disturbance (0 services)
Transmission Line Construction Work Areas						

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
Structure Work Areas	1.15 acres 200 ft X 250 ft	Cleared	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in footprint (0 services)	All areas return to baseline conditions following vegetation recovery timelines
		Mowed	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-sagebrush shrub vegetation and sagebrush vegetation types return to baseline habitat values on accelerated timeframe[27]
		Drive and Crush	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-big sagebrush shrubs return to baseline habitat values 5 years post-construction. Big sagebrush returns to baseline habitat values 15 years post construction
Pulling/ Tensioning /Splicing Site	3.44 acres 600 ft X 250 ft Two at each heavy angle location	Cleared	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in footprint (0 services)	All areas return to baseline conditions following vegetation recovery timelines

[27] Non-sagebrush shrub vegetation types return to baseline habitat values in 10 years; sagebrush vegetation types return to baseline habitat values in 50 years

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
		Mowed	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-sagebrush shrub vegetation and sagebrush vegetation types return to baseline habitat values on accelerated timeframe[27]
		Drive and Crush	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-big sagebrush shrubs return to baseline habitat values 5 years post-construction. Big sagebrush returns to baseline habitat values 15 years post construction
Mid-span Pulling/ Tensioning/ Splicing Site	2.87 acres 500 ft X 250 ft	Cleared	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in footprint (0 services)	All areas return to baseline conditions following vegetation recovery timelines
		Mowed	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-sagebrush shrub vegetation and sagebrush vegetation types return to baseline habitat values on accelerated timeframe[28]

[28] Non-sagebrush shrub vegetation types return to baseline habitat values in 10 years; sagebrush vegetation types return to baseline habitat values in 50 years

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
		Drive and Crush	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-big sagebrush shrubs return to baseline habitat values 5 years post-construction. Big sagebrush returns to baseline habitat values 15 years post construction
OPGW Pulling/ Tensioning/ Splicing Site	2.87 acres 500 ft X 250 ft	Cleared	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in footprint (0 services)	All areas return to baseline conditions following vegetation recovery timelines
		Mowed	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-sagebrush shrub vegetation and sagebrush vegetation types return to baseline habitat values on accelerated timeframe[28]
		Drive and crush	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-big sagebrush shrubs return to baseline habitat values 5 years post-construction. Big sagebrush returns to baseline habitat values 15 years post construction

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
Fly Yard	7 acres	Cleared	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in footprint (0 services)	All areas return to baseline conditions following vegetation recovery timelines
Batch Plant	5 acres	Cleared	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in footprint (0 services)	All areas return to baseline conditions following vegetation recovery timelines
Material Storage Yard	20 acres	Cleared	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in footprint (0 services)	All areas return to baseline conditions following vegetation recovery timelines
Fly yard, batch plant, material storage yard co-located with existing disturbance or facility	No New Disturbance	Cleared	Temporary or permanent	Same as Baseline – Zero additional effect	Same as Baseline – Zero additional effect	Same as Baseline – Zero additional effect
Ancillary Facilities						

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
North Terminal	200 acres	Cleared	Permanent	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.
Ground Electrode Site	0.20 acres	Cleared	Permanent	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in footprint (0 services),	Total loss of vegetation in footprint (0 services),
Ground Electrode Line tangent Structure	8 ft^2	Cleared around foundation	Permanent	Total loss of vegetation in footprint of disturbance (0 services),	Total loss of vegetation in footprint of disturbance (0 services),	Total loss of vegetation in footprint of disturbance (0 services),
Ground Electrode Line dead end Structure	16 ft^2	Cleared around foundation	Permanent	Total loss of vegetation in footprint of disturbance (0 services),	Total loss of vegetation in footprint of disturbance (0 services),	Total loss of vegetation in footprint of disturbance (0 services),
OPGW Regeneration Site	0.23 acres 100 ft X 100 ft	Cleared	Permanent	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.
Ancillary Facility Construction Work Areas						

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
North Terminal Material Storage Yard and Concrete Batch Plant	7.5 acres	Cleared	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in footprint (0 services)	All areas return to baseline conditions following vegetation recovery timelines
Ground Electrode Facility Work Area	37 acres	Cleared	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Total loss of vegetation in footprint (0 services)	All areas return to baseline conditions following vegetation recovery timelines
Ground Electrode Line Structure Work Area	0.115 acres 100 ft X 50 ft	Drive and Crush	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-big sagebrush shrubs return to baseline habitat values 5 years post-construction. Big sagebrush returns to baseline habitat values 15 years post construction
Ground Electrode Line Pulling/ Tensioning/ Splicing Site	0.344 acres 200 ft X 75 ft	Drive and Crush	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-big sagebrush shrubs return to baseline habitat values 5 years post-construction. Big sagebrush returns to baseline habitat values 15 years post construction

Project Facility/ Component Description	Direct Disturbance for 600kV DC Transmission Line			Model Milestone and Assumption		
	Typical Disturbance	Disturbance Condition	Temporary or Permanent	Construction	Reclamation	Recovery[14]
Ground Electrode Line Mid-span Pulling/ Tensioning/ Splicing Site	0.172 acres 100 ft X 75 ft	Drive and Crush	Temporary	Total loss of vegetation in footprint (0 services), service reduction like a secondary road in adjacent cells.	Agricultural and, grass/forb-dominated areas return to baseline conditions	Non-big sagebrush shrubs return to baseline habitat values 5 years post-construction. Big sagebrush returns to baseline habitat values 15 years post construction

APPENDIX E

Quantification of Habitat Service Losses Due to Direct and Indirect Effects Over the Lifetime of the TransWest Express Transmission Project

E. Quantification of Habitat Service Losses

Habitat service losses caused by the TransWest Express Transmission Project (Project) will be modeled using geographic information system (GIS) technology for important Project milestones by decreasing the variable scores for the habitat services metric below the baseline level in the footprint of the Project (direct disturbances) and in buffers around the footprint (indirect disturbances). The habitat service scores for each milestone will be summed across the Assessment Area to calculate the estimated interim and permanent habitat service losses associated with the Project.

E.1 DESCRIPTION OF DISTURBANCES BY PROJECT MILESTONE

The habitat services provided by the Assessment Area will be calculated at Project milestones that reflect varying levels of disturbance. The Project milestones modeled with GIS data for the HEA are listed below.

1. **Baseline**—the baseline milestone quantifies habitat services available to greater sage-grouse before Project disturbance.
2. **Construction**—the construction milestone quantifies habitat services available to greater sage-grouse during the construction of the transmission line and ancillary facilities. Magnitude of the loss of habitat services during construction is dependent on proximity to the Project and the amount of new surface disturbance.
3. **Restoration**—the restoration milestone quantifies habitat services available to greater sage-grouse after construction is complete and some services return with the reduction in noise and human presence.
4. **Recovery**—the recovery milestone quantifies habitat services available to greater sage-grouse after a vegetation type has recovered to the greatest extent expected after the Project restoration is complete. Habitat services return to baseline conditions in restored areas with the time to recovery being dependent on the vegetation type and the disturbance condition. Recovery periods for each disturbance condition and vegetation type are described in Appendix B.
5. **ROW Term**—the Right-of-Way (ROW) term milestone quantifies the habitat services available to greater sage-grouse after expiration of the ROW Grant issued by BLM, but while the disturbance to the sagebrush vegetation is still recovering. As described in Section 6.1 of this document, for purposes of the HEA model only, the assumption is made that the transmission structures will be dismantled and removed, thereby ending the Project's indirect effects..

E.2 QUANTIFYING LOSS OF HABITAT SERVICES DUE TO DIRECT DISTURBANCES

E.2.1 Construction Milestone

For the construction milestone, direct disturbances are defined as the loss of habitat services associated with vegetation removal and ground-disturbing activities within the construction footprint (Appendix D). The habitat service scores for all 30- by 30-meter (m) raster cells in the Project footprint where vegetation removal or ground disturbance occur will be changed from the baseline service scores to 0 in the GIS model for this milestone. Recovery from the disturbed state will be applied per the vegetation-specific recovery curves for the Project, as defined in Appendix D and Table E-1.

E.2.2 Restoration and Recovery Milestones

Project-related habitat service losses are anticipated to decrease once construction is complete. Although still below baseline levels, the habitat service scores rise during restoration and recovery with vegetation regrowth (direct disturbances) and decreased levels of noise and human presence (indirect disturbances).

For the restoration milestone, direct disturbances were defined as the loss of all habitat services in the construction footprint where vegetation clearing and ground disturbance occurs because the vegetation has not regrown sufficiently to provide habitat. For the recovery milestone, direct disturbances were defined as the loss of all habitat services in the permanent structure footprint and the progressive return of habitat services in areas of vegetation regrowth per the vegetation recovery rates set in Table E.1. Services will return more rapidly for vegetation types having rapid recovery rates (e.g., agriculture, wetland, grassland, or riparian) than for those with slower recovery times (e.g., shrub-dominated including sagebrush).

Table E-1. Vegetation recovery curves for interim direct impacts.

Project Milestone	Percent of Baseline Services Present at Each Milestone by Disturbance Condition and Vegetation Recovery Endpoint		
	Cleared	**Mowed**	**Drive and Crush**
Baseline	• 100% of agricultural and wetland • 100% of grassland and riparian • 100% shrub • 100% of low and big sagebrush	• 100% of agricultural and wetland • 100% of grassland and riparian • 100% shrub and low sagebrush • 100% of big sagebrush	• 100% of agricultural and wetland • 100% of grassland and riparian • 100% shrub and low sagebrush • 100% of big sagebrush
Construction	• 0% of agricultural and wetland • 0% of grassland and riparian • 0% shrub • 0% of low and big sagebrush	• 0% of agricultural and wetland • 0% of grassland and riparian • 0% shrub and low sagebrush • 0% of big sagebrush	• 0% of agricultural and wetland • 0% of grassland and riparian • 0% shrub and low sagebrush • 0% of big sagebrush
Restoration	• 0% of agricultural and wetland • 0% of grassland and riparian • 0% shrub • 0% of low and big sagebrush	• 100% of agricultural, wetland, grassland, and riparian • 0% shrub and low sagebrush • 0% of big sagebrush	• 100% of agricultural, wetland, grassland, and riparian • 0% shrub and low sagebrush • 0% of big sagebrush
Recovery 1 (1 year after Restoration)	• 100% of agricultural and wetland • 20% of grassland and riparian • 5% shrub • 1% of low and big sagebrush	• 100% of agricultural, wetland, grassland, and riparian • 10% shrub and low sagebrush • 2% of big sagebrush	• 100% of agricultural, wetland, grassland, and riparian • 20% shrub and low sagebrush • 7% of big sagebrush
Recovery 2 (5 years after Restoration)	• 100% of agricultural, wetland, grassland, and riparian • 25% shrub • 5% of low and big sagebrush	• 100% of agricultural, wetland, grassland, and riparian • 50% shrub and low sagebrush • 10% of big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush • 33% of big sagebrush
Recovery 3 (10 years after Restoration)	• 100% of agricultural, wetland, grassland, riparian, and shrub • 10% of low and big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush • 20% of big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush • 67% of big sagebrush
Recovery 4 (15 years after Restoration)	• 100% of agricultural, wetland, grassland, riparian, and shrub • 15% of low and big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush • 30% of big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush, big sagebrush
Recovery 5 (20 years after Restoration)	• 100% of agricultural, wetland, grassland, riparian, and shrub • 20% of low and big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush • 40% of big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush, big sagebrush
Recovery 6 (50 years after Restoration)	• 100% of agricultural, wetland, grassland, riparian, and shrub • 50% of low and big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush, big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush, big sagebrush
Recovery 7 (100 years after Restoration)	• 100% of agricultural, wetland, grassland, riparian, shrub, and low and big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush, big sagebrush	• 100% of agricultural, wetland, grassland, and riparian, shrub and low sagebrush, big sagebrush

E.3 QUANTIFYING LOSS OF HABITAT SERVICES DUE TO INDIRECT DISTURBANCES

Indirect disturbances will be simulated by applying buffers to the construction footprint and decreasing the habitat service scores below the baseline habitat service scores within the buffers.

E.3.1 Construction Milestone

Indirect effects due to human presence and noise are modeled during the construction milestone. Use of construction equipment such as backhoes, cranes, front-end loaders, bulldozers, graders, excavators, compressors, generators, and various trucks would be needed for mobilizing crew, transportation and use of materials, line work, site clearing, and preparation during the construction phase of the Project. Construction of and improvements to access roads would require use of earthmoving equipment such as bulldozers and graders. Table E.2 provides the typical noise levels for the construction equipment that could potentially be used during the construction phase of the Project (ranging 80 to 90 A-weighted decibels [dBA] at 50 feet [15 m] from any work site) (Bureau of Land Management 2013).

Table E.3. Typical Noise Levels from Construction Equipment

Equipment Type	Noise Level at 50 feet (dBA)	Equipment Type	Noise Level at 50 feet (dBA)
Crane	88	Flatbed truck	88
Backhoe	85	Dump truck	88
Pan loader	87	Tractor	80
Bulldozer	89	Concrete truck	86
Fuel truck	88	Concrete pump	82
Water truck	88	Front end loader	83
Grader	85	Scraper	87
Roller	80	Air compressor	82
Mechanic truck	88	Average construction site	85

Noise during the construction phase of the Project would be similar in magnitude to noise produced by vehicles using secondary roads (county highways, state highways, and heavily travelled gravel roads [e.g., access roads for oil and gas development, mining, etc.]). Passenger vehicles, medium trucks, and heavy trucks going 55 miles per hour produce typical noise levels of 72 to 74 dBA, 80 to 82 dBA, and 84 to 86 dBA, respectively, from a distance of 50 feet. Therefore, the noise disturbance associated with construction will be modeled as if the construction footprint was a secondary road.

In the model, buffers were placed around active construction areas in a manner that is identical to the methods used for secondary roads (VAR02 in the habitat service metric; Appendix A). For Variable 02, all cells that are more than 200 m from the project footprint were given a score of 3; those between 50 and 200 m were given a score of 2; those between 25 and 50 m were given a score of 1; and those cells within 25 m were assigned a value of 0 habitat services.

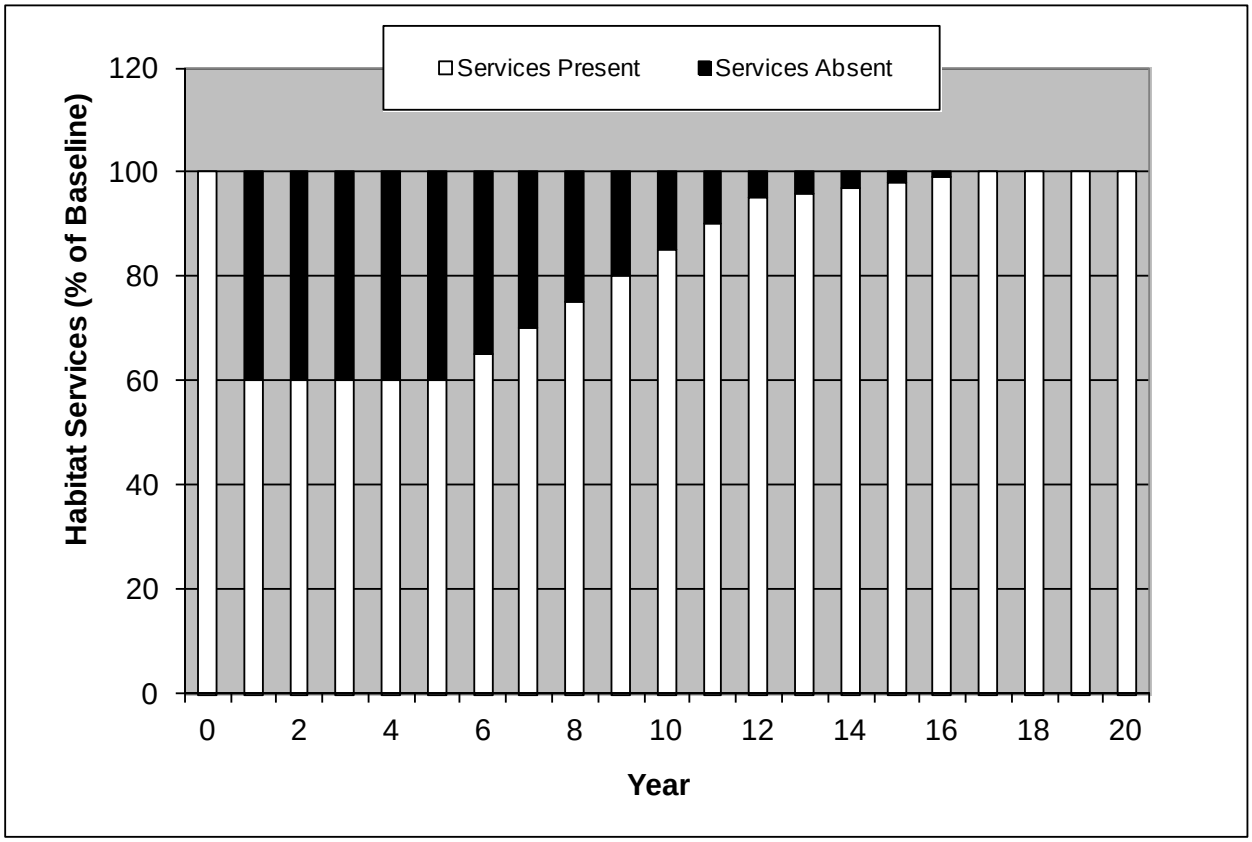
E.3.2 Restoration, Recovery, and Permit Term Milestones

In the model, buffers were placed around the transmission lines and the habitat service scores are reduced using the approach described in Appendix C for indirect effects. Using this approach indirect effects to sage-grouse (behavioral avoidance of the Project and reduced population growth) extend to

10 km to either side of the transmission line. The approach models avoidance as a habitat service loss that decreases linearly from 75% loss (adjustment factor of 1 - 0.75 = 0.25) immediately below the line to 0% loss (adjustment factor of 1 – 0 = 1) 600 m from the line.. The approach models decreased population growth as a habitat service loss that decreases linearly from 3% loss (adjustment factor of 1 – 0.03 = 0.97) directly below the line to 0% loss (adjustment factor of 1 – 0 = 1) 10 km from the line. Details on the calculation of adjustment factors where the effects overlap are provided in Appendix C.

E.4 HEA TO QUANTIFY INTERIM AND PERMANENT HABITAT INJURIES

The approach described above will produce a measure of habitat services (in service-acres) for each of the Project milestones for each of the modeled project segments. The HEA is a stepwise model which quantifies the habitat injury separately in each year (Figure E.1). Each of the milestones will be assigned to a calendar year. A linear change in habitat services is used to estimate annual service-acre increases between restoration and recovery and between the vegetation-specific recovery times. The total number of service-acres lost per year is summed across the analysis period and expressed as service-acre-years. This value is the estimated sum of the interim and permanent losses to greater sage-grouse habitat that would occur as a result of the project construction, operation, and maintenance.



Hypothetical example of how the HEA model considers habitat services absent and habitat services present in each year to calculate the total services lost over the Project period (i.e., sum of the black bars).

Figure E.1. HEA Model Calculation Example

The HEA model balances the cumulative injury (*I*, service-acre-years) over the lifetime of the Project with the cumulative benefit of habitat restoration and mitigation (*R*, service-acre-years), so that the services returned by habitat restoration and mitigation are greater than or equal to the cumulative injury ($R \geq I$). The habitat injury (*I*, service-acre-years) is quantified for the life of the Project using Equation E.1. Equation E.1 was adapted from Equation 8.1 in Allen et al. (2005). The discount rate (*r*) is anticipated to be set to 3%, which is standard for this type of analysis. The discount rate converts services being provided in different time periods into current time period equivalents (Allen et al. 2005). The discount rate effectively weighs the habitat service losses so that losses occurring early in the Project result in a greater overall injury than losses occurring later in the project. Likewise, habitat restoration and mitigation occurring early in the Project would result in a greater benefit than habitat restoration and mitigation occurring late in the project.

Equation E.3.

$$I = \sum_{t=1}^{y} (JV^{j} - JV^{t}) * \rho_{t}$$

where:

I is the present value of the service-acre-years lost over *y* due to interim and permanent injury;

t is the project year, with t= 1 being the year that Project construction begins;

y is the analysis period, in years (e.g., 104);

JV^{j} is the value of the habitat services provided by the injured habitat (service-acres) before injury (i.e., at the Baseline milestone);

JV^{t} is the value of the habitat services provided by the injured habitat (service-acres) in year t; and

ρ_t is the discount factor, where $\rho_t = 1/(1+r)^{t-C}$, where *r* is the discount rate for the time period and *C* is the time the claim is presented (C = Project Year 1).

E.5 LITERATURE CITED

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APPENDIX F

Quantification of Habitat Service Gains Produced by Habitat Restoration and Mitigation Measures for the TransWest Express Transmission Project

F. Modeling Mitigation Project Habitat Service Gains

Habitat restoration and conservation measures are intended to create new, or protect existing, greater sage-grouse (*Centrocercus urophasianus*) habitat services (Table F.1). These measures serve as a "toolbox" from which mitigation projects may be selected by TransWest for inclusion in a mitigation package for the final engineered design. The purpose of the mitigation projects is to offset the cumulative greater sage-grouse habitat service losses in the Assessment Area over the TransWest Express Transmission Project (Project) lifetime (i.e., *I* in Equation E.1). This appendix describes the general approach that will be used to quantify the benefits of mitigation measures as well as the types of measures that may be selected for final mitigation. The HEA will be used to evaluate the actual habitat services returned of the mitigation measures selected by TransWest for the final mitigation package to ensure that habitat service losses have been replaced with habitat service gains. In addition to using the HEA to quantify the habitat service gains from the final conservation and mitigation projects, TransWest will ensure that final projects meet the Standards identified in Section 5.4 of this document.

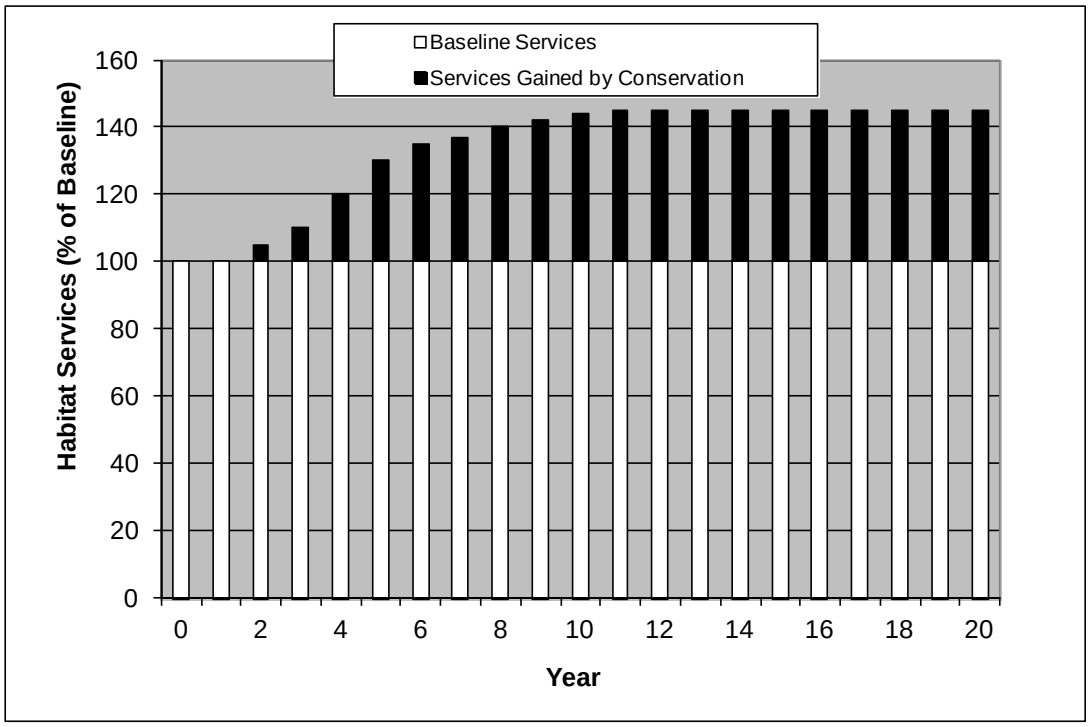
Table F.4. Potential Habitat Restoration and Conservation Measures for Modeling in the HEA

Mitigation Project Type	Brief Project Description	Anticipated Benefits
Fence removal and marking with flight diverters	Fences would be removed or marked in: 1) sections of fence known to cause greater sage-grouse collisions; 2) within 3 km (1.2 miles) of leks (Stevens et al. 2013) or other high risk areas; 3) in areas with low slope and terrain ruggedness (Stevens 2011); and 4) where segments are bounded by steel t-posts with spans greater than 4 m (Stevens 2011).	• Reduce mortality due to greater sage-grouse collisions • Increase visibility of fences, where diverters are used • Increase contiguous patches of shrub-steppe habitat • Remove localized grazing pressure where fences are removed, thereby increasing local habitat quality (e.g., bunchgrass cover)
Sagebrush restoration and improvement projects	Seeding, planting seedlings, or transplanting containerized sagebrush plants (one plant per 5 m^2)	• Create contiguous patches of shrub-steppe habitat with optimal sagebrush cover and height • Increase availability of high-quality nesting, brood rearing, and winter habitats
Juniper/conifer removal	Mechanical removal (lop and scatter, cut-pile-cover, or mastication) of juniper/confer adjacent to areas with optimal sagebrush cover and height.	• Reverse juniper/conifer encroachment on shrub-steppe habitat to increase contiguous patches of greater sage-grouse habitat • Increase light penetration to support a forb and grass understory
Conservation easements	Removes threat of specific land uses to sensitive wildlife populations.	• Prevent greater sage-grouse habitat destruction or degradation near urban areas and oil and gas development • Reduce future fragmentation of shrub-steppe habitat

km = kilometer m = meter

F.1 GIS MODELING OF CONSERVATION BENEFITS

The analysis of habitat service benefits produced by each habitat restoration or mitigation measure in Table D.1 was completed using an approach similar to that described for quantifying habitat losses. It is necessary that both analyses (i.e., quantification of habitat service losses and habitat service gains) use the same habitat services metric (see Appendix A), the same unit of measure (service-acres and service-acre-years), the same analysis period, and the same discount rate. Figure F.1 illustrates a hypothetical example of how mitigation was added to the baseline service metric over time to derive an estimate of the service-acre-years provided by the mitigation measures that were modeled for the Project.



Hypothetical example of how the HEA model considers habitat services gained by habitat restoration and mitigation to calculate the total services gained over the project period (i.e., sum of the black bars).

Figure F.2. HEA services gained example

F.1.1 Modeling Habitat Restoration and Mitigation Measures

Hypothetical habitat restoration and mitigation project areas will be used to estimate average habitat service gain. Once beneficial locations for these projects are identified, variable scores in the HEA model will be changed to approximate the change in habitat services expected with implementation of the measure (Table F.2). The new habitat service score is calculated for each cell in the Assessment Area using the same habitat services metric used to quantify baseline and impacts (see Appendix A). The habitat service benefit of a modeled mitigation project is calculated by determining the difference in the habitat services provided at baseline and after implementation of the habitat restoration or mitigation measure. For each habitat restoration/mitigation project type, the assumed time to full benefit are provided in Table F.3. A linear increase in services is assumed between project initiation and time of full benefit.

Table F.5. Site Selection and Changes in Metric Scoring Applied During GIS Analysis of Mitigation Measure Benefit

Type of Improvement	Site Selection Criteria	Changes in Metric Scoring	Analysis Product
Fence removal and marking with reflectors	Priority areas for fence removal and/or marking are as follows: 1) sections of fence known to cause greater sage-grouse collisions; 2) within 2 km (1.2 miles) of leks (Stevens et al. 2013) or other high risk areas; 3) in areas with low slope and terrain ruggedness (Stevens 2011); and where segments are bounded by steel t-posts with spans greater than 4 m (Stevens 2011).	Remove fence score adjustment for a known length of high priority fences in the analysis area*	Analysis provides the services gained, the analysis area, and the kilometers of fences marked and removed in the analysis area.
Sagebrush restoration and improvement projects	Smaller patches of agriculture or surface disturbance (i.e., well pads) surrounded by sagebrush habitat.	• Make it a modeled habitat type • Change Sagebrush Abundance Index score as appropriate • Change Sagebrush Canopy Cover score to 3 • Change the Sagebrush Canopy Height to 3 • Change the scores of the surrounding cells for Distance of Habitat to Sage or Shrub Dominant	Analysis provides the services gained, the area of the analysis, and the area of the habitat improvement (i.e., the agricultural field or well pad)
Juniper/conifer removal	Phase I Juniper (a sagebrush-dominated landscape with scattered juniper) adjacent to sagebrush	• Make it a modeled habitat type • Change Sagebrush Abundance Index score as appropriate • Change Sagebrush Canopy Cover score to average score of local sagebrush vegetation • Change the Sagebrush Canopy Height score to average score of local sagebrush vegetation • Change the scores of the surrounding cells for Distance of Habitat to Sage or Shrub Dominant	Analysis provides the services gained, the total analysis area, and the acres of juniper removed.

Type of Improvement	Site Selection Criteria	Changes in Metric Scoring	Analysis Product
	Phase II Juniper (50:50 mix sagebrush and juniper) adjacent to sagebrush	• Make it a modeled habitat type • Change Sagebrush Abundance Index score as appropriate • Change Sagebrush Canopy Cover score to average score of local sagebrush vegetation • Change the Sagebrush Canopy Height score to average score of local sagebrush vegetation • Change the scores of the surrounding cells for Distance of Habitat to Sage or Shrub Dominant	Analysis provides the services gained, the total analysis area, and the acres of juniper removed.
	Phase III Juniper (a juniper-dominated landscape) adjacent to sagebrush	• Make it a modeled habitat type • Change Sagebrush Abundance Index score as appropriate • Change Sagebrush Canopy Cover score to average score of local sagebrush vegetation • Change the Sagebrush Canopy Height score to average score of local sagebrush vegetation • Change the scores of the surrounding cells for Distance of Habitat to Sage or Shrub Dominant	Analysis provides the services gained, the total analysis area, and the acres of juniper removed.
Conservation easements	Areas with suitable habitat within sage-grouse PHMA and GHMA	No change to metric score. Calculate habitat services contained within the conservation easement property boundary..	Analysis provides the actual habitat services gained as a result of establishing the conservation easement.

* Although fence removal is more effective at removing the threat of sage-grouse collision than fence marking, both measures are modeled the same for the HEA

Table F.6. Assumed Time to Project Implementation and to Full Benefit for Mitigation Measures

Type of Improvement	Time to Full Benefit of Project After Implementation
Fence removal and marking with reflectors	Immediate full benefit
Sagebrush restoration and improvement projects	Seeding sagebrush and bunchgrass understory: 100 years to full benefit (assume linear increase in services)*
	Transplanting containerized stems and seeding bunchgrass understory: 15 years to full benefit (assume linear increase in services)
	Planting seedlings and seeding bunchgrass understory: 90 years to full benefit (assume linear increase in services)
Juniper/conifer removal	Lop and Scatter Phase I Juniper: 20 years to full benefit (assume linear increase in services)
	Cut-Pile-Cover or Mastication of Phase II Juniper: 50 years to full benefit (assume linear increase in services)
	Mastication of Phase III Juniper plus bunchgrass seeding: 100 years to full benefit (assume linear increase in services)
Conservation easements	Immediate full benefit once established

* Time to sagebrush establishment is based on passive restoration rates. Rates of establishment are expected to be higher for this active restoration, but the longer time is used in the analysis to offset potential restoration project failures.

The present value habitat service gain (*R*, service-acre-years) is quantified for the life of the Project using Equation F.1 (adapted from Equation 8.1 in Allen et al. 2005).

Equation F4.

$$R = \sum_{t=1}^{y} (PV^{t} - PV^{p}) * \rho_{t}$$

where:

R is the present value of the service-acre-years gained by the habitat restoration or mitigation measure;

t = 1 is the year the transmission line Project begins;

y is the analysis period, in years (i.e., 104);

PV^{p} is the value of the habitat services provided by the improved habitat (service-acres) before habitat restoration or mitigation measure (i.e., at the Baseline milestone);

PV^{t} is the value of the habitat services provided by the improved habitat (service-acres) in year *t*; and

ρ_t is the discount factor, where $\rho_t = 1/(1+r)^{t-C}$, where *r* is the discount rate for the time period and *C* is the time the claim is presented (*C* = Project Year 1).

The present value habitat service gain (*R*) was standardized among mitigation project types by dividing by size of mitigation project (units in acres or linear mile depending on the measure modeled) and averaged among hypothetical projects applying the same measure to produce the service-years gained per unit of treatment ($\overline{R}^{m}$). This value was used in mitigation calculations.

F.2 APPROACH TO OFFSET HABITAT SERVICE LOSSES WITH HABITAT SERVICE GAINS

An HEA scales the mitigation package (i.e., funding to create habitat services) to offset the loss of habitat services over the lifetime of the Project. The injury is offset by planned habitat restoration and mitigation projects in Equation F.2, where the mitigation project size (P^m) can be solved for each habitat restoration or mitigation measure type (m).

Equation F.5.

$$I = \sum_{m1}^{i} P^m * \overline{R}^m$$

where:

I is the present value of the service-acre-years lost over y due to interim and permanent injury;

i is the number of habitat restoration and mitigation measures modeled;

Pm is the size of the habitat restoration or mitigation project of type m (in units of acres or miles); and

$\overline{R}^m$ is mean service-years gained per unit (acres or miles) of treatment.

Once the P^m is defined for each habitat improvement and mitigation measure, the costs per unit can be applied. Mitigation due is the sum of the costs to implement each of the habitat improvement and mitigation projects needed to offset the Project.

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APPENDIX G

Assignment of National Gap Analysis Program (GAP) Vegetation Classifications to Categories for HEA Modeling for the TransWest Express Transmission Project

G. Vegetation Categorization for HEA Modeling

Vegetation and other landcover types in the U.S. Geological Survey national Gap Analysis Program (GAP) Land Cover Dataset were classified as providing habitat for greater sage-grouse (*Centrocercus urophasianus*) or not providing habitat for greater sage-grouse. Vegetation types providing no habitat services to greater sage-grouse (Non-Habitat in Table G.1) were assumed to require no mitigation in the habitat equivalency analysis (HEA). Those vegetation types that are used by greater sage-grouse (Table G.1) were assigned to one of four modeled vegetation categories. Each of the modeled vegetation categories had a different vegetation recovery time in the HEA model (see Table 3 of the main body of this mitigation plan and Appendix D for vegetation recovery rates specific to different disturbance conditions).

Table G.7. Vegetation Categorization Based on GAP Landcover Types

Vegetation Categories	GAP Vegetation: ECOLSYS_LU
Non-Habitat: Anthropogenic Disturbance and Open Water	Developed, High Intensity
	Developed, Low Intensity
	Developed, Medium Intensity
	Developed, Open Space
	Disturbed/Successional - Recently Chained Pinyon-Juniper
	Open Water (Fresh)
	Quarries, Mines, Gravel Pits and Oil Wells
Non-Habitat: Natural Vegetation	Colorado Plateau Mixed Bedrock Canyon and Tableland
	Colorado Plateau Pinyon-Juniper Shrubland
	Colorado Plateau Pinyon-Juniper Woodland
	Great Basin Pinyon-Juniper Woodland
	Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland
	Inter-Mountain Basins Cliff and Canyon
	Inter-Mountain Basins Juniper Savanna
	Inter-Mountain Basins Shale Badland
	Introduced Riparian and Wetland Vegetation
	Introduced Upland Vegetation - Annual Grassland
	Introduced Upland Vegetation - Perennial Grassland and Forbland
	Introduced Upland Vegetation - Treed
	North American Warm Desert Bedrock Cliff and Outcrop
	North American Warm Desert Lower Montane Riparian Woodland and Shrubland
	Recently Burned
	Rocky Mountain Alpine Bedrock and Scree
	Rocky Mountain Aspen Forest and Woodland
	Rocky Mountain Bigtooth Maple Ravine Woodland

Vegetation Categories	GAP Vegetation: ECOLSYS_LU
	Rocky Mountain Cliff, Canyon and Massive Bedrock
	Rocky Mountain Foothill Limber Pine-Juniper Woodland
	Rocky Mountain Gambel Oak-Mixed Montane Shrubland
	Rocky Mountain Lodgepole Pine Forest
	Rocky Mountain Lower Montane Riparian Woodland and Shrubland
	Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland
	Rocky Mountain Subalpine-Montane Limber-Bristlecone Pine Woodland
	Southern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Woodland
	Southern Rocky Mountain Mesic Montane Mixed Conifer Forest and Woodland
	Western Great Plains Cliff and Outcrop
Habitat: Agriculture and Wetland	Cultivated Cropland
	Inter-Mountain Basins Playa
	North American Arid West Emergent Marsh
	North American Warm Desert Playa
	Pasture/Hay
	Rocky Mountain Alpine-Montane Wet Meadow
	Rocky Mountain Subalpine-Montane Mesic Meadow
	Western Great Plains Closed Depression Wetland
	Western Great Plains Open Freshwater Depression Wetland
	Western Great Plains Saline Depression Wetland
Habitat: Grassland and Riparian	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland
	Inter-Mountain Basins Semi-Desert Grassland
	North American Warm Desert Riparian Mesquite Bosque
	North American Warm Desert Wash
	Northwestern Great Plains Mixedgrass Prairie
	Rocky Mountain Subalpine-Montane Riparian Shrubland
	Southern Rocky Mountain Montane-Subalpine Grassland
	Western Great Plains Riparian Woodland and Shrubland
Habitat: Shrub	Great Basin Semi-Desert Chaparral
	Inter-Mountain Basins Active and Stabilized Dune
	Inter-Mountain Basins Curl-leaf Mountain Mahogany Woodland and Shrubland
	Inter-Mountain Basins Greasewood Flat
	Inter-Mountain Basins Mat Saltbush Shrubland

Vegetation Categories	GAP Vegetation: ECOLSYS_LU
	Inter-Mountain Basins Mixed Salt Desert Scrub
	Inter-Mountain Basins Semi-Desert Shrub Steppe
	Mogollon Chaparral
	Mojave Mid-Elevation Mixed Desert Scrub
	Rocky Mountain Lower Montane-Foothill Shrubland
	Sonora-Mojave Creosote bush-White Bursage Desert Scrub
	Sonora-Mojave Mixed Salt Desert Scrub
Habitat: Sagebrush, Low Sagebrush	Colorado Plateau Mixed Low Sagebrush Shrubland
	Wyoming Basins Dwarf Sagebrush Shrubland and Steppe
Habitat: Sagebrush, Big Sagebrush	Great Basin Xeric Mixed Sagebrush Shrubland
	Inter-Mountain Basins Big Sagebrush Shrubland
	Inter-Mountain Basins Big Sagebrush Steppe
	Inter-Mountain Basins Montane Sagebrush Steppe

APPENDIX K-1

SAGEBRUSH MITIGATION PLAN

Mitigation Plan to Offset Effects of the TransWest Express Transmission Project to Sagebrush Habitat in Wyoming

Prepared by

TransWest Express LLC

September 2016

Mitigation Plan to offset Effects of the TransWest Express Transmission Project to Sagebrush Habitat in Wyoming

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1.0 Introduction

TransWest Express LLC's (TransWest) TransWest Express Transmission Project (TWE Project, Project) is a proposed extra high voltage, direct current (DC) transmission system extending from south-central Wyoming to southern Nevada. The proposed transmission line would cross four states (Wyoming, Colorado, Utah, and Nevada) on lands owned or administered by the Bureau of Land Management (BLM), U.S. Forest Service, National Park Service, Bureau of Reclamation, Utah Reclamation Mitigation and Conservation Commission, various state agencies, Native American tribes, municipalities, and private parties. The TWE Project would provide the transmission infrastructure and capacity necessary to deliver cost-effective renewable energy produced in Wyoming to the Desert Southwest region (California, Nevada, Arizona), ultimately helping strengthen the electric grid and provide much-needed electricity to millions of homes and businesses every year. The TWE Project would deliver enough clean, sustainable energy to power nearly 2 million homes and reduce greenhouse-gas emissions equivalent to taking 1.5 million cars from the road.

The TWE Project includes ground-disturbing activities associated with the construction of the above-ground transmission line and includes transmission tower locations, access roads, a ground electrode line, a ground electrode site, fly yards, material yards, two alternating current (AC)/DC converter stations (a northern terminal and a southern terminal), pulling/tensioning areas, and work areas. The ±600 kilovolt (kV) DC transmission line would be approximately 725 to 750 miles in length (depending upon the alternative selected), located within a 250-foot-wide right-of-way (ROW).

The TWE Project has been sited to avoid and minimize impacts to greater sage-grouse (*Centrocercus urophasianus*, sage-grouse) leks and occupied habitat. However, portions of the TWE Project would cross designated habitat for greater sage-grouse (BLM's General Habitat Management Area [GHMA] and Priority Habitat Management Area [PHMA]) in Wyoming, Colorado, and Utah. As a result, TransWest has coordinated with the BLM, Western Area Power Administration (WAPA), U.S. Fish and Wildlife Service (USFWS), Wyoming Game and Fish Department (WGFD), Colorado Parks and Wildlife (CPW), and Utah Division of Wildlife Resources (UDWR) to develop a mitigation strategy to compensate for the unavoidable loss of greater sage-grouse habitat that would potentially occur as a result of the TWE Project construction, operation, and maintenance. TransWest's Mitigation Plan to offset Effects of the TransWest Express Transmission Project to Greater Sage-Grouse Habitat, September 2016, is a part of and attached to the TWE Project Plan of Development (POD) as Appendix K (GRSG Mitigation Plan).

The BLM has indicated that it will not require TransWest to provide compensatory mitigation (hereafter compensatory mitigation or mitigation) for greater sage-grouse in Wyoming because the TWE Project is consistent with the greater sage-grouse management decisions and management actions described in BLM's "Record of Decision and Approved Resource Management Plan Amendments for the Rocky Mountain Region Greater Sage-Grouse Sub-Regions of: Lewistown, North Dakota, Northwest Colorado, and Wyoming, and the Approved Resource Management Plans (RMPs) for Billings, Buffalo, Cody, HiLine, Miles City, Pompeys Pillar National Monument, South Dakota, and Worland" (Rocky Mountain Regional ROD) and the Wyoming Approved Resource Management Plan Amendments (ARMPA), as well as the State of Wyoming's Core Area Strategy (BLM 2015; Wyoming Executive Order [EO] 2011-5, updated by EO 2015-4, Core Area Strategy) However, the BLM has indicated that it may require TransWest to provide compensatory mitigation for impacts to sagebrush in PHMAs in Wyoming. This plan sets forth the methods and procedures TransWest would follow should BLM require compensatory mitigation for impacts to sagebrush in PHMAs in Wyoming.

2.0 Habitat Equivalency Analysis

Should BLM require mitigation for sagebrush in Wyoming, TransWest would use the Habitat Equivalency Analysis (HEA) model developed for greater sage-grouse to calculate sagebrush impact debits and credits with modifications as described in the following sections. A HEA is a science-based, peer-reviewed method of quantifying interim and permanent habitat injuries, measured as a loss of habitat services from pre-disturbance conditions, and scaling compensatory habitat requirements to those injuries (King 1997; Dunford et al. 2004; Allen et al. 2005; Kohler and Dodge 2006; National Oceanic and Atmospheric Administration [NOAA] 2006, 2009). Habitat services include those ecosystem features (i.e., physical site-specific characteristics of an ecosystem) and ecosystem functions (i.e., biophysical processes that occur within an ecosystem) that support wildlife and human populations (King 1997).

The greater sage-grouse HEA methods and process are described in detail in the GRSG Mitigation Plan. In summary, TransWest's GRSG Mitigation Plan relies upon Habitat Equivalency Analysis (HEA) to determine the amount of compensatory mitigation necessary to offset potential direct effects and indirect effects to greater sage-grouse habitat resulting from the construction, operation, and maintenance of the final engineered Project. The greater sage-grouse HEA produces an estimate of the permanent and interim loss of greater sage-grouse habitat services that may potentially result from direct disturbances (vegetation loss) and indirect disturbances (habitat avoidance due to noise and human presence, behavioral avoidance of structures, decreased population growth) anticipated with Project construction and operation. The greater sage-grouse HEA also models mitigation measures that may be implemented to enhance habitat service levels and offset Project effects.

2.1 Application of the HEA to Sagebrush Mitigation

To adapt the greater sage-grouse HEA to quantify sagebrush debits and credits, certain modifications are necessary to eliminate the variables and factors related to greater sage-grouse that are not applicable to sagebrush. These modifications to the greater sage-grouse HEA variables and quantification methods are described below.

2.1.1 Quantification of Baseline Conditions

To quantify the habitat services (e.g., greater sage-grouse habitat functionality) provided by an ecosystem, the GRSG Mitigation Plan developed a habitat service metric that scores key habitat elements for greater sage-grouse. Scoring habitat services is a critical step in the HEA process because it provides a way to quantitatively measure the quality of specific habitat functions in a specific area. The habitat metrics used in the greater sage-grouse HEA capture the relative differences in the quantity of services provided before and after construction and conservation-focused activities. These habitat services have three components—land area, service level, and time—and are commonly expressed in service-acres (1 year) or service-acre-years (service-acres summed over multiple years).

The focus of the metric is to capture changes in habitat services over time with vegetation removal and recovery. Using this approach, lost habitat services (decreases in habitat quality) must be replaced with like services. The HEA does not assume a one-to-one trade-off in resources (e.g., number of acres of habitat affected), but instead determines compensation based on the habitat services those acres provide (e.g., development in high-quality habitat would have higher compensation levels than development in lower-quality habitat that provides fewer services).

Habitat Service Variables

The habitat service metric developed for the GRSG Mitigation Plan included variables identified by the peer-reviewed literature as having influence on the quality of greater sage-grouse habitat, including dominant vegetative components and anthropogenic influences. The variables included were limited to those for which reliable and consistent data were available across the Project area. For each of the variables, a habitat service score ranging from 0 to 3 (zero to high services) was assigned for categories like those defined in the Sage-grouse Habitat Assessment Framework multi-scale habitat assessment tool (Stiver et al. 2010, 2015). Categorical variables were more appropriate than continuous variables due to the resolution of the remotely sensed vegetation data available for the length of the Project. The breaks between scores were primarily based on information contained in the literature regarding greater sage-grouse habitat use and selection. When literature did not allow for direct quantification of the HEA scores, professional judgments informed by the available peer-reviewed literature were used. When a particular variable matched literature-based optimal conditions, that variable was given a service score of 3.

The sagebrush HEA would use the vegetation habitat service metrics developed for the GRSG Mitigation Plan in order to develop habitat service scores related to sagebrush (Table 1). Specifically, the sagebrush HEA would use the following variables which are measures of sagebrush quality:

- VAR05 – Sagebrush abundance
- VAR06 – Percent sagebrush canopy cover
- VAR07 – Sagebrush canopy height

The following HEA variables, which are specific to sage-grouse habitat use, would not be used:

- VAR01 – Distance to high-traffic roads. There is no evidence that sagebrush quality is related to traffic volume.
- VAR02 – Distance to low-traffic roads. There is no evidence that sagebrush quality is related to traffic volume.
- VAR03 – Percent slope. While slope may influence sagebrush occurrence and vitality, this metric is captured in VAR05, VAR06 and VAR07.
- VAR04 – Distance to occupied lek. This measure is specific to greater sage-grouse only.
- VAR08 – Distance of habitat to sagebrush or other shrub. This variable is specific to the proximity of suitable escape cover and connectivity for greater sage-grouse.

Assessment Area

The HEA metric will be applied to sagebrush habitat occurring within PHMA in Wyoming (the Assessment Area) prior to habitat service scoring. The PHMA layer encompasses the highest quality sagebrush habitat, so the Assessment Area will include only those areas that are recognized as high quality sagebrush habitats. Land cover types that contain no sagebrush will be assigned a habitat service score of 0 (provides no habitat services) before the metric is applied to the remaining areas. These land cover types include all forest types, urban areas, open water, non-sagebrush vegetation types, introduced vegetation types, roadways, well pads, mine footprints, paved roads and graded roads. The specific GAP vegetation classifications included in these avoided land cover types are listed in Appendix G of the GRSG Mitigation Plan. Disturbances to lands outside PHMA and in other land cover types scoring 0 will require no mitigation in the sagebrush HEA.

Table 1. Vegetation Variables Used as a Metric of Sagebrush Habitat Services

Variable Number	Variables	3	2	1	0	Primary Citations[1]
VAR05	Sagebrush abundance index (% of vegetation that is sagebrush within a 1-square-kilometer moving window)	50–100	30–50	10–30	0–10	Carpenter et al. (2010); Walker et al. (2007); Aldridge and Boyce (2007); Aldridge et al. 2008; Wisdom et al. (2011)
VAR06	Percent sagebrush canopy cover	15–35	5–15 or >35	1–5	<1	Cagney et al. (2009); Connelly et al. (2000); Stiver et al. (2010)
VAR07	Sagebrush canopy height (centimeters)	30–80	20 to <30 or >80	5–20	<5	Crawford et al. (2004); Connelly et al. (2000); Stiver et al. (2010)

[1] While these citations are specific to habitat preferences of greater sage-grouse, they provide a suitable index of the quality of sagebrush habitat.

2.1.2 Quantification of Habitat Service Losses

The following sections describe the methods to evaluate direct losses of sagebrush habitat services that would likely occur as a result of the Project construction and operation. Indirect impacts are behavioral in nature and there is no scientific evidence that sagebrush is affected by the indirect effects considered in the greater sage-grouse HEA; therefore, the sagebrush HEA will omit the indirect effects component of the greater sage-grouse HEA. Habitat service losses (debits) and mitigation gains (credits) for sagebrush in PHMA in Wyoming will be quantified prior to the Notice to Proceed for construction of the Project using the final engineered design.

Description of Changing Habitat Service Level by Project Milestone

The habitat services provided by the Assessment Area will be calculated at Project milestones that reflect varying levels of disturbance. The Project milestones modeled with GIS data for the HEA are listed below.

1. **Baseline**—the baseline milestone quantifies sagebrush habitat services available before Project disturbance.

2. **Construction**—the construction milestone quantifies sagebrush habitat services available during the construction of the transmission line and ancillary facilities. Magnitude of the loss of habitat services during construction is dependent on proximity to the Project and the amount of new surface disturbance.

3. **Restoration**—the restoration milestone quantifies sagebrush habitat services available after construction is complete.

4. **Recovery**—the recovery milestone quantifies sagebrush habitat services available after sagebrush has recovered to the greatest extent expected after the Project restoration is complete. Habitat services return to baseline conditions in restored areas with the time to recovery being dependent on the vegetation type and the disturbance condition. Recovery milestones and periods for each disturbance condition and vegetation type are described in Tables 2 and 3.

Snapshots of the changing habitat services over time will be modeled using GIS-based tools for each of the milestones identified above for incorporation into the HEA. The HEA calculates the total interim and permanent habitat service losses that will result from the Project. Specifics of the GIS and HEA methods for the direct effects are provided in Appendix E of the GRSG Mitigation Plan.

Timing

Habitat service losses will be calculated based on final engineered footprints, construction schedule, and operations timeline for the Project Table 2 provides an example of the approximate timing of each project milestone based on current Project plans. Table 3 provides additional detail of timing and vegetation recovery assumptions associated with each of these project milestones.

Table 2. Project Milestone Years

Project Year	Project Milestone
0	Baseline
1	Construction
2	Construction
3	Construction
4	Restoration
5	Recovery 1
9	Recovery 2
14	Recovery 3
19	Recovery 4
24	Recovery 5
54	Recovery 6
104	Recovery 7; End of Analysis

The relative timing of Project events is an important element of the HEA model. HEA calculates the present value of future changes to the baseline habitat service level with time caused by losses of habitat services with Project development and gains of habitat services with mitigation projects. Economists call this process discounting and it is a standard part of the HEA model. Discounting converts services being provided in different time periods into current time period equivalents (Allen et al. 2005). Discounting results in a gradual increase in the service-acres provided by injured habitats over time (the habitat service loss is discounted), and the same rate of decrease in service-acres gained by habitat conservation over time (the habitat service gain is discounted). Consequently, credit for mitigation in the form of habitat conservation is greater when implemented early in the lifetime of the Project or prior to Project construction rather than when implemented late in the lifetime of the Project. This encourages early mitigation to offset habitat service losses, to ensure that long-term impacts to the resource are minimal. The discount rate used in the Project HEA is 3%.

3.0 Direct Effects

The final engineered footprint of the Project will be provided electronically by the Company for modeling Project-related disturbances (milestones Construction through Recovery). The footprint files will specify the final engineered locations and disturbance footprints of all Project disturbances. The direct disturbance assumptions used in the HEA are described in detail in Appendix D of the GRSG Mitigation Plan by Project facility/component, disturbance area, disturbance condition, disturbance duration.

3.1 During Construction

The scores of cells (30 m x 30 m) that intersect the project footprint during construction are set to 0, assuming they provide no habitat services. Using this approach, the model overestimates the habitat services lost to direct effects during construction as the Project features do not fully cover the cells they intersect. Note that the model does not capture temporal restrictions on the Project construction required by the BLM, which may result in higher estimates of service losses than may actually occur.

3.2 During Restoration and Recovery

Disturbances may be permanent or interim. Interim disturbances occur in areas that will be restored to their baseline vegetation type and condition. Habitat services in cells intersecting interim direct disturbances return at different rates depending on baseline vegetation type and disturbance condition (Table 3). For purposes of sagebrush mitigation, only those vegetation types identified as sagebrush will be considered. All other vegetation types (agriculture, wetland, grassland, riparian, and shrub communities other than sagebrush) would not be included in the sagebrush mitigation HEA. There are three vegetation disturbance conditions affect the vegetation-specific recovery rates: 1) cleared; 2) mowed; and 3) drive and crush. The assignment of the GAP vegetation types to the four vegetation recovery endpoints identified in Table 3 is described in Appendix G of the GRSG Mitigation Plan. TransWest intends for the vegetation growth rates to be conservative, overestimating the average time to recovery. Conservative growth rates offset the potential for mitigation project failure in the model.

Permanent direct disturbances, such as substations/terminal locations and the transmission structure foundations, result in a 100% loss of habitat services for the lifetime of the project. In the special case of transmission structure foundations, the model does not assume a 100% loss of services in cells intersected except during the construction and restoration milestones. During the recovery milestones, habitat services in cells containing transmission structures return per the rate associated with the baseline vegetation type and disturbance condition (Table 3) minus the habitat services that occurred in the footprint of the structures at baseline. For example, if the baseline score was 9 and the footprint hypothetically covers 5% of the area of a cell, the maximum habitat service score achieved with full restoration would be 8.55 (9 - 0.05*9 = 8.55). This approach motivates the use of structures that minimize permanent surface disturbances.

The sagebrush HEA calculates the habitat services lost to direct effects over the lifetime of the Project based on the calculation of habitat service level at each Project milestone. The expansion of the habitat service calculation over the entire Assessment Area and project lifetime and the application of standard economic discount rates are described in detail in Appendix E of the GRSG Mitigation Plan.

Table 3. Vegetation recovery curves for direct impacts in low sagebrush and big sagebrush communities. Vegetation classes included in each of these communities is defined in Appendix G of the GRSG Mitigation Plan

Project Milestone	Percent of Baseline Services Present at Each Milestone by Disturbance Condition and Vegetation Recovery Endpoint		
	Cleared	**Mowed**	**Drive and Crush**
Baseline	• 100% in low sagebrush communities • 100% in big sagebrush communities	• 100% in low sagebrush communities • 100% in big sagebrush communities	• 100% in low sagebrush communities • 100% in big sagebrush communities
Construction	• 0% in low sagebrush communities • 0% in big sagebrush communities	• 0% in low sagebrush communities • 0% in big sagebrush communities	• 0% in low sagebrush communities • 0% in big sagebrush communities
Restoration	• 0% in low sagebrush communities • 0% in big sagebrush communities	• 0% in low sagebrush communities • 0% in big sagebrush communities	• 0% in low sagebrush communities • 0% in big sagebrush communities
Recovery 1 (1 year after Restoration)	• 1% in low sagebrush communities • 1% in big sagebrush communities	• 10% in low sagebrush communities • 2% in big sagebrush communities	• 20% in low sagebrush communities • 7% in big sagebrush communities
Recovery 2 (5 years after Restoration)	• 5% in low sagebrush communities • 5% in big sagebrush communities	• 50% in low sagebrush communities • 10% in big sagebrush communities	• 100% in low sagebrush communities • 33% in big sagebrush communities
Recovery 3 (10 years after Restoration)	• 10% in low sagebrush communities • 10% in big sagebrush communities	• 100% in low sagebrush communities • 20% in big sagebrush communities	• 100% in low sagebrush communities • 67% in big sagebrush communities
Recovery 4 (15 years after Restoration)	• 15% in low sagebrush communities • 15% in big sagebrush communities	• 100% in low sagebrush communities • 30% in big sagebrush communities	• 100% in low sagebrush communities • 100% in big sagebrush communities
Recovery 5 (20 years after Restoration)	• 20% in low sagebrush communities • 20% in big sagebrush communities	• 100% in low sagebrush communities • 40% in big sagebrush communities	• 100% in low sagebrush communities • 100% in big sagebrush communities
Recovery 6 (50 years after Restoration)	• 50% in low sagebrush communities • 50% in big sagebrush communities	• 100% in low sagebrush communities • 100% in big sagebrush communities	• 100% in low sagebrush communities • 100% in big sagebrush communities
Recovery 7 (100 years after Restoration)	• 100% in low sagebrush communities • 100% in big sagebrush communities	• 100% in low sagebrush communities • 100% in big sagebrush communities	• 100% in low sagebrush communities • 100% in big sagebrush communities

4.0 Quantification of Habitat Services Gained From Mitigation Measures

TransWest has selected habitat mitigation measures to be modeled in the HEA (Table 4). These measures have been identified to improve sagebrush habitat services and produce a benefit that is measurable by the habitat service metric used in this HEA. These measures serve as a "toolbox" from which mitigation options may be selected by TransWest for inclusion in a mitigation package.[2] The benefit (in service-acres) of each mitigation project identified in TransWest's final mitigation package will be quantified using the same habitat service metric as is used to calculate habitat service losses.

The same conservative vegetation growth rates that will be used to model vegetation recovery in the Project footprint will be applied to the habitat mitigation measures proposed for mitigation. Conservative growth rates offset the potential for mitigation project failure in the model.

The benefit of each mitigation project will be evaluated using the HEA to quantify the habitat services gained. Appendix F of the GRSG Mitigation Plan describes the calculations that will be used to quantify the benefit of the mitigation projects compared to baseline condition.

Table 4. Potential Mitigation Projects that may be considered as part of the final sagebrush mitigation package.

Mitigation Project Type	Brief Project Description	Anticipated Benefits
Sagebrush restoration and improvement projects	Seeding, planting seedlings, or transplanting containerized sagebrush plants (one plant per 5 meters^2).	• Create additional acres of sagebrush habitat and/or provide contiguous patches of shrub-steppe habitat with optimal sagebrush cover and height
Juniper/conifer removal	Mechanical removal (lop and scatter, cut-pile-cover, or mastication) of juniper/confer adjacent to areas with optimal sagebrush cover and height.	• Reverse juniper/conifer encroachment on shrub-steppe habitat to increase contiguous patches of sagebrush • Increase light penetration to support a forb and grass understory
Conservation easements	Removes threat of specific land uses to sensitive habitats.	• Prevent sagebrush habitat destruction or degradation near urban areas and oil and gas development • Reduce future fragmentation of shrub-steppe habitat

[2] Proposed mitigation may not be limited to the identified measures. The benefit of some measures could not be quantified using the habitat service metric. Additionally, it is anticipated that new mitigation measures may be identified prior to Project construction and operation. Any new measures would be considered in coordination with state and federal agencies and appropriate stakeholders.

5.0 Application of Results to a Mitigation Package

TransWest and BLM will evaluate the services returned per habitat mitigation measure, compare those services gained to the services lost as a result of the Project, and develop an appropriate mitigation package to compensate for services lost. Habitat conservation and mitigation measures will be identified to fully compensate for the direct sagebrush habitat service losses. Projects will be selected in accordance with the requirements of the BLM Resource Management Plans and the TWE Project Record of Decision.

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APPENDIX L
FRAMEWORK HAZARDOUS MATERIALS MANAGEMENT PLAN

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ACRONYMS

Applicant	TransWest Express LLC, also TransWest
BMP	Best Management Practice
CAA	Clean Air Act
CCR	Colorado Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CESQG	Conditionally Exempt Small Quantity Generator
CFR	Code of Federal Regulations
CIC	Compliance Inspection Contractor
CWA	Clean Water Act
FEIS	Final Environmental Impact Statement
EMM	Environmental Mitigation Measure
EPA	United States Environmental Protection Agency
HMMP	Hazardous Materials Management Plan, also Plan
ID	identification
LQG	Large Quantity Generator
MSDSs	Material Safety Data Sheets
NTP	Notice to Proceed
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
Plan	Hazardous Materials Management Plan, also NMMP
POD	Plan of Development
ppm	parts per million
Project	TransWest Express Transmission Project, also TWE Project
RCRA	Resource Conservation and Recovery Act of 1976
ROD	Record of Decision
ROW	right-of-way
SHWD	Solid and Hazardous Waste Division
SQG	Small Quantity Generator
TransWest	TransWest Express LLC, also Applicant
TSCA	Toxic Substance Control Act
TWE Project	TransWest Express Transmission Project, also Project
USDOT	United States Department of Transportation
WAQSR	Wyoming Air Quality Standards and Regulations
WDEQ	Wyoming Department of Environmental Quality
WEQA	Wyoming Environmental Quality Act
WQS	Wyoming Quality Standards

L1.0 INTRODUCTION

This framework Hazardous Materials Management Plan (HMMP or Plan) identifies project-specific mitigation measures and other specific stipulations and methods to be taken by TransWest Express LLC (TransWest or Applicant) and its Construction Contractor(s) to address hazardous materials spill prevention, response, and cleanup procedures for the TransWest Express Transmission Project (TWE Project or Project).

The term "hazardous material," as presented in this framework Plan, refers to hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, and materials designated as hazardous for transportation as defined in 49 Code of Federal Regulations (CFR) 171.8.

The Spill Prevention and Response Plan (Appendix S) identifies specific measures that the Construction Contractor(s) shall take to prevent, respond to, and control a spill, should a spill occur.

L2.0 PLAN PURPOSE

The purpose of this HMMP is to reduce the risks associated with the use, storage, transportation, and disposal of hazardous materials. The Construction Contractor(s) shall use the following framework to develop a detailed HMMP.

The HMMP will clearly identify which legal requirements apply to specific types of hazardous materials and will identify best management practices (BMPs) that will be followed to reduce risks associated with hazardous materials.

The Construction Contractor(s) shall develop and implement the HMMP in accordance with the BMPs, Applicant Committed Environmental Mitigation Measures (EMMs), and applicable state and federal land management agencies' mitigation measures to reduce the risks associated with using, storing, transporting, and disposing of hazardous materials.

L3.0 PLAN UPDATES

This HMPP framework will be updated as required for the Notice to Proceed (NTP) POD based on preliminary and final design and engineering. The Construction Contractor(s) will be responsible for preparing and implementing the final Plan in compliance with all local, state, and federal regulations pertaining to hazardous materials.

L4.0 REGULATORY COMPLIANCE

For the purpose of the HMMP, the primary laws governing hazardous materials include the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), Resource Conservation and Recovery Act of 1976 (RCRA), Clean Air Act Amendments of 1990 (CAA), and Federal Water Pollution Control Act of 1973 (Clean Water Act [CWA]). Some of these laws' key regulations are listed below. The following list is not comprehensive. Numerous other federal, state, and local regulations also govern the use, storage, transportation, and disposal of hazardous materials.

L4.1 CERCLA/Superfund Amendments and Reauthorization Act (40 CFR Parts 300-399)

- 40 CFR Part 300, National Oil and Hazardous Substances Pollution Contingency Plan
- 40 CFR Part 302, Designation, Reportable Quantities, and Notification

- 40 CFR Part 355, Emergency Planning and Notification
- 40 CFR Part 370, Hazardous Chemical Reporting: Community Right-to-Know
- 40 CFR Part 372, Toxic Chemical Release Reporting: Community Right-to-Know

L4.2 Clean Air Act (40 CFR Parts 50-99)

- 40 CFR Part 50, National Ambient Air Quality Standards
- 40 CFR Parts 61-63, National Emissions Standards for Hazardous Air Pollutants

L4.3 Clean Water Act (40 CFR Parts 100-149)

- 40 CFR Part 110, Discharges of Oil
- 40 CFR Part 112, Oil Pollution Prevention
- 40 CFR Part 116, Designation of Hazardous Substances
- 40 CFR Part 117, Determination of Reportable Quantities for Hazardous Substances
- 40 CFR Part 129, Toxic Pollutant Effluent Standards
- 40 CFR Part 131, Water Quality Standards
- 40 CFR Parts 141-149, Safe Drinking Water Act

L4.4 Hazardous Materials Transportation Act (49 CFR Parts 100-199)

- 49 CFR Part 130, Oil Spill Prevention and Response Plans
- 49 CFR Part 171, General Information, Regulations, and Definitions
- 49 CFR Part 172, Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
- 49 CFR Part 177, Carriage by Public Highway

L4.5 Occupational Safety and Health Administration (OSHA) (29 CFR Parts 1900-1926)

- 28 CFR Parts 1900-1910, Occupational Safety and Health Act
- 29 CFR Part 1904, Recording and Reporting Occupational Injuries and Illness
- 29 CFR Part 1910.120, Hazard Communication
- 29 CFR Part 1926, Safety and Health Regulations for Construction

L4.6 Solid and Hazardous Wastes (40 CFR Parts 239-299)

- 70 CFR Parts 201-211, Noise Abatement Programs
- 40 CFR Part 243, Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
- 40 CFR Part 260, Hazardous Waste Management System: General
- 40 CFR Part 261, Identification and Listing of Hazardous Waste
- 40 CFR Part 262, Standards Applicable to Generators of Hazardous Waste

- 40 CFR Part 263, Standards Applicable to Transporters of Hazardous Waste
- 40 CFR Part 273, Standards for Universal Waste Management
- 40 CFR Part 279, Standards for the Management of Used Oil

L4.7 Toxic Substances Control Act (TSCA) (40 CFR Parts 700-799)

- 40 CFR Part 710, TSCA Chemical Inventory Regulations
- 40 CFR Part 761, Polychlorinated biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions

L4.8 State Regulations

L4.8.1 State of Wyoming

- Wyoming Department of Environmental Quality (WDEQ), Wyoming Air Quality Standards and Regulations (WAQSR), Wyoming Environmental Quality Act (WEQA)
- WAQSR, Chapter 2, Ambient Standards
- WAQSR, Chapter 3, General Emissions Standards
- WAQSR, Chapter 6, Permitting Requirements
- WAQSR, Chapter 7, Monitoring Requirements
- WAQSR, Chapter 8, Non-attainment Area Regulations
- WAQSR, Chapter 9, Visibility Impairment/Particulate Matter Fine Controls
- WAQSR, Chapter 13, Mobile Sources
- WDEQ Water Quality Standards (WQS), Chapter 1, Surface Water Quality Standards
- WQS, Chapter 4, Regulations for Release of Oil and Hazardous Substances into Waters of the State
- WQS, Chapter 8, Quality Standards for Wyoming Groundwater
- WQS, Chapter 9, Wyoming Groundwater Pollution Control Permit
- WDEQ Solid and Hazardous Waste Division (SHWD) Hazardous Waste Permitting and Corrective Action
- SHWD Voluntary Remediation
- SHWD Inspection and Compliance
- SHWD Storage Tank Program

L4.8.2 State of Colorado

- Colorado Department of Public Health and Environment, Colorado Board of Health, Air Quality Control Commission, Solid and Hazardous Waste Commission, Water Quality Control Commission
- Air Quality Control Commission: Air Quality Standards, Designation and Emission Budgets, Common Provisions Regulation, Procedural Rules
- Air Quality Control Commission, Regulation Number 8, Control of Hazardous Air Pollutants

- Air Quality Control Commission, Regulation Number 19, Control of Lead Hazards
- Colorado Hazardous Waste Control Act, Title 25, Article 15, Parts 1, 2, 3, and 5
- Hazardous Waste Regulations, 6 Code of Colorado Regulations (CCR) 1007-3:
    - Part 2, Requirements for Siting of Hazardous Waste Disposal Sites
    - Part 3, Requirements for Inspection of Off-Site Hazardous Waste Disposal Sites
- Hazard Waste Regulations, 6 CCR 1007-2
- Water Quality Control Commission, Regulation 31: The Basic Standards and Methodologies for Surface Water
- Water Quality Control Commission, Regulation 41: The Basic Standards for Ground Water
- Colorado River Basin Salinity Control Act

L4.8.3 State of Utah

- Utah Department of Environmental Quality: Division of Air Quality, Division of Solid and Hazardous Waste, Division of Water Quality
- Utah Administrative Code, Title 19, Chapter 2, Section 109, Air Quality Standards
- Utah Administrative Code, Title 19, Chapter 2, Section 112, Generalized Condition of Air Pollution Creating Emergency – Sources Causing Imminent Danger to Health – Powers of Executive Director – Declaration of Emergency
- Utah Administrative Code, Title 19, Chapter 6, Hazardous Substances
- Utah Administrative Code, Title R315, Environmental Quality, Solid and Hazardous Waste
- Utah Administrative Code, Title 19, Chapter 5, Section 114, Spills or discharges of oil or other substance

L4.8.4 State of Nevada

- Nevada Division of Environmental Protection: Bureau of Air Pollution Control, Bureau of Waste Management, Bureau of Water Quality Planning
- Nevada Administrative Code, Chapter 445B.2201, Hazardous air pollutants and toxic regulated air pollutants: identification
- Nevada Administrative Code, Chapter 445B.22013, Hazardous air pollutants and toxic regulated air pollutants: prohibited discharge
- Nevada Administrative Code, Chapter 445B.22097, Standards of quality for ambient air
- Nevada Administrative Code, Chapter 459.952 – 459.9542, Regulation of Highly Hazardous Substances and Explosives
- Nevada Administrative Code, Chapter 590.700 – 590.790, Cleanup of Discharged Petroleum
- Nevada Administrative Code, Chapter 445A.121, Standards applicable to all surface water
- Nevada Administrative Code, Chapter 445A.1236, Standards for toxic materials applicable to designated waters
- Nevada Administrative Code, Chapter 445A.226 – 445A.22755, Action Levels for Contaminated Sites

- Nevada Administrative Code, Chapter 445A.345 – 445A.348, Notification of Release of Hazardous Substance

L5.0 HAZARDOUS MATERIALS MANAGEMENT PLAN REQUIREMENTS

The following sections provide specific methods for the Construction Contractor(s) to use in developing and implementing the HMMP. The Construction Contractor(s) shall provide TransWest with all information requested in the forms at the end of this document. Additionally, the Construction Contractor(s) shall complete other required federal, state, or local government forms.

L5.1 Certifications, Amendments, and Designation of Emergency Response Coordinator

L5.1.1 Certifications

The Construction Contractor(s) shall certify that all of the information provided in the HMMP is accurate and complete to the best of their knowledge. The Construction Contractor(s) shall also certify that they are committed to implementing the HMMP as written.

L5.1.2 Amendments

The Construction Contractor(s) shall agree to make all necessary and appropriate amendments to the HMMP and submit all such amendments to TransWest and the appropriate federal, state, or local government agencies (if required) within seven days of finding that an amendment is necessary.

Amendments to the HMMP shall be necessary under the following circumstances:

- Applicable laws or regulations are revised.
- A 100 percent or more increase of a previously disclosed hazardous material is used, stored, or transported to or from a Project facility or construction site.
- Handling of a previously undisclosed hazardous material subject to inventory requirements.
- A change in properties of a previously disclosed hazardous material (e.g., solid to liquid).
- A change of business address, name, or ownership.
- The list of emergency coordinator changes.
- The list of emergency equipment changes.

L5.1.3 Emergency Response Coordinator

The Construction Contractor(s) shall identify an Emergency Response Coordinator for hazardous materials management and emergency response. Two alternates shall also be identified. Business, residential, and mobile phone or pager numbers shall be provided for all three persons to allow for contact on a 24-hour basis. Primary and alternate Emergency Response Coordinators shall be knowledgeable of the chemicals and processes involved in construction of the Project, and will have the authority to commit Construction Contractor resources to implement the HMMP. The Emergency Response Coordinator and his/her alternates shall also have stop-work authority in case of non-compliance or danger to human health or the environment.

L5.2 Facilities Description and Inventory of Materials

L5.2.1 Site Maps

The Construction Contractor(s) shall provide site maps or facility maps in the HMMP that include storage and safety precautions for each location where hazardous materials and hazardous wastes are kept. At a minimum, the maps shall include the following information:

- Orientation and scale
- Total land area in square feet
- Entrances and exits
- Buildings and/or temporary trailers
- Parking areas
- Adjacent land uses (if business, indicate business name)
- Surrounding roads, storm drains, and waterways (including streams and wetlands)
- Locations of hazardous materials and hazardous waste storage areas
- Underground and aboveground storage tanks
- Containment or diversion structures (curbs, dikes, earthen berms, retention ponds)
- Shutoff valves and/or circuit breakers
- Location of emergency response materials and equipment
- Location of material safety data sheets (MSDSs), the HMMP, and the Spill Prevention and Response Plan
- Location of emergency assembly area

L5.2.2 Inventory

The Construction Contractor(s) shall maintain a complete inventory, using TransWest-provided forms, of all hazardous materials kept at Project facilities and/or construction sites. The inventory shall include MSDSs for such materials. During each work shift, the MSDSs shall be readily available to all employees. The MSDSs shall provide basic emergency response information for small and large releases of the hazardous materials. When and where bulk hazardous materials are used, the U.S. Department of Transportation's (USDOT) Emergency Response Guidebook shall be an acceptable reference. The Construction Contractor(s) shall be responsible for consulting with the relevant agencies if they handle extremely hazardous substances. The Construction Contractor(s) shall have a comprehensive hazardous materials management program in place and shall use non-hazardous substances in construction, operation, and maintenance activities to the extent possible.

L6.0 HAZARDOUS MATERIALS MANAGEMENT

L6.1 Types of Hazardous Materials

Hazardous materials used during Project construction may include petroleum products such as gasoline, diesel fuel, and hydraulic fluid; lubricating oils and solvents; cleansers; explosives; and other substances. Some of these materials will be used at material yards and on the right-of-way (ROW) to operate and maintain equipment during construction. Explosives may be used for blasting rock where needed to install transmission structure foundations or anchors and possibly on rare occasions to facilitate access road construction (see Appendix C – Blasting Plan). Small quantities of

other materials such as pesticides, herbicides, fertilizers, paints, and chemicals may be used during Project operation and maintenance activities. Pesticides and herbicides are hazardous materials and they will be used according to manufacturer labeling (see Appendix N – Noxious Weed Management Plan).

L6.2 Storage of Hazardous Materials

The Construction Contractor(s) shall use designated material yards for storing hazardous materials. The material yards shall be located more than 100 feet from wetlands and intermittent streams, 200 feet from water supply wells or springs, and more than 500 feet from perennial streams. The Construction Contractor(s) shall coordinate with the Compliance Inspection Contractor (CIC) when topographic conditions and/or limited space may require that one or more material yards lie within the 100-, 200-, or 500-foot distances above. Hazardous materials shall not be stored in areas subject to flooding or inundation. At the material yards, the Construction Contractor(s) shall:

- Limit the quantity and the amount of time that hazardous materials are stored near water bodies.
- Per the West-wide Energy Corridor (WWEC) Final Programmatic Environmental Impact Statement (EIS) BMP PHS-11 in the Final EIS (FEIS), the Applicant shall provide secondary containment for all on-site hazardous materials and waste storage areas. Secondary containment structures shall be sized to contain 110 percent of the volume of the largest single container, with sufficient freeboard to capture precipitation, where applicable. Areas that require secondary containment structures include liquid and hazardous waste drum storage areas, aboveground storage tanks, and tanker trucks that are parked at one location for more than two days. Secondary containment structures may include, but are not limited to:
    - Spill containment pallets in which 55-gallon or similar-sized drums can be placed.
    - Earthen berms or trenches lined with plastic sheeting.
    - Concrete containment pits or other impervious basins.
    - Double-walled aboveground storage tanks.
- Maintain adequate amounts of absorbent materials and containment booms to enable the rapid cleanup of a minor spill. The Spill Prevention and Response Plan (Appendix S) lists the actions to take should a minor or moderate to large spill occur.
- Provide adequate lighting for locations where hazardous materials are used and stored.
- Ensure that personnel trained in hazardous materials management are utilized to monitor activities at the material yards.

L6.2.1 Physical Storage Requirements

Storage Containers

In accordance with the WWEC Final Programmatic EIS BMP PHS-10 in the FEIS, all hazardous materials (including vehicle and equipment fuel) brought to the Project site will be in appropriate containers and will be stored in designated and properly designed storage areas with appropriate secondary containment features. Excess hazardous materials will be removed from the Project site after completion of the activities for which they are used.

Containers storing hazardous materials shall be compatible with the materials stored. If the container is damaged or is leaking material, the material shall be transferred to an undamaged container. The Construction Contractor(s) shall inspect containers at least once every week to verify the integrity of

the containers and containment systems. Containers used for transporting hazardous materials shall comply with applicable USDOT and state department of transportation requirements.

Incompatible Materials

Hazardous materials, including hazardous wastes, shall not be placed in containers that previously held incompatible wastes or materials.

Ignitable or Reactive Materials

Containers holding hazardous wastes, or materials that are reactive or may ignite, shall be located at least 50 feet from the material yard's property line. "No Smoking" signs shall be conspicuously placed where there is a hazard from ignitable or reactive material.

Explosives

See Appendix C – Blasting Plan.

Container Management

Containers holding hazardous wastes shall be kept closed at all times, except when it is necessary to add or remove contents. Before handling and/or transporting containers of hazardous wastes, the containers shall be inspected to ensure they are sealed properly. Per the Applicant Committed EMM TWE-61, hazardous materials shall not be drained onto the ground or into drainage areas.

Secondary Containment

Secondary containment structures may include, but are not limited to, those structures mentioned above.

Security

Hazardous materials shall be stored in secure areas to prevent damage, vandalism, or theft. All storage containers shall remain sealed when not in use. Storage areas shall be gated, locked, and/or guarded at night and/or during non-construction periods.

L6.2.2 Container Labeling Requirements

The Construction Contractor(s) shall comply with all labeling requirements for hazardous materials containers, including tanks used on-site to store accumulated hazardous wastes. The containers shall be labeled with the information below and as required per 40 CFR Part 262:

- The accumulation start date and/or the date the 90-day storage period began.
- The words: "Hazardous Waste."
- Warning words indicating the particular hazards of the waste, such as flammable, corrosive, reactive, or toxic.
- The name and address of the facility that generated the waste.

L6.3 Refueling and Servicing

Construction vehicles and equipment generally shall be refueled and serviced in designated areas more than 100 feet from wetlands and intermittent streams, at least 200 feet from water supply wells or springs, and more than 500 feet from perennial streams. Refueling locations generally shall be flat

to minimize the chance that a hazardous material spill could reach a water body. Fueling locations shall have spill kit and fire suppression equipment available.

In most cases, smaller rubber-tired vehicles shall be refueled and serviced at local gas stations or material yards. Tracked vehicles typically shall be refueled and serviced on-site. In some cases, pickup trucks or tankers shall be used to refuel and service construction vehicles on the ROW.

Washing of construction vehicles, such as concrete trucks, shall be allowed only in designated areas more than 100 feet from streams and wetlands. Washing areas shall be contained with barriers to prevent migration of wastewater and/or sediments into water bodies. Waste concrete material shall be removed and properly disposed of once it has hardened. In addition, all preventive measures shall be followed as they relate to vehicle washing procedures (see Appendix N – Noxious Weed Management Plan).

L6.4 Transportation of Hazardous Materials

Procedures for loading and transporting fuels and other hazardous materials shall meet the minimum requirements established by the USDOT, applicable state departments of transportation in Wyoming, Colorado, Utah, and Nevada, and local government requirements. Prior to transporting hazardous materials, appropriate shipping papers shall be completed. Transporting hazardous materials shall be performed by a hazardous material transport firm in accordance with USDOT regulations. Additionally, the Construction Contractor(s) shall ensure all handling or packaging of hazardous materials and all paperwork for transport of hazardous materials is performed by properly trained personnel in accordance with USDOT and applicable state regulations.

All hazardous materials used for the Project shall be properly stored in approved containers and labeled, including during transportation. Fuel trucks transporting fuel on-site shall travel only on approved access roads. Smaller containers shall be used on-site to transport needed amounts of hazardous materials to a specific location. Transfer of materials from large to small containers shall be performed using appropriate equipment, including pumps, hoses, and safety equipment; hand pouring techniques shall not be utilized. These smaller containers also shall be clearly labeled. Special provisions apply to transporting explosives (see Appendix C – Blasting Plan).

L6.5 Generating Hazardous Waste

L6.5.1 Prior to Construction Activities

Prior to the start of construction activities, the Construction Contractor(s) shall only purchase the amount of materials that are expected to be used during construction activities.

L6.5.2 During Construction Activities

The Construction Contractor(s) shall provide all drums (Department of Transportation Spec. 1A1 or 1A2), roll-off boxes, or other containers necessary to contain wastes generated during the performance of work, including wastes generated in response to spill response and cleanup activities, unless otherwise specified. The Construction Contractor(s) shall provide containment areas for liquids, hazardous wastes, and special wastes as required. The containment areas shall be impervious to the materials being stored and be kept in good condition. Temporary storage on the ROW shall not require protection from the weather. Temporary storage shall not exceed seven days.

During the Project's construction activities, the Construction Contractor(s) shall minimize the amount of hazardous wastes generated. To this end, the Construction Contractor(s) shall use alternative non-

hazardous materials when available; recycle usable materials such as oils, paints, and batteries to the maximum extent; and filter and reuse solvents and thinners whenever possible.

L6.5.3 After Construction Activities

The Construction Contractor(s) shall collect all hazardous waste(s) at the close of each workday and place the waste(s) in an approved location. The Construction Contractor(s) shall be responsible for proper packaging, labeling, marking, and storing of the waste(s). The Construction Contractor(s) shall keep hazardous, non-hazardous, special, and general trash wastes separate and shall not mix waste streams. If the Construction Contractor(s) cannot adequately classify a waste, the waste shall be assumed to be hazardous.

Table 1 below presents the U.S. Environmental Protection Agency (EPA) requirements for generators of hazardous waste. Generators are classified as Conditionally Exempt Small Quantity Generators (CESQG), Small Quantity Generators (SQG), or Large Quantity Generators (LQG). The section (§) references are to Title 40 CFR Part 261, which identifies and lists hazardous wastes and to Title 40 CFR Part 262, which presents the RCRA regulations for hazardous waste.

TABLE 1 EPA REQUIREMENTS FOR HAZARDOUS WASTE GENERATORS

REQUIREMENT	CESQG	SQG	LQG
Quantity Limits	≤100 kg/month ≤1 kg/month of acute hazardous waste ≤100 kg/month of acute spill residue or soil §261.5(a) and (e)	>100 <1,000 kg/month §262.34(d)	≥1,000 kg/month >1 kg /month of acute hazardous waste >100 kg/month of acute spill residue or soil Part 262 and §261.5(e)
EPA ID Number	Not required	Required §262.12	Required §262.12
On-Site Accumulation Quantity	≤1,000 kg ≤1 kg acute ≤100 kg of acute spill residue or soil §261.5(f)(2) and (g)(2)	≤6,000 kg §262.34(d)(1)	No limit
Accumulation Time Limits	None	≤180 days, or ≤270 days if the waste must be shipped more than 200 miles for disposal §262.34(d)(2) and (3)	≤90 days §262.34(a)
Storage Requirements	None	Basic requirements with technical standards for tanks or containers §262.34(d)(2) and (3)	Full compliance for management of tanks, containers, drip pads, or containment buildings §262.34(a)
Sent To:	State approved or RCRA permitted/interim status facility §261.5(f)(3) and (g)(3)	RCRA permitted/interim status facility §262.20(b)	RCRA permitted/interim status facility §262.20(b)
Manifest	Not required	Required §262.20	Required §262.20
Biennial Report	Not required	Not required	Required §262.41
Personnel Training	Not required	Basic training required §262.34(d)(5)(iii)	Required §262.34(a)(4)
Contingency Plan	Not required	Basic plan §262.34(d)(5)(i)	Full plan required §262.34(a)(4)

REQUIREMENT	CESQG	SQG	LQG
Emergency Procedures	Not required	Required §262.34(d)(5)(iv)	Full plan required §262.34(a)(4)
DOT Transport Requirements	Yes (if required by DOT)	Yes §262.30-262.33	Yes §262.30-262.33

L6.6 Disposal of Hazardous Waste

Prior to the start of construction activities, the Construction Contractor(s) shall assign personnel to dispose of hazardous wastes. The assigned personnel shall have completed training in the handling and disposal of hazardous wastes.

In accordance with the WWEC Final Programmatic EIS BMP PHS-12 and PHS-17 in the FEIS, the Applicant shall ensure that hazardous wastes, including wastes generated as a result of component cleaning, are properly containerized and removed periodically for disposal at appropriate off-site permitted disposal facilities. All Project-related hazardous wastes shall be disposed of in accordance with all applicable laws and regulations.

L6.7 Contaminated Containers

Containers that once held hazardous materials shall be considered as contaminated containers due to the possible presence of residual hazardous materials. To qualify as a non-hazardous waste, and to be handled as such, the containers shall meet the following requirements:

- The Construction Contractor(s) shall pump out, pour out, or aspirate the container's contents as much as possible to empty the container.
- A container that held compressed gas is empty when the pressure in the container approaches atmospheric pressure.

The actions below shall occur within one year of the container being emptied.

- If empty containers are less than five gallons, they may be disposed of as a non-hazardous solid waste or scrapped.
- If the empty containers are greater than five gallons, they must be handled in the following manner: returned to the vendor for re-use; sent to a drum recycler for reconditioning; or used or recycled on-site.

L6.8 Waste Oil Filters

Used metal canister oil filters can be managed as non-hazardous wastes if:

- They are thoroughly drained of oil that is "free flowing." Oil exiting drop-by-drop is not considered "free flowing."
- The filters are accumulated, stored, and transferred in a closed, rainproof container.
- The filters are transferred for the purposes of recycling.
- The filters are not terne-plated, which is an alloy of tin and lead. Terne-plated oil filters are a hazardous waste, exhibiting the hazardous characteristic of lead. Terne-plated oil filters not recycled must be managed as a hazardous waste.

L6.9 Used Lubricating Oil

Lubrication oil is considered used oil, as indicated below:

- Any oil refined from crude oil and as a result of use has been contaminated with physical or chemical impurities.
- Any oil that is no longer useful to the original purchaser due to extended storage, spillage, or contamination with non-hazardous impurities such as dirt, rags, and water.
- Spent lubricating fluids removed from a truck, heavy equipment, automobile, or bus.

Used oil may be a hazardous waste if:

- The concentrations of PCBs exceed 50 parts per million (ppm).
- Total halogens exceed 1,000 ppm.
- The oil is mixed with a hazardous waste.

Used oil not being burned or recycled shall be managed as a hazardous waste unless laboratory analysis determines that the oil is not hazardous.

L7.0 MITIGATION MEASURES

For a list of additional mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

ATTACHMENT A

SAMPLE FORMS FOR HAZARDOUS MATERIALS MANAGEMENT PLAN

Certification, Amendments, and Designation of Emergency Coordinator

The Construction Contractor(s) responsible for managing the material yards shall complete and submit the following information:

General Information

Business Name

Facility Street Address

City	County	Zip Code	Phone

Mailing Address (if different)

City	County	Zip Code	Phone

Emergency Coordinator

Primary Emergency Coordinator

Business Phone	24-hour Phone	Pager/Cellular Phone

First Alternate

Business Phone	24-hour Phone	Pager/Cellular Phone

Second Alternate

Business Phone	24-hour Phone	Pager/Cellular Phone

Note: Certification is only necessary if an SPCC Plan is required.

Emergency Contacts

Dial 911 for Emergency Response

Emergency Numbers

Emergency Response (Ambulance, Fire, Police, Sheriff, State Highway Patrol): Call 911

Poison Control Center (800) 456-7707

Nearest Hospitals (2) _____ Phone:_____

_____ Phone:_____

Clean-up Contractor _____ Phone:_____

Other (specify) _____ Phone:_____

Other (specify) _____ Phone:_____

Agency Notifications (to be made by the Proponent's environmental manager or environmental field supervisor or emergency response coordinator)

Wyoming Department of Environmental Quality	(307) 777-7937
Colorado Environmental Release and Incident Reporting	(877) 518-5608
Utah Department of Environmental Quality Hotline	(800) 458-0145
Nevada Division of Environmental Protection Hotline	(888) 331-6337

National Response Center (800) 424-8802

Other (specify) _____ Phone:_____

Other (specify) _____ Phone:_____

Note: The Construction Contractor(s) shall verify and update the emergency numbers on this page before and during Project construction.

Weekly Hazardous Material/Waste Inspection Log

For each item listed below, the Construction Contractor(s) shall indicate whether existing conditions are acceptable (A) or unacceptable (U). Resolution of all unacceptable conditions shall be documented. The Construction Contractor(s) shall inspect all storage facilities on a regular basis, but not less than weekly. The Construction Contractor(s) shall keep records on file of all inspections.

I. Storage Areas for Fuels, Lubricants, and Chemicals

General

A/U

_____ Material yard and storage areas secured
_____ National Fire Protection Association 704 system symbol posted in storage area or at material yard entrance
_____ Storage areas properly prepared and signed
_____ No evidence of spilled or leaking materials
_____ Incompatible materials separated
_____ All containers labeled properly
_____ All containers securely closed
_____ All containers upright
_____ No evidence of container bulging, damage, rust, or corrosion
_____ Material Safety Data Sheets (MSDS) available
_____ Hazardous Materials Management and Spill Prevention and Response plans available

Secondary Containment Areas

A/U

_____ Containment berm intact and capable of holding 110 percent of material stored
_____ Lining intact
_____ No materials overhanging berms
_____ No materials stored on berms
_____ No flammable materials used for berms

Compressed Gases

A/U

_____ Cylinders labeled with contents
_____ Cylinders secured from falling
_____ Oxygen stored at least 25 feet away from fuel
_____ Cylinders in bulk storage are separated from incompatible materials by fire barriers or by appropriate distance

II. Hazardous Waste Management

Waste Container Storage

A/U

_____ No evidence of spilled or leaking wastes
_____ Adequate secondary containment for all wastes
_____ Separate containers for each waste stream – no piles
_____ Waste area not adjacent to combustibles or compressed gases
_____ All containers securely closed
_____ Bungs secured tightly
_____ Open-top drum hoops secured
_____ All containers upright
_____ No evidence of container bulging, damage, rust, or corrosion
_____ Containers are compatible with waste (e.g., plastic liner for corrosives, metal liner for solvents)
_____ No smoking and general danger/warning signs posted

Waste Container Labeling

A/U

_____ Containers properly labeled
_____ Name, address, and EPA ID number or ID number of generator listed
_____ Accumulation start date listed
_____ Storage start date listed
_____ Chemical and physical composition of waste listed
_____ Hazardous properties listed

Non-hazardous Waste Areas

A/U

_____ No litter in material yard
_____ No hazardous wastes with trash such as contaminated soil, oily rags, or other oily materials
_____ Empty oil and aerosol containers are completely emptied for disposal as non-hazardous waste

APPENDIX M
HEALTH AND SAFETY PLAN

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ACRONYMS

AED	automatic external defibrillator
ANSI	American National Standards Institute
Applicant	TransWest Express LLC, also TransWest
Base	Project Base
BMP	Best Management Practice
CFR	Code of Federal Regulations
CPR	cardiopulmonary resuscitation
FEIS	Final Environmental Impact Statement
DIR	Division of Industrial Relations
EMM	Environmental Mitigation Measure
JSA	Job Safety Analysis
mph	miles per hour
NESC	National Electrical Safety Code
Nevada OSHA	Nevada Occupational Safety and Health Administration
NTP	Notice to Proceed
OHV	off-highway vehicle
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
Plan	Health and Safety Plan
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
ROD	Record of Decision
ROW	right-of-way
SCATS	Safety Consultation and Training Section
the Act	Occupational Safety and Health Act of 1970
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
USPS	United States Postal Service
WWEC	West-wide Energy Corridor

M1.0 INTRODUCTION

This Health and Safety Plan (Plan) describes the measures to be taken by TransWest Express LLC (TransWest or Applicant) and its Construction Contractor(s) to address potential health and safety issues and protect both workers and the public during construction, operation, and decommissioning of the TransWest Express Transmission Project (TWE Project or Project).

This Plan is prepared in accordance with Environmental Mitigation Measures (EMMs) TWE-51 *"The TWE Project will be designed, constructed, and operated to meet or exceed the requirements of the National Electrical Safety Code (NESC), U.S. Department of Labor, Occupational Safety and Health Administration [OSHA] standards, and the Applicant's requirements for safety and protection of landowners and their property"* and TWE-56 *"As part of the POD, the Applicant will provide a Health and Safety Plan, which will outline measures to protect workers and the general public during construction, operation, and decommissioning of the TWE Project. The Health and Safety Plan will identify applicable federal and state occupational safety standards, establish safe work practices, and define safety performance standards"*.

For a list of additional mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

M2.0 PLAN PURPOSE

This Plan describes the requirements for the health and safety program for the Project. The Construction Contractor(s) will be responsible for preparing and implementing these requirements through development of a health and safety management plan (HSM Plan) that is also in compliance with all local, state, and federal regulations pertaining to health and safety. The purpose of the HSM Plan is to identify the measures that will be implemented in order to minimize safety-related situations that could occur and provide procedures to assist in the protection of workers and the public during the construction phase of the Project.

The Construction Contractor's HSM Plan(s) will provide specific information for implementing EMMs TWE-51 and TWE-56, and the applicable mitigation measures listed in Section 8 of the TWE Project Plan of Development.

The management practices and activities in the HSM Plan are intended to accomplish the following objectives:

- Educate construction workers on the hazards associated with the Project and how to identify them; the safety measures that must be taken to prevent injury; how to identify potentially contaminated soils and/or groundwater; and the procedures for ensuring personnel receive necessary training.

- Identify federal and state occupational standards regarding occupational safety and safe work practices.

- Establish fire safety evacuation procedures.

- Explain the appropriate response actions for each safety hazard and develop and describe the procedures and mechanisms for responding to and reporting serious accidents to appropriate agencies and for notifying the appropriate authorities of safety issues.

- Identify requirements for temporary fencing around staging areas, storage yards, and excavation areas during construction or decommissioning activities, as well as appropriate measures to be taken during construction of the Project to limit public access to hazardous facilities.

- Designate environmental field representative(s) to be on site to observe, enforce, and document adherence to this Plan.

- Identify where medical kits are located.

M3.0 HEALTH AND SAFETY PLAN IMPLEMENTATION

The following subsections describe the requirements for the HSM Plan(s) that will be developed by the Construction Contractor(s) and implemented during construction of the Project. Similar to the HSM Plan(s) for construction, HSM Plan(s) developed for operation would address critical aspects of operations including, but not limited to, hazardous material and waste management, stormwater management, and monitoring for external impacting factors (e.g., seismic activity, landslides). Operating plans would establish detailed procedures, assign responsibilities, and establish self-auditing processes for evaluating overall effectiveness and sufficiency of operations. Mitigation strategies would be developed for both routine and off-normal operating conditions. Under normal operating conditions, health and safety impacts to the public from any of the approved systems would be minimal. Mitigation of impacts under failure modes for the various systems; however, would involve both design considerations and active emergency response measures.

Decommissioning involves activities similar to construction, and thus presents many of the same health and safety hazards. These hazards mainly affect workers, but some, including increased construction traffic and the presence of potentially hazardous work areas, also affect members of the public, albeit at low risk levels. Decommissioning phases are expected to last for shorter periods of time than the construction phase and may involve fewer specific steps. In addition, the majority of activities would occur within the right-of-way (ROW), and their related health and safety impacts would be imposed primarily on the deconstruction workforce. However, impacts to the public would also occur from activities occurring off the ROW such as material storage yards; component dismantlement; salvage recycling operations; and as a result of increased traffic on public roadways. Impacts to the public could also occur from unauthorized access to work sites and storage and recycling facilities.

M3.1 Project Workers and the Public

Workers are protected through the implementation of the HSM Plan. The public is protected by restricting public access to construction work areas; implementing appropriate site security measures, traffic control, dust control, and hazardous material management plans; by coordinating with emergency service providers; and notifying property owners of any hazardous operations to be conducted, such as blasting. Construction sites should be secured at the end of the workday to protect the equipment and the general public. The following subsections provide further details regarding the procedures to be utilized for the protection of workers and the public.

M3.1.1 Site Access and Security

The Construction Contractor(s) will develop a Project orientation training program. Project orientation training will include basic hazard awareness, site-specific hazards, safe working practices, and emergency procedures. Only personnel with a visible hard-hat decal, daily visitor pass, or other visible means of verifying that they have completed Project orientation training, will be allowed on any Project work area. Members of the public will not be allowed access to potentially hazardous facilities, including construction work sites and staging yards for materials and equipment. Visitors to any construction site or material yard must have a signed Safety and Environmental Visitor Form indicating that they have been apprised of basic hazards and environmental issues associated with the Project. Visitors must be escorted at all times by Project personnel, who have completed Project orientation training and are familiar with the Project site. In addition, access to material and equipment staged at substation sites and material yards will be restricted by means of fencing, locked gates, and/or posted security guards. Where fencing is used, it will be suitable to restrict transient traffic, off-highway vehicles (OHVs), and the public from accessing potentially hazardous areas. Existing gates on the ROW will be locked, monitored, or left open as determined by the property owner. Personal vehicles must be parked in designated locations, as determined by the Construction Contractor(s). Only approved Project vehicles will be allowed on construction sites, material yards, and transmission ROWs. Security guards will be stationed at major sites as necessary. Cameras and night lighting will be utilized where warranted.

M3.2 Safe Work Practices, Training, Documentation, and Reporting

The Construction Contractor(s) will maintain appropriate standards, safe work practices, hazard training, documentation, and reporting in accordance with their respective HSM Plans. As described in Section M4.1 Protect Workers and the Public, these plans will conform to the requirements of the OSHA.

M3.2.1 Safe Work Practices for Each Task

The Construction Contractor(s) will develop a task-specific Job Safety Analysis (JSA) for each construction task. The JSA provides a list of steps, potential hazards, safety procedures, and recommended controls. They specify equipment to be used, as well as inspection and training requirements.

Training on general safe work practices is a requirement for TransWest and its contractors, as specified in the Construction Contractor(s) HSM Plans. Training topics may also include heat illness prevention, cardiopulmonary resuscitation (CPR)/automatic external defibrillator (AED), first aid, emergency action and fire prevention, and safe driving. No horseplay or fighting will be tolerated. Drugs and alcohol are prohibited, and pets are not permitted on any Project site or ROW. Guns are prohibited on any Project site except for authorized security personnel or law enforcement officers. Unless otherwise posted, vehicles must not exceed 15 miles per hour (mph) along approved access roads, or 5 mph in construction yards. In addition, seatbelts must be worn in all motorized vehicles.

M3.2.2 Worker Training Procedures and Requirements

All Project personnel will participate in worker training and sign a roster verifying their attendance. Information from rosters will be logged into a spreadsheet for ease of verifying Project worker training attendance records. All attendees will be provided with a hard-hat decal or other visible means of verifying their attendance. Trade personnel will be required to receive essential skills and safety training through an appropriate apprenticeship program or equivalent, which qualifies them to perform the work of their trade. Non-trade personnel will be required to have received essential skills

and safety training appropriate to their job tasks through their employers' training programs. Records of all training will be available for audit as required.

M3.2.3 Hazard Training Requirements

Construction Contractor(s) shall have an appropriate training program in accordance with its health and safety practices, as well as federal, state, and local laws and regulations. Job-specific construction hazards may be addressed before work begins each day at a tailgate meeting. Typically, the daily tailgate meetings will include a review of the JSA for the work being performed. Other potential safety discussions could include site access, work practices, security, transportation of heavy equipment, traffic management, emergency procedures, wildlife encounters, and fire control and management. If the work plan changes later in the day, an additional tailgate meeting may be held. Anyone arriving at the site after the tailgate meeting will be briefed on the JSA and other tailgate issues discussed prior to entering the construction site, and will sign the tailgate roster.

M3.2.4 Contaminated Soils and/or Groundwater Awareness

Worker training will also address identification of and appropriate response actions for potentially contaminated soils and/or groundwater

M3.2.5 Safety Performance Standards

The Construction Contractor will monitor all Project-related workplace injuries and illnesses utilizing OSHA Recordkeeping and Reporting Standards. This includes recordable cases, as well as first aid cases. In addition, the Construction Contractor will monitor close calls and motor vehicle incidents reflecting standard OSHA metrics, including recordable cases and cases resulting in lost time.

The Construction Contractor(s) will provide the proper tools, equipment, personal protective equipment, and appropriate training for their respective personnel as needed to perform their specific job duties. All safety requirements will be implemented in accordance with OSHA safety standards.

M3.3 Federal and State Occupational Safety Standards

The Project will be constructed in accordance with the NESC and other relevant industry standards (e.g., American National Standards Institute [ANSI]) to insure that adequate safety clearances and provisions are provided. Safety measures including fencing, warning signs, and equipment grounding will be provided per code requirements. All construction personnel will be required to follow OSHA Standards throughout Project construction.

Section 18 of the Occupational Safety and Health Act of 1970 (the Act) encourages States to develop and operate their own job safety and health programs. OSHA approves and monitors such State plans. States must set job safety and health standards that are "at least as effective as" comparable federal standards. Most States adopt standards identical to federal ones. States have the option to promulgate standards covering hazards not addressed by federal standards. A State must conduct inspections to enforce its standards, cover public (State and local government) employees, and operate occupational safety and health training and education programs. States in the Project area with Approved Occupational Safety and Health Plans include Wyoming, Utah, and Nevada.

M3.3.1 Nevada

The Nevada State Plan is administered by the Division of Industrial Relations (DIR), Department of Business and Industry. Within the DIR, an enforcement section and consultation section have been established. Enforcement is provided by the Nevada Occupational Safety and Health Administration

(Nevada OSHA), and Consultation is provided by the Nevada Safety Consultation and Training Section (SCATS). The Nevada State Plan applies to all public and private sector employers in the State, with the exception of federal employees, the United State Postal Service (USPS), private sector maritime, employment on Indian Lands, and areas of exclusive federal jurisdiction.

Nevada adopts federal OSHA standards by reference and enforces OSHA standards contained within 29 Code of Federal Regulations (CFR), Parts 1910 (General Industry), 1926 (Construction) and 1928 (Agriculture). In addition, Nevada has adopted additional requirements to include: safety programs, cranes, steel erection, construction projects, asbestos, explosives, ammonium perchlorate, and photovoltaic system projects.

M3.3.2 Utah

The Utah Occupational Safety and Health Division is part of Utah's Labor Commission. The Utah State Plan applies to all public and private sector places of employment in the State, with the exception of federal employees, the USPS, private sector maritime, Hill Air Force Base, Tooele Army Depot which includes the Tooele Chemical Demilitarization Facility, and certain agricultural related operations (field sanitation and temporary labor camps), which are subject to federal OSHA jurisdiction. While Utah adopts most federal standards identically, the State periodically supplements federal standards with additional requirements.

M3.3.3 Wyoming

The Wyoming State Plan applies to all public and private sector places of employment in the State, with the exception of federal employees (including those employed at Yellowstone and Grand Teton National Parks), the USPS, private sector maritime, employment at Warren Air Force Base and at the Naval Petroleum and Oil Shale Reserve in Casper, and certain agricultural related operations (field sanitation and temporary labor camps), which are subject to federal OSHA jurisdiction.

The Wyoming State Plan adopts all federal standards identically except for 29 CFR Part 1910 Subparts A, B, and C, and Part 1926 Subparts A and B, which have been reworded to reflect the Wyoming's Safety Act. New standards are promulgated by the state of Wyoming within six months of promulgation by the Secretary of Labor. Wyoming cannot adopt standards that are more stringent than corresponding federal standards, but can adopt standards for industries not covered by federal OSHA. Wyoming has adopted the federal recordkeeping and reporting requirements identical to the federal rule, 29 CFR Part 1904.

M3.4 Potential Health and Safety Issues

Most occupational health and safety issues during the construction, operation, and decommissioning of electric power projects include, among others, exposure to physical hazards from use of heavy equipment and cranes; trip and fall hazards; exposure to dust and noise; falling objects; work in confined spaces; exposure to hazardous materials; and exposure to electrical hazards from the use of tools and machinery. Occupational health and safety hazards specific to electric power transmission projects primarily include:

- Live power lines
- Working at height on poles and structures
- Exposure to chemicals (primarily handling of pesticides (herbicides) used for ROW maintenance and exposure to polychlorinated biphenyls (PCBs) in transformers and other electrical components).

Additional health and safety issues include, but are not limited to the following:

- Working in or near traffic;
- Driving and hiking in rugged terrain;
- Working in inclement weather and in extremes of heat and cold;
- Coming into contact with poisonous snakes, spiders, and plants;
- Falling into excavation areas;
- Falling from structures or from ladders;
- Working with or around blasting materials;
- Working near energized electric facilities;
- Working in isolated areas prone to wildland fire;
- Working in areas located far from emergency medical services;
- Encountering buried utilities;
- Working around noisy equipment and/or helicopters; and
- Working near abandoned mines.

M3.4.1 Fire Control and Evacuation Procedures

Refer to Appendix H – Fire Protection Plan.

M3.4.2 Heavy Equipment Transportation and Traffic Management

Refer to Appendix U – Traffic and Transportation Management Plan.

M3.5 Response Actions for Safety Hazards

At least two personnel on each construction crew should have first aid, CPR, AED, and blood borne pathogen training. Fire safety personnel will periodically inspect work along the ROW and s be certified emergency responders. Crews will also be familiar with evacuation routes should emergency evacuation be needed. Additional emergency support will be available by calling 911 directly or by contacting the Project Base or the Construction Contractor's support office (collectively, Base), which provides direct lines to emergency medical services, life flight, fire protection, County Sheriff's Departments, and State Highway Patrols. Base will be staffed by personnel that are trained to monitor construction field activities, both in the air and on the ground. Base will provide and/or coordinate necessary emergency responses, notifications, and formally document events. When appropriate, Base will trigger a call to emergency services. Crews will have direct contact with Base by means of radios, cell phones, and satellite phones if necessary. While working through the appropriate procedures, Base will provide the following support:

- Dispatching field security agents and field safety advisors to the scene of an incident/event.
- Beginning an incident/event timeline as an event unfolds, documenting times when actions or events occur.
- Launching a wide variety of notifications to Project and TransWest leadership. These notifications will be made to different distribution lists based on the level and type of incident/event. Notifications will be made within minutes of an event and contain information regarding who, what, when, where, any action taken, and the status of the incident/event.
- Staying in communication with the field personnel reporting an incident/event and the procedure will ensure expeditious response and accurate information.

M3.5.1 Authority Notification

Construction crews will immediately alert Base of all incidents. Base will then be responsible for notifications to appropriate Project personnel and TransWest management. These notifications will be made to different distribution lists based on the level and type of incident/events. Notifications will be made within minutes of an event and provide information regarding who, what, when, where, any action taken, and the status of the incident/event.

M3.5.2 Fire Safety Evacuation

The Construction Contractor(s)HSM Plan will also include fire safety evacuation procedures and incorporate the Fire Protection Plan. As previously described, the Construction Contractor will maintain a Base operation, which will be available during all work hours, to assist with effective communications with crews, emergency agencies, and Project management. Base will facilitate evacuation/rescue efforts if required. An evacuation route map showing safe exit routes and assembly locations will be shared as part of the worker training orientation. In the event of fire or other site emergency, the following evacuation procedures will be followed to track personnel leaving the work site:

- At each work site the designated point of contact will verify the current head count and notify Base.
- Base will notify fire dispatch and emergency responders of personnel locations, headcount, rally points, and headings to assist in evacuation operations.
- Radios and global positioning system tracking units will be monitored at Base. Updated information will be relayed to Base as needed.
- Upon arrival at the rallying points, all personnel to be evacuated will be required to checkout with Base before leaving.

M3.5.3 Medical Aid Kit Locations

Facilities/areas such as substations and construction yards will contain first aid kits that are appropriate for the number of personnel working at the respective sites. First aid kits and fire extinguishers will also be stored in Project vehicles. An AED will be maintained at each terminal site.

M3.5.4 Reporting Serious Accidents

As previously described, Base will monitor field personnel and maintain radio communications with a designated point of contact at each work site. All incidents will be reported immediately to Base, which will initiate notifications as described previously. In addition, TransWest may have environmental monitors, field safety advisors, fire marshals, and security agents in the field to monitor, respond to, and report any incidents.

M3.6 Environmental Field Representative(s)

A field representative will be designated as the Construction Contractor's field fire, safety, and security team lead. In this role, the field representative will be responsible for safety, fire preparedness, security, and Project Base operations and will provide management oversight for Project personnel fulfilling these roles. The field representative will work closely with these individuals to implement the HSM Plan during construction.

APPENDIX N
FRAMEWORK NOXIOUS WEED MANAGEMENT PLAN

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ACRONYMS

°F	degrees Fahrenheit
ACEC	Area of Critical Environmental Concern
APHIS	Animal and Plant Health Inspection Services
Applicant	TransWest Express LLC, also TransWest
BA	Biological Assessment
BE	Biological Evaluation
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	Biological Opinion
CCR	Colorado Code of Regulations
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWMA	Cooperative Weed Management Area
EDRR	Early Detection Rapid Response
EMM	Environmental Mitigation Measure
EPA	Environmental Protection Agency
ESA	Endangered Species Act of 1973
ft	feet
FEIS	Final Environmental Impact Statement
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FLPMA	Federal Land Policy and Management Act of 1976
GPS	global positioning system
ISA	Instant Study Area
mph	miles per hour
MSDSs	Material Safety Data Sheets
NEPA	National Environmental Policy Act
NISIMS	National Invasive Species Information Management System
NTP	Notice to Proceed
ORV	off-road vehicle
Plan	Noxious Weed Management Plan
PAR	Pesticide Application Record
POD	Plan of Development
POEA	polyoxyethyleneamine
Project	TransWest Express Transmission Project, also TWE Project
psi	pounds per square inch
PUP	Pesticide Use Proposal
Reclamation	Bureau of Reclamation
ROD	Record of Decision
ROW	right-of-way
SRMA	Special Recreation Management Area
SUP	Special Use Permit
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
U.S.C.	United States Code
UDWR	Utah Division of Wildlife Resources
URMCC	Utah Reclamation Mitigation and Conservation Commission
USDA	United States Department of Agriculture
USDOI	United States Department of Interior

USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WEAP	Worker Environmental Awareness Program
WMA	Wildlife Management Area
WWPC	Wyoming Weed and Pest Control Act of 1973

N1.0 INTRODUCTION

This framework Noxious Weed Management Plan (Plan) sets forth the methods TransWest Express LLC (TransWest or Applicant) and its Construction Contractor(s) will undertake to prevent, mitigate and control the spread of noxious and invasive weeds during construction, operation and maintenance of the TransWest Express Transmission Project (TWE Project or Project).

Federal Invasive Species Executive Order 13112 defines an invasive plant as an alien, non-native, species whose introduction causes or is likely to cause economic or environmental damage or harm to human health (U.S. Federal Register 1999). A noxious weed is any plant designated by a federal, state, or county government as injurious to public health, agriculture, recreation, wildlife or property.

Road construction and other ground-disturbing activities associated with construction, operation and maintenance of the Project could potentially allow noxious weed species to establish in new locations or for a pre-existing noxious weed location to increase in extent and/or density. Prevention, treatment, monitoring, and documentation measures, as described in this Plan, would reduce the probability of this occurring as a result of the TWE Project. This Plan describes the status of noxious weed species in the Project area, the regulatory agencies responsible for the control of noxious and invasive weeds, and steps that TransWest and its Construction Contractor(s) would take to prevent the establishment and spread of noxious weed species due to Project construction, operation and maintenance activities. In addition to providing updated information contained within this framework, the final Plan would include information on locations of weed problem areas within the Project footprint and proposed treatment methods as applicable.

N1.1 Plan Purpose

The purpose of this framework Plan is to describe and recommend methods for managing noxious weeds during and after construction of the TWE Project that would meet federal and state regulatory requirements and guidelines for noxious weed management. These methods are described in this Plan as follows: 1) plan purpose, goals, and timeline; 2) noxious weed management practices and agency requirements; 3) the use of herbicides; and 4) monitoring. This document provides a template for the final Plan to be developed by the Construction Contractor(s).

The focus of noxious weed control efforts is to prevent new infestations and to prevent existing infestations from expanding (as documented by pre-construction surveys) as a result of Project activities. TransWest is only responsible for the control of noxious weeds that are a result of construction-related, surface-disturbing activities. TransWest is not responsible for noxious weed species that occur adjacent to Project areas or for controlling or eradicating a species that was present prior to the Project. For example, Canada thistle (*Cirsium arvense*) is widespread across large portions of the Project area. Eradication of these infestations is not the responsibility of TransWest and would not be attempted, although containment would be the goal where required by state regulations.

Table N1 provides the Applicant committed mitigation measures and BLM Field Office stipulations along the Agency Preferred Alternative from the Final Environmental Impact Statement (FEIS) which may be applicable to this Plan. For a list of additional mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

TABLE N1 APPLICANT COMMITTED AND BLM FIELD OFFICE NOXIOUS WEED MANAGEMENT MEASURES

MEASURE CATEGORY	NOXIOUS WEED BMP, DESIGN FEATURES, AND BLM FO-SPECIFIC STIPULATIONS
Applicant Committed Environmental Mitigation Measures	
Project Design, Access, and Construction (site restoration and clean-up)	TWE-17
Groundwater, Surface Water, and Wetlands (water quality)	TWE-22
Vegetation and Soils Management (vegetation management and noxious weeds)	TWE-26
Ecological Resources (ecological, special status species and habitats)	TWE-32, TWE-33
Hazardous Materials, Waste, and Wastewater Management (hazardous materials, waste management)	TWE-61, TWE-62
Fire Protection	TWE-64
Wyoming BLM Field Offices	
BLM Rawlins Field Office	OHV use limited to designated roads and vehicle routes in the Upper Platte SRMA and Red Rim-Daley Wildlife Habitat Management Area.
Colorado BLM Field Offices	
BLM Little Snake Field Office	Developed recreation sites are NSU.

N1.2 Plan Updates

The Plan will be updated for the Notice to Proceed (NTP) POD based on the final engineering and design, results of pre-construction field surveys, and continued agency coordination. The Construction Contractor will be responsible for preparing and implementing the final Plan.

N1.3 Goals

The goals of this Plan are to: 1) prevent the spread of existing noxious weeds; and 2) avoid noxious weed invasion into new sites during and following construction of the TWE Project. This would be accomplished by executing agency requirements to:

- Prevent and manage the spread of noxious weeds;
- Implement weed control measures for the TWE Project;
- Use herbicides safely; and
- Monitor noxious weed management effectiveness.

Information gathered during pre-construction surveys and provided by land management agencies may be used to monitor and control the spread of noxious weeds on the TWE Project right-of-way (ROW). Proposed noxious weed management measures are listed in this document along with relevant regulatory requirements.

N1.4 Agency Regulations

Federal and state agency regulations are presented in the following section. If any special management areas are crossed by the TWE Project, then additional requirements would be

coordinated with the appropriate agency. In addition, Table N2 provides a list of jurisdictions, contacts, and weed management requirements for the TWE Project. Table N2 is incomplete at this time and will be filled in once the selected Agency Preferred Alternative has been identified.

TABLE N2 AGENCY WEED PERSONNEL CONTACT INFORMATION AND COMMENTS FOR THE TWE PROJECT

AGENCY	CONTACT/NUMBER	WEED MANAGEMENT REQUIREMENTS/REQUESTS	TYPE OF GIS DATA PROVIDED	COMMENTS
Wyoming				
BLM Wyoming State Office	Kenneth Henke, Natural Resource Specialist 307-775-6041 khenke@blm.gov			
BLM Rawlins Field Office	Susan Foley, Soil Scientist 307-328-4221 sfoley@blm.gov			
Carbon County Weed and Pest Control District	Reese Irvine, Supervisor 307-324-6584 or 307-320-8001 ccwpsupervisor@gmail.com			
Sweetwater County Weed and Pest Control District	Dan Matson, Supervisor 307-273-9683 swwp1@bvea.net			
NRCS Rock Springs Field Office - Sweetwater County Conservation District	Jeff Lewis, District Conservationist 307-362-3062, ex. 106 jeff.lewis@wy.usda.gov			
NRCS Saratoga Field Office – Carbon County	Mark Shirley, District Conservationist 307-326-5657, ex. 101 mark.shirley@wy.usda.gov			
Colorado				
BLM Colorado State Office	Carol Dawson, Botanist 303-239-3725 cdawson@blm.gov			
BLM Little Snake Field Office	Christina Rhyne, Rangeland Management Specialist 970-826-5001 crhyne@blm.gov			
BLM White River Field Office	Mary Taylor, Rangeland Management Specialist 970-878-3807 m6taylor@blm.gov			
Colorado Department of Agriculture	Steve Ryder, State Weed Coordinator 303-869-9034 steve.ryder@state.co.us			

AGENCY	CONTACT/NUMBER	WEED MANAGEMENT REQUIREMENTS/REQUESTS	TYPE OF GIS DATA PROVIDED	COMMENTS
	Jeanne Ring, State Survey Coordinator (contact person for exotic pest surveys and data) 303-869-9076 jeanne.ring@state.co.us			
Moffat County Noxious Weed Management Program	Gary Brannan, Pest Management Manager 970-824-9180 jgoodnow@moffatcounty.net			
NRCS Craig Field Office - Moffat County	District Conservationist 970-824-3476			
Utah				
BLM Utah State Office	Alan Bass, Rangeland Management Specialist 801-539-4149 abass@blm.gov			
BLM Cedar City Field Office	Craig Egerton, AFOM for Renewable Resources (435) 865-3089 cegerton@blm.gov			
BLM Fillmore Field Office, including the Little Sahara National Recreation Area	Weed Program Coordinator 435-743-3100			
BLM Richfield Field Office	Weed Program Coordinator 435-896-1500			
BLM Vernal Field Office	Weed Program Coordinator 435-781-4400			
Manti La Sal National Forest	Karlton Moss, Rangeland Management Specialist 435-636-3304 kmoss@fs.fed.us			
Uinta National Forest	Weed Program Coordinator 801-999-2103			
Northwest Manti WMA—Dairy Fork and Lake Fork Units; North Nebo WMA—Spencer Fork Unit; and South Nebo WMA—Triangle Ranch Unit	UDWR Central Region, Weed Program Coordinator 801-491-5678			

AGENCY	CONTACT/NUMBER	WEED MANAGEMENT REQUIREMENTS/REQUESTS	TYPE OF GIS DATA PROVIDED	COMMENTS
Tabby Mountain WMA—Rabbit Gulch Unit and Sand Wash/Sink Draw Conservation Easement; and Currant Creek WMA—Wildcat Unit	UDWR Northeastern Region, Weed Program Coordinator 435-781-9453			
Utah Reclamation Mitigation and Conservation Commission	Weed Program Coordinator 801-524-3146			
County Weed Supervisor for Beaver County	Kevin Whicker 435-438-6461 kwhicker@beaver.state.ut.us			
County Weed Supervisor for Duchesne County and West Uintah Basin CWMA	Ron Johnson 435-738-2745 weeds@co.duchesne.ut.us			
County Weed Supervisor for Iron County, including Iron County Agricultural Protection Areas	Kacy Adams 435-559-1408 kacy.adams@ironcounty.net			
County Weed Supervisor for Juab County	Kevin Bailey 435-623-1593 juabweed@co.juab.ut.us			
County Weed Supervisor for Millard County	Terry Scottorn 435-743-5412 tscottorn@co.millard.ut.us			
County Weed Supervisor for Sanpete County	Scott Rasmussen 435-835-6442 spotfaux@cut.net			
Sanpitch CWMA (Juab, Millard, Sanpete, and Utah counties)	Robert Bessey 435-896-8965			
County Weed Supervisor for Uintah County and Uintah Basin CWMA	Nathan Belliston 435-789-1073 nbelliston@co.uintah.ut.us			
County Weed Supervisor for Utah County	Aaron Eager 801-851-8638 aarone.ucpw@state.ut.us			
Utah County CWMA	Craig Searle, Manager at Public Works Weed Control 801-370-8638			
County Weed Supervisor for Wasatch County	Quenton Lewis 435-657-3282			

AGENCY	CONTACT/NUMBER	WEED MANAGEMENT REQUIREMENTS/REQUESTS	TYPE OF GIS DATA PROVIDED	COMMENTS
	435-654-1661 glewis@co.wasatch.ut.us			
Wasatch County CWMA	Stephen Smith 435-657-1465 ssmith@shadowlink.net			
Utah Department of Agriculture and Food	Rich Riding, State Weed Specialist 801-538-7186 rriding@utah.gov			
NRCS Beaver Field Office	District Conservationist 435-438-5092			
NRCS Cedar City Field Office	District Conservationist 435-586-2429			
NRCS Ephraim Field Office	District Conservationist 435-283-8004			
NRCS Fillmore Field Office	District Conservationist 435-743-6655			
NRCS Nephi Field Office	District Conservationist 435-623-0342			
NRCS Provo Field Office	District Conservationist 801-377-5580			
NRCS Roosevelt Field Office	District Conservationist 435-722-4621			
NRCS Vernal Field Office	District Conservationist 435-789-2100			
BOR Upper Colorado Region – Provo Area Office (Strawberry Valley Project)	Weed Program Coordinator 801-379-1101 (general number)			
Nevada				
BLM Nevada State Office	Mark Coca 775-861-6475 775-861-6712 mcoca@blm.gov			
BLM Caliente Field Office	Weed Program Coordinator 775-726-8100			
BLM Las Vegas Field Office, including Beaver Dam Slope ACEC, Mormon Mesa ACEC, Las Vegas Valley SRMA,	Weed Program Coordinator 702-515-5000			

AGENCY	CONTACT/NUMBER	WEED MANAGEMENT REQUIREMENTS/REQUESTS	TYPE OF GIS DATA PROVIDED	COMMENTS
Nelson/Eldorado SRMA, Rainbow Gardens ACEC, River Mountains ACEC, Sunrise Mountain ISA, Sunrise Mountain SRMA				
Clark County Wetlands Park	Brandon, Senior Program Administrator 702-455-7522 wetlands@clarkcountynv.gov			
Moapa Indian Reservation	Moapa Band of Paiutes Business Office, Weed Program Coordinator 702-865-2787			
Clark County Public Works (Vector Control)	Weed Program Coordinator 702-455-6000 InTheWorks@ClarkCountyNV.gov			
Lincoln County	Tri-County Weed Control Program, Weed Program Coordinator 775-289-6341			
Nevada Department of Agriculture	Jamie Greer, Noxious Weed Program Coordinator 775-353-3640 jgreer@agri.nv.gov			
NRCS Caliente Field Office	Cory Lytle, District Conservationist 775-726-3101 cory.lytle@nv.usda.gov			
NRCS Las Vegas Service Center	Teri Knight, District Conservationist 702-407-1400 teri.knight@nv.usda.gov			
BOR Lower Colorado Regional Office	Weed Program Coordinator 702-293-8000 (general number)			

N1.4.1 All Lands

Relevant regulations applicable to all lands include:

- Noxious Weed Act of 1974 -- Public Law 93-629 (7 United States Code [U.S.C.] §2801 et seq.; 88 Stat. 2148)
- U.S. Environmental Protection Agency (EPA) Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA; 7 Code of Federal Regulations [CFR] Part 136, 40 CFR Parts 140-189)
- Clean Water Act (CWA) Sections 303(d) and 404
- Endangered Species Act (ESA) of 1973, as amended Section 7(a)(2)
- U.S. Department of Agriculture (USDA) State Noxious-Weed Seed Requirements Recognized in the Administration of the Federal Seed Act – 7 CFR Part 201 (USDA 2011)
- Noxious Weed Control and Eradication Act of 2004, 7 U.S.C. §§7781-7786, Subtitle E
- Plant Protection Act of 2000, 7 U.S.C. §7701 *et* seq. (supersedes the Federal Executive Order 13112 of February 3, 1999, on Invasive Species)
- National Invasive Species Act of 1996, 16 U.S.C. § 4701
- Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, 16 U.S.C. §4701

N1.4.2 Bureau of Land Management

Relevant regulations applicable to BLM lands include:

- Federal Land Policy and Management Act (FLPMA) Sec. 101(a)(8)
- USDOI Manual 517 DM 1—Integrated Pest Management Policy (USDOI 2007)
- Final Vegetation Treatments Using Herbicides Programmatic EIS (BLM 2007)
- BLM Integrated Vegetation Management Handbook H1740-2 (BLM 2008)
- BLM Terms and Conditions of Right-of-Way Grants and Temporary Use Permits 43 CFR 2881.2
- BLM Field Office Resource Management Plans

N1.4.3 United States Forest Service

Relevant regulations applicable to U.S. Forest Service (USFS) lands include:

- FLPMA Sec. 101(a)(8)
- Forest Service Handbook 2109.14 (USFS 1994)

- Forest Service Manual 2000 Zero Code 2080 – Servicewide and Region 4 (USFS 2001, 2011a)
- Forest Service Manual 2000 Zero Code 2150 - Servicewide, Regions 2 & 4, and Uinta National Forest (USFS 1988, 2003, 2012, 2013a)
- Forest Service Manual 2000 Zero Code 2900 – Servicewide (USFS 2011b)
- National Forest Resource Management Plans

N1.4.4 Bureau of Reclamation

Relevant regulations applicable to Bureau of Reclamation (Reclamation) lands include:

- FLPMA Sec. 101(a)(8)
- USDOI Manual 517 DM 1—Integrated Pest Management Policy (USDOI 2007)

N1.4.5 Utah Reclamation Mitigation and Conservation Commission

Relevant regulations applicable to Utah Reclamation Mitigation and Conservation Commission (URMCC) lands include:

- FLPMA Sec. 101(a)(8)
- USDOI Manual 517 DM 1—Integrated Pest Management Policy (USDOI 2007)

N1.4.6 State of Colorado

Relevant regulations applicable to State of Colorado lands include:

- Colorado Noxious Weed Act (Title 35, Article 5.5, Sections 35-5.5-104.5 to 35-5.5-118)
- Colorado Pesticide Act, Title 35, Article 9, Section 35-9-118
- Colorado Code of Regulations (CCR) 8 CCR 1206-2

N1.4.7 State of Nevada

Relevant regulations applicable to State of Nevada lands include:

- Nevada Revised Statutes: Chapter 555.005-555.5570 —Control of Insects, Pests, and Noxious Weeds

N1.4.8 State of Utah

Relevant regulations applicable to State of Utah lands include:

- Utah Noxious Weed Act (Rule R68-9, Title 4, Chapter 17, Sections 1 to 11)
- Utah Pesticide Control Act (Rule R68-7, Title 4, Chapter 14, Sections 1 to 13)
- County Weed Supervisors from Beaver, Duchesne, Iron, Juab, Millard, Sanpete, Uintah, Utah, and Wasatch counties

N1.4.9 State of Wyoming

Relevant regulations applicable to State of Wyoming lands include:

- Wyoming Weed and Pest Control Act of 1973 (Title 11, Chapter 5, Section 11-5-101 to 11-5-406)
- Wyoming Environmental Pesticide Control Act of 1973 (Title 35, Chapter 7, Section 35-7-350 to 35-7-376)
- County Weed and Pest Control Districts in Carbon and Sweetwater counties

N1.5 Timeline

TransWest may be required to treat noxious weeds within the ROW, access roads, and all other areas disturbed during construction, operation and maintenance of the TWE Project. The schedule and timing of such treatments will be determined during the National Environmental Policy Act (NEPA) review process and set forth as conditions of approval in the ROW grants or special use authorizations.

N1.6 Responsible Parties

TransWest will have the overall responsibility of directing and monitoring noxious weed management efforts for the TWE Project. The Construction Contractor(s) may retain the services of a company who specializes in noxious weed management to implement the protocols identified in this Plan during and following construction. It is anticipated that post-construction noxious weed monitoring would occur concurrently with the practices outlined in the Reclamation Plan (Appendix Q), as appropriate.

N2.0 NOXIOUS WEED MANAGEMENT PLAN

N2.1 State- and County-Listed Noxious Weeds

Tables N3 through N6 contain a list of all listed federal, state, and county noxious weed species for all Project states and identifies whether they are known or expected to occur within the Project area based on their recorded presence in the counties where the TWE Project is located. The BLM and USFS use the most current federal and state noxious weed lists for managing weeds on federal lands. The most current federal and state noxious weed lists will be used for the Moapa Indian Reservation, unless otherwise notified during Tribal coordination.

TABLE N3 COLORADO NOXIOUS WEEDS AND POTENTIAL FOR OCCURRENCE IN COLORADO PROJECT COUNTY (MOFFAT)

SPECIES NAME[1]	FEDERAL NOXIOUS STATUS[2]	COLORADO NOXIOUS STATUS[3]	PRESENCE IN COLORADO PROJECT COUNTY[4,5]	MANAGEMENT TECHNIQUES PERMITTED AND REQUIRED BY COLORADO NOXIOUS WEED ACT
Velvetleaf (*Abutilon theophrasti*)	-	C	-	Elimination not required.
Hardheads, Russian knapweed (*Acroptilon repens, Centaurea repens*)	-	B	Moffat	Elimination recommended or required, depending on location. Techniques are limited to herbicides approved by Commissioner and mowing.
Jointed goatgrass (*Aegilops cylindrica*)	-	B	-	Elimination recommended or required, depending on location. Techniques are limited to herbicides approved by Commissioner and hand-pulling, digging, or tilling
Camelthorn (*Alhagi maurorum*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and digging.
Garlic mustard (*Alliaria petiolata*)	-	Watch	-	Elimination not required.
Yellowtuft (*Alyssum corsicum*, *A. murale*)	-	Watch	-	Elimination not required.
Common bugloss (*Anchusa officinalis*)	-	Watch	-	Elimination not required.
Corn chamomile (*Anthemis arvensis*)	-	B	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling, or digging.
Stinking chamomile (*Anthemis cotula*)	-	B	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Lesser burdock (*Arctium minus*)	-	C	Moffat	Elimination not required
Absinthium (*Artemisia absinthium*)	-	B	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Giant reed (*Arundo donax*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging. Any efforts to physically remove plants must prevent fragmentation as stem fragments are considered plant propagules.
Onionweed (*Asphodelus fistulosus*)	Noxious – Terrestrial	Watch	-	N/A
Elongated mustard (*Brassica elongata*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging
Asian mustard (*Brassica tournefortii*)	-	Watch	-	Elimination not required.
Cheatgrass (*Bromus tectorum*)	-	C	Moffat	Elimination not required.
White bryony (*Bryonia alba*)	-	Watch	-	Elimination not required.

SPECIES NAME[1]	FEDERAL NOXIOUS STATUS[2]	COLORADO NOXIOUS STATUS[3]	PRESENCE IN COLORADO PROJECT COUNTY[4,5]	MANAGEMENT TECHNIQUES PERMITTED AND REQUIRED BY COLORADO NOXIOUS WEED ACT
Flowering rush (*Butomus umbellatus*)	-	Watch	-	Elimination not required.
Whitetop (*Cardaria draba, Cardaria* spp.)	-	B	Moffat	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Spiny plumeless thistle (*Carduus acanthoides*)	-	B	Moffat	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Nodding plumeless thistle, musk thistle (*Carduus nutans*)	-	B	Moffat	Elimination recommended or required, depending on location. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Woolly distaff thistle (*Carthamus lanatus*)	-	Watch	-	Elimination not required.
Caraway (*Carum carvi*)	-	B	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Diffuse knapweed (*Centaurea diffusa*)	-	B	Moffat	Elimination recommended or required, depending on location. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Tyrol knapweed (*Centaurea nigrescens*, SYN= *C. pratensis*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Yellow star-thistle (*Centaurea solstitialis*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Squarrose knapweed (*Centaurea virgata*, SYN=*C. squarrosa*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Spotted knapweed (*Centaurea stoebe* ssp. *micranthos*, SYN=*C. maculosa*)	-	B	Moffat	Elimination recommended or required, depending on location. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Rush skeletonweed (*Chondrilla juncea*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Chicory (*Cichorium intybus*)	-	C	-	Elimination not required.
Canada thistle (*Cirsium arvense*)	-	B	Moffat	Elimination required. Techniques are limited to herbicides approved by Commissioner and mowing.
Bull thistle (*Cirsium vulgare*)	-	B	Moffat	Elimination recommended or required, depending on location. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Oriental virginsbower (*Clematis orientalis*)	-	B	Moffat	Elimination required. Techniques are limited to herbicides approved by Commissioner and digging.
Poison hemlock	-	C	Moffat	Elimination not required.

SPECIES NAME[1]	FEDERAL NOXIOUS STATUS[2]	COLORADO NOXIOUS STATUS[3]	PRESENCE IN COLORADO PROJECT COUNTY[4,5]	MANAGEMENT TECHNIQUES PERMITTED AND REQUIRED BY COLORADO NOXIOUS WEED ACT
(*Conium maculatum*)				
Field bindweed (*Convolvulus arvensis*)	-	C	Moffat	Elimination not required.
Purple pampas grass (*Cortaderia jubata*)	-	Watch	-	Elimination not required.
Common crupina (*Crupina vulgaris*)	Noxious – Terrestrial	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Dodder (*Cuscuta* spp. – except for natives)	Noxious – Parasitic	-	Moffat	Elimination not required. There may be some special status species in this genus which should not be managed as noxious weeds.
Gypsyflower, houndstongue (*Cynoglossum officinale*)	-	B	Moffat	Elimination recommended or required, depending on location. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Yellow nutsedge (*Cyperus esculentus*)	-	B	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Scotch broom (*Cytisus scoparius*)	-	Watch	-	Elimination not required.
Fuller's teasel (*Dipsacus fullonum*)	-	B	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Cutleaf teasel (*Dipsacus laciniatus*)	-	B	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Brazilian waterweed, Brazilian egeria (*Egeria densa*)	-	Watch	-	Elimination not required.
Common water hyacinth (*Eichhornia crassipes*)	-	Watch	-	Elimination not required.
Russian olive (*Elaeagnus angustifolia*)	-	B	Moffat	Elimination recommended or required, depending on location. Techniques are limited to herbicides approved by Commissioner and hand-pulling, digging, or sawing.
Quackgrass (*Elymus repens*)	-	C	Moffat	Elimination not required.
Codlins and cream, hairy wouldow-herb (*Epilobium hirsutum*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Redstem stork's bill (*Erodium cicutarium*)	-	C	Moffat	Elimination not required.
Cypress spurge (*Euphorbia cyparissias*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Leafy spurge (*Euphorbia esula*)	-	B	Moffat	Elimination recommended or required, depending on location. Techniques are limited to herbicides approved by Commissioner and digging.

SPECIES NAME[1]	FEDERAL NOXIOUS STATUS[2]	COLORADO NOXIOUS STATUS[3]	PRESENCE IN COLORADO PROJECT COUNTY[4,5]	MANAGEMENT TECHNIQUES PERMITTED AND REQUIRED BY COLORADO NOXIOUS WEED ACT
Myrtle spurge (*Euphorbia myrsinites*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Baby's breath (*Gypsophila paniculata*)	-	Watch	Moffat	Elimination not required.
Saltlover (*Halogeton glomeratus*)	-	C	Moffat	Elimination not required.
Dames rocket (*Hesperis matronalis*)	-	B	Moffat	Elimination required. Techniques are limited to herbicides approved by Commissioner and digging.
Orange hawkweed (*Hieracium aurantiacum*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner
Meadow hawkweed (*Hieracium caespitosum*)	-	Watch	-	Elimination not required
Waterthyme (*Hydrilla verticillata*)	Noxious – Aquatic	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and water drawdown (controlled water drainage) or hand-removal. Any efforts to physically remove plants must prevent fragmentation as stem fragments are considered reproductive propagules.
Black henbane (*Hyoscyamus niger*)	-	B	Moffat	Elimination recommended or required, depending on location. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Common St. Johnswort (*Hypericum perforatum*)	-	C	-	Elimination not required.
Cogongrass, Japanese blood grass (*Imperata cylindrica*)	Noxious – Terrestrial	Watch	-	Elimination not required.
Paleyellow iris, yellow flag iris (*Iris pseudacorus*)	-	Watch	-	Elimination not required.
Dyer's woad (*Isatis tinctoria*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Broadleaved pepperweed (*Lepidium latifolium*)	-	B	Moffat	Elimination recommended or required, depending on location. Techniques are limited to herbicides approved by Commissioner.
Sericea lespedeza (*Lespedeza cuneata*)	-	Watch	-	Elimination not required.
Oxeye daisy (*Leucanthemum vulgare*, SYN=*Chrysanthemum leucanthemum*)	-	B	Moffat	Elimination recommended or required, depending on location. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Dalmation toadflax (*Linaria dalmatica*)	-	B	Moffat	Elimination recommended or required, depending on location. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.

SPECIES NAME[1]	FEDERAL NOXIOUS STATUS[2]	COLORADO NOXIOUS STATUS[3]	PRESENCE IN COLORADO PROJECT COUNTY[4,5]	MANAGEMENT TECHNIQUES PERMITTED AND REQUIRED BY COLORADO NOXIOUS WEED ACT
Broomleaf toadflax (*Linaria genistifolia*)	-	B	-	Elimination recommended or required, depending on location. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Butter and eggs, yellow toadflax (*Linaria vulgaris*)	-	B	Moffat	Elimination required. Techniques are limited to herbicides approved by Commissioner.
Garden yellow loosestrife, garden loosestrife (*Lysimachia vulgaris*)	-	Watch	-	Elimination not required.
Purple loosestrife (*Lythrum salicaria* and cultivars)	-	A	Moffat	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging. Any efforts to physically remove plants must prevent fragmentation as stem fragments are considered plant propagules.
Parrot feather milfoil, parrotfeather (*Myriophyllum aquaticum*)	-	Watch	-	Elimination not required.
Eurasian watermilfoil (*Myriophyllum spicatum*)	-	B	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling.
Yellow floatingheart (*Nymphoides peltata*)	-	Watch	-	Elimination not required.
Scotch cottonthistle (*Onopordum acanthium*)	-	B	Moffat	Elimination recommended or required, depending on location. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Bull cottonthistle (*Onopordum tauricum*)	-	B	Moffat	Elimination recommended or required, depending on location. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Broomrape (*Orobanche* spp. – except for natives)	Noxious – Parasitic	-	Moffat	Elimination not required. There may be some special status species in this genus which should not be managed as noxious weeds.
Proso millet (*Panicum miliaceum*)	-	C	-	Elimination not required.
Harmal peganum, African rue (*Peganum harmala*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Common reed (*Phragmites australis*)	-	Watch	Moffat	Elimination not required.
Water lettuce (*Pistia stratiotes*)	-	Watch	-	Elimination not required.
Bulbous bluegrass (*Poa bulbosa*)	-	C	Moffat	Elimination not required.
Bohemium knotweed (*Polygonum x bohemicum*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.. Any efforts to physically remove plants must prevent

SPECIES NAME[1]	FEDERAL NOXIOUS STATUS[2]	COLORADO NOXIOUS STATUS[3]	PRESENCE IN COLORADO PROJECT COUNTY[4,5]	MANAGEMENT TECHNIQUES PERMITTED AND REQUIRED BY COLORADO NOXIOUS WEED ACT
				fragmentation as stem fragments are considered plant propagules.
Japanese knotweed (*Polygonum cuspidatum*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging. Any efforts to physically remove plants must prevent fragmentation as stem fragments are considered plant propagules.
Giant knotweed (*Polygonum sachalinense*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.. Any efforts to physically remove plants must prevent fragmentation as stem fragments are considered plant propagules.
Sulphur cinquefoil (*Potentilla recta*)	-	B	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging..
Himalayan blackberry (*Rubus armeniacus*)	-	Watch	-	Elimination not required.
Mediterranean sage (*Salvia aethiopis*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and digging..
Kariba-weed, giant salvinia (*Salvinia molesta*)	Noxious – Aquatic	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner, water drawdown (controlled water drainage), and hand-removal. Any efforts to physically remove plants must prevent fragmentation as stem fragments are considered plant propagules.
Bouncingbet (*Saponaria officinalis*)	-	B	-	Elimination required. Techniques are limited to herbicides approved by Commissioner
Stinking wouldie, tansy ragwort (*Senecio jacobaea*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Field sowthistle (*Sonchus arvensis*)	-	C	Moffat	Elimination not required.
Johnson grass (*Sorghum halepense*) and all other perennial *Sorghum* spp.	-	C	-	Elimination not required.
Alkali swainsonpea (*Sphaerophysa salsula*)	-	Watch	-	Elimination not required.
Medusahead (*Taeniatherum caput-medusae*)	-	A	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and prescribed fire used with herbicide, hand-pulling, or digging.
Tamarisk, salt cedar (*Tamarix* spp.)	-	B	Moffat	Elimination recommended. Techniques are limited to herbicides approved by Commissioner and sawing or digging.
Common tansy (*Tanacetum vulgare*)	-	B	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or mowing.
Puncturevine (*Tribulus terrestris*)	-	C	-	Elimination not required.

SPECIES NAME[1]	FEDERAL NOXIOUS STATUS[2]	COLORADO NOXIOUS STATUS[3]	PRESENCE IN COLORADO PROJECT COUNTY[4,5]	MANAGEMENT TECHNIQUES PERMITTED AND REQUIRED BY COLORADO NOXIOUS WEED ACT
Scentless false mayweed (*Tripleurospermum perforatum*, SYN=*Matricaria perforata*)	-	B	Moffat	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling or digging.
Moth mullein (*Verbascum blattaria*)	-	B	-	Elimination required. Techniques are limited to herbicides approved by Commissioner and hand-pulling, digging, or tilling.
Common mullein (*Verbascum thapsus*)	-	C	Moffat	Elimination not required.
Spiny cocklebur (*Xanthium spinosum*)	-	Watch	-	Elimination not required.
Syrian beancaper (*Zygophyllum fabago*)	-	Watch	-	Elimination not required.

Sources:

[1] Species common and scientific name is from the USDA Plants Database (2015). If a synonymous name is used by a state for designating noxious status and is substantially different from the USDA Plants Database name, then these names are listed after the USDA Plants Database name.

[2] APHIS (2010)

[3] The following weeds are officially designated by the State of Colorado. List A: Designated by the Commissioner for eradication. List B: Species for which the Commissioner, in consultation with the state noxious weed advisory committee, local governments, and other interested parties, develops and implements state noxious weed management plans designed to stop the continued spread of these species. List C: Species for which the Commissioner, in consultation with the state noxious weed advisory committee, local governments, and other interested parties, would develop and implement state noxious weed management plans designed to support the efforts of local governing bodies to facilitate more effective integrated weed management on private and public lands. The goal of such plans would not be to stop the continued spread of these species but to provide additional education, research, and biological control resources to jurisdictions that choose to require management of List C species. Watch List: Determined to pose a potential threat to the agricultural productivity and environmental values of the lands of the state. The Watch List is intended to serve advisory and educational purposes only. Its purpose is to encourage the identification and reporting of these species to the Commissioner in order to facilitate the collection of information to assist the Commissioner in determining which species should be designated as noxious weeds (Colorado Department of Agriculture 2014a,b).

[4] Consortium of Intermountain Herbaria and Southwestern Environmental Information Network (2015), USDA Plants Database (2015)

[5] Colorado Department of Agriculture (2015)

TABLE N4 NEVADA NOXIOUS WEEDS AND POTENTIAL FOR OCCURRENCE IN NEVADA PROJECT COUNTIES (CLARK, LINCOLN)

SPECIES NAME[1]	FEDERAL NOXIOUS STATUS[2]	NEVADA NOXIOUS STATUS[3]	PRESENCE IN NEVADA PROJECT COUNTIES[4,5]
Hardheads, Russian knapweed (*Acroptilon repens*)	-	B	Clark, Lincoln
Camelthorn (*Alhagi maurorum*)	-	A	Clark
Stinking chamomile, mayweed chamomile (*Anthemis cotula*)	-	A	Lincoln
Giant reed (*Arundo donax*)	-	A	Clark
Asian mustard, Sahara mustard (*Brassica tournefortii*)	-	B	Clark, Lincoln
Whitetop, hoary cress (*Cardaria draba*)	-	C	Clark, Lincoln
Nodding plumeless thistle, musk thistle (*Carduus nutans*)	-	B	Clark, Lincoln
Red star-thistle, purple starthistle (*Centaurea calcitrapa*)	-	A	-
Diffuse knapweed (*Centaurea diffusa*)	-	B	Clark, Lincoln
Iberian knapweed, Iberian starthistle (*Centaurea iberica*)	-	A	-
Maltese star-thistle, Malta starthistle (*Centaurea melitensis*)	-	A	Clark, Lincoln
Yellow star-thistle (*Centaurea solstitialis*)	-	A	-
Squarrose knapweed (*Centaurea virgata*, SYN=*C. squarrosa*)	-	A	-
Spotted knapweed (*Centaurea stoebe* ssp. *micranthos*, SYN=*C. maculosa*)	-	A	Clark, Lincoln
Rush skeletonweed (*Chondrilla juncea*)	-	A	-
Spotted water hemlock, water hemlock (*Cicuta maculata*)	-	C	Lincoln
Canada thistle (*Cirsium arvense*)	-	C	Clark, Lincoln
Poison hemlock (*Conium maculatum*)	-	C	Lincoln
Common crupina (*Crupina vulgaris*)	Noxious – Terrestrial	A	-
Dodder (*Cuscuta* spp. – except for natives)	Noxious – Parasitic	-	Clark, Lincoln
Gypsyflower, Houndstongue (*Cynoglossum officinale*)	-	A	Lincoln
Leafy spurge (*Euphorbia esula*)	-	B	-
Professor-weed, goats rue (*Galega officinalis*)	Noxious – Terrestrial	A	-
Waterthyme, hydrilla (*Hydrilla verticillata*)	Noxious – Aquatic	A	-

SPECIES NAME[1]	FEDERAL NOXIOUS STATUS[2]	NEVADA NOXIOUS STATUS[3]	PRESENCE IN NEVADA PROJECT COUNTIES[4,5]
Black henbane (*Hyoscyamus niger*)	-	A	Lincoln
Common St. Johnswort, Klamath weed (*Hypericum perforatum*)	-	A	Clark
Dyer's woad (*Isatis tinctoria*)	-	A	-
Broadleaved pepperweed, perennial pepperweed (*Lepidium latifolium*)	-	C	Clark, Lincoln
Dalmation toadflax (*Linaria dalmatica*)	-	A	Lincoln
Butter and eggs, yellow toadflax (*Linaria vulgaris*)	-	A	-
Purple loosestrife (*Lythrum salicaria* and cultivars)	-	A	Clark
European wand loosestrife (*Lythrum virgatum* and cultivars)	-	A	-
Eurasian watermilfoil (*Myriophyllum spicatum*)	-	A	-
Scotch cottonthistle, Scotch thistle (*Onopordum acanthium*)	-	B	Clark, Lincoln
Broomrape (*Orobanche* spp. – except for natives)	Noxious – Parasitic	-	Clark, Lincoln
Harmal peganum, African rue (*Peganum harmala*)	-	A	Clark
Crimson fountaingrass, green fountaingrass (*Pennisetum setaceum*)	-	A	Clark
Sulphur cinquefoil (*Potentilla recta*)	-	A	-
Austrian yellowcress, Austrian fieldcress (*Rorippa austriaca*)	-	A	-
Mediterranean sage (*Salvia aethiopis*)	-	A	Clark
Kariba-weed, giant salvinia (*Salvinia molesta*)	Noxious – Aquatic	A	-
Carolina horsenettle (*Solanum carolinense*)	-	B	-
Silverleaf nightshade, white horse nettle (*Solanum elaeagnifolium*)	-	B	Clark, Lincoln
Field sowthistle (*Sonchus arvensis*)	-	A	Lincoln
Johnson grass (*Sorghum halepense*)	-	C	Clark, Lincoln
Alkali swainsonpea, Austrian peaweed (*Sphaerophysa salsula*)	-	A	-
Medusahead (*Taeniatherum caput-medusae*)	-	B	-
Tamarisk, salt cedar (*Tamarix* spp.)	-	C	Clark, Lincoln
Puncturevine (*Tribulus terrestris*)	-	C	Clark, Lincoln

SPECIES NAME[1]	FEDERAL NOXIOUS STATUS[2]	NEVADA NOXIOUS STATUS[3]	PRESENCE IN NEVADA PROJECT COUNTIES[4,5]
Syrian beancaper (*Zygophyllum fabago*)	-	A	-

Sources:
[1] Species common and scientific name is from the USDA Plants Database (2015). If a synonymous name is used by a state for designating noxious status and is substantially different from the USDA Plants Database name, then these names are listed after the USDA Plants Database name.
[2] APHIS (2010)
[3] Officially designated and published as noxious by the State of Nevada (Nevada Administrative Code 2013). Category A: Noxious weeds that are generally not found or that are limited in distribution throughout the State. Category B: Noxious weeds that are generally established in scattered populations in some counties of the State. Category C Weeds: Noxious weeds that are generally established and generally widespread in many counties of the State.
[4] Consortium of Intermountain Herbaria and Southwestern Environmental Information Network (2015), USDA Plants Database (2015)
[5] University of Nevada Cooperative Extension (2010)

TABLE N5 UTAH NOXIOUS WEEDS AND POTENTIAL FOR OCCURRENCE IN UTAH PROJECT COUNTIES

SPECIES NAME[1]	FEDERAL NOXIOUS STATUS[2]	UTAH NOXIOUS STATUS[3]	PRESENCE IN UTAH PROJECT COUNTIES[4,5]
Hardheads, Russian knapweed (*Acroptilon repens*)	-	B	All project counties
Whorled milkweed (*Asclepias verticillata*)	-	County (Iron)	-
Whitetop (*Cardaria draba, Cardaria* spp.)	-	B	All project counties
Nodding plumeless thistle, musk thistle (*Carduus nutans*)	-	B	All project counties
Diffuse knapweed (*Centaurea diffusa*)	-	A	Beaver, Iron, Juab, Uintah, Utah
Yellow star-thistle (*Centaurea solstitialis*)	-	A	Utah, Wasatch
Squarrose knapweed (*Centaurea virgata*, SYN=*C. squarrosa*)	-	B	Juab, Millard, Sanpete, Utah, Wasatch
Spotted knapweed (*Centaurea stoebe* ssp. *micranthos*, SYN=*C. maculosa*)	-	A	All project counties
Crossflower, blue flowering mustard (*Chorsipora tenella*)	-	County (Juab)	All project counties
Spotted water hemlock (*Cicuta maculata*)	-	County (Duchesne)	Beaver, Duchesne, Juab, Millard, Sanpete, Uintah, Utah, Wasatch
Canada thistle (*Cirsium arvense*)	-	C	All project counties
Bull thistle (*Cirsium vulgare*)	-	County (Beaver & Iron)	All project counties
Poison hemlock (*Conium maculatum*)	-	B	All project counties
Field bindweed (*Convolvulus arvensis*)	-	C	All project counties
Dodder (*Cuscuta* spp. – except for natives)	Noxious – Parasitic	-	Duchesne, Iron, Juab, Millard, Sanpete, Uintah, Utah, Wasatch
Bermudagrass (*Cynodon dactylon*)	-	B	Millard, Uintah, Utah
Gypsyflower, Houndstongue (*Cynoglossum officinale*)	-	C	All project counties

SPECIES NAME[1]	FEDERAL NOXIOUS STATUS[2]	UTAH NOXIOUS STATUS[3]	PRESENCE IN UTAH PROJECT COUNTIES[4,5]
Russian olive (*Elaeagnus angustifolia*)	-	County (Duchesne & Uintah)	All project counties
Quackgrass (*Elymus repens*)	-	C	All project counties
Leafy spurge (*Euphorbia esula*)	-	A	Duchesne, Juab, Millard, Sanpete, Uintah, Utah, Wasatch
Black henbane (*Hyoscyamus niger*)	-	A	Beaver, Duchesne, Juab, Sanpete, Uintah, Utah, Wasatch
Common St. Johnswort (*Hypericum perforatum*)	-	A	Utah
Dyer's woad (*Isatis tinctoria*)	-	B	All project counties
Broadleaved pepperweed (*Lepidium latifolium*)	-	B	Beaver, Duchesne, Iron, Juab, Sanpete, Uintah, Utah, Wasatch
Oxeye daisy (*Leucanthemum vulgare*, SYN=*Chrysanthemum leucanthemum*)	-	A	Sanpete, Uintah, Utah, Wasatch
Dalmation toadflax (*Linaria dalmatica*)	-	B	Beaver, Duchesne, Millard, Uintah, Utah, Wasatch
Butter and eggs, yellow toadflax (*Linaria vulgaris*)	-	A	Beaver, Duchesne, Millard, Sanpete, Uintah, Utah, Wasatch
Purple loosestrife (*Lythrum salicaria* and cultivars)	-	A	Juab, Millard, Uintah, Utah, Wasatch
Scotch cottonthistle (*Onopordum acanthium*)	-	B	All project counties
Broomrape (*Orobanche* spp. – except for natives)	Noxious – Parasitic	-	All project counties
Common reed (*Phragmites australis*)	-	County (Utah)	Beaver, Duchesne, Juab, Millard, Sanpete, Uintah, Utah
Sulphur cinquefoil (*Potentilla recta*)	-	A	Utah
Johnson grass (*Sorghum halepense, S. almum*) and all other perennial *Sorghum* spp.	-	A	Beaver, Juab, Sanpete, Uintah, Utah
Medusahead (*Taeniatherum caput-medusae*)	-	A	Utah
Tamarisk, salt cedar (*Tamarix* spp.)	-	C	All project counties
Puncturevine (*Tribulus terrestris*)	-	County (Iron)	Duchesne, Millard, Uintah, Utah

Sources:

[1] Species common and scientific name is from the USDA Plants Database (2015). If a synonymous name is used by a state for designating noxious status and is substantially different from the USDA Plants Database name, then these names are listed after the USDA Plants Database name.

[2] APHIS (2010)

[3] The following weeds are officially designated and published as noxious for the State of Utah, as per the authority vested in the Commissioner of Agriculture under Section 4-17-3, Utah Noxious Weed Act (Utah Department of Agriculture 2010). Class A Early Detection Rapid Response (EDRR): Early Detection Rapid Response (EDRR) Declared noxious weeds not native to the state of Utah that pose a serious threat to the state and should be considered as a very high priority. Class B (Control): Declared noxious weeds not native to the state of Utah, that pose a threat to the state and should be considered a high priority for control. Class C (Containment): Declared noxious weeds not native to the state of Utah that are widely spread but pose a threat to the agricultural industry and agricultural products with a focus on stopping expansion. There are additional noxious weeds designated by Project counties (Utah Department of Agriculture 2009).

[4] Consortium of Intermountain Herbaria and Southwestern Environmental Information Network (2015), USDA Plants Database (2015)

[5] Utah State University Cooperative Extension (2009).

TABLE N6 WYOMING NOXIOUS WEEDS AND POTENTIAL FOR OCCURRENCE IN WYOMING PROJECT COUNTIES (CARBON, SWEETWATER)

SPECIES NAME[1]	FEDERAL NOXIOUS STATUS[2]	WYOMING NOXIOUS STATUS[3]	PRESENCE IN WYOMING PROJECT COUNTIES[4,5]
Hardheads, Russian knapweed (*Acroptilon repens,* SYN=*Centaurea repens*)	-	State	Carbon, Sweetwater
Skeletonleaf bur ragweed, skeletonleaf bursage (*Ambrosia tomentosa,* SYN=*Franseria discolor*)	-	State	Carbon, Sweetwater
Lesser burdock, common burdock (*Arctium minus*)	-	State	Carbon, Sweetwater
Whitetop (*Cardaria draba*)	-	State	Carbon, Sweetwater
Hairy whitetop (*Cardaria pubescens*)	-	State	Carbon, Sweetwater
Spiny plumeless thistle (*Carduus acanthoides*)	-	State	Carbon
Nodding plumeless thistle, musk thistle (*Carduus nutans*)	-	State	Carbon, Sweetwater
Diffuse knapweed (*Centaurea diffusa*)	-	State	Carbon, Sweetwater
Spotted knapweed (*Centaurea stoebe* ssp. *micranthos*, SYN=*C. maculosa*)	-	State	Carbon, Sweetwater
Canada thistle (*Cirsium arvense*)	-	State	Carbon, Sweetwater
Field bindweed (*Convolvulus arvensis*)	-	State	Carbon, Sweetwater
Dodder (*Cuscuta* spp. – except for natives)	Noxious – Parasitic	-	Carbon, Sweetwater
Gypsyflower, houndstongue (*Cynoglossum officinale*)	-	State	Carbon, Sweetwater
Geyer's larkspur, Plains larkspur (*Delphinium geyeri*)	-	County (Carbon)	Carbon, Sweetwater
Russian olive (*Elaeagnus angustifolia*)	-	State	Carbon, Sweetwater
Quackgrass (*Elymus repens*)	-	State	Carbon, Sweetwater
Leafy spurge (*Euphorbia esula*)	-	State	Carbon, Sweetwater
Yellow Spring bedstraw, lady's bedstraw (*Galium verum*)	-	County (Sweetwater)	Sweetwater
American licorice, wild licorice *(Glycyrrhiza lepidota)*	-	County (Sweetwater)	Carbon, Sweetwater
Saltlover, halogeton (*Halogeton glomeratus*)	-	County (Carbon)	Carbon, Sweetwater
Foxtail barley (*Hordeum jubatum*)	-	County (Sweetwater)	Carbon, Sweetwater
Black henbane (*Hyoscyamus niger*)	-	County (Carbon & Sweetwater)	Carbon, Sweetwater

SPECIES NAME[1]	FEDERAL NOXIOUS STATUS[2]	WYOMING NOXIOUS STATUS[3]	PRESENCE IN WYOMING PROJECT COUNTIES[4,5]
Common St. Johnswort (*Hypericum perforatum*)	-	State	-
Dyer's woad (*Isatis tinctoria*)	-	State	Carbon, Sweetwater
Broadleaved pepperweed, perennial pepperweed (*Lepidium latifolium*)	-	State	Carbon, Sweetwater
Oxeye daisy (*Leucanthemum vulgare*, SYN=*Chrysanthemum leucanthemum*)	-	State	Carbon
Dalmation toadflax (*Linaria dalmatica*)	-	State	Carbon, Sweetwater
Butter and eggs, yellow toadflax (*Linaria vulgaris*)	-	State	Carbon
Wyeth's lupine (*Lupinus wyethii*)	-	County (Carbon)	Carbon
Purple loosestrife (*Lythrum salicaria* and cultivars)	-	State	-
Scotch cottonthistle, Scotch thistle (*Onopordum acanthium*)	-	State	Carbon
Plains pricklypear (*Opuntia polyacantha*)	-	County (Carbon)	Carbon, Sweetwater
Broomrape (*Orobanche* spp. – except for natives)	Noxious – Parasitic	-	Carbon, Sweetwater
Common reed (*Phragmites australis*)	-	County (Sweetwater)	Carbon, Sweetwater
Field sowthistle (*Sonchus arvensis*)	-	State	Carbon, Sweetwater
Tamarisk, salt cedar (*Tamarix* spp.)	-	State	Carbon, Sweetwater
Common tansy (*Tanacetum vulgare*)	-	State	Carbon
Mountain goldenbanner, mountain thermopsis (*Thermopsis montana*)	-	County (Sweetwater)	Carbon, Sweetwater
Rough cocklebur, common cocklebur (*Xanthium strumarium*)	-	County (Carbon)	Carbon, Sweetwater

Sources:

[1] Species common and scientific name is from the USDA Plants Database (2015). If a synonymous name is used by a state for designating noxious status and is substantially different from the USDA Plants Database name, then these names are listed after the USDA Plants Database name.

[2] APHIS (2010)

[3] The following weeds are officially designated and published as noxious for the State of Wyoming, per the Wyoming Weed and Pest Control Act Designated List (Designated Noxious Weeds .S. 11-5-102 (a)(xi) and Prohibited Noxious Weeds W.S. 11-12-104)(Wyoming Weed and Pest Council 2013). In Wyoming, there are 25 state noxious weeds and 11 Carbon or Sweetwater County noxious weeds designated under the authority of the Wyoming Weed and Pest Control Act of 1973 (Wyoming Weed and Pest Control 2014a,b). The State of Wyoming designates certain species as noxious weeds but does not further classify them.

[4] Consortium of Intermountain Herbaria and Southwestern Environmental Information Network (2015), USDA Plants Database (2015)

[5] INVADERS Database (Rice 2015), University of Wyoming Extension (2013)

N2.1.1 APHIS

Animal and Plant Health Inspection Services (APHIS) designates nine noxious weed species that either occur or have the potential to occur in Project states (APHIS 2010). These noxious weeds are designated under the authority of the Federal Noxious Weed Act, and require federal land management agencies to control such plants and complement cooperative agreements with state agencies.

N2.1.2 State of Wyoming

In Wyoming, 25 plant species are designated as noxious weeds under the authority of the Wyoming Weed and Pest Control Act (WWPC) of 1973 (Wyoming Weed and Pest Council 2014a). The State of Wyoming designates certain species as noxious weeds but does not further classify them. Eleven additional noxious weeds are designated by Carbon and/or Sweetwater counties (Wyoming Weed and Pest Council 2014b).

N2.1.3 State of Colorado

In Colorado, a total of 74 plant species are designated as noxious weeds under the authority of the Colorado Noxious Weed Act (Colorado Department of Agriculture 2014a, 2014b). These include 23 List A species, 35 List B species, and 16 List C species. In addition, there are 26 Watch List species that have the potential to be designated as noxious in the future. These classifications are defined as follows:

List A: Designated by the Commissioner for eradication.

List B: Species for which the Commissioner, in consultation with the state noxious weed advisory committee, local governments, and other interested parties, develops and implements state noxious weed management plans designed to stop the continued spread of these species.

List C: Species for which the Commissioner, in consultation with the state noxious weed advisory committee, local governments, and other interested parties, would develop and implement state noxious weed management plans designed to support the efforts of local governing bodies to facilitate more effective integrated weed management on private and public lands. The goal of such plans would not be to stop the continued spread of these species but to provide additional education, research, and biological control resources to jurisdictions that choose to require management of List C species.

Watch List: Determined to pose a potential threat to the agricultural productivity and environmental values of the lands of the state. The Watch List is intended to serve advisory and educational purposes only. Its purpose is to encourage the identification and reporting of these species to the Commissioner in order to facilitate the collection of information to assist the Commissioner in determining which species should be designated as noxious weeds.

N2.1.4 State of Utah

In Utah, a total of 27 plant species are designated as noxious weeds under the authority of the Utah Noxious Weed Act (Utah Department of Agriculture 2010). These include 14 Class A species, 10 Class B species, and 5 Class C species, as per the authority vested in the State of Utah Commissioner of Agriculture and Food under Section 4-17-3. These classifications are defined as follows:

Class A Early Detection Rapid Response (EDRR): EDRR Declared noxious weeds not native to the state of Utah that pose a serious threat to the state and should be considered as a very high priority.

Class B (Control): Declared noxious weeds not native to the state of Utah that pose a threat to the state and should be considered a high priority for control.

Class C (Containment): Declared noxious weeds not native to the state of Utah that are widely spread but pose a threat to the agricultural industry and agricultural products with a focus on stopping expansion.

In addition, there are seven additional noxious weeds designated by Project counties (Utah Department of Agriculture 2009).

N2.1.5 State of Nevada

In Nevada, a total of 47 plant species are designated as noxious weeds under the authority of the Nevada Revised Statutes: Chapter 555.005-555.5570 —Control of Insects, Pests, and Noxious Weeds (Nevada Administrative Code 2013). These include 30 Category A species, nine Category B species, and eight Category C species. These classifications are defined as follows:

Category A: Noxious weeds that are generally not found or that are limited in distribution throughout the State.

Category B: Noxious weeds that are generally established in scattered populations in some counties of the State.

Category C Weeds: Noxious weeds that are generally established and generally widespread in many counties of the State.

N2.1.6 Invasive Weeds on Federal or Tribal Lands

Updated Plans will identify invasive weeds for each affected BLM Field Office, USFS National Forest, and the Moapa Indian Reservation and would focus monitoring and control methods on these species.

N2.2 Noxious Weed Management

The requirements for Noxious Weed Management will be determined based on information provided in the FEIS, BA, BO, BE, and agency consultation. Updated information on Noxious Weed Management will be included in the NTP POD version of this Plan. Section N2.2 provides a description of what may be required in future versions of this Plan. All actions described below are subject to change in future versions of this Plan.

The various regulatory agencies with jurisdiction over the Project have different noxious weed management requirements. TransWest would adhere to all EPA, USDA, USDOI and state agricultural agencies' (Wyoming, Colorado, Utah, and Nevada) requirements during all components of the TWE Project. In addition, TransWest would adhere to BIA, BLM, USFS, URMCC, or Reclamation requirements when crossing lands managed by these agencies. All four TWE Project states require that all noxious weeds designated for that state (except for some Colorado List B species and all List C and Watch List species) are eradicated before such weeds propagate and spread, and some Project counties have additional county-declared noxious weeds that require treatment in that county. The following sections outline TransWest's approach to identifying problem areas, preventative strategies, and treatment measures for noxious weeds.

N2.2.1 Weed Management Personnel Requirements

Weed management actions would be carried out by weed management specialist(s) with the following qualifications:

- Training and experience in native plant taxonomy/identification;
- Training and experience in field ecology and plant community mapping;
- Training in weed management or Integrated Pest Management with an emphasis on weeds; Experience in coordination with agency and private landowners; and,
- Additional requirements depending on roles and responsibilities of personnel, as described later in this Plan.

N2.2.2 Pre-Construction Noxious Weed Surveys

Prior to construction activities, TransWest will be required to conduct pre-construction surveys for noxious weeds in the footprints of the ROW, access roads, and temporary work areas associated with Project facilities. For all federal lands, TransWest will collect weed inventory data so that it meets both project needs and is compatible with use in BLM's National Invasive Species Information Management System (NISIMS) (BLM 2014). Survey information collected during pre-construction surveys may include species name, global positioning system (GPS) location of weed infestations, percent cover, and approximate size of weed infestations in acres. Noxious weed GPS location information would be listed in Table N7, plotted on maps, and included in Pesticide Use Proposals (PUPs) to be submitted and approved by the appropriate land management agency before any pesticide treatments are conducted. Information in Table N7 will be provided in updated versions of this Plan when pre-construction noxious weed surveys have been completed, if necessary.

TABLE N7 NOXIOUS WEED PROBLEM AREAS IDENTIFIED IN THE TWE PROJECT FOOTPRINT (ROW, ACCESS ROADS, STAGING AREAS, MATERIAL STORAGE AREAS, ETC.)

COUNTY / STATE	MILE-POST	PROJECT FEATURE TYPE[1]	SPECIES	WEED CLASS[2]	WEED COVER[3]	SIZE (ACRES)[4]	DATA SOURCE[5]	LOCATION	
								LATITUDE	LONGITUDE

[1] Project feature types: ROW; permanent access road; temporary access road; ground electrode system; staging area; material storage area; fly yard; pulling, tensioning, and splicing site; communication and regeneration site; and batch plant.
[2] Location of Class A, B, C, Watch, or county weed species per state/county noxious weed list where weed is located. The state of Wyoming does not classify noxious weeds beyond state vs. county.
[3] Percent cover was used to determine weed abundance. The following categories were used: Trace = <1%, Low = 1-5%, Moderate = 6-25%, and High = 26=100% (may be modified depending on agency-provided data).
[4] Size (acres) refers to the approximate land area of the weed problem area.
[5] Agency abbreviations (TBD)

N2.2.3 Identification of Problem Weed Areas

Before vegetation and soil disturbance activities began, noxious weed problem areas may be identified and marked with signs by Project construction personnel, Project biologists, or Environmental Inspectors. Weed problem areas would include all locations where noxious weed species (or other invasive weed species per agreement with agencies) would need to be controlled (supports BLM 2007). Signs placed on the ROW (or on the edge of the ROW after clearing and grading activities) and other Project areas would alert construction personnel to the locations and types of weed infestations.

N2.2.4 Preventative Measures

TransWest recognizes that prevention is the most effective approach to noxious weed management. The following preventive measures would be implemented to minimize the spread of both terrestrial and aquatic noxious weeds:

- Prevent the introduction and spread of weeds caused by moving weed-infested sand, gravel, borrow, and fill material. Active gravel and borrow sources should be visually inspected and determined to be noxious weed free before use. If possible, borrow materials should be verified weed seed free by sending samples to a laboratory. A source supporting noxious weeds should be considered for closure until it is weed free (supports BLM 2007 and Forest Service Manual 2080 – Region 4 (USFS 2001)).

- Signs would identify the locations (or segments of ROW) of weed problem areas where separate topsoil segregation must occur before earth disturbance may take place.

- Inspect material sources on site (e.g., soil stockpiles, mulches), and ensure that they are weed-free before use and transport. Treat weed-infested sources to eradicate weed seed and plant parts, and strip and stockpile contaminated material before any use of pit material (supports BLM 2007).

- Prevent weed establishment by minimizing driving through weed-infested areas. Additional measures may include limiting or implementing additional restrictions on vehicle movement through weed-infested areas when the spread of seeds or propagules is most likely (supports BLM 2007).

- Avoid acquiring water for dust abatement where access to the water is through weed-infested sites (supports BLM 2007).

- After construction is completed, seed with an agency or landowner approved, weed-free seed mixture, as detailed in Reclamation Plan (Appendix Q).

Worker Environmental Awareness Program (WEAP) Training

TransWest would conduct an Worker Environmental Awareness Program (WEAP) before surface disturbance activities begin to educate all Project personnel regarding environmental concerns and requirements, including weed identification, prevention, control methods, and the potential impacts of noxious weeds on agriculture, livestock, and wildlife. All personnel would be informed of the importance of and techniques in preventing the spread of noxious weeds to uncontaminated areas and of controlling the proliferation of weeds already present. No personnel would be allowed to enter the TWE Project ROW before first taking part in the WEAP, at any point during the Project. Qualified biological monitors approved by the BIA, BLM, USFS, Reclamation, and URMCC, as appropriate, would conduct training for the WEAP program.

Cleaning Equipment, Vehicles, and Personnel

The following measures specify procedures for cleaning equipment and vehicles to prevent noxious weeds from spread or invasion as a result of the TWE Project (supports BLM 2007 and Forest Service Manual 2900 (USFS 2011b)):

- Before construction activities start, TransWest would identify sites where construction vehicles and equipment can be cleaned. These sites would be reviewed and approved by the landowner or appropriate land management agency. Sites would not be located in sensitive resource areas such as wetlands. All cleaning stations shall be allowed only in designated areas at least 100 feet from streams and wetlands. Cleaning stations would be identified by signs on the edge of the ROW for the duration of the Project, and GPS locations of cleaning stations provided in each PUP (supports BLM 2007; see Attachments A & B). Cleaning stations shall be contained with barriers to prevent migration of wastewater and/or sediments into water bodies. Waste concrete material shall be removed and properly disposed of once it has hardened.

- At cleaning sites, a high-pressured washer would be used to clean construction vehicles and equipment before entering and leaving the ROW, and before entering public lands. In addition, all equipment must be cleaned and inspected for presence of invasive, non-native plants and seeds prior to entry of occupied or field-verified suitable habitat for clay phacelia (*Phacelia argillacea*) or Deseret milkvetch (*Astragalus desereticus*).

- It is assumed that any water body could contain aquatic invasive species (e.g., zebra and quagga mussels) and invasive weed species. If work occurs in or near a water body, all equipment would be decontaminated at a cleaning station. Decontamination would occur before arrival at a Project site to avoid the transfer of aquatic invasive species from a previous work site in or near water. Decontamination would consist of either of these actions: 1) Drain all water from equipment and compartments; clean equipment of all mud, plants, debris, and aquatic organisms; and dry equipment for specified time by season (five days in June through August, 18 days in March through May, and three days in December through February when temperatures are at or below freezing); or 2) Use a high pressure (2,500 pounds per square inch [psi]) hot water (140 degrees Fahrenheit [°F]) pressure washer to thoroughly clean equipment and flush all compartments that may hold water. A field monitor would be present to ensure that the cleaning was completed prior to vehicle and equipment moving to other streams and drainages.

- Inspect, remove, and properly dispose of weed seed and plant parts found on workers' clothing and equipment. Proper disposal entails bagging the seeds and plant parts and incinerating them (supports BLM 2007 and Colorado Noxious Weed Act).

N2.2.5 Treatment Measures

TransWest may be required to implement noxious weed treatment measures in accordance with existing regulations and jurisdictional land management agency or landowner agreements. TransWest would focus treatment efforts on areas with designated noxious weed species unless other agreements have been made with the jurisdictional agencies. Special attention would be given to state- and federal-designated noxious weeds (versus county-listed noxious weeds), and noxious weeds listed as higher priority species, if applicable (Category A weeds in Tables Q3 through Q6). TransWest would continue coordinating with appropriate agencies to determine which of the species would require treatment and to determine appropriate treatment schedules.

Where there is a pre-existing high occurrence of noxious weeds in the vicinity of the TWE Project, eradication would be difficult or impossible unless performed on a scale well beyond that of the TWE Project timeline. At a minimum, the preventative measures outlined in Section N2.2.4 would be implemented for such species. TransWest would consult with the appropriate agency personnel in situations where herbicide treatment may not be an appropriate option (e.g., near known special status species locations). TransWest would obtain agency concurrence before deciding to forego herbicide treatment of any widespread noxious weed species. Alternative treatments (e.g., biological controls, mechanical treatments) may be implemented if recommended by the appropriate agency where herbicide treatment is not an option.

General treatment methods that may be used include:

- Noxious weed problem areas would be pre-treated with pesticides before implementing construction activities (supports BLM 2007; also see Table N1).

- Control of noxious weeds could include chemical, physical, and biological methods and would be developed in consultation with the land agencies, and private landowners (supports USDOI 2007; BLM 2007; Forest Service Manual 2150 (USFS 2013a), Forest Service Manual 2900 (USFS 2011b), also see Table N1).

- When necessary to blade noxious weed infested roadsides or ditches, work would be scheduled for spring or early summer prior to the seed-set stage or later in the fall after seeds have fallen. Surface disturbance would be minimized and bladed material isolated in weed infested sites. Surface disturbance would be prohibited within 300 ft of occupied or field-verified suitable habitat for federally listed plant species. (supports Forest Service 2150 – Region 4).

- Timing of treatment for noxious weeds on the TWE Project would vary depending on species targeted, and may require multiple treatments in a given year to effectively treat all noxious weeds.

N2.2.6 Reclamation Measures

The Reclamation Plan (Appendix Q) describes detailed procedures for revegetation and handling of soil and mulches (e.g., hay, straw) to prevent noxious weed spread or invasion as a result of the TWE Project.

N3.0 PESTICIDE APPLICATION, HANDLING, SPILLS, AND CLEANUP

N3.1 Pesticide Applicator Training

The following measures for pesticide applicator training procedures may be required for the TWE Project. All pesticide applicators would also be required to undergo the standard health and safety training procedures required for all Project workers.

- All pesticide applicator personnel would take training required for all workers (see WEAP Training in Section N2.2.4) and additional hazard training specific to safe pesticide use and reporting serious accidents, which would be documented. Following training, pesticide applicators would be certified by the state where pesticides are to be applied, per the jurisdictional agency's requirements.

- Prior to work activities, all pesticide applicator personnel would be instructed on the protection of cultural, paleontological, ecological resources, fire safety, and other natural resources in accordance with POD provisions. To assist in this effort, the Construction Contractor(s) would address (a) federal, state, and tribal laws regarding cultural resources, fossils, wetlands, plants, and wildlife, including collection and removal; and (b) the importance of these resources and the purpose and necessity of protecting them. All pesticide applicator personnel would specifically be instructed on avoidance areas and/or timing restrictions for the protection of humans, wildlife, special status species, livestock, wetlands, and other sensitive areas.

- Prior to work activities, all pesticide applicator personnel would be instructed where/if there is a known occurrence or suitable habitat for protected species or other sensitive areas in the construction area. Sensitive areas would be considered avoidance areas unless otherwise coordinated with the land agency and would be marked on the ground and maintained through the duration of the Contract. Maps with areas of avoidance, including buffers, of sensitive areas will be provided to all employees accessing the project area.

- When working in or near occupied or suitable federally listed plant habitat, all project employees, including pesticide applicator personnel, will be informed of the occurrence such plant species. All project employees shall be advised as to the potential penalties (up to $200,000 in fines and one year in prison) for damaging, destroying or removing and possessing a federally listed plant species on federal lands.

N3.2 Pesticide Application and Handling

Pesticide application and handling procedures for the TWE Project follow numerous federal and state regulations. The following measures for pesticide application and handling may be required for the TWE Project.

- Pesticides would only be applied by state-certified pesticide applicators using protective equipment as directed by the herbicide product label.

- Only EPA-registered pesticides that are applied within the framework of agency policies, registered in the state where they are used, are applied in a manner consistent with label directions and state pesticide regulations would be used, and following all “advisory statements”. Only BLM-approved pesticides listed in Table N8 would be used on all land ownerships, unless otherwise approved or denied by the appropriate land management agency (BLM 2007, 2012). Pesticide use would be limited to non-persistent immobile pesticides that are applied only in accordance with label and application permit directions for terrestrial and aquatic applications. This includes applying herbicides on a spot treatment basis, suspending herbicide applications whenever weather conditions may cause off-site drift, using drift control agents, and using low volatile formulations.

- Individual plants will be treated with hand-only application methods rather than broadcast application in areas where special status species occur, if permitted by the land management agency. Aerial spraying of herbicides is prohibited within 500 ft of known special status species. No herbicide treatments will be performed within 2500 ft of occupied or field-verified suitable habitat for clay phacelia or Deseret milkvetch. In lieu of the 2500 ft buffer a vegetation management plan that outlines methods for control of invasive, non-native species in greater detail while protecting clay phacelia and its habitat can be developed.

- For BLM lands, all pesticide application and handling would be consistent with the Standard Operating Procedures, Mitigation Measures and Conservation Measures contained in Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States Programmatic EIS and with any locally overriding conservation measures from site specific NEPA documents.

- Use herbicides of low toxicity to humans, wildlife, fish, and livestock, where feasible. See Table N8 for herbicides approved on the TWE Project.

- All applications would be avoided near sole source aquifer areas.

- When mixing and applying pesticides, the herbicide label would be adhered to for protective equipment, re-entry period, and environmental protection constraints. Pesticides would not be stored, mixed, or loaded, or equipment rinsed near or on stream banks, lake shorelines, ditches, irrigation canals, or other areas where runoff could impact an aquatic body.

- To improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment, livestock permittees would be notified of herbicide treatments on individual grazing allotments. Coordinate with appropriate land management agency to obtain permittee's name and contact information for notification. Design treatments to take advantage of normal livestock grazing rest periods, when possible. Avoid use of diquat in riparian pasture while pasture is being used by livestock.

- A copy of Material Safety Data Sheets (MSDSs) would be kept at work sites. MSDSs are available for review at http://www.cdms.net/.

- Pesticides and pesticide containers would be transported, stored, and disposed of in accordance with applicable state, local, and federal laws and regulations.

- Proper application equipment would be used to minimize herbicide drift (e.g., spray equipment that produces 200- to 800-micron diameter droplets [spray droplets of 100 microns and less are most prone to drift]). Proper application methods would be implemented (e.g., set maximum spray heights, use appropriate buffer distances between spray sites and non-target resources).

- Granular herbicides would not be applied on slopes of more than 15% where there is the possibility of runoff carrying the granules into non-target areas.

- Weather forecasts would be reviewed daily before pesticide application to evaluate conditions for pesticide drift or runoff and general fire safety. Pesticides would not be applied when winds exceed 10 miles per hour (mph), or when a serious rainfall event is imminent, and treatments on steep slopes would be minimized.

- Pesticide applicator personnel may only operate vehicles on designated roads and park in areas free of vegetation.

- A no-spray buffer would be maintained between treatment areas and human residences or crops, with a minimum buffer of 100 feet for ground applications, unless a written waiver is granted. If a written waiver is granted, land management agencies, landowners, adjacent landowners, and/or other appropriate parties must be notified before pesticide treatment.

- Post treated areas with appropriate signs at common public access areas and observe restricted entry intervals specified by the product label. When possible, spray applications would be accomplished when human or livestock use is likely to be low. Notify land management agencies, landowners, adjacent landowners, and/or other appropriate parties before pesticide treatment.

- Buffer zones would be provided along streams, rivers, lakes, and riparian areas, including riparian areas along ephemeral and intermittent streams, as well as downstream habitats and species/populations of interest. Use appropriate herbicide-free buffer zones for herbicides not labeled for aquatic use, with minimum widths of 25 feet for vehicle and 10 feet for hand spray applications. Wild and Scenic Rivers require a buffer of 0.25 mile on either side of river.

- Maintain Pesticide Application Records (PARs). All herbicide treatments would be documented in daily logs, which include the type of herbicide, formulation, pounds of active ingredient applied per acre, gallons of solution applied, method of application, date, time, and location. Pesticide use reports would be completed at the end of the treatment season to summarize types and amount of herbicides applied. Pesticide use report and Pesticide Application Records would be submitted to the appropriate agency by annually for the life of the Special Use Permit (SUP). If NISIMS is used to record treatments, it would eliminate the need for daily completion of a PAR.

- Herbicide products would be selected that are least damaging to the environment while providing the desired results, using the least amount of herbicide needed to achieve the desired result, and for minimizing additional impacts from herbicide degradates, adjuvants, inert ingredients, and tank mixtures. Only BLM-approved adjuvants would be used. Spot applications or low-boom broadcast operations would be preferred to limit contamination of wildlife food sources.

- TransWest would prepare a PUP for each land management agency or land owner before pesticide spraying or on the schedule required. Each PUP would identify a list of approved herbicides that may be used as well as site-specific information about the herbicides to be used, timing and locations where specific herbicides would be used, other weed treatments that would be used (e.g., biocontrol), maximum application rate, targeted species, general site characteristics, description of sensitive resources present and protective measures, and effects of the treatment. PUPs for BLM lands must be signed by a certified weed applicator, the field office manager, state coordinator, and deputy state director before the treatment can go forward, and by District and Forest pesticide use coordinators on USFS lands. The Pesticide Application Record, which must be completed within 24 hours after completion of the application, documents the actual rate of application and that all the above factors have been taken into account. The PUPs and associated reporting requirements would be submitted on the schedule required for each BLM Field Office or National Forest office.

- Buffer zones would be provided around hibernacula and important pollinator nesting habitat.

- Herbicide spraying in desert tortoise habitat in Nevada would require consultation with the BLM and U.S. Fish and Wildlife Service (USFWS).

- The cut-stumps of mature salt cedar stands that are cut as part of vegetation clearing would be immediately painted with herbicides. The specific control methods and herbicide to be used would be determined in consultation with the Nevada BLM State and Field Office offices.

Additional control measures could include planting native or desired plant species following treatment to provide erosion control and the use of biocontrols.

- Cleaning sites, access roads, staging areas, mulch and soil stockpiles, and special status plant occurrences and other sensitive sites would be prioritized for weed treatment where permitted to reduce the potential of weeds spreading or affecting sensitive areas.

TABLE N8 HERBICIDE ACTIVE INGREDIENTS PERMITTED FOR TREATING WEEDS FOR THE TWE PROJECT

HERBICIDE ACTIVE INGREDIENTS	TRADE NAME	ADDITIONAL RESTRICTIONS AFTER FOLLOWING MSDS AND LABEL
2,4-D	Agrisolution 2,4-D LV6, 2,4-D Amine 4, Five Star, ,4-D Amine, HardBall, Saber, Aqua-Kleen, Weedar 64, and others	Minimize the size of application areas, where practical, when applying to limit impacts to wildlife and livestock, particularly through contamination of food items. Do not exceed the typical application rate when applying in known traditional use areas, and to reduce risk to occupational and public receptors.
bromacil	Bromacil 80DF, Hyvar X, Hyvar XL, others	Minimize use in watersheds with downgradient ponds and streams if potential impacts to aquatic plants or fish are identified, particularly during periods when fish are in sensitive life stages. Minimize the size of application areas, where practical, to limit impacts to wildlife and livestock, particularly through contamination of food items. Use the typical application rate, where feasible, when applying to reduce risk to occupational and public receptors. Do not exceed the typical application rate when applying in known traditional use areas. Do not apply in rangelands, and use appropriate buffer zones if used to limit contamination of off-site rangeland or wildlife vegetation.
bromacil + diuron	Bromacil/Diuron 40/40, Krovar I DF, DiBro 4+4, DiBro 4+2, Weed Blast 4G, others	See restrictions for each active ingredient.
chlorsulfuron	Alligare Chlorsulfuron , Telar DF , Chlorsulfuron E-Pro 75 WDG, others	N/A
clopyralid	Spur, Pyramid R&P, Clopyralid 3, Reclaim, Stinger, Transline, others	N/A
clopyralid + 2,4-D	Commando, Curtail, Cutback	See restrictions for each active ingredient.
dicamba	Banvel, Clarity, others	To minimize risks to terrestrial wildlife, do not exceed the typical application rate for applications. Do not apply across large application areas, where feasible, to limit impacts to livestock, particularly through the contamination of food items.
dicamba + 2,4-D	Range Star, Weedmaster, Outlaw, others	See restrictions for each active ingredient.
diflufenzopyr + dicamba	Distinct, Overdrive	Aerial application of this herbicide is prohibited on BLM lands. Minimize the size of application areas, where practical to limit impacts to wildlife and livestock, particularly through contamination of food items.
diquat	Alligare Diquat, NuFarm Diquat SPC 2 L Herbicide, Reward, others	Limit use in water bodies that have native fish and aquatic resources. Limit application to ATV, truck spraying, and boat applications to reduce risks to occupational receptors. Limit applications to areas away from high residential, subsistence, or traditional use to reduce risks to public receptors. Use the typical application rate, where feasible, when applying to reduce risk to occupational and public receptors.
diuron	Diuron 80DF, Karmex DF, Direx	Minimize use in watersheds with downgradient ponds and streams if potential impacts to aquatic plants or

HERBICIDE ACTIVE INGREDIENTS	TRADE NAME	ADDITIONAL RESTRICTIONS AFTER FOLLOWING MSDS AND LABEL
	4L, others	fish are identified, particularly during periods when fish are in sensitive life stages. To minimize risks to terrestrial wildlife and livestock, do not exceed the typical application rate for applications. Minimize the size of application areas, where practical, when applying to limit impacts to wildlife and livestock, particularly through contamination of food items. Evaluate applications on a site-by-site basis to avoid risks to humans. There appear to be few scenarios where can be applied without risk to occupational receptors. Do not exceed the typical application rate when applying in known traditional use areas, and to reduce risk to occupational and public receptors. Do not apply in rangelands, and use appropriate buffer zones if used to limit contamination of off-site rangeland or wildlife vegetation.
fluridone	Avast!, Sonar AS, others	Do not exceed the typical application rate when applying in known traditional use areas, and to reduce risk to occupational and public receptors.
glyphosate	Aqua Star, GlyStar Gold, Accord SP, Rodeo, Mirage, Roundup Original, Honcho, others	Only use adjuvants BLM has approved for aquatic environments, and either avoid using glyphosate formulations containing polyoxyethyleneamine (POEA), or use formulations with the least amount of POEA, to reduce risks to aquatic organisms in aquatic environments. To minimize risks to terrestrial wildlife and livestock, do not exceed the typical application rate for applications. Where practical, limit to spot applications in rangeland and wildlife habitat areas to avoid contamination of wildlife food items.
glyphosate + 2,4-D	Campaign, Landmaster BW	See restrictions for each active ingredient.
hexazinone	Velpar ULW, Velossa, Pronone MG, others	To minimize risks to terrestrial wildlife and livestock, do not exceed the typical application rate for applications. Where practical, limit to spot applications in rangeland and wildlife habitat areas to avoid contamination of wildlife food items. Do not apply with an over-the-shoulder broadcast applicator. Do not exceed the typical application rate when applying in known traditional use areas, and to reduce risk to occupational and public receptors.
hexazinone + sulfometuron methyl	Oustar, Westar	See restrictions for each active ingredient. Aerial application of this herbicide is prohibited on BLM lands.
imazapic	Panoramic 2SL, Plateau	N/A
imazapic + glyphosate	Journey	See restrictions for glyphosate.
imazapyr	Arsenal, Chopper, Imazapyr 2SL, Polaris, others	N/A
imazapyr + diuron	Imazuron E-Pro , Mojave 70 EG, Sahara DG, SSI Maxim Topsite 2.5G	See restrictions for diuron.

HERBICIDE ACTIVE INGREDIENTS	TRADE NAME	ADDITIONAL RESTRICTIONS AFTER FOLLOWING MSDS AND LABEL
imazapyr + metsulfuron methyl	Lineage Clearstand	N/A
imazapyr + sulfometuron methyl + metsulfuron methyl	Lineage HWC, Lineage Prep	See restrictions for sulfometuron methyl. Aerial application of this herbicide is prohibited on BLM lands.
metsulfuron methyl	Escort DF, Patriot, PureStand, Metsulfuron Methyl DF, others	N/A
metsulfuron methyl + chlorsulfuron	Cimarron Extra, Cimarron Plus	N/A
metsulfuron methyl + dicamba + 2,4-D	Cimarron MAX	See restrictions for dicamba and 2,4-D.
picloram	Grazon PC, Picloram K, Tordon 22K, Triumph K, others	Do not apply across large application areas, where feasible, to limit impacts to livestock, particularly through the contamination of food items.
picloram + 2,4-D	Gunslinger, Picloram + D, Grazon P+D, Trooper 101, others	See restrictions for each active ingredient.
picloram + 2,4-D + dicamba	Trooper Extra	See restrictions for each active ingredient.
sulfometuron methyl	Oust XP, SFME E-Pro 75EG, Spyder, others	Aerial application of this herbicide is prohibited on BLM lands. Minimize use in watersheds with downgradient ponds and streams if potential impacts to aquatic plants or fish are identified, particularly during periods when fish are in sensitive life stages.
sulfometuron methyl + chlorsulfuron	Landmark XP	See restrictions for sulfometuron methyl. Aerial application of this herbicide is prohibited on BLM lands.
sulfometuron methyl + metsulfuron methyl	Oust Extra	See restrictions for sulfometuron methyl. Aerial application of this herbicide is prohibited on BLM lands.
tebuthiuron	Alligare Tebuthiuron 80 WG , Spike 20P, SpraKil S-5 Granules, others	To minimize risks to terrestrial wildlife and livestock, do not exceed the typical application rate for applications. Do not exceed the typical application rate when applying in known traditional use areas, and to reduce risk to occupational and public receptors.
tebuthiuron + diuron	SpraKil SK-13 Granular, SpraKil SK-26 Granular	See restrictions for each active ingredient.
triclopyr	Element 3A, Garlon 4, Pathfinder, Remedy, Tahoe 3A, Triclopyr 3, others	To minimize risks to terrestrial wildlife and livestock, do not exceed the typical application rate for applications. Do not apply across large application areas, where feasible, to limit impacts to livestock, particularly through the contamination of food items. Do not exceed the typical application rate when applying in known traditional use areas, and to reduce risk to occupational and public receptors.
triclopyr +2,4-D	Aquasweep, Candor, Crossbow, Everett	See restrictions for each active ingredient.

HERBICIDE ACTIVE INGREDIENTS	TRADE NAME	ADDITIONAL RESTRICTIONS AFTER FOLLOWING MSDS AND LABEL
triclopyr + clopyralid	Prescott Herbicide, Redeem R&P, Brazen	See restrictions for triclopyr.

N3.3 Pesticide Spills and Cleanup

The following measures for pesticide spills and cleanup may be required for the TWE Project. Additional details regarding spills and cleanup are provided in the Spill Prevention and Response Plan (Appendix S).

- TransWest would address the potential of pesticide spills and cleanup during annual coordination meetings with local emergency management officials.

- TransWest would report to all appropriate land owners or agencies immediately if there are any pesticide spills, unplanned non-target pesticide applications, unusual occurrences of drift, unforeseen effects on wildlife or other resources, or any other situation that may affect public welfare. Pesticide clean-up and disposal is the responsibility of TransWest and would comply with all federal, state, and county requirements.

- In the event of an accidental release to the environment, spill cleanup procedures and documentation of the event would be implemented, including a cause analysis; appropriate corrective actions taken; and a characterization of the resulting environmental or health and safety impacts. Documentation of the event would be provided to the land management agency's authorized officer and other federal and state agencies, as required.

- Construction Contractor(s) would possess a spill kit. At a minimum the following items are suggested: shovel, 10 pounds of absorbent material (cat litter, soil, sawdust, or absorbent clay), large polyethylene bags with ties, safety goggles, rubber gloves, protective overalls, rubber boots, 5-gallon pail, respirator and cartridges suited to the chemical composition of the pesticide(s), dust pan, shop brush, portable eyewash, blank labels, first aid kit, apron, soap, water, and phone numbers of appropriate emergency personnel and CHEMTREC. At all times, the Construction Contractor(s) would maintain the spill kits where pesticide spills are most likely to occur.

N4.0 MONITORING

The purpose of TransWest's noxious weed monitoring program would be to ensure that Project areas containing identified problem weeds are progressing toward the long-term goal of appropriate vegetative cover and diversity, and that existing weed populations are not spreading to new areas as a result of Project construction. While TransWest's primary goal would be to eradicate noxious weed populations within Project areas, a secondary and likely more realistic goal would be to prevent the introduction of new weed populations and spreading of existing populations (containment).

The noxious weed monitoring program would also help TransWest assess its noxious weed management approach. In the event that large infestations occur or reoccur, an evaluation would be performed to determine what caused the infestation, and a new strategy may be implemented. Any significant shift in weed management treatment would be discussed with the appropriate agencies prior to being implemented.

Noxious weed sites that would be prioritized for monitoring include cleaning sites, access roads, staging areas, mulch and soil stockpiles, and special status plant occurrences and other sensitive sites (which are also prioritized for treatment), so that these sites can be re-treated as needed during the season.

In areas of disturbance, TransWest would conduct noxious weed monitoring as specified in the ROD, ROW grants or special use authorizations for the Project. Annual monitoring would be conducted until vegetation has successfully reestablished. General monitoring for noxious weeds would occur during routine operations and maintenance of the project facilities.

PUPs and PARs may be used for more site-specific implementation monitoring. For example, the PARs can be used to track whether the application was made at the correct time and if mitigation for sensitive wildlife concerns is included in the PUP (see Appendices A and B; BLM 2007; Forest Service Manual 2150 (USFS 2013a)).

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ATTACHMENT A
BLM PESTICIDE USE PROPOSAL (PUP) TEMPLATE

UNITED STATE DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

PESTICIDE USE PROPOSAL

STATE: _____ DATE:

_____

COUNTY: _____ PROPOSAL NUMBER:

_____

DISTRICT: _____ EA REFERENCE NUMBER:

_____

DURATION OF PROPOSAL: _____ DECISION RECORD (DR) NUMBER:

LOCATION: _____ _____

_____

_____

ORIGINATOR – NAME:

_____

ORIGINATOR – COMPANY:

_____

ORIGINATOR – CONTACT INFORMATION:

_____

PROPOSAL PREPARER - NAME:

_____

PROPOSAL PREPARER – COMPANY:

_____

PROPOSAL PREPARER – CONTACT INFORMATION:

_____

I. APPLICATION INFORMATION – Including mixtures and adjuvants):

1. TRADE NAME(S):

   _____

2. COMMON NAME(S)

   _____

3. EPA REGISTRATION NUMBER(S):

   _____

4. MANUFACTURER(S):

   _____

5. METHOD OF APPLICATION:

   _____

6. MAXIMUM RATE OF APPLICATION – AS STATED IN THE EIS:
   a. Pounds Active Ingredient or Acid Equivalent:

      _____

7. MAXIMUM RATE OF APPLICATION – AS STATED ON THE LABEL:
   a. Formulated Product:

      _____

   b. Pounds Active Ingredient or Acid Equivalent:

      _____

8. INTENDED RATE OF APPLICATION:
   a. Formulated Product:

      _____

   b. Pounds Active Ingredient or Acid Equivalent:

      _____

9. APPLICATION DATE(S):

   _____

10. NUMBER OF APPLICATIONS: _____

II. **PEST** [List specific pest(s) and reason(s) for the proposed application of the pesticide]:

_____

_____

_____

_____

III. DESIRED RESULTS OF THE APPLICATION – LINKED TO THE OBJECTIVES OF THE APPLICATION:

_____

_____

_____

_____

_____

_____

IV. APPLICATION SITE DESCRIPTION:

1. ESTIMATED NUMBER OF ACRES: _____
2. GENERAL DESCRIPTION (Describe land type or use, size, stage of growth of target species, soil characteristics, and any additional information that may be important in describing the area to be treated.)

_____

_____

_____

_____

_____

_____

_____

V. SENSITIVE ASPECTS AND PRECAUTIONS (Describe sensitive areas – marsh, endangered, threatened, candidate, and sensitive species habitat – and distance to application site. List measures to be taken to avoid impact to these areas):

_____

_____

_____

_____

_____

_____

_____

_____

VI. NON-TARGET VEGETATION (Describe potential immediate and cumulative impacts to non-target pests in project area as a result of the pesticide application. Identify any planned mitigation measures that would be employed – BE GENERAL, SPECIFICS DISCUSSED IN THE EA):

_____

_____

_____

_____

_____

_____

_____

VII. INTEGRATED PEST MANAGEMENT PRACTICES CONSIDERED IN THE OVERALL PROJECT :

_____

_____

_____

_____

_____

_____

_____

VIII. SIGNATURES:

1. Pesticide Use Proposal's Originator: _____

   Date: _____

   a. Company: _____

2. Certified Pesticide Applicator: _____ Date: _____

   a. License Number: _____

   b. Certifying Organization: _____

3. Field Office Pesticide/Noxious Weed Coordinator:

   _____ Date: _____

4. Field Office Manager:

   _____ Date: _____

5. BLM State Pesticide Coordinator:

   _____ Date: _____

6. Deputy State Director:

   _____ Date: _____

   - Concur or Approved
   - Not Concur or Disapproved

- Concur or Approved With Modifications
    - Any changes (modifications) to this proposal by the State Pesticide Coordinator would be listed in an attached memo to the manager requesting approval from the Deputy State Director.

ATTACHMENT B
FOREST SERVICE PESTICIDE USE PROPOSAL (PUP) SAMPLE FORM

Form FS-2100-2, Pesticide-Use Proposal Sample Form (USFS 1994)

Forest Service units must complete Form FS-2100-2, Pesticide-Use Proposal, for all proposed pesticide uses on National Forest System lands, except for housekeeping type uses or when the amount proposed for use is less than one pound active ingredient (except that the form must be completed for all uses of sodium cyanide and strychnine, regardless of quantity).

PESTICIDE-USE PROPOSAL SAMPLE FORM, FS-2100-2 (Reference FSM 2150)

To complete this form, see Instructions for Form FS-2100-2, Pesticide-Use Proposal

AGENCY/ COOPERATOR	CONTACT NAME, PHONE NUMBER, and E-MAIL	REGION	FOREST/ DISTRICT	DATE SUBMITTED

1) OBJECTIVE a) Project name and/or identifier b) Specific target pest(s) c) Purpose	
2) PESTICIDE PRODUCT(S) a) Trade name b) Formulation as purchased c) Restricted-use pesticide (yes/no) d) EPA registration number e) Common name of chemical(s) f) AI, AE, IU, or PIB expressed as % or concentration	
3) TYPE OF APPLICATION a) Method b) Equipment	
4) FIELD APPLICATION INFORMATION a) Formulation of material to be applied b) Planned application rate c) Dilution rate d) Diluent e) Pounds of AI or AE per acre (or other applicable rate) f) Other pesticides being applied to proposed treatment site(s)	•
5) TREATMENT AREA DESCRIPTION a) Targeted treatment area b) State and county c) Site description d) Estimate of acres (or other unit) to be treated e) Number of applications f) Month(s) and year(s) of application	
6) SENSITIVE AREAS a) Special designated area (if applicable) b) Areas to be avoided c) Areas to be treated with caution	

7) PROJECT IMPLEMENTATION a) Trained/certified personnel to be used b) Personal safety c) State and local coordination d) Best management practices e) Monitoring f) Additional project information	
8) REVIEWER(S) SIGNATURE(S) a) Pesticide use coordinator Date: b) Other reviewer(s) (as necessary) Date:	
9) APPROVAL (signature of approving official) Date:	

APPENDIX O
OPERATIONS AND MAINTENANCE PLAN

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ACRONYMS

Applicant	TransWest Express LLC, also TransWest
ATV	all-terrain vehicle
BA	Biological Assessment
BE	Biological Evaluation
BLM	Bureau of Land Management
BO	Biological Opinion
EMM	Environmental Mitigation Measure
ERO	electric reliability organization
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
NERC	North American Electric Reliability Corporation
NTP	Notice to Proceed
O&M Plan	Operations and Maintenance Plan, also Plan
O&M	Operations and Maintenance
Plan	Operations and Maintenance Plan, also O&M Plan
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
ROD	Record of Decision
ROW	right-of-way
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
USFS	United States Forest Service
WECC	Western Electricity Coordination Council

O1.0 INTRODUCTION

This Operations and Maintenance Plan (O&M Plan or Plan) has been developed by TransWest Express LLC (TransWest or Applicant) for conducting routine, corrective, and emergency operation and maintenance (O&M) activities for the TransWest Express Transmission Project (TWE Project or Project). O&M activities are required to comply with North American Electric Reliability Corporation's (NERC) and Western Electric Coordinating Council (WECC) reliability and service requirements.

NERC is a not-for-profit international regulatory authority whose mission is to ensure the reliability of the bulk power system in North America. NERC develops and enforces Reliability Standards; annually assesses seasonal and long-term reliability; monitors the bulk power system through system awareness; and educates, trains, and certifies industry personnel. NERC's area of responsibility spans the continental United States, Canada, and the northern portion of Baja California, Mexico. NERC is the electric reliability organization (ERO) for North America, subject to oversight by the Federal Energy Regulatory Commission (FERC) and governmental authorities in Canada. NERC's jurisdiction includes users, owners, and operators of the bulk power system, which serves more than 334 million people.

The ERO's key programs, which impact more than 1,900 bulk power system owners and operators, are based on four pillars of continued success:

- Reliability – to address events and identifiable risks, thereby improving the reliability of the bulk power system.
- Assurance – to provide assurance to the public, industry, and government for the reliable performance of the bulk power system.
- Learning – to promote learning and continuous improvement of operations and adapt to lessons learned for improved bulk power system reliability.
- Risk-based Approach – to focus attention, resources, and actions on issues most important to bulk power system reliability.

In 2007, FERC approved agreements by which NERC delegates its authority to monitor and enforce compliance to eight Regional Entities. The members of the Regional Entities come from all segments of the electric industry: investor-owned utilities; federal power agencies; rural electric cooperatives; state, municipal and provincial utilities; independent power producers; power marketers; and end-user customers. WECC is the Regional Entity for the TWE Project operating area.

NERC and WECC develop and maintain reliability standards and ensure compliance and enforcement of these standards amongst all Bulk-Power System owners, operators, and users with NERC-approved Reliability Standards. The TWE Project will be part of the Bulk-Power System and TransWest as the owner and operator will need to comply with these standards. NERC and WECC have compliance and enforcement programs that include registration procedures, compliance audits, and a process to review and issues sanctions and ensure mitigation of any violations of the mandatory reliability standards.

O2.0 PLAN PURPOSE

This Plan is intended to ensure the following:

- Compliance with NERC and WECC reliability and service requirements;
- Compliance of O&M activities with applicable state and federal laws and policies;
- Consistency across and within federal jurisdictions;
- Access to the transmission line and ancillary facilities to implement the necessary O&M activities in a timely, cost effective and safe manner; and
- Impacts to the environment are avoided where practicable or are minimized.

This Plan provides an overview of methods to be implemented if the need for O&M activities is required under emergency conditions. This document discusses the existing support structure, chain of command, and emergency communication protocols to be used.

O3.0 OPERATION AND MAINTENANCE

TransWest will perform a number of activities to keep transmission lines operational and in good repair. Most of these activities, such as routine patrols, inspections or scheduled maintenance are planned in advance. However, there will be an occasional need for emergency response in cases where public safety and property are threatened, to prevent imminent damage to the transmission line and ancillary facilities, or to restore service in the event of an outage.

Routine, corrective and emergency response activities will be conducted in accordance with this O&M Plan. TransWest will notify BLM Field Offices of routine and corrective maintenance activities; however, prior approval will not be necessary. Exceptions where prior notification and approval are required are described in Section O5.0. Maintenance activities outside of the right-of-way (ROW), outside of established service and access roads or other Project related ancillary facilities, or that are not identified in this Plan will not be conducted until approved by the agencies. An exception to this would be when emergency action/maintenance is needed which requires some outside ROW work to be completed to ensure reliable power to customers or for the health and safety of the public.

Typical schedules and equipment used for the O&M activities are provided below. However, additional vehicles and equipment may be necessary depending on the terrain, site access and necessary maintenance work. Work may also be conducted outside of the typical schedule; schedule changes may occur as a result of weather, manpower, equipment availability, budgets and other factors.

Maintenance activities planned in advance will be conducted in accordance with the seasonal and spatial wildlife restrictions described in Section 8 of the Plan of Development (POD). Seasonal spatial restrictions may include sensitive big game ranges, known raptor and eagle nest buffers, and greater sage-grouse lek buffers. Operations required during emergency repair situations will not be subject to identified seasonal avoidance areas and buffers.

O3.1 Routine (Preventative) Maintenance

Routine maintenance activities are ordinary maintenance tasks conducted on a regular basis to identify and repair any deficiencies. The work performed is typically repair or replacement of individual components (no new ground disturbance) performed by relatively small crews using a minimum of equipment. These activities do not damage vegetation or soil outside of the ROW, do not adversely impact sensitive resources, including special status species, waters of the U.S. and cultural resources, and do not require land manager approval. Personnel are generally present in any one area for less than one day.

The following are examples of routine maintenance activities:

- Semi-annual aerial patrols from a helicopter to inspect for structural and conductor defects, conductor clearance problems and hazardous trees.

- Routine ground patrols to inspect structural and conductor components. Such inspections generally require either an all-terrain vehicle (ATV) or pickup and possibly additional support vehicles traveling on access roads and may rely on either direct line-of-sight or binoculars. In some cases, the inspector may walk the ROW. Patrols are typically conducted in the spring and fall. Follow-up maintenance is scheduled depending on the severity of the problem, either as soon as possible or as part of routine scheduled maintenance.

- Climbing surveys may be necessary to inspect hardware or make repairs. Personnel generally access these structures by pickup, ATV or on foot.

- Structure or conductor maintenance typically occurs from a bucket truck (low reach), bucket truck (high reach), or man lifts. The maintenance vehicle may be located on or off a road, and no grading is typically necessary to create a safe work area.

- Cathodic protection surveys to check the integrity and functionality of the anodes and ground beds. These surveys typically require personnel to use an ATV or pickup and make brief stops.

- Routine cyclical vegetation clearing to trim or remove tall shrubs and trees to ensure adequate ground-to-conductor clearances. Vegetation clearing cycles vary from 3 to 10 years or as needed (depending upon the vegetation present). Personnel generally access the area by pickup, ATV or on foot; use chainsaws to clear the vegetation; and typically spend less than half a day in any one area. In some cases vegetation may be cleared using mechanical means.

- Removal of individual trees or snags (hazard trees) that pose a risk of falling onto conductors or structures and causing outages or fires. Personnel generally access hazard trees by truck, ATV or by foot from an access road and cut them with a chainsaw or similar tool. Any felled trees or snags are left in place as sources of large woody debris or as previously directed by the land management agency. Felled green trees are limbed to reduce fire hazard.

- Wood poles are periodically treated to retard rotting and structural degradation. Wood poles may be used for the ground electrode 34.5 kV lines on this Project. Personnel typically access structures by pickup, ATV or on foot; inspect and test (including the subsurface) the poles; and then treat them by injecting preservatives into the poles if required. Wood pole inspections and treatments generally occur on a 10-year cycle.

- Routine road maintenance, such as blading (as needed) to improve road surface conditions and drainage, or removing minor physical barriers, such as rocks and debris. All initial road maintenance is performed by field crews which typically use ATVs, pickups, chainsaws and hand tools. Trees and brush are cut off at grade to minimize damage to vehicles. Slash, deadfall and boulders are placed at the edge of the road or down slope of the road bed, depending on site topography, to serve as a filtering windrow to minimize erosion and sedimentation. Smaller vegetation (e.g., grasses) is left in the road bed unless it is too tall, hinders access or could be construed as a fire hazard to O&M vehicles.

- Vegetation removal may be required on access roads to allow the necessary clearance for access and provide for worker safety. Field crews access the service roads by pickup or ATV and use chainsaws and hand tools to clear the vegetation. Where practicable and feasible, mechanical methods may be used.

- The relocation or removal of bird problem nests posing imminent fire or outage risk. The Avian Protection Plan in Appendix B provides information and agency coordination requirements regarding problem nests.

- Noxious weed control and vegetation management activities that include the use of herbicides. Herbicide use is based on agreements with the landowner or federal land management agency for the parcel in question and the chemicals used are agreed to in advance. The Noxious Weed Management Plan in Appendix N provides additional information concerning noxious weed management.

O3.2 Corrective Maintenance

Corrective maintenance activities are relatively large-scale efforts that occur infrequently, may result in more extensive vegetation clearing or earth movement and may include rehabilitation seeding and associated activities (e.g., measures to control noxious weeds). Personnel are generally present in any one location or area for a prolonged time, generally more than one day. The following are examples of corrective maintenance:

- Non-cyclical vegetation clearing to remove saplings or larger trees in the ROW.

- Structure or conductor maintenance in which earth must be removed.

- Road maintenance involving erosion control, water drainage installation or repair (such as culverts or rock crossings), road rehabilitation after major disturbances such as slumping or a storm event), or other road maintenance requiring heavy equipment (not including routing grading).

- Follow-up restoration activities, such as seeding, noxious weed control and erosion control.

- Conductor repair or replacement, which requires the use of several types of trucks and equipment and grading to create a safe work area to hang and pull the conductor into place.

O4.0 EMERGENCY SITUATIONS

Emergency situations are those conditions that may result in imminent or direct threats to public safety or threaten or impair TransWest's ability to provide reliable transmission service to its customers. Emergency situations may include:

- Failure of conductor splices.
- Damage to structures or conductors from wildfire, high winds, ice or other weather-related conditions.
- Line or system outages or fire hazards caused by trees falling onto conductors.
- Breaking or imminent failure of cross-arms or insulators, which could, or causes conductor failure.
- Damage to structures or conductors from vandalism.
- Serious personal injury.

In case of an emergency where life or substantial property is at risk or there is a potential or actual interruption in service, TransWest will promptly respond to the emergency and conduct any and all activities, including emergency repair requiring heavy equipment access to the structures or other ancillary facilities, needed to remedy the emergency and will implement feasible and practicable environmental mitigation measures (EMMs). The Emergency Preparedness and Response Plan in Appendix F outline the protocols and procedures for emergency situations.

O5.0 ACCESS ROAD MANAGEMENT

Transmission line access roads that are necessary for the operation and maintenance of transmission lines, structures or ancillary facilities, will be maintained by TransWest in a safe, useable condition, as directed by an authorized officer from the appropriate land management agency or private landowner. These roads are not part of the public backbone access network.

During routine operations, vehicular access will be needed to reach each structure for periodic inspections and maintenance and to areas of forest or tall shrubs to control vegetation in the ROW for safe operation. When practicable, TransWest plans to employ live-line maintenance techniques on the transmission line to minimize the requirement for outages. Live line maintenance and repair techniques require the utilization of high-reach bucket trucks and other trucks and equipment. Roads required as routine access roads for the operational life of the Project will be revegetated following construction but will not be re-contoured; they would be maintained free of trees and shrubs for a minimum eight foot width. TransWest will coordinate with the local BLM FOs, USFS offices, counties and private landowners on a case-by-case basis regarding access requirements (including low water crossings) for operation and maintenance of the Project.

For non-routine maintenance requiring access by larger vehicles, the full width of the access road may be used. Roads would be repaired, as necessary, but would not be routinely graded. In order to preserve the ability to enter rapidly, the road structure (cuts and fills) would be left in place. In an emergency (i.e., in the event of a tower or conductor failure) full emergency access, including cranes and other heavy equipment, will be needed. Based on historical reliability of the structure types proposed, it is anticipated that only a small fraction of the structure sites will require emergency access over the life of the Project.

Other roads making up the backbone access network may be used by TransWest during operations. However, these roads will not be maintained by TransWest except as noted. These include:

- Public roads, including state highways and county roads. These roads are for public use and the appropriate state or county entity maintains them.

- Open roads on federal land. The appropriate federal agency (Bureau of Land Management [BLM] or United States Forest Service [USFS]) maintains these roads, which are open to the public. These roads, including drainage features, cuts and fill slopes, would be repaired by TransWest if damaged during O&M activities but not maintained on a routine basis.

- Closed roads on federal land. These roads are still needed for administrative or emergency functions, but they have been closed to the public because of management policies to protect natural resources or reduce maintenance costs. If utilized during O&M activities, TransWest would assume some maintenance responsibilities proportionate to their use for O&M purposes.

TransWest would typically perform two types of road maintenance activities: 1) vegetation and debris clearing to maintain safe access; and 2) repairs using heavy equipment. Roads are inspected generally every three to six years and repairs are made as necessary. Typically, a small crew uses hand tools to cut small brush and trees (greater than 12 inches tall); remove dead-fall and debris; and repair and replace signs on access and service roads. Crews also prepare an inventory of road damage that will require ground disturbance (e.g., repair of a failed bank), and repair work is scheduled accordingly (typically the following year). Inspections and maintenance are typically conducted from spring through summer, when roads are clear of snow. TransWest would report these activities to the agencies as specified in the right-of-way grants or special use authorizations.

TransWest will implement the O&M environmental mitigation measures when maintaining roads and follow the seasonal restrictions by time and location for sensitive wildlife and plant resources as described in the Wildlife and Plant Conservation Measures Plan (Appendix X).

O6.0 ENVIRONMENTAL MITIGATION MEASURES

O&M activities are planned to minimize impacts to the environment. EMMs will be implemented by TransWest during routine and corrective O&M activities and, to the extent possible, during emergency situations. For a list of mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

O6.1 Vegetation Management

A ROW Preparation and Vegetation Management Plan is located in Appendix R and includes O&M activities for vegetation within the ROW.

O6.2 Noxious Weed Control

Maintenance vehicles, ATVs and equipment have the potential to transport weed seeds from one area to another via dirt and debris that inadvertently collects on equipment. TransWest will implement the O&M environmental mitigation measures described in the Noxious Weed Management Plan (Appendix N).

O6.3 Restoration and Revegetation

The Reclamation Plan (Appendix Q) and Noxious Weed Management Plan (Appendix N) ensure appropriate reclamation and revegetation is implemented and to prevent accidental introduction or transport of noxious weeds along the ROW.

O6.4 Fire Protection

Fire regulations on federally managed lands are generally in effect between April 1 and October 31, and at other times with unusual weather conditions. O&M activities will follow the requirements and procedures specified by the appropriate federal or state agency when conducted on federal or state lands as well as those identified in the Fire Protection Plan (Appendix H).

TransWest is responsible for inspecting the transmission lines for fire hazards. When working during fire season, TransWest and/or their contractor(s) will carry the following suppression tools and equipment:

- All power-driven equipment shall be equipped with one fire extinguisher that is rated at a minimum as ABC-10 pound and one "D" handled or long handled round point shovel, size "O" or larger;
- Each motor patrol, truck and passenger-carrying vehicle shall be equipped with a double-bit axe or Pulaski, 3.5 pounds or larger; and
- Each internal combustion engine shall be equipped with a spark arrester that meets the federal land managing agency's standards.

TransWest and the federal or state land manager will work cooperatively to evaluate request for Industrial Fire Precaution Level Waivers that would allow TransWest and/or their contractor(s) to continue working when certain fire restrictions are in place.

Continuous operation of the transmission lines is necessary for the supply of electric service to customers and to provide stability to the entire interconnected western U.S. transmission system. Therefore, the agencies will use their best efforts to avoid using fire suppression techniques that could take the lines out of service. TransWest will be notified of any and all fire suppression efforts or prescribed burns that could come into close proximity (two miles) with the transmission lines prior to initiating those efforts.

O6.5 Emergency Notification Procedures

If TransWest becomes aware of an emergency situation that is caused by a fire on or threatening federal or state land that could damage the transmission lines or their operation, they will notify the appropriate federal contact. Likewise, if the federal or state land manager becomes aware of an emergency situation that is caused by a fire on or threatening federal or state land and that could damage the transmission line or its operation, it will notify TransWest.

O6.6 Protection Measures for Sensitive Environmental Resources

TransWest has taken a thorough, systemic approach in providing protection for sensitive environmental resources, including special status plants and wildlife, aquatic resources, and sensitive cultural resources. TransWest will implement the mitigation measures described in the protection plans listed below for protection of sensitive environmental resources during routine and corrective O&M activities.

- Appendix B – Avian Protection Plan
- Appendix D – Cultural Resources Protection and Management Plan
- Appendix N – Noxious Weed Management Plan
- Appendix P – Paleontological Resources Management and Mitigation Plan
- Appendix W – Water Resources Protection Plan
- Appendix X – Wildlife and Plant Conservation Measures Plan

If an emergency occurs and access is immediately needed, the appropriate federal agency will be notified as soon as possible. Depending on the urgency, the agency may not have responded until after the repair work has begun. Timing restrictions may not be adhered to, but the other measures listed above will be followed to the extent possible.

O7.0 O&M PLAN HISTORY

The O&M Plan is a living document and changes are anticipated over the life of the Project. This Plan and its updates will be distributed to the appropriate BLM and USFS field offices. Table O1 will be completed prior to construction.

In addition, the following items will developed and distributed as needed:

- List of road closures and gate locations.
- Maps containing known locations of sensitive plant and animal species mapped as “sensitive areas” without specifying the resource.
- Known locations of cultural features mapped as “sensitive areas” without specifying the resource.

TABLE O1 O&M CONTACT LIST

DEPARTMENT/ROLE	CONTACT NAME	TELEPHONE	CELL PHONE	EMAIL
Wyoming BLM				
Rawlins Field Office				
Colorado BLM				
Little Snake Field Office				
White River Field Office				
Utah BLM				
Vernal Field Office				
Richfield Field Office				
Fillmore Field Office				
Cedar City Field Office				
Salt Lake Field Office				
Nevada BLM				
Caliente Field Office				
Las Vegas Field Office				
U.S. Forest Service				
Uinta National Forest				
Manti-La Sal National Forest				

O8.0 REFERENCES

AECOM. 2011. Memorandum: Characteristics of Land Cover Crossed by TransWest Transmission Project Alternative Corridors Draft. Fort Collins, Colorado. February 2011.

American National Standards Institute, Inc. (ANSI). 2006. ANSI, A300 (Part 7) - 2006. Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (Integrated Vegetation Management a. Electric Utility Rights-of-way). Washington, D.C. February 2006.

Bramble, W.C., W.R. Brynes and R.J. Hutnik. 1985. Effects of a Special Technique for Right-of-Way Maintenance on Deer Habitat. Journal of Arboriculture. 11:278-284.

_____. 1986. Effects of a Special Technique for Right-of-Way Maintenance on an Avian Population. Journal of Arboriculture. 12: 219-226.

Miller, Randall. 2007. International Society of Arboriculture's Best Management Practices: Integrated Vegetation Management.

North American Electric Reliability Corporation (NERC). 2009. Transmission Vegetation Management Standard FAC-003-2 Technical Reference. Princeton, New Jersey. September 2009.

APPENDIX P
FRAMEWORK PALEONTOLOGICAL RESOURCES MANAGEMENT AND MITIGATION PLAN

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ACRONYMS

Applicant	TransWest Express LLC, also TransWest
BLM	Bureau of Land Management
BMP	Best Management Practice
CRS	Colorado Revised Statute
FEIS	Final Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act
GIS	geographic information system
NEPA	National Environmental Policy Act of 1969
NTP	Notice to Proceed
PFYC	Potential Fossil Yield Classification
Plan	Paleontological Resources Management and Mitigation Plan, also PRMMP
POD	Plan of Development
PRMMP	Paleontological Resources Management and Mitigation Plan, also Plan
Project	TransWest Express Transmission Project, also TWE Project
PRPA	Paleontological Resource Preservation Act
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project

P1.0 INTRODUCTION

This framework Paleontological Resources Management and Mitigation Plan (PRMMP or Plan) identifies the process that will be followed by TransWest Express LLC (TransWest or Applicant) and its Construction Contractor(s) to identify sensitive paleontological resources, develop measures to mitigate impacts to those sensitive resources, and implementation and reporting of those measures for the TransWest Express Transmission Project (TWE Project or Project).

Paleontological resources are the remains or traces of once-living organisms preserved in rocks or sediment. These fossils include bones, teeth, soft tissue, shells, leaves, wood, footprints, burrows, and microscopic remains found in geological deposits within which they were originally buried. The fossil record is the only direct evidence that life on Earth has existed for more than 3.6 billion years. Fossils are important scientific and educational resources because they are used to: (1) study evolutionary relationships, (2) understand fossil preservation, (3) interpret ancient environments and changes in climate, (4) determine the relative geologic age of rocks, (5) study the past geographic distribution of organisms, and (6) study the patterns and processes of evolution, extinction, and speciation. Fossils are considered non-renewable resources because the organisms they represent no longer exist. Information concerning the type of paleontological resources found in the TWE Project area and the potential for the Project to affect these resources can be found in the Final Environmental Impact Statement (FEIS).

P2.0 PLAN PURPOSE

The purpose of this framework Plan is to assist TransWest and its Construction Contractor(s) and those regulatory agencies with the responsibility for protecting paleontological resources in the design and construction of the Project. The PRMMP identifies the process that will be followed to identify sensitive resources, develop measures to mitigate impacts to those sensitive resources, implementation of those measures, and reporting. Prior to issuance of Notices to Proceed (NTPs) with construction, the steps outlined for the identification of sensitive resources and mitigation measures will need to be completed and the PRMMP updated. For a list of additional mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

P3.0 PLAN UPDATES

The PRMPP will be updated for the NTP Plan of Development (POD) based on detailed final engineering and design and pre-construction surveys, if required, for the Selected Alternative. The Construction Contractor will be responsible for preparing and implementing the final Plan in compliance with local, state, and federal regulations pertaining to paleontological resources.

P4.0 REGULATORY FRAMEWORK

Federal and state legislation, regulatory compliance, and professional standards applicable to paleontological resources in the Project area include:

- National Environmental Policy Act (NEPA)
- Federal Land Policy and Management Act (FLPMA)

- Paleontological Resources Preservation Act (PRPA)
- Colorado Revised Statute (CRS) 24-80-401-411
- Utah State Code 63-73-11 through 63-73-19
- Nevada Revised Statutes 381.195 – 381.227

P5.0 POTENTIAL FOSSIL YIELD CLASSIFICATION

The Potential Fossil Yield Classification (PFYC) system is a measure of the likelihood of impacting fossil resources in a given area based on the occurrence of fossil-bearing geological units. This system predicts the probability of finding paleontological resources in a given area using geological maps of sufficient scale and detail. The numerical nature of the PFYC system also allows for ease of importation into a geographic information system (GIS), further facilitating the planning and management decision-making process. The five-part PFYC system, as defined by the Bureau of Land Management (BLM) (2008), is explained below.

Class 1 – Very low potential: Geological units not likely to contain recognizable fossil remains. Units that are igneous or metamorphic, excluding reworked volcanic-ash units. Units that are Precambrian in age. The probability for impacting any fossils is negligible. Assessment or mitigation of paleontological resources is usually unnecessary. The occurrence of significant fossils is nonexistent or extremely rare.

Class 2 – Low potential: Sedimentary geological units not likely to contain vertebrate fossils or scientifically significant non-vertebrate fossils. Vertebrate or significant invertebrate or plant fossils not present or very rare. Units that are generally younger than 10,000 years before present. Recent eolian deposits. Deposits that exhibit significant physical and chemical changes (i.e., diagenetic alteration). The probability for impacting vertebrate fossils or scientifically significant invertebrate or plant fossils is low. Assessment or mitigation of paleontological resources is not likely to be necessary. Localities containing important resources may exist, but would be rare and would not influence the classification. These important localities will be managed on a case-by-case basis and assessment or mitigation may be unnecessary except in rare or isolated circumstances.

Class 3 – Moderate or **unknown potential:** Fossiliferous sedimentary geological units where fossil content varies in significance, abundance, and predictable occurrence or sedimentary units of unknown fossil potential. Commonly marine in origin with sporadic known occurrences of vertebrate fossils. Vertebrate fossils and scientifically significant invertebrate and plant fossils known to occur intermittently and predictably known to be low. Poorly studied and/or poorly documented. Potential yield cannot be assigned without ground reconnaissance.

***Class 3a* – Moderate potential:** Units are known to contain vertebrate fossils or scientifically significant invertebrate or plant fossils, but these occurrences are widely scattered. Common invertebrate or plant fossils may be found in the area and opportunities may exist for hobby collecting. The potential for a project to be sited on or impact a significant fossil locality is low, but the potential is somewhat higher for common fossils.

***Class 3b* – Unknown potential:** Units exhibit geological features and preservational conditions that suggest significant fossils could be present, but little information about the paleontological resources of the unit or the area is known. This may indicate the unit or area is poorly studied, and field surveys may uncover significant fossils. The units in this class may eventually be placed in another class

when sufficient surveying and research is performed. The unknown potential of the units in this class should be carefully considered when developing any mitigation or management plans.

This classification includes a broad range of paleontological potential. It includes geological units of unknown potential, as well as units of moderate or infrequent occurrence of fossil resources. Management considerations cover a broad range of options as well and could include pre-construction surveys, monitoring, or avoidance. Ground disturbing activities will require sufficient assessment to determine where significant paleontological resources occur in the area of the proposed action and whether the action could affect the paleontological resources. These units may contain areas that would be appropriate to designate as hobby-collecting areas due to the higher occurrence of common fossils and lower concern about affecting significant paleontological resources.

Class 4 – High potential: Geological units containing a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented but may vary in occurrence and predictability. Ground-disturbing activities may adversely affect paleontological resources in many cases.

***Class 4a* – High potential:** Units exposed with little or no soil or vegetative cover. Outcrop areas are extensive, with exposed bedrock areas often larger than two acres. Paleontological resources may be susceptible to adverse impacts from ground-disturbing actions. Illegal collecting activities may impact some areas.

***Class 4b* – High potential:** These are areas underlain by geological units with high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity. Areas of exposed outcrop are smaller than two contiguous acres. Outcrops form cliffs of sufficient height and slope so impacts are minimized by topographic conditions. Other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources.

The probability for impacting significant paleontological resources is moderate to high, and is dependent on the proposed action. Mitigation considerations must include assessment of the disturbance, which may include removal or penetration of the protective surface alluvium or soils, potential for future accelerated erosion, or increased ease of access resulting in greater looting potential. If impacts to significant fossils can be anticipated, on-the-ground surveys prior to authorizing the ground-disturbing action will usually be necessary. On-site monitoring or spot-checking may be necessary during construction activities. Management prescriptions for resource preservation and conservation through controlled access or special management designation should be considered. Class 4 and 5 units may be combined as Class 5 for broad applications, such as planning efforts or preliminary assessments, when geological mapping at the appropriate scale is not available. Resource assessment, mitigation, and other management considerations are similar at this level of analysis, and impacts and alternatives can be addressed at a level appropriate to the application.

Class 5 – Very high potential: Highly fossiliferous geological units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils and are at risk of human-caused adverse impacts or natural degradation.

***Class 5a* – Very high potential:** Units are exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas commonly larger than two contiguous acres. Paleontological resources are highly susceptible to adverse impacts from ground-disturbing activities. Unit is frequently the focus of illegal collecting activities.

***Class 5b* – Very high potential:** These are areas underlain by geological units with very high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has very high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from activity. Outcrops form cliffs of sufficient height and slope so impacts are minimized by topographic conditions. Other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources.

The probability of impacting significant fossils is high to very high. Vertebrate fossils or scientifically significant invertebrate fossils are known or can be reasonably expected to occur in the impact area. On-the-ground surveys prior to authorizing any ground disturbing activities or land use adjustments will usually be necessary. On-site monitoring may be necessary during construction activities. Mitigation will often be necessary before and/or during these actions. Official designation of areas of avoidance, special interest, and concern may be appropriate.

P6.0 PALEONTOLOGICAL TREATMENT

TransWest has committed to the following design features and Best Management Practices (BMPs) to avoid or minimize potential paleontological impacts.

TWE-38: If paleontological resources are known to be present in the Project area, or if areas with a high potential to contain paleontological material has been identified through the NEPA process and FEIS, the Applicant will prepare a Paleontological Resources Management and Mitigation Plan as part of the NTP POD.

TWE-39: Paleontological mitigation may be required in areas of greatest disturbance and areas likely to have significant fossils. Pre-construction surveys of such areas may be conducted as agreed upon by the land management and lead federal agency.
The following steps indicate how the above design features will be implemented for the treatment of paleontological resources:

1. Conduct paleontological pre-construction field survey and report.

2. Develop a PRMMP.

3. Undertake resource data recovery (if required) and monitoring as prescribed in the PRMMP.

4. Prepare report documenting the results of the monitoring and additional investigations that were required.

The pre-construction field survey shall be undertaken by a qualified paleontologist(s) within those PFYC Class 4 or Class 5 areas identified in the FEIS. The survey will examine existing rocks and sediment exposures. The survey will confirm and augment geological mapping, locate and collect any significant paleontological resources exposed at the surface, and assess paleontological potential with more precision. The results of the pre-construction survey will be presented in a report that will be provided to the appropriate regulatory agencies.

Based on the results of the pre-construction field survey, a final PRMMP will be developed. This Plan will specifically identify any specimens that require data recovery prior to construction, identify those portions of the Project area where monitoring for paleontological resources should be conducted during construction, and describe the procedures to be followed in the event of an unanticipated

discovery. The PRMMP will also outline a working training program, curation requirements, and reporting.

P7.0 REFERENCES

Bureau of Land Management (BLM). 2008. Potential Fossil Yield Classification (PFYC) System. Instruction Memorandum No. 2008-009.

APPENDIX Q
FRAMEWORK RECLAMATION PLAN

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ACRONYMS

ACEC	Area of Critical Environmental Concern
Applicant	TransWest Express LLC, also TransWest
BA	Biological Assessment
BE	Biological Evaluation
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	Biological Option
FEIS	Final Environmental Impact Statement
FO	Field Office
NTP	Notice to Proceed
OHV	off-highway vehicle
Plan	Reclamation Plan
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
Reclamation	Bureau of Reclamation
ROD	Record of Decision
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
USFS	United States Forest Service

Q1.0 INTRODUCTION

Q1.1 Purpose

TransWest Express LLC (TransWest or Applicant) has prepared this framework Reclamation Plan (Plan) for the TransWest Express Transmission Project (TWE Project or Project) to outline reclamation goals and objectives and the reclamation process, including soil management, site preparation, revegetation, monitoring, and reporting. This Reclamation Plan for the TWE Project provides an overview of the reclamation goals and standards that will be used to ensure successful reclamation of disturbed areas created by the Project. The reclamation procedures outlined in this document describe the methodologies, monitoring, and reporting requirements for reclaiming disturbances associated with the Project.

This Reclamation Plan describes the framework for the development of a final Reclamation Plan that will be a part of the Plan of Development (POD) provided with the Notice to Proceed (NTP). Final reclamation plan(s) will be developed by the Construction Contractor(s) based on the final selected location of all Project facilities and will be submitted to the appropriate agency prior to the issuance of the construction NTP. Final reclamation plan(s) are intended to be adaptive to changing conditions and technologies, and the federal Authorized Officer(s) will have discretion to update, modify, or change the procedures should it be deemed warranted due to site conditions or other factors.

The Project area contains federal lands administered by the Bureau of Land Management (BLM), U.S. Forest Service (USFS), and Bureau of Reclamation (Reclamation) ("federal lands"); state lands under the management of various state land boards and management agencies (the "state lands"); and private lands. The Reclamation Plan and the procedures and standards outlined herein will apply to federal lands within the Project area. While the preference will be to use the procedures and standards of the Reclamation Plan throughout the Project area, specific reclamation techniques, standards, and schedules on private lands and state lands may vary and will be developed in coordination with private landowners, state land boards or state management agencies.

Q1.2 Reclamation Goals and Objectives

Reclamation objectives emphasize eventual ecosystem reconstruction to maintain a safe and stable landscape and meet the desired outcomes of the land use plan, which means returning the land to a condition approximate to or better than pre-disturbance conditions. For purposes of this Reclamation Plan, reclamation is defined as the rehabilitation of a disturbed area to make it acceptable for designated use. Reclamation objectives include initial stabilization and long-term reclamation to ensure biophysical conditions are maintained in the short term to achieve the long-term goals of revegetation and ecosystem reconstruction.

To achieve long-term reclamation, interim reclamation may be necessary to maintain viable, healthy ecosystems until decommissioning. Interim reclamation will likely be used on stabilized areas that may be re-disturbed during operation and maintenance. Interim reclamation goals and objectives include maintaining active topsoil, establishing erosion control measures, and minimizing habitat, visual resource, and forage loss. Final, long-term reclamation will take place on all surfaces that will not be disturbed during operations and maintenance activities, as well as during decommissioning of all areas.

Table Q1 provides the Applicant committed mitigation measures and BLM Field Office stipulations along the Agency Preferred Alternative identified in the Final Environmental Impact Statement (FEIS) which may be applicable to this Plan. For a list of additional mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table

17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

TABLE Q1 APPLICANT COMMITTED AND BLM FIELD OFFICE RECLAMATION MITIGATION MEASURES

MEASURE CATEGORY	RECLAMATION BMP, DESIGN FEATURES, AND BLM FIELD OFFICE-SPECIFIC STIPULATIONS
Applicant Committed Environmental Mitigation Measures	
Project Design, Access, and Construction (general ROW, visual, access, vegetation management, restoration, erosion control, soils, clean-up)	TWE-10, TWE-11, TWE-13, TWE-14, TWE-15, TWE-16, TWE-17
Geology and Soils (drainage and soil control)	TWE-19
Groundwater, Surface Water, and Wetlands (water quality)	TWE-22
Vegetation and Soils Management (vegetation management)	TWE-26, TWE-27
Ecological Resources (ecological, special status species and habitats)	TWE-32, TWE-33
Land Use and Visual Resources (land use, agriculture, ranching, access, gates)	TWE-41, TWE-43
Hazardous Materials, Waste, and Wastewater Management (waste management)	TWE-60
Fire Protection	TWE-64
Wyoming BLM Field Offices	
BLM Rawlins FO	OHV use limited to designated roads and vehicle routes.
BLM Rawlins FO	Surface disturbance avoided on unstable areas.
Colorado BLM Field Offices	
BLM Little Snake FO	Surface disturbing activities would be allowed on isolated sites that meet fragile soil criteria, under certain circumstances.
BLM White River FO	Surface occupancy not permitted on soils identified as unstable and subject to slumping.
BLM White River FO	Surface disturbing activities not permitted on fragile soils on slopes >35 percent, or saline soils derived from Manco shale without appropriate plan and approval by Area Manager.
BLM White River FO	Avoidance of cottonwood stands or cottonweed regeneration areas to the extent practicable and special design features that that would accelerate recovery and/or reestablishment of affected cottonwood communities may be required within 0.25 mile of a bald eagle nest or roost/concentration area.
BLM White River FO	Habitats having Blue Mountain Deciduous Browse/Aspen/Serviceberry/Chokecherry Communities may be prohibited, but if allowed would be avoided to the extent possible and use of special restoration measures to promote recovery.
BLM White River FO	Conversion or adverse modification of sage-grouse habitats will be avoided.
BLM White River FO	To protect outstanding scenic and natural landscape values at

MEASURE CATEGORY	RECLAMATION BMP, DESIGN FEATURES, AND BLM FIELD OFFICE-SPECIFIC STIPULATIONS
	select areas (VRM Class II and III), if construction is permitted, special design and reclamation measures may be implemented including transplanting trees and shrubs, fertilization, mulching, special erosion control structures, irrigation, site recontouring, low profile equipment, and painting to reduce visual contrasts.
BLM White River FO	Special restoration measures must be implemented for loss of prairie dog habitat.
Utah BLM Field Offices	
BLM Fillmore FO	All land disturbed by new ROW except authorized new access roads shall be rehabilitated to as close to natural conditions as possible.
BLM Vernal FO	If surface disturbance cannot be avoided on slopes of 21-40%, a plan would be required which includes an erosion control strategy, GIS modeling, survey by certified engineer, and adhere to surface operating standards in the BLM Gold Book (USDI and USDA 2007). For slopes >40%, there would be no surface occupancy unless there is a plan and a detailed analysis (e.g. Order I soil survey by soil scientist) finds that conditions would allow occupancy while adequately protecting area from accelerated erosion.
BLM Richfield FO	Avoid routing through areas with slopes of 30% or greater. If avoidance is not practical, an erosion control strategy, reclamation and site plan with detailed survey by certified engineer are required. Avoid soils having high potential for wind erosion.
BLM Richfield FO	Wetlands would additional measures, such as no surface occupancy areas, erosion control strategies, mitigation to protect surface from rutting, compaction, and displacement, and disruption of surface and subsurface function, mitigation or restoration measures to restore hydrologic function to site, survey requirements and design by certified engineer.
BLM Salt Lake FO	Avoid lands with slopes >30%. Surface disturbance only allowed on fragile soils with slopes >35% with appropriate engineering plan.
Nevada BLM Field Offices	
BLM Las Vegas FO	In Mormon Mesa and Rainbow Garden ACECs for critical desert tortoise habitat, the following is required: reclamation to pre-disturbance conditions within reasonable timeframe, which may include salvage and transplant of cactus and yucca, recontouring of area, scarification of compacted soil, soil amendments, seeding and transplant of seedling shrubs. Subsequent revegetation measures may be required if monitoring indicates not successful the first time.
BLM Las Vegas FO	Reclamation of temporary roads required in ACECs.

ACEC = Area of Critical Environmental Concern; FO = Field Office; BLM = Bureau of Land Management; BMP = Best Management Practice; OHV = off-highway vehicle

Q1.3 Plan Updates

The Plan will be updated for the Notice to Proceed (NTP) POD based on the final engineering and design, results of pre-construction field surveys, and continued agency coordination. The Construction Contractor will be responsible for preparing and implementing the final Plan.

Q2.0 SURFACE-DISTURBING ACTIVITIES

Project surface-disturbing activities will be described in the NTP POD. Pre-disturbance assessments will provide the baseline information needed for construction planning. The NTP POD will include a Project layout, location and detail of surface-disturbing activities, and design documentation. This information will be used to determine specific reclamation techniques and reclamation timing for different disturbance elements and locations. Based on the level of disturbance, final reclamation standards and a monitoring schedule will be determined for each surface-disturbing activity. Soil stabilization will begin immediately following construction followed by interim reclamation.

Q3.0 SOIL MANAGEMENT

Soil is constantly being weathered through biological processes, which develops the structure and function essential in sustaining vegetation communities and providing wildlife habitat. Thus, maintaining soil structure and function is critical for successful reclamation efforts. As described in the Framework Access Road Siting and Management Plan (Appendix A) TransWest will use existing roads and overland access ("drive and crush") whenever practicable to avoid or reduce the need for reclamation. Where practicable, topsoil will be separated and handled differently than subsoil layers. Topsoil will be salvaged during construction to use for site preparation and to support future reclamation efforts. Soils on federal lands will be managed using measures approved by the appropriate federal agency. While the preference will be to use the same soil management practices on private lands and state lands, specific soil management practices on private lands and state lands may vary and will be developed in coordination with private landowners, state land boards or state management agencies as appropriate.

Q3.1 Soil Handling

A critical component of reclamation is to maintain the biological, chemical, and physical integrity of the soil resource by establishing a series of guidelines for the proper handling of topsoil and subsoil. For each surface-disturbing activity, topsoil, and in some instances subsoil, will be salvaged and stockpiled. Components of soil handling will include the identification, erosion protection, placement, and incorporation of salvaged soil stockpiles.

Q3.2 Landscape Reconstruction

Surface runoff and erosion control in areas exposed to surface-disturbing activities will be accomplished by reconstructing the landscape and maintaining soil stability. The landscape will be reconstructed to achieve a desired topography, slope stability, and surface stability, to the extent possible. Water courses and drainage features will be reconstructed, where practicable, to maintain the drainage pattern, profile, and dimension to approximate the natural features and hydrologic characteristics of pre-disturbance characteristics. Surface stability will be controlled by maintaining soil physical properties and treating compacted surfaces with accepted technologies.

Q4.0 RIGHT-OF-WAY RECLAMATION

Reclamation restores the disturbed area by recreating the physical characteristics that approximate the landscape features of adjacent areas and pre-disturbance conditions. Components of reclamation

include landscape reconstruction, site preparation and revegetation. Disturbed areas on federal lands will be revegetated in accordance with agency-approved measures and seed mixtures.

Q4.1 Erosion Control

Erosion control measures will be implemented to avoid and minimize impacts from surface-disturbing activities. Erosion control measures will be installed prior to and immediately following surface-disturbing activities. Initial stabilization measures will be used to control surface runoff and erosion and to ensure biophysical conditions are maintained until long-term reclamation can be initiated. Long-term erosion control measures will be established with an overriding goal of revegetation and ecosystem reconstruction.

Immediately following surface-disturbing activities, temporary runoff and erosion control measures will be implemented where necessary to ensure soil stabilization. Measures may include mulching and netting of biodegradable blankets stapled firmly to the soil surface, applying sediment control, respreading scalped vegetation, and constructing water bars, diversion ditches, sediment fences, and energy dissipaters. Specific measures will be determined based on site-specific conditions.

Following soil stabilization, long-term measures will be applied to further stabilize disturbed areas and control surface runoff and erosion to meet reclamation standards. Long-term erosion control measures may include constructing sediment trapping devices, sediment filtering devices, water bars and revegetation of disturbed areas.

All runoff and erosion control structures will be inspected and properly maintained until the desired vegetation is established and soil stability is attained at the reclaimed area. Substandard or ineffective structures will be evaluated and replaced.

Q4.2 Seedbed Preparation

The primary objective of revegetation is to establish the species composition, diversity, structure, and ground cover appropriate for the desired plant community. Seedbed preparation maximizes seeding efficiency and improves reclamation success and includes topsoil replacement, discing, and surface roughening techniques. Compacted areas will be treated with the most appropriate methods and technologies to improve soil aeration, water infiltration, and root penetration. Soil conditioning and amendments may be necessary to ameliorate poor topsoil and subsoil quality.

Q4.2.1 Seeding Methods

Following seedbed preparation, seed will be applied using a broadcast spreader, drill, and/or hydroseeder depending on site conditions and seed mix. Seeding will be done after ground-disturbing activities are complete and at the appropriate time of year (preferably in the fall or, if fall is not an option, the spring). TransWest will coordinate with the applicable BLM Field Office to determine the appropriate time of year for seeding. If there is a lag time between the end of ground-disturbing activities and seeding, appropriate erosion control measures will be implemented.

Q4.2.2 Seed Mixes

Proper seeding mixtures will be used to reclaim disturbed areas on federal lands. According to established criteria, the seed mixture selection process for federal lands will consider agency-specific pick lists, seed availability and price, growth form, seasonal variety, and prevailing dominant species. To increase the likelihood of successful reclamation, locally adapted native plant materials based on the site characteristics and ecological setting (i.e., the pre-disturbance site characterization) will be selected when possible.

Seed mixtures will be tailored to establish species diversity, composition, and ground cover appropriate for each desired plant community. Only approved, certified weed-free seeds will be used. The local land management agency (i.e., BLM Field Office) will approve the seed mix to be used on their respective land. The seed mixture will contain the following elements.

- Species composition and diversity for the desired plant community, ecological setting, and current soil properties.
- Dominant herbaceous species (native where practical) that support or augment the post-disturbance land uses, including species-specific wildlife habitat, rangelands, and other public uses.
- Full shrub and/or sub-shrub species when these species are available and will help achieve reclamation objectives while supporting post-disturbance land uses and/or wildlife habitat needs.
- Forb species (native where practical) or other agency or landowner-approved plant species, as appropriate for management objectives.

Q4.3 Weed Management

Noxious weed management for Project will occur as described in Appendix N of the POD, the "Noxious Weed Management Plan." The focus of noxious weed control efforts is to prevent the spread of new infestations resulting from Project activities.

Q5.0 MONITORING AND REPORTING

Reclamation monitoring will document the condition of reclaimed areas and reclamation progress across the Project. TransWest will conduct post-construction reclamation monitoring annually for a 2-year period or until reclamation goals are met following the conclusion of ground-disturbing activities.

Q5.1 Monitoring Activities

Reclamation monitoring will occur annually in accordance with agency specific requirements on federal lands. Vegetation will be evaluated against reclamation goals and objectives (Section 1.2). Successful revegetation will be determined by monitoring reclaimed areas against existing conditions. Species and relative density will be assessed annually and compared to baseline data collected prior to the start of ground-disturbing activities. Reclamation will be determined successful if vegetation has become established in the seeded areas and are demonstrating that they will, over time, achieve a distribution and diversity similar to pre-construction conditions. If after a second growing season problem areas have been identified (e.g., seed germination is lower than expected; prevalence of noxious-weed species), the area will be treated and re-seeded. Treatment may include additional seedbed preparation, control of noxious weeds, use of soil amendments, and/or use of another appropriate seed mix.

Q5.2 Reporting

TransWest will document pre-construction observations, construction reclamation activities, and post-construction monitoring on federally and state-managed lands in an annual report. Annual reports will be prepared for submittal to federal or state entities that administer federal lands in the Project area.

The reports will provide a summary of Project reclamation activities and observations and include recommendations for additional corrective actions if necessary.

Q6.0 REFERENCES

Bureau of Land Management (BLM). 2013. TransWest Express Transmission Project. Draft Environmental Impact Statement. BLM Wyoming State Office and Western Area Power Administration. June 2013.

APPENDIX R
ROW PREPARATION AND VEGETATION MANAGEMENT PLAN

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ACRONYMS

AC	alternating current
ACEC	Area of Critical Environmental Concern
Applicant	TransWest Express LLC, also TransWest
BA	Biological Assessment
BE	Biological Evaluation
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	Biological Opinion
CFR	Code of Federal Regulations
CWA	Clean Water Act
DC	direct current
ESA	Endangered Species Act of 1973
FEIS	Final Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act of 1976
FO	Field Office
IRA	Inventoried Roadless Area
IVM	integrated vegetation management
kV	kilovolt
MVCD	Minimum Vegetation Clearance Distance
NEPA	National Environmental Policy Act of 1969
NERC	North American Electric Reliability Corporation
NF	National Forest
NTP	Notice to Proceed
OHV	off-highway vehicle
Plan	ROW Preparation and Vegetation Management Plan
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
Reclamation	Bureau of Reclamation
ROD	Record of Decision
ROW	right-of-way
SDAs	Special Designated Areas
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
URMCC	Utah Reclamation Mitigation and Conservation Commission
USFS	United States Forest Service
VQO	Visual Quality Objective
VRM	Visual Resource Management

R1.0 INTRODUCTION

R1.1 Plan Purpose

This Right-of-Way (ROW) Preparation and Vegetation Management Plan (Plan) describes the vegetation management actions to be carried out by TransWest Express LLC (TransWest or Applicant) and its Construction Contractor(s) to meet regulatory requirements for ROW clearing and maintenance, fuels management, and to support restoration actions for implementation of the Reclamation Plan (Appendix Q) for the TransWest Express Transmission Project (TWE Project or Project).

Table R1 provides the Applicant committed design features, best management practices (BMPs), and mitigation measures and BLM Field Office stipulations along the Agency Preferred Alternative identified in the Final Environmental Impact Statement (FEIS) which may be applicable to this Plan. For a list of additional mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

TABLE R1 APPLICANT COMMITTED AND BLM FIELD OFFICE VEGETATION MANAGEMENT MITIGATION MEASURES

MEASURE CATEGORY	VEGETATION MANAGEMENT BMP, DESIGN FEATURES, AND BLM FO-SPECIFIC STIPULATIONS
Applicant Committed Environmental Mitigation Measures	
Project Design, Access, and Construction (general ROW, visual, access, vegetation management, restoration, erosion control, soils, clean-up)	TWE-11, TWE-18
Vegetation and Soils Management (vegetation management)	TWE-26, TWE-27, TWE-28
Ecological Resources (ecological, special status species and habitats)	TWE-32, TWE-33
Land Use and Visual Resources (land use, agriculture, ranching, access, gates)	TWE-42
Public Health and Safety (worker health and safety)	TWE-51
Hazardous Materials, Waste, and Wastewater Management (waste management)	TWE-60
Fire Protection	TWE-64
Colorado BLM Field Offices	
BLM White River Field Office	Habitats having Blue Mountain Deciduous Browse/Aspen/Serviceberry/Chokecherry Communities may be prohibited, but if allowed would be avoided to the extent possible and use of special restoration measures to promote recovery.

MEASURE CATEGORY	VEGETATION MANAGEMENT BMP, DESIGN FEATURES, AND BLM FO-SPECIFIC STIPULATIONS
BLM White River FO	Avoidance of cottonwood stands or cottonweed regeneration areas to the extent practicable and special design features that that would accelerate recovery and/or reestablishment of affected cottonwood communities may be required within 0.25 mile of a bald eagle nest or roost/concentration area.
BLM White River FO	Adverse habitat modification prohibited within 0.25 mile of raptor nests.
BLM White River FO	Conversion or adverse modification of sage-grouse habitats will be avoided.
BLM White River Field Office	To protect outstanding scenic and natural landscape values at select areas (VRM Class II and III), if construction is permitted, special design and reclamation measures may be implemented including transplanting trees and shrubs, fertilization, mulching, special erosion control structures, irrigation, site recontouring, low profile equipment, and painting to reduce visual contrasts.
Wyoming BLM Field Offices	
BLM Rawlins Field Office	Off-highway vehicle use limited to designated roads and vehicle routes.
Nevada BLM Offices	
BLM Las Vegas Field Office	In Mormon Mesa and Rainbow Garden ACECs for critical desert tortoise habitat, the following is required: reclamation to pre-disturbance conditions within reasonable timeframe, which may include salvage and transplant of cactus and yucca, recontouring of area, scarification of compacted soil, soil amendments, seeding and transplant of seedling shrubs. Subsequent revegetation measures may be required if monitoring indicates not successful the first time.

FO = Field Office; VQO = Visual Quality Objectives; BMP = best management practice; BLM = Bureau of Land Management; ACEC = Areas of Critical Environmental Concern

R1.2 Agency Regulations

Federal and state agency regulations are presented in the following sections. Additional regulations may apply where special management areas are crossed by the TWE Project.

R1.2.1 All Lands

Relevant regulations applicable to all lands include:

- Clean Water Act (CWA) Sections 303(d) and 404
- North American Electric Reliability Corporation (NERC) Reliability Standard, FAC-003-2 (NERC 2011, 2013)
- Endangered Species Act (ESA) of 1973, as amended Section 7(a)(2)

R1.2.2 Bureau of Land Management

Relevant regulations applicable to Bureau of Land Management (BLM) lands include:

- Federal Land Policy and Management Act (FLPMA) of 1976 Sec. 101(a)(8)

- BLM Integrated Vegetation Management Handbook H1740-2 (BLM 2008)
- BLM Terms and Conditions of Right-of-Way Grants and Temporary Use Permits 43 Code of Federal Regulations (CFR) Part 2881.2
- BLM Field Office Resource Management Plans

R1.2.3 U.S. Forest Service

Relevant regulations applicable to United States Forest Service (USFS) lands include:

- FLPMA Sec. 101(a)(8)
- Forest Service Manual 2000 Zero Code 2070 – Service-wide (USFS 2008)
- National Forest Resource Management Plans

R1.2.4 Bureau of Reclamation

Relevant regulations applicable to Bureau of Reclamation (Reclamation) lands include:

- FLPMA Sec. 101(a)(8)

R1.2.5 Utah Reclamation Mitigation and Conservation Commission

Relevant regulations applicable to Utah Reclamation Mitigation and Conservation Commission (URMCC) lands include:

- FLPMA Sec. 101(a)(8)

R1.3 Approved Areas of Disturbance

This Plan is applicable to the ROW; temporary work areas; access roads; and other facilities associated with the TWE Project. Any project-related ground disturbing activities outside these areas would require prior approval by the appropriate landowners or agencies. TransWest will document that appropriate cultural resources and biological surveys have been conducted, as determined necessary by the appropriate federal and state agencies. All construction activities outside of authorized areas are subject to all applicable survey and permit requirements, and landowner easement agreements.

R1.4 Responsible Parties

TransWest would have the overall responsibility of directing and monitoring vegetation management activities for the TWE Project. The Construction Contractor(s) may retain the services of a company that specializes in vegetation management to implement the protocols identified in this Plan during and following construction.

R2.0 ROW PREPARATION ACTIONS

ROW preparation typically includes general site preparation involving flagging of the ROW boundaries, temporary work areas, and exclusion areas. It also typically includes identification of plants to preserve in place, weed problem areas, salvage plants, and identification of storage areas for windrowed plant and soil materials. Monitoring would also be established during pre-construction activities, as described in the Reclamation Plan (Appendix Q). Pre-construction actions focus on

protection of sensitive resources identified for preservation. Disturbance related to Project construction may begin after all ROW preparation and pre-construction actions have been completed. Pre-construction actions which may apply to the Project are described below.

R2.1 Additional Plans

This Plan is applicable to the construction of transmission structures, temporary work areas, staging areas, and access roads associated with the TWE Project. Any Project-related ground disturbing activities outside these areas would require prior approval by the appropriate land owners or agencies. TransWest would document that appropriate cultural resources and biological surveys have been conducted, as determined necessary by the appropriate federal and state agencies. As may be required in the ROW grant(s) or special use authorizations, all suitable habitat areas for ESA listed species, BLM sensitive, USFS sensitive, and state-listed species would be identified and marked with flagging or other appropriate means to avoid direct impacts during construction activities, as described in the Flagging, Fencing, and Signage Plan (Appendix I). All construction or reclamation activities outside of authorized areas are subject to all applicable survey and permit requirements and landowner easement agreements. All ROW preparation actions will be subject to stipulations identified in the following Protection Plans in the POD:

- Avian Protection Plan (Appendix B)
- Flagging, Fencing, and Signage Plan (Appendix I)
- Noxious Weed Management Plan (Appendix N)
- Reclamation Plan (Appendix Q)
- Stormwater Pollution Prevention Plan (Appendix T)
- Water Resources Protection Plan (Appendix W)
- Wildlife and Plant Conservation Measures Plan (Appendix X)

R3.0 VEGETATION MANAGEMENT

Procedures for vegetation management include information on preserving existing vegetation to the degree possible, salvaging live plants, vegetation clearing, and salvaging dead or cut plants for mulching. Land management agencies would be consulted regarding vegetation management activities where there may be potential conflicts with fire, livestock, recreation, wildlife, and special status species management. Vegetation management procedures to be used are described below.

R3.1 Preserve in Place

The Preserve in Place activity includes the preservation of existing vegetation to the degree possible to reduce visual impacts and/or if mature plant specimens are present to enhance habitat recovery and quality. This activity would be implemented in construction areas where recontouring is not required, wherever practicable and consistent with NERC standards, and the original contour would be maintained to avoid excessive root damage and allow for re-sprouting. Preservation of specimens may also be requested by the appropriate land management agency or recommended by the Construction Contractor(s) on a case-by-case basis. Eligible specimens would include mature trees and shrubs, succulents, or diverse vegetation groupings that would provide seed and a suitable

microclimate for seedling germination. Flagging or fencing of specimens (e.g., Joshua trees) to be preserved would be done before ground is disturbed. The Construction Contractor(s) would ensure construction activities would not disturb the specimens. If it is determined that construction activity would be detrimental to the plant, then salvage should be considered if the specimen meets the qualifications described in Appendix Q - Reclamation Plan.

R3.2 Plant Salvage

Where required by the ROW grant(s) or special use authorizations, plants would be salvaged from the ROW and other areas in the Project footprint to the extent feasible so they can be replanted after construction activities are complete. Salvaged material would be replanted as soon as possible to avoid loss of plants. Salvaged material would be replanted in sites that match the original one to the extent possible to ensure adaptability. Plant salvaging and replanting is required in the Mormon Mesa and Rainbow Garden Areas of Critical Environmental Concern (ACECs) for Critical Desert Tortoise Habitat (BLM Las Vegas Field Office) and BLM White River Field Office as described in Section 8, Table 18 of the TWE Project Plan of Development. Specific methods for replanting salvaged plants are described in the Reclamation Plan (Appendix Q).

R3.3 Vegetation Clearing in ROW

NERC has established reliability standard FAC-003-2 to prevent vegetation related outages from occurring on bulk transmission systems, which could lead to cascading outages (NERC 2011). This mandatory standard was developed in response to serious outages and operational problems, which have resulted from interference between overgrown vegetation and transmission lines over the past 10 to 20 years. FAC-003-2 requires having and implementing a documented vegetation management program, designed to control vegetation on transmission ROWs. Vegetation management for the TWE Project is based on meeting NERC reliability requirements through the integrated vegetation management (IVM), which includes the wire–border zone approach to vegetation management (ANSI 2006; Ballard et al. 2007; NERC 2011). There would be three levels of ROW clearing within the TWE Project transmission line ROW, which are defined and described below.

- Level 1 – Standard ROW Vegetation Management
- Level 2 – Selective ROW Wire-Border Zone Vegetation Management
- Level 3 – Selective ROW Clearance-Based Vegetation Management

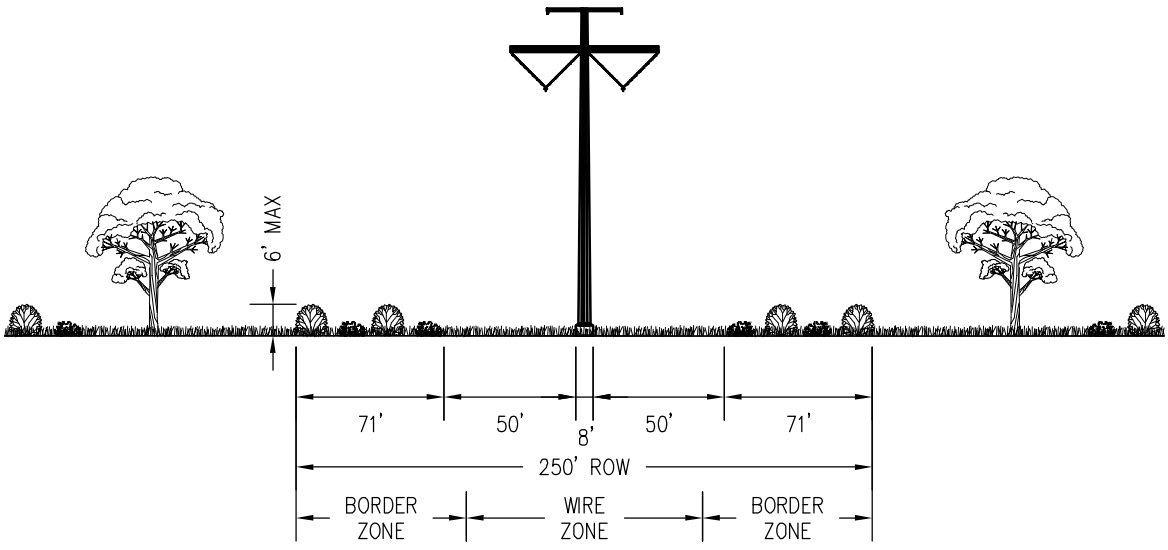
R3.3.1 Level 1 – Standard ROW Vegetation Management

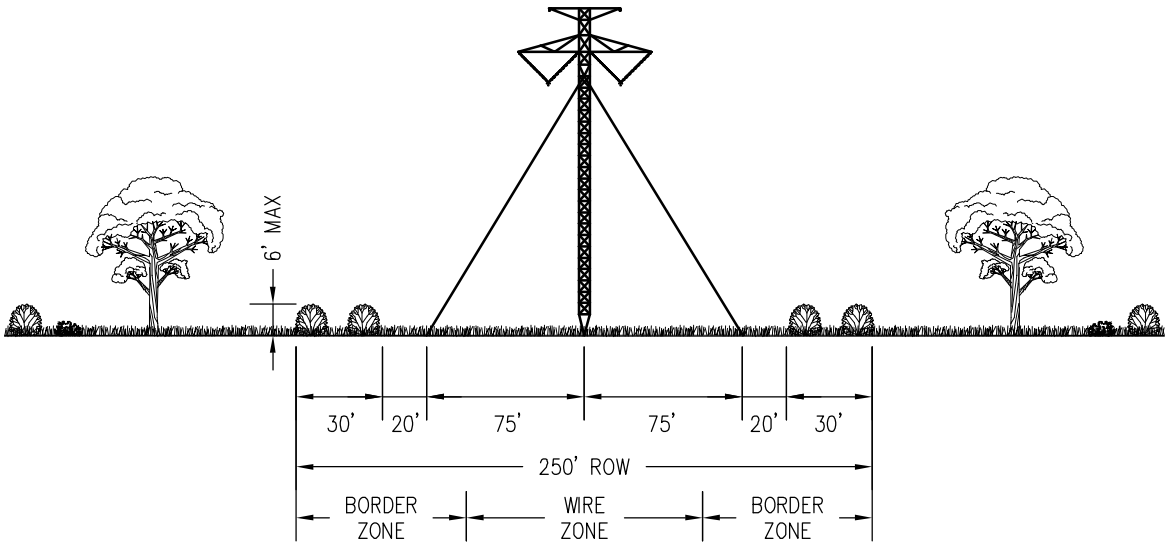
Definition

The standard ROW vegetation management approach (Level 1) would entail initially clearing the ROW of all undesirable vegetation and managing the ROW to maintain the desired condition. The desired condition is characterized by stable, low growth plant communities, free of noxious or invasive plants. These communities would typically be comprised of herbaceous plants and low growing shrubs, ideally native to the local area. Vegetation heights would average three feet in height, and may range up to six feet. Accumulations of vegetation debris from intensive or repetitive vegetation treatments may require removal to reduce risks from wildfire and enhance the fire survivability of the transmission line. The density of remaining vegetation would be a consideration in assessing overall fire risk. Adequate access routes are required and must be maintained to provide for efficient, cost-effective vegetation treatment activities.

Application and Desired Condition

Level 1 is TransWest's desired condition for the majority of the TWE Project ROW. Level 1 represents the most effective way to meet and exceed the NERC standards in a cost-effective manner. Figures R1 and R2, illustrate the Level 1 desired conditions.





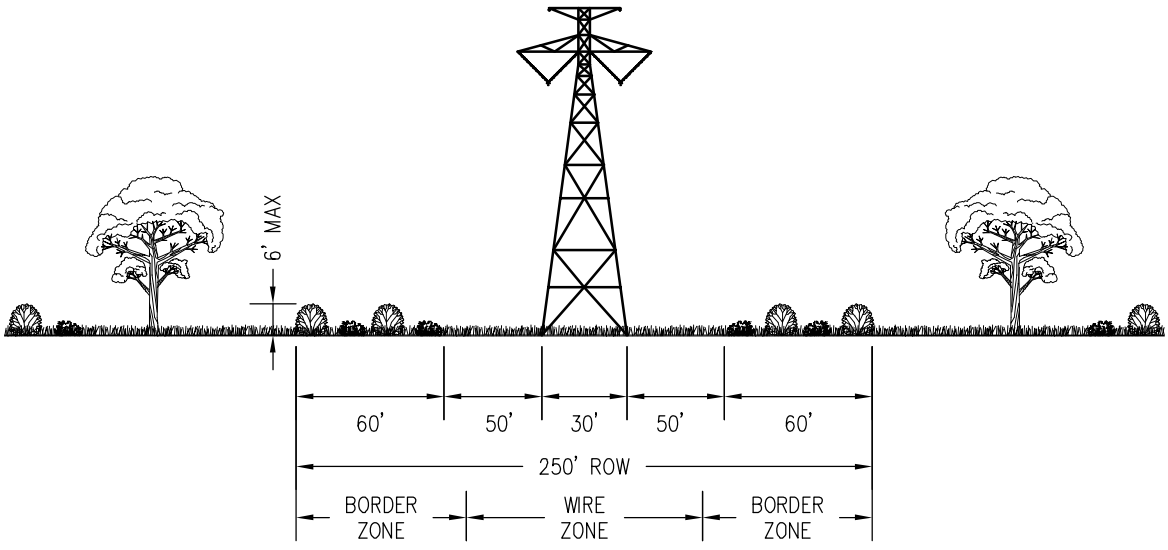


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FIGURE R1

LEVEL 1 STANDARD ROW VEGETATION MANAGEMENT – CROSS SECTION VIEW

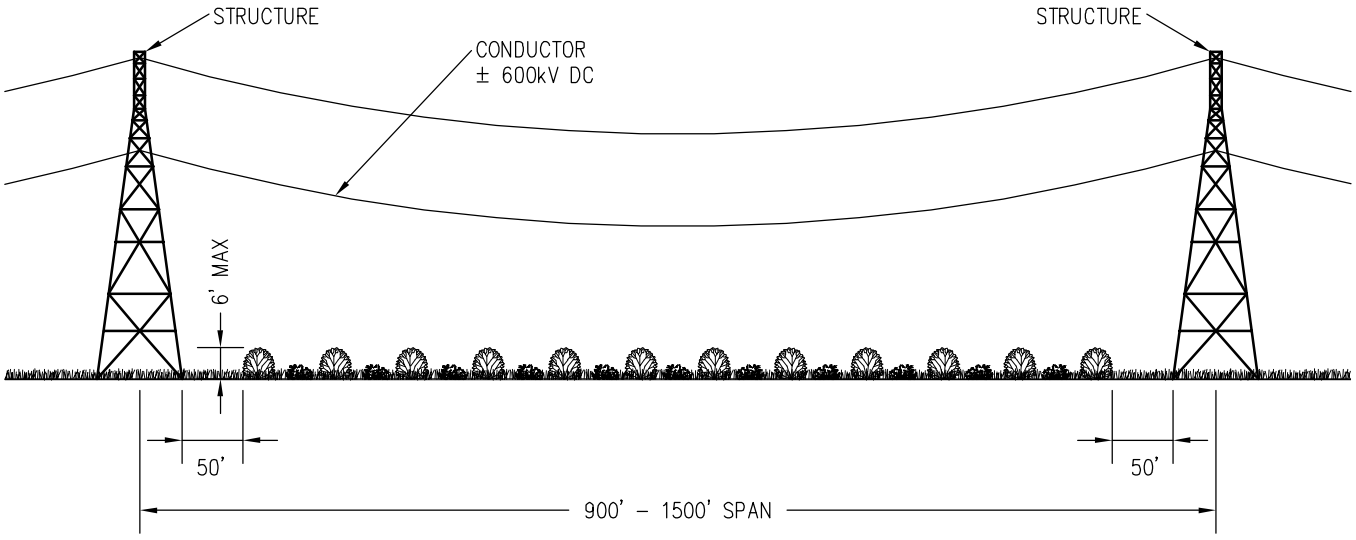

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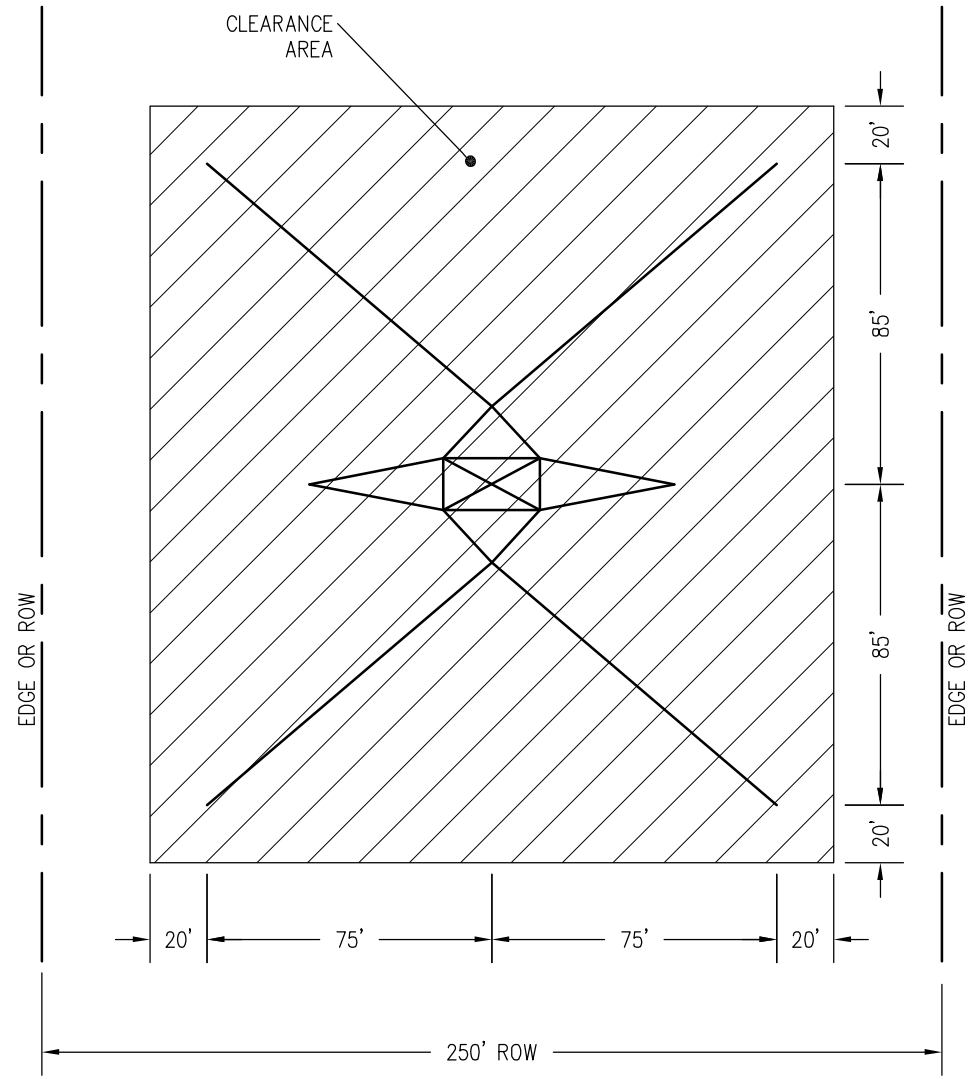
FIGURE R2

LEVEL 1 STANDARD ROW VEGETATION MANAGEMENT – PROFILE VIEW

Implementation

As part of construction, the clearing of the ROW and access roads would be accomplished in accordance with this Plan. As part of the ROW clearing, all danger trees would be identified and removed from the ROW. Where necessary, tree removal would be accomplished by cutting as near to the surrounding grade wherever possible, and would not exceed eight inches above grade when measured on the downhill side of the tree, and two inches on the uphill side of the tree (BLM 2008). All stumps would be left in place for erosion control. Low-growing trees, shrubs, and ground vegetation would be left in place to the extent possible. To the extent feasible, the Applicant would maintain adequate downed material for wildlife habitat. At ravine crossings with higher conductor clearances, more woody vegetation would be retained to the extent practical. Vegetation would be cleared at each tower location. Clearance zones would extend out 50 feet around self-supporting lattice towers and single shaft tubular steel poles. The clearance zone for the guyed lattice towers would extend out 20 feet from the outline of the guy pattern. Figure R3 shows the extents of vegetation clearing planned for the guyed lattice towers. Figure R4 provides comparable information for the tubular steel pole and self-supporting lattice towers. Shrubs and ground cover outside these tower clearance zones would be left in place to the extent possible. Slash would be removed from the Project site or respread according to Section R3.4 Slash and Mulch Management and the Reclamation Plan (Appendix Q).

During the life of the TWE Project, the ROW would be managed to retain the Level 1 desired condition in designated areas. During operation, the Applicant would be responsible for routine inspections of vegetation. Annual plans for the inspection and treatment of vegetation would be implemented. Vegetation would be removed using mechanical equipment such as chain saws, weed trimmers, rakes, shovels, mowers, and brush hooks. Clearing efforts in heavy growth areas would use equipment such as a Hydro-Ax or similar. The duration of activities, and the size of crew and equipment required, would depend on the amount and size of the vegetation to be trimmed or removed. In selected areas, herbicides may be used to control noxious weeds, as described in the Noxious Weed Management Plan (Appendix N). All herbicide applications would be performed in accordance with federal, state, and local regulations, and in compliance with appropriate land management agency or private landowner requirements.



CLEARANCE ZONE FOR GUYED LATTICE TOWER

(TYPICAL)

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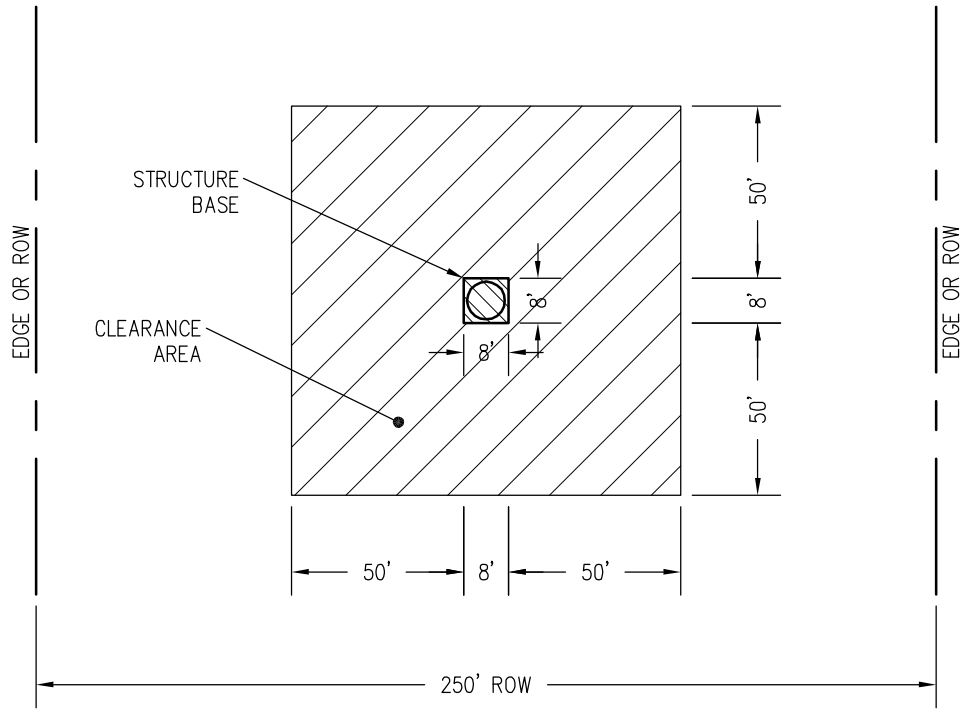
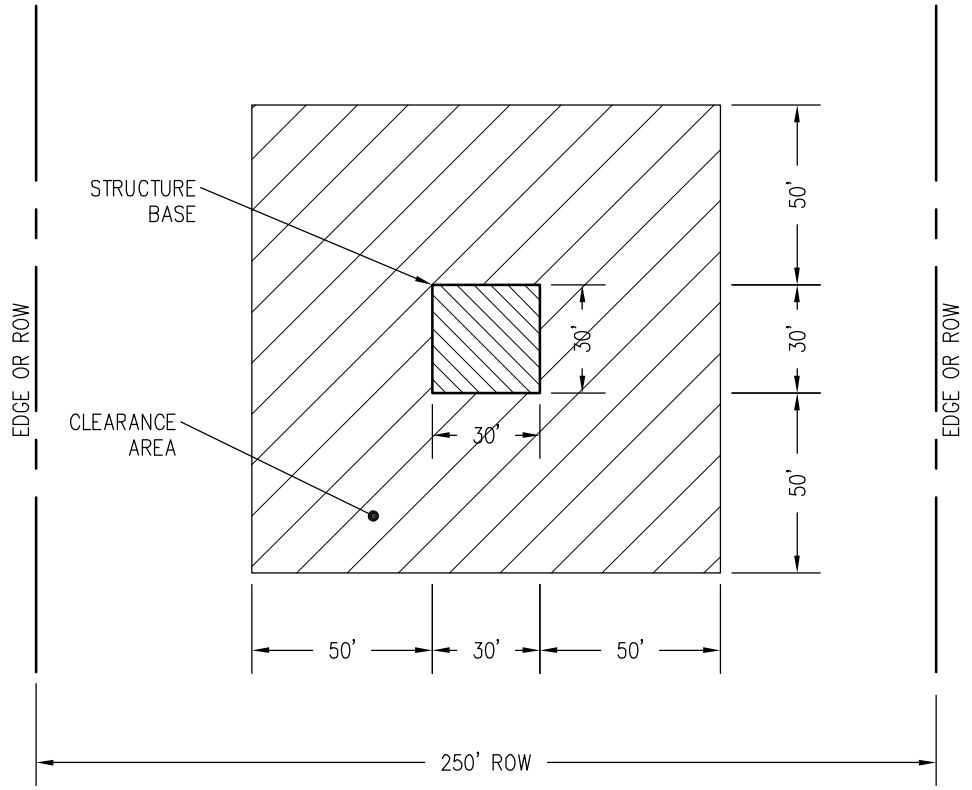
FIGURE R3

LEVELS 1, 2, & 3 VEGETATION CLEARANCE ZONE FOR GUYED STEEL LATTICE TOWER



CLEARANCE ZONE FOR TUBULAR STEEL POLE
(TYPICAL)



CLEARANCE ZONE FOR SELF-SUPPORTING LATTICE TOWER
(TYPICAL)

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FIGURE R4

LEVELS 1, 2, & 3 VEGETATION CLEARANCE ZONE FOR TUBULAR STEEL POLE & SELF SUPPORTING STEEL LATTICE TOWER

R3.3.2 Level 2 – Selective ROW Wire-Border Zone Vegetation Management

Definition

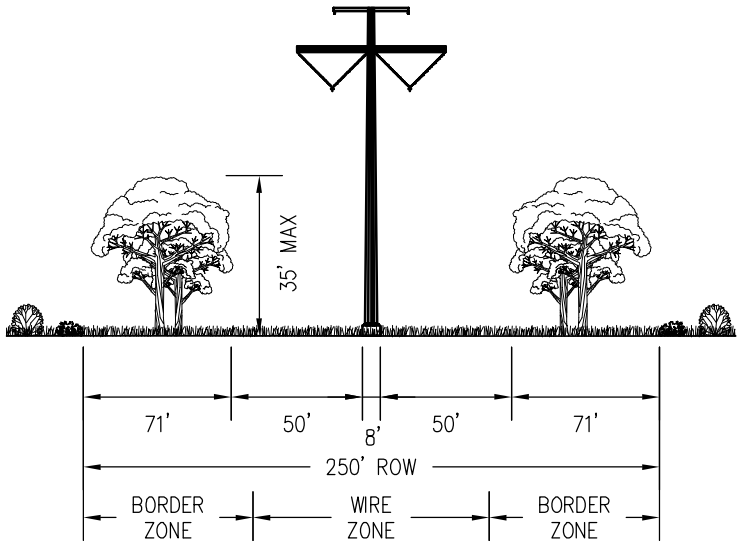
The wire–border zone approach to vegetation management (Level 2) divides the ROW width into three distinct management zones from edge to edge: the border zone, the wire zone, and another border zone. The ROW vegetation is managed differently in each zone to optimize the safe and reliable transmission of electricity while minimizing vegetation clearing in the border zone to balance for other values such as wildlife habitat and visual aesthetics. Herb–grass–forb cover types (low-growing vegetation), which may include short woody shrubs, are promoted in the wire zone, and shrub–short tree cover types (taller woody vegetation) are allowed to grow in the border zones (Ballard et al. 2007). The wire–border zone approach is supported by over 50 years of research to manage vegetation on transmission ROWs and is an industry accepted best practice to help ensure electric system reliability (NERC 2011). The wire–border zone approach is consistent with the NERC FAC-003-2 regulatory requirements to maintain the required Minimum Vegetation Clearance Distance (MVCD). MVCD is the calculated minimum distance (feet) to prevent flash-over between conductors and vegetation, for various altitudes and operating voltages (NERC 2011).

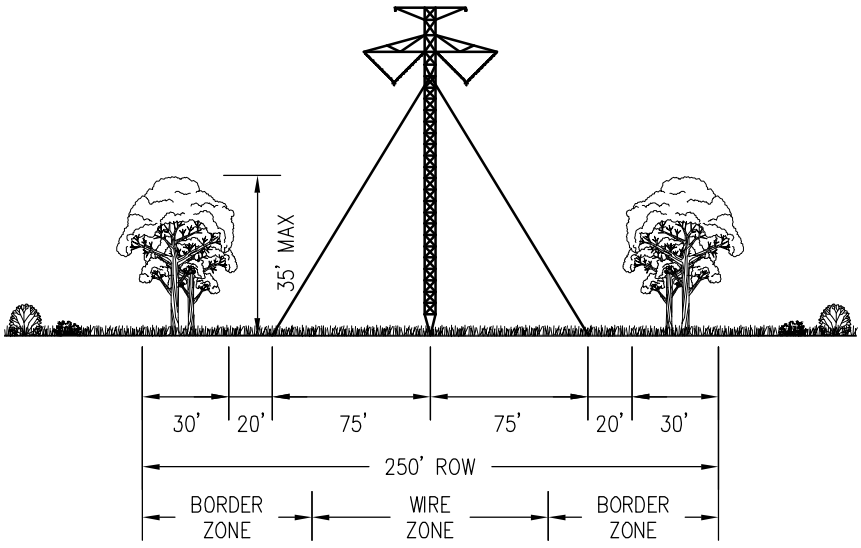
Application and Desired Condition

Level 2 is the desired condition for portions of the ROW where highly sensitive or constrained resource or agency management issues have been identified through the National Environmental Policy Act (NEPA) process and that can be effectively mitigated with Level 2 vegetation treatment. Level 2 vegetation management would meet the NERC standards, but would be more costly in terms of ongoing maintenance. Consequently, Level 2 would be applied selectively to only those portions of the ROW where the implementation of Level 2 would effectively mitigate potential impacts to highly sensitive resources. Examples of areas where Level 2 vegetation management may be appropriate are Visual Resource Management (VRM) Class III landscapes, or sensitive wildlife habitats susceptible to forest fragmentation impacts, where potential impacts can be effectively mitigated with this vegetation measure. Figure R5 shows a typical ROW cross-section for the TWE Project ±600 kilovolt (kV) direct current (DC) transmission line, and wire zone and border zone areas. A detailed definition of each zone and desired conditions are as follows:

Wire Zone

The Wire Zone is defined as the section of the utility ROW that is directly under the wires and extending outward a distance sufficient to accommodate anticipated wire movement. The Wire Zone for this Project is 90 feet in width centered on the transmission centerline. The maximum vegetation height for the desired conditions for Level 2 within the Wire Zone is six feet. The desired condition for the Wire Zone would be the same as Level 1 and characterized by stable, low-growth plant communities, free of noxious or invasive weeds. These communities would typically be comprised of herbaceous plants and low-growing shrubs, ideally native to the local area. Vegetation heights would average three feet in height, and may range up to six feet. Refer to Level 1 for full definitions.





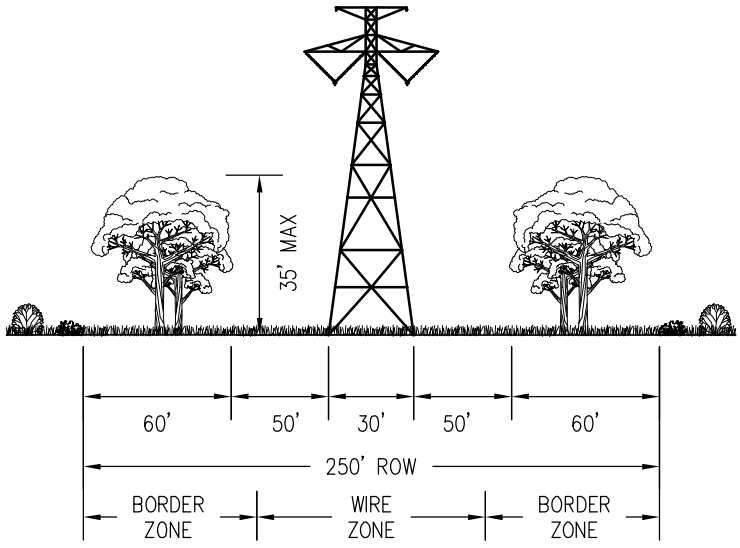


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FIGURE R5

LEVELS 2 & 3 SELECTIVE ROW VEGETATION MANAGEMENT – CROSS SECTION VIEW

Border Zone

The Border Zone is defined as the section of the utility ROW that extends outward from Wire Zone boundary to the ROW boundary. For the TWE Project, the Border Zone would extend 80 feet on either side of the Wire Zone to the ROW boundary, depending on slope and other topographic conditions. For Level 2, the desired condition within the Border Zone is to manage this section of the ROW for stable low-growth vegetation consisting of small trees and large shrubs, as well as lower growing grasses and herbs. The maximum vegetation height within the Border Zone, within the center half of the span is 25 feet. The maximum vegetation height within the Border Zone, within the quarter spans nearest the structures is 35 feet. Taller vegetation may also be suitable, depending on the growth and density characteristics of specific tree varieties, as well as increased height of the conductors across canyons or low-lying valleys. Figure R5 conceptually illustrates the differences in vegetation height that the Wire-Border Zone management technique would allow for each of the three structure types. Figures R6 and R7 illustrate a typical profile view of Level 2 vegetation heights.

Implementation

As part of construction, implementation standards for the clearing of the ROW and access roads would be the same in the Level 2 Wire Zone as described previously (refer to Level 1 discussion). Level 1 construction standards would also be applied to the Level 2 Border Zone in instances where undesirable vegetation needs to be removed and managed for the life of the Project (e.g., fast-growing or invasive species). Other techniques that may be used in the Level 2 Border Zone during construction are selective mechanical or manual tree removal, side pruning, and selective use of herbicides. During operation, Level 2 vegetation would be managed the same as Level 1 in the Wire Zone. The Applicant would be responsible for routine inspections of vegetation. Annual work plans for the inspection and treatment of vegetation would be implemented. The annual work plans would describe the methods used, such as manual clearing, mechanical clearing, herbicide treatment, or other actions.

In the Border Zone, long-term operational practices would include additional techniques such as selective mechanical tree removal, selective manual control measures (e.g., use of hand-carried tools), thinning or feathering edges, and side pruning. To the extent feasible, the Applicant would maintain adequate downed material and standing snags for wildlife habitat. Long-term operational management of ROW vegetation under Level 2 would be more costly and labor-intensive over time, to ensure taller trees in the Border Zone do not violate NERC reliability standards for MVCD.

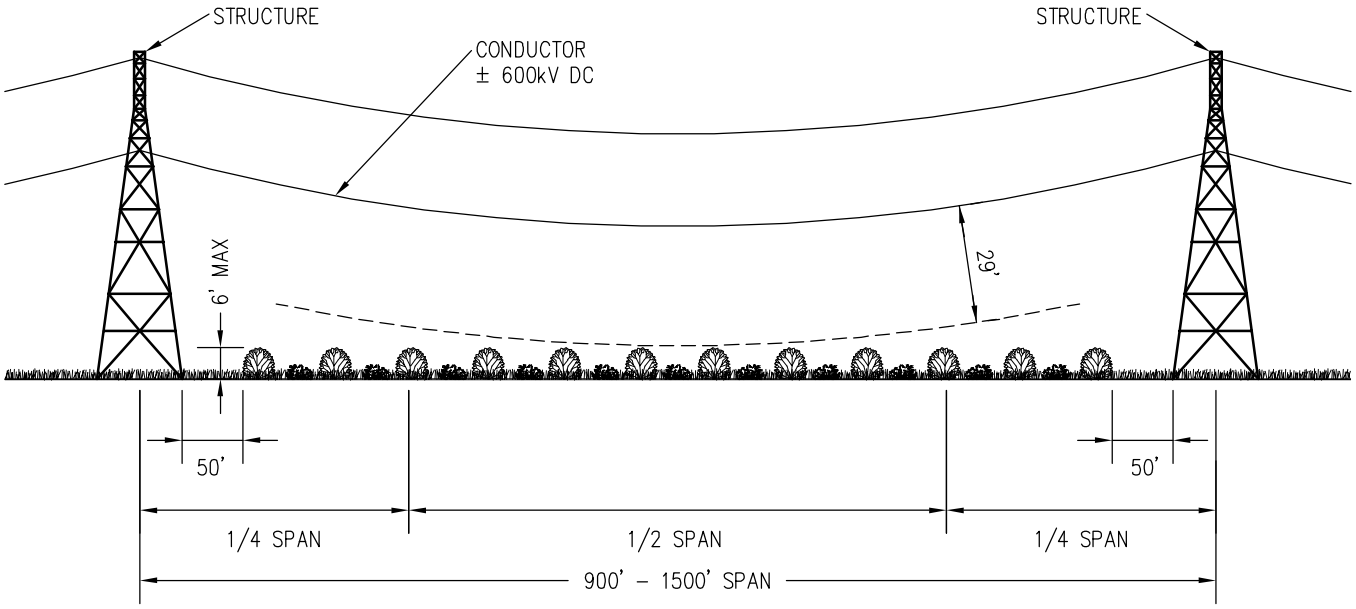

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FIGURE R6

LEVEL 2 SELECTIVE ROW VEGETATION MANAGEMENT – WIRE ZONE PROFILE VIEW

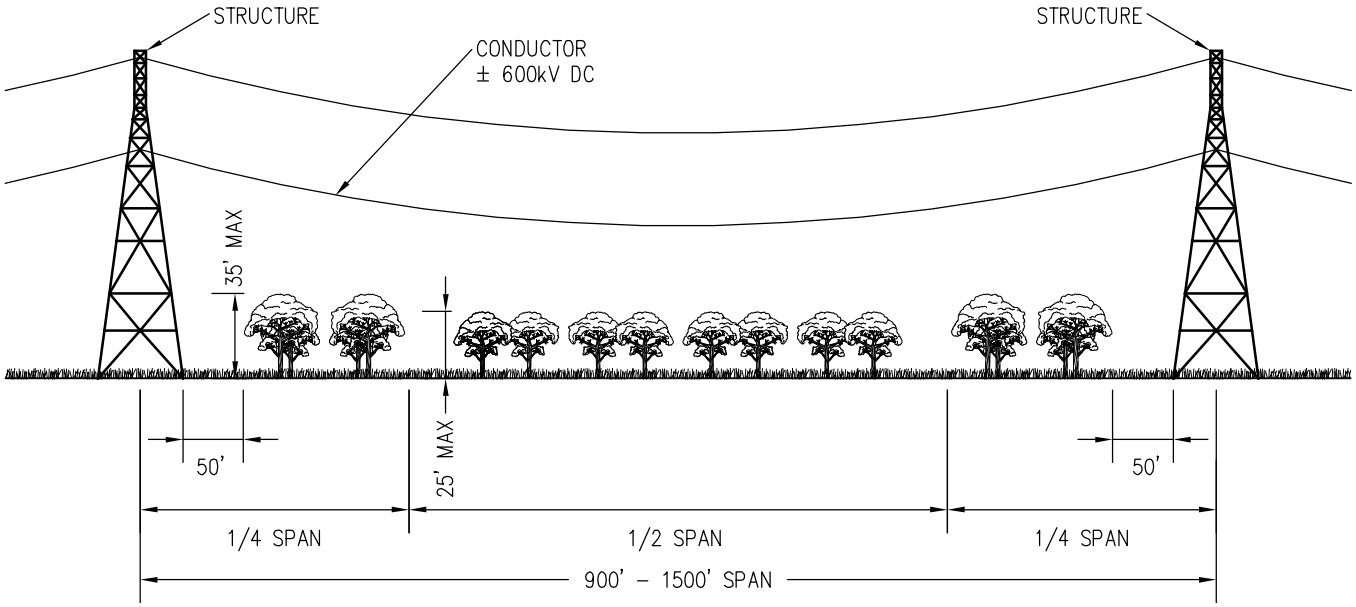

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FIGURE R7

LEVELS 2 & 3 SELECTIVE ROW VEGETATION MANAGEMENT – BORDER ZONE PROFILE VIEW

R3.3.3 Level 3 – Selective ROW Clearance-Based Vegetation Management

Definition

Clearance based vegetation management (Level 3) builds on the wire-border zone approach described above. The desired condition is based on maintaining the Applicant-defined minimum clearance from energized conductors to any type of vegetation. Within the wire zone and border zone, the desired condition would allow for increased vegetation diversity and heights, where such vegetation would not pose potential conflicts with the Applicant-defined minimum clearances to vegetation. The Applicant-defined minimum clearances to vegetation have been established to incorporate NERC reliability standards, construction tolerances (variance in construction materials and workmanship skills), conductor and tree movement due to wind and/or ice loading, increased sag as a result of thermal loading, and allowances for rapid vegetation growth. For the TWE Project, the minimum clearances from an energized conductor to vegetation would be (NERC 2011):

- ±600 kV DC – 29 feet, which exceeds the MVCD of 13.24 feet (at maximum elevation of 10,000 feet)

- 500 kV alternating current (AC) – 23 feet, which exceeds the MVCD of 7.13 feet (at maximum elevation of 10,000 feet)

Increased vegetation heights within the ROW would be suitable where the vegetation does not encroach on the minimum clearance to vegetation established by the Applicant. Level 3 is also expected to be feasible at most ROW crossings of riparian vegetation due to increased structure heights at canyon crossings or low valley crossings. Level 3 may also be achieved in some locations by increasing the height of structures at riparian crossings to allow a greater diversity and height of vegetation to remain.

Application and Desired Condition

Level 3 is the Applicant's desired condition for limited and selective portions of the ROW that have been determined to have critical resource or agency management issues associated with vegetation within the Wire Zone. Level 3 would meet the NERC standards, but would be significantly more costly in terms of ongoing maintenance of the ROW, would require more frequent access to the ROW, and more frequent vegetation treatments. Consequently, Level 3 is proposed by the Applicant only in limited and specific areas of the ROW where practices would effectively mitigate potential impacts to critical resources and related land management issues. Examples of critically sensitive areas where Level 3 may be appropriate are at ROW crossings of riparian vegetation or VRM Class II areas where potential impacts can be effectively mitigated with this vegetation management practice. Figures R7 and R8 provide profiles for both the Wire and Border Zones for Level 3.

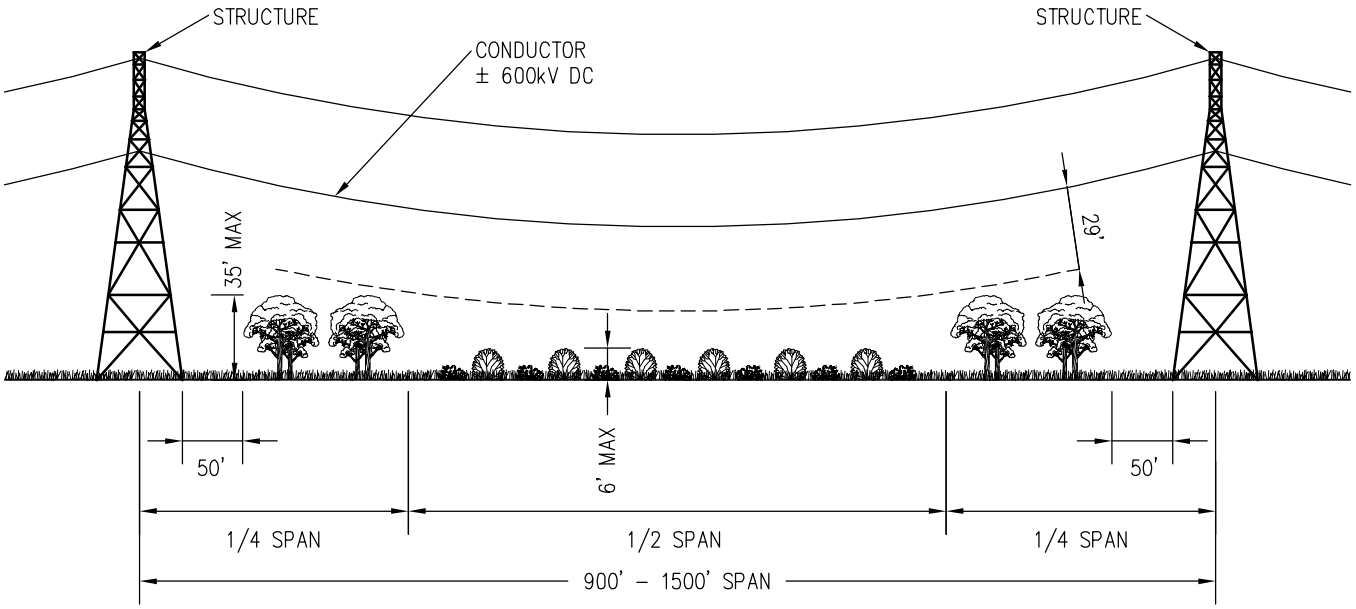

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FIGURE R8

LEVEL 3 SELECTIVE ROW VEGETATION MANAGEMENT – WIRE ZONE PROFILE VIEW

Implementation

As part of construction, implementation standards for the clearing of the transmission structure sites and access roads within the ROW would be the same under Level 3 as previously described for Level 1 (refer to Level 1 discussion). In practice, Level 3 selective clearing of the entire ROW would be defined on a span-by-span basis such that any vegetation that does not meet the minimum clearance to vegetation established by the Applicant would be cleared. Level 3 construction standards would be applied in instances where undesirable vegetation needs to be removed from the ROW and managed for the life of the Project (e.g., fast-growing or invasive species). Selective clearing techniques that may be used for Level 3 clearance criteria during construction are selective mechanical tree removal, directional felling, cable yarding, side pruning, selective use of herbicides to control noxious weeds, and thinning or feathering edges. In general, trees and larger shrubs would be retained through selective clearing. To the extent feasible, the Applicant would maintain adequate downed material and standing snags for wildlife habitat.

During operation, Level 3 vegetation would be managed within the ROW to maintain the desired conditions. Long-term operational practices for Level 3 ROW areas would be more labor-intensive and expensive than Level 1 or 2, to ensure that, over time, taller trees and shrubs do not violate the Applicant-defined minimum clearances to vegetation. Level 3 also requires more frequent visitation and access to the ROW for inspections and vegetation treatments. During operation, the Applicant would be responsible for routine inspections of vegetation. Annual plans for the inspection and treatment of vegetation would be implemented. The annual plan would describe the methods to be used in Level 3 areas, as well as techniques applicable to the Level 1 and 2 portions of the ROW.

R3.3.4 Project-Specific Measures Applicable to All Levels

For all levels of ROW clearing, TransWest must meet the NERC requirements. Irrespective of the level of vegetation management applied, site-specific conditions may require a more conservative vegetation management approach such that the Applicant-defined minimum clearance to vegetation criteria, which complies with NERC, is met. Table R2 summarizes how these three levels would apply to each of the vegetation communities.

Clearing of mature vegetation (trees and tall shrubs), under or near the conductors, would be required to provide adequate electrical clearance and to maintain reliability. TransWest would coordinate timing and methods of tree clearing and removal with the appropriate land management agency, which would also approve the ROW boundary for tree removal. Restrictions that would apply to vegetation clearing throughout the TWE Project as required by land ownership are listed below:

- Clearing would be performed so as to minimize marring and scarring the countryside and preserve the natural beauty to the extent feasible.

- Vegetation clearing in the ROW would be minimized in deep valleys with high line clearance.

- Except for “danger trees,” no clearing would be performed outside the limits of the ROW or other predetermined construction areas. “Danger trees” are trees or tree limbs (located off of the transmission line ROW, and thus outside of normal clearing limits), which are of such height; condition (e.g., leaning, rotted); location (e.g., side hill, proximity to transmission lines, soil characteristics); and/or species type that they represent a threat to the integrity of the transmission line conductors, pole structures, or other facilities.

- If any salt cedar (*Tamarix* spp.) stands are felled, the cut stumps would be immediately treated with herbicides, as described in Appendix N – Noxious Weed Management Plan.

- Woody areas such as pinyon-juniper, which are on average taller than the six foot minimum clearance, but with wide spacing between trees allowing vehicle and equipment access to the ROW, would not be cleared during construction activities, as long as conductor clearance requirements and compliance with NERC is maintained (typically following standards described in Levels 2 and 3 below). Where clearing of pinyon-juniper is required, edges of clearing would be feathered. Where feasible, trees would be topped rather than removed if they exceed the allowable height unless otherwise directed by the land management agency or landowner.

- Within Inventories Roadless Areas (IRAs) and Special Designated Areas (SDAs) of high scenic quality, Level 2 or Level 3 management methods would be utilized as required in the BLM ROD or the USFS ROD to reduce impact to wildlife habitat and reduce the level of habitat fragmentation during operations.

TABLE R2 TWE PROJECT VEGETATION MANAGEMENT GUIDELINES BY VEGETATION LAND COVER TYPE

VEGETATION LAND COVER TYPE/ AND DOMINANT SPECIES*	HEIGHT RANGE	REGENERATION TIME TO FORMER HEIGHT (YEARS)	LEVEL 1 – STANDARD ROW VEGETATION MANAGEMENT	LEVEL 2 – SELECTIVE ROW VEGETATION MANAGEMENT – WIRE-BORDER ZONE	LEVEL 3 – SELECTIVE ROW – CLEARANCE BASED VEGETATION MANAGEMENT
Montane Forest SO28, SO32 - Douglas fir - Subalpine fir - Engelmann spruce - Aspen	60 to 80 feet	50 to 150 years	Construction Phase: Cleared from ROW. Operation Phase: ROW managed for low growing shrubs and herbs.	Construction Phase: *ROW Wire Zone* – Same as Level 1. Cleared from ROW *ROW Border Zone* - Selectively cleared based on allowed vegetation types, heights and densities. Operation Phase: *ROW Wire Zone* - Same as Level 1. Managed for low growing shrubs and herbs. *ROW Border Zone* – Managed for compatible vegetation types, heights and densities, including trees, shrubs and herbs, based on allowed types, heights and densities.	Construction Phase: *ROW Wire Zone* - Selectively cleared based on allowed vegetation types, heights and densities. *ROW Border Zone* - Selectively cleared based on allowed vegetation types, heights and densities. Operation Phase: *ROW Wire Zone* – Managed for compatible vegetation, including trees, shrubs and herbs, based on allowed types, heights and densities. *ROW Border Zone* – Managed for compatible vegetation, including trees, shrubs and herbs, based on allowed types, heights and densities.
Aspen SO 23	30 to 70 feet	30 to 60 years	Construction Phase: Cleared from ROW. Operation Phase: ROW managed for low growing shrubs and herbs.	Construction Phase: *ROW Wire Zone* – Same as Level 1. Cleared from ROW *ROW Border Zone* – Same as Level 1. Cleared from ROW. Operation Phase: *ROW Wire Zone* - Same as Level 1. Managed for low growing shrubs and herbs. *ROW Border Zone* – Managed for allowed tree heights and densities.	Construction Phase: *ROW Wire Zone* - Selectively cleared based on allowed heights and densities. *ROW Border Zone* - Selectively cleared based on allowed heights and densities. Operation Phase: *ROW Wire Zone* – Managed for allowed vegetation, including shrub and types, heights and densities. *ROW Border Zone* – Managed for allowed vegetation, including shrub and tree types, heights and densities.
Ponderosa Pine SO36	40 to 90 feet	30 to 100 years	Construction Phase: Cleared from ROW.	Construction Phase: *ROW Wire Zone* – Same as	Construction Phase: *ROW Wire Zone* -

VEGETATION LAND COVER TYPE/ AND DOMINANT SPECIES*	HEIGHT RANGE	REGENERATION TIME TO FORMER HEIGHT (YEARS)	LEVEL 1 – STANDARD ROW VEGETATION MANAGEMENT	LEVEL 2 – SELECTIVE ROW VEGETATION MANAGEMENT – WIRE-BORDER ZONE	LEVEL 3 – SELECTIVE ROW – CLEARANCE BASED VEGETATION MANAGEMENT
			Operation Phase: ROW managed for low growing shrubs and herbs.	Level 1. Cleared from ROW *ROW Border Zone* - Selectively cleared based on allowed vegetation types, heights and densities. Operation Phase: *ROW Wire Zone* - Same as Level 1. Managed for low growing shrubs and herbs. *ROW Border Zone* – Managed for allowed tree heights and densities.	Selectively cleared based on allowed heights and densities. *ROW Border Zone* - Selectively cleared based on allowed heights and densities. Operation Phase: *ROW Wire Zone* – Managed for allowed vegetation, including shrub and types, heights and densities. *ROW Border Zone* – Managed for allowed vegetation, including shrub and tree types, heights and densities.
Pinyon Juniper SO39, SO40, SO52 - Pinyon pine Utah Juniper	15 to 40 feet	100 to 300 years	Construction Phase: Cleared from ROW. Operation Phase: ROW managed for low growing shrubs and herbs.	Construction Phase: *ROW Wire Zone* – Same as Level 1. Cleared from ROW *ROW Border Zone* - Selectively cleared based on allowed heights and densities. Most pinyon juniper would be allowed in the border zone. Operation Phase: *ROW Wire Zone* - Same as Level 1. Managed for low growing shrubs and herbs. *ROW Border Zone* – Managed for allowed tree heights and densities.	Construction Phase: *ROW Wire Zone* - Selectively cleared based on allowed heights and densities. Most pinyon juniper would be allowed in the wire zone. *ROW Border Zone* - Selectively cleared based on allowed heights and densities. Most pinyon juniper would be allowed in the border zone. Operation Phase: *ROW Wire Zone* – Managed for allowed vegetation, including shrub and tree types, heights and densities. *ROW Border Zone* – Managed for allowed vegetation, including shrub and tree types, heights and densities.
Mountain Shrubland SO46 - Gambel oak - Serviceberry - Mountain-mahogany - Chokecherry	8 to 15 feet	20 to 50 years	Construction Phase: Cleared from ROW. Operation Phase: ROW managed for low growing shrubs and herbs.	Construction Phase: *ROW Wire Zone* – Same as Level 1. Cleared from ROW *ROW Border Zone* - Selectively cleared based on allowed heights and densities. Most shrubs would be allowed in	Construction Phase: *ROW Wire Zone* - Selectively cleared based on allowed heights and densities. Most shrubs would be allowed in the wire zone, except along access roads and structure clearance sites.

VEGETATION LAND COVER TYPE/ AND DOMINANT SPECIES*	HEIGHT RANGE	REGENERATION TIME TO FORMER HEIGHT (YEARS)	LEVEL 1 – STANDARD ROW VEGETATION MANAGEMENT	LEVEL 2 – SELECTIVE ROW VEGETATION MANAGEMENT – WIRE-BORDER ZONE	LEVEL 3 – SELECTIVE ROW – CLEARANCE BASED VEGETATION MANAGEMENT
				the border zone. Operation Phase: *ROW Wire Zone* - Same as Level 1. Managed for low growing shrubs and herbs. *ROW Border Zone* – Managed for allowed shrub heights and densities.	*ROW Border Zone* - Selectively cleared based on allowed heights and densities. Most shrubs would be allowed in the border zone, except along access roads and structure clearance sites. Operation Phase: *ROW Wire Zone* – Managed for allowed vegetation, including shrub types, heights and densities. *ROW Border Zone* – Managed for allowed vegetation, including shrub types, heights and densities.
Sagebrush Shrubland SO54, SO55, SO56 - Big sagebrush - Silver sagebrush - Black sagebrush	2 to 6 feet tall	20 to 50 years	Construction Phase: Retained in ROW and along access roads and construction sites. Operation Phase: ROW managed for low growing shrubs and herbs.	NOT APPLICABLE	NOT APPLICABLE
Desert Shrubland SO45, SO60, SO65, SO69 Cold Desert: - Greasewood - Rabbitbrush - Saltbush species Warm Desert: - Creosote bush - Burro bush - Josha trees	1 to 6 feet tall Josha trees – 20 feet; Salt bush – less than 1 foot; Average – 3 feet	Cold desert: 30 to 50 years Warm desert: 50 to 200 years	Construction Phase: Retained in ROW except where fuel load is too great; and along access roads and construction sites. Joshua trees would be retained, except for center span of wire zone. Operation Phase: ROW managed for low growing shrubs and herbs. Joshua trees would be retained, except for center span of wire zone.	NOT APPLICABLE	NOT APPLICABLE
SO96, S118 - Cottonwoods - Wouldows	Trees – 30 to 60 feet (if	Trees – 50 to 80 years Shrubs – 5 to 20 years	NOT APPLICABLE	NOT APPLICABLE	Retained in ROW except where fuel load is too great; or where conductor clearances cannot be maintained.

VEGETATION LAND COVER TYPE/ AND DOMINANT SPECIES*	HEIGHT RANGE	REGENERATION TIME TO FORMER HEIGHT (YEARS)	LEVEL 1 – STANDARD ROW VEGETATION MANAGEMENT	LEVEL 2 – SELECTIVE ROW VEGETATION MANAGEMENT – WIRE-BORDER ZONE	LEVEL 3 – SELECTIVE ROW – CLEARANCE BASED VEGETATION MANAGEMENT
- River birch - Boxelder - Wouldow	present) Shrubs – 5 to 15 feet				Riparian areas would be avoided by access roads and construction sites to the extent feasible. Trees would be retained, except for center span of wire zone. *ROW Wire Zone and Border Zone* - Selectively cleared based on allowed vegetation types, heights and densities. Operation Phase: *ROW Wire Zone and Border Zone* - Managed for compatible vegetation, including trees, shrubs and herbs, based on allowed types, heights and densities.
Wetland SO96 - Greasewood - Saltbush - Inland salt grass - Alkali sacaton	2 to 5 feet	20 to 40 years	NOT APPLICABLE	NOT APPLICABLE	Construction Phase: Retained in ROW except where impacts are unavoidable (e.g., limited access roads). Operation Phase: Managed for retention of compatible vegetation.
Grassland/Steppe SO71, SO79, SO90 - Herbs and Shrubs	Herbs – 1 to 2 feet Shrubs – 1 to 5 feet	5 to 20 years	Construction Phase: Retained in ROW. Operation Phase: ROW managed for low growing shrubs and herbs.	NOT APPLICABLE	NOT APPLICABLE
Grassland – Invasive D08 - Cheatgrass - Red brome	Herbs – 1 to 2 feet	1 to 2 years	Construction Phase: Retained in ROW. Operation Phase: ROW managed for low growing shrubs and herbs if possible.	NOT APPLICABLE	NOT APPLICABLE
Riparian – Invasive D04 - Tamarisk	5 to 20 feet	5 to 20 years	Construction Phase: Cleared from ROW. Operation Phase:	NOT APPLICABLE	NOT APPLICABLE

VEGETATION LAND COVER TYPE/ AND DOMINANT SPECIES*	HEIGHT RANGE	REGENERATION TIME TO FORMER HEIGHT (YEARS)	LEVEL 1 – STANDARD ROW VEGETATION MANAGEMENT	LEVEL 2 – SELECTIVE ROW VEGETATION MANAGEMENT – WIRE-BORDER ZONE	LEVEL 3 – SELECTIVE ROW – CLEARANCE BASED VEGETATION MANAGEMENT
			ROW managed for noninvasive low growing shrub species.		

* Land cover types and dominant species listing is based on AECOM's Memorandum: Characteristics of Land Cover Crossed by TransWest Express Transmission Project Alternative Corridors, Draft, February 22, 2011.

R3.4 Slash and Mulch Management

Slash and mulch would be managed to reduce fire hazard, improve restoration effectiveness, reduce soil erosion, and improve aesthetic appeal. Cut trees would be whole tree yarded, decked, and removed or left on site as approved by the appropriate land management agency. Due to inaccessibility and safety concerns, it may not be possible to reach desired fuel levels on every piece of ground within the ROW, and trees may be left on site if they cannot be safely removed, as approved by the appropriate land management agency. Excessive pine needles left by tree clearing would be removed from the ROW and disposed of to prevent harm from grazing animals. All other slash and biodegradable debris would be left in place or disposed of in accordance with agency requirements. Depending on agency requirements, access, existing fuel loads, and fire safety, one or more of the slash disposal methods described below would be used to manage activity fuels.

R3.4.1 Lopping and Scattering

Vegetation may be lopped and scattered, but may not exceed a depth of 18 inches. Slash may not be left in streambeds, natural drainages, roadside ditches, or collection basins at the entrance of culverts. Slash may not be scattered so that concentrations lie around the base of any live trees. To the extent practicable, total residual debris (slash and natural debris) greater than three inches in diameter would not exceed 10 tons per acre, and total residual debris three inches or less in diameter would not exceed five tons per acre. This may require dispersing slash over a large area.

R3.4.2 Chipping

Foliage and limbs less than six inches in diameter may be chipped and spread on the ground within the ROW or removed from the ROW. If chipping and spreading woody material in the ROW, wood chips would not exceed three inches in depth and would be spread discontinuously so there is not a continuous chip mat (e.g., <40% of surface covered by three inches of chips) or as required in the BLM ROD or the USFS ROD. Chipping should be conducted in the fall to allow the chips to dry over the winter and before the spring bark beetle flight, as per the BLM Integrated Vegetation Management Handbook (BLM 2008).

R3.4.3 Windrow Vertical Mulch

Windrow vertical mulch is defined as materials including cut trees and shrubs, dead plants, cut plants and rocks that are temporarily set aside during ROW preparation so that they may be shredded or directly placed on the soil surface (post-construction) to increase fertility, provide microclimates for seed to germinate and stabilize soil. This would include any succulents that did not meet salvage requirements referred to in Section R3.2 Plant Salvage discussed further in Reclamation Plan (Appendix Q). To the extent feasible, windrow vertical mulch retained and/or replaced in the ROW would be spread discontinuously and not exceed 10 tons per acre of material over three inches in diameter and five tons per acre for material three inches or less in diameter. Windrow vertical mulch would not come entirely in contact with the soil surface, rather, parts of the mulch rise above the surface. Large rocks and boulders would be removed to the side. Rocks over six inches can be removed and stockpiled outside the disturbance areas (within the ROW), and used as needed for off-highway vehicle (OHV) deterrents. In some vegetation communities where mulch density would be very high, removal of excess mulch off site would be arranged after replacement quantities have been determined. Vertical mulch temporary storage areas would be located within the ROW.

R3.4.4 Decking

In areas that are accessible by existing roads or that allow for overland travel, cut trees may be whole tree yarded, skidded, and decked at designated decking yards or laydown areas for processing and loading onto trucks for transportation off site. During helicopter clearing, whole trees may be yarded

from the ROW to the decking yards or laydown areas where they would be limbed and processed. Commercial timber generated from the ROW clearing may be purchased from the appropriate land management agency or private landowner prior to ROW clearing and according to fair market value. Slash resulting from tree processing at decking areas may be chipped and removed as mutually agreed. All trees that may be safely removed from the ROW to a decking area shall be removed before April 1 of the following year. Trees would be whole-tree removed as much as possible (i.e., the removal of the entire tree, except for the branches that break-off during the cutting and removal operation). Logs or trees removed from the ROW would be transported to the decking areas by ground based equipment or helicopter. Updated versions of this Plan would identify staging areas and construction yards/decking areas.

R3.5 Reclamation

In areas disturbed during ROW clearing, surface preparation and reclamation activities would be implemented, as described in the Reclamation Plan (Appendix Q). Erosion and sediment control measures are specified in the Stormwater Pollution Prevention Plan (Appendix T).

R4.0 ANNUAL WORK PLANS

TransWest would complete 100% of its annual vegetation work plan for the transmission line to ensure no encroachments occur within the MVCD. Modifications to the work plan in response to changing conditions or to findings from vegetation inspections may be made (provided they do not allow encroachment of vegetation into the MVCD) and would be documented. For each annual work plan, TransWest would calculate the percent completed, which is based on the number of units actually completed, divided by the number of units in the final amended work plan (measured in units of choice - circuit, pole line, line miles or kilometers, etc.). Examples of reasons for modification to an annual plan may include:

- Change in expected growth rate/environmental factors
- Circumstances that are beyond the control of a Transmission Owner
- Rescheduling work between growing seasons
- Crew or contractor availability/Mutual assistance agreements
- Identified unanticipated high priority work
- Weather conditions/Accessibility
- Permitting delays
- Land ownership changes/Change in land use by the landowner
- Emerging technologies

R5.0 VEGETATION INSPECTIONS

NERC requires that inspections of vegetation clearance be conducted at least once per year at intervals no greater than 18 months, on 100% of applicable lines. It is not anticipated that more frequent vegetation inspections would be needed, because of the generally low rainfall amounts and growth rates of local vegetation where the TWE Project is located (NERC 2011). However, more frequent visits may be required in forested areas where selective vegetation clearing measures would

be implemented (Levels 2 and 3). Vegetation inspections require the systematic examination of the ROW to document those vegetation conditions under TransWest's control that are likely to pose a hazard to the line, and may be combined with a general line inspection. The inspection includes the identification of any vegetation that may pose a threat to reliability prior to the next planned maintenance or inspection work, considering the current location of the conductor and other possible locations of the conductor due to sag and sway for rated conditions. The information from the vegetation inspections would be used to determine risk, determine future work, and evaluate recently complete work.

TransWest would maintain records to demonstrate vegetation is being managed to prevent encroachment into the MVCD and that vegetation inspections are annually implemented following the annual work plan (NERC 2011). These records would include a copy of the completed annual work plan (including modifications if any), completed and dated work orders, dated invoices, dated inspection records, dated attestations, confirmation of no real-time observations of any MVCD encroachments, and/or dated reports containing no vegetation-related Sustained Outages associated with any of the following encroachment types:

- An encroachment due to a fall-in from inside the ROW;
- An encroachment due to blowing together of applicable lines and vegetation located inside the ROW; or
- An encroachment due to vegetation growth into the MVCD.

If TransWest is constrained from performing vegetation work (e.g., by land owners or land management agencies), which may lead to a vegetation encroachment into the MVCD prior to the implementation of the next annual vegetation inspection, then TransWest would take corrective action to ensure continued vegetation management to prevent encroachments. TransWest would maintain records of the corrective action taken for each constraint where the transmission line was put at potential risk. Examples of acceptable forms of evidence may include initially-planned work orders, documentation of constraints from landowners, court orders, inspection records of increased monitoring, documentation of the de-rating of lines, revised work orders, invoices, or evidence that a line was de-energized (NERC 2011).

If there are vegetation conditions that could cause a fault at any moment, TransWest would immediately notify the appropriate control center holding switching authority for the transmission line. In this scenario, TransWest would maintain records that it notified the control center holding switching authority without any intentional time delay. Examples of evidence may include control center logs, voice recordings, switching orders, clearance orders and subsequent work orders. All potential grow-in or fall-in vegetation-related conditions would not necessarily cause a fault at any moment. For example, danger trees would not require notification to the control center unless they pose an immediate fall-in threat (NERC 2011).

R6.0 REPORTING

TransWest would document annual inspections and vegetation management activities in compliance with NERC requirements. Additional documentation regarding the preservation of existing vegetation if feasible, salvaging live plants, and salvaging dead or cut plants for mulching would be included as part of restoration monitoring for implementation of the Reclamation Plan (Appendix Q).

R7.0 REFERENCES

AECOM. 2010. Memorandum: TransWest Express Project Review of Applicant-Supplied Project Description Information and Draft Project Description Data Request. December 2010.

American National Standards Institute, Inc. (ANSI). 2006. ANSI, A300 (Part 7) - 2006. Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (Integrated Vegetation Management a. Electric Utility Rights-of-way). Washington, D.C. February 2006.

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Bureau of Land Management (BLM). 2008. Integrated Vegetation Management Handbook H1740-2. Release 1-1714. 103 pp. plus appendices.

North American Electric Reliability Corporation (NERC). 2011. Transmission Vegetation Management Standard FAC-003-2 Technical Reference. Princeton, New Jersey. September 2011.

_____. 2013. Docket No. RM12-4-000; Order No. 777. Revisions to Reliability Standard for Transmission Vegetation Management, 18 CFR Part 40. March 21, 2013.

U.S. Forest Service (USFS). 2008. Forest Service Manual 2000 – National Forest Resource Management, Chapter 2070 – Vegetation Ecology, Washington Office (WO) Amendment No. 2000-2008-1. Washington, D.C.

APPENDIX S
FRAMEWORK SPILL PREVENTION AND RESPONSE PLAN

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ACRONYMS

Applicant	TransWest Express LLC, also TransWest
BLM	Bureau of Land Management
BMP	Best Management Practice
CFR	Code of Federal Regulations
CSU	Controlled Surface Use
EMM	Environmental Mitigation Measure
EPA	United States Environmental Protection Agency
FEIS	Final Environmental Impact Statement
NSU	No Surface Use
NTP	Notice to Proceed
Plan	Spill Prevention and Response Plan
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
ROD	Record of Decision
ROW	right-of-way
SPCC Plan	Spill Prevention, Control, and Countermeasure Plan
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
USDOT	United States Department of Transportation
USFS	United States Forest Service
WWEC	West-wide Energy Corridor

S1.0 INTRODUCTION

This framework Spill Prevention and Response Plan (Plan) identifies the specific stipulations and methods that TransWest Express LLC (TransWest or Applicant) and its Construction Contractor(s) will follow to address spill prevention, response, and cleanup for the TransWest Express Transmission Project (TWE Project or Project). In conjunction with this framework Plan, TransWest developed a framework Hazardous Materials Management Plan (Appendix L), which identifies specific measures that TransWest and its Construction Contractor(s) will take to reduce the risks associated with the use, storage, transportation, and disposal of hazardous materials.

S2.0 PLAN PURPOSE

The purpose of this Plan is to prevent hazardous material spills from Project facilities entering into water bodies. The Construction Contractor(s) shall use the following framework to develop the Spill Prevention and Response Plan, which differs from a Spill Prevention, Control, and Countermeasure (SPCC) Plan which is required for facilities that store more than 1,320 gallons of oil. For Project facilities that store more than 1,320 gallons of oil in containers with shell capacities of 55 gallons or greater, an SPCC Plan will be developed in accordance with Title 40 Code of Federal Regulations (CFR) Part 112.

The following framework describes measures that the Construction Contractor(s) shall use to prevent, respond to, and control spills of hazardous materials, as well as measures to minimize a spill's effect on the environment.

S3.0 PLAN UPDATES

The Plan for the Notice to Proceed (NTP) POD will include updates as needed based on the final design and engineering and a complete and up-to-date emergency contact list. The Construction Contractor(s) will be responsible for preparing and implementing the final Plan in compliance with local, state, and federal regulations pertaining to spill prevention and response.

S4.0 RESPONSIBILITY FOR PLAN IMPLEMENTATION

TransWest, through its Construction Contractor(s) and inspectors, shall be responsible for implementing the Plan. The Construction Contractor(s) shall comply with applicable federal, state, and local regulations for using, storing, transporting, and disposing of hazardous materials, as well as for oil transfer operations.

S5.0 GENERAL PETROLEUM PRODUCTS, QUANTITIES, AND STORAGE

During construction activities, the Construction Contractor(s) would use various petroleum products. Typical fuels used for the Project include diesel fuel and gasoline. Typical lubricants for the Project include engine oil, transmission/drive train oil, hydraulic oil, gear oil, and general lubricating grease. Typical coolants include glycols such as anti-freeze.

The quantity of fuel storage will vary generally from 500 to 1,000 gallons in aboveground storage tanks at designated construction yards. The aboveground storage tanks will be equipped with secondary containment sized to contain the largest volume of fuel and provide sufficient freeboard. Fuel trucks will be used to transport large quantities of fuel. Smaller quantities of fuel, five to 100 gallons, may sometimes be stored temporarily in the construction area along the right-of-way (ROW). Pickup trucks will be used to transport these smaller quantities of fuel.

Lubricants and coolants will be stored in bulk or retail packaging at contractor yards in quantities typically less than 500 gallons and transported in trucks to the construction area as needed.

S6.0 SPILL PREVENTION MEASURES

The following describes various spill prevention measures that the Construction Contractor(s) shall implement to reduce the potential for a spill to occur in accordance with Applicant Committed Environmental Mitigation Measure (EMM) TWE-57. The measures include conducting oil transfer operations in accordance with applicable oil pollution prevention and safety requirements, and conducting periodic inspections and personnel training.

S6.1 Oil Transfer Operations

S6.1.1 Hydraulic and Lubricating Oils

The hydraulic and lubricating oils in construction vehicles are typically replenished or replaced on an infrequent basis. It is expected that the hydraulic and lubricating oils would be handled using containers, each of which would have a shell capacity of less than 55 gallons.

S6.1.2 Diesel Fuel and Gasoline

It is expected that vendors would use tank trucks to deliver diesel fuel and gasoline to aboveground storage tanks, where construction vehicles would refuel. When tank truck loading/unloading operations occur, Construction Contractor personnel shall ensure that procedures at the site meet the minimum requirements and regulations established by the U.S. Department of Transportation (USDOT). Fuel transfer operations shall occur through aboveground unloading hoses, which shall be supported and designed to minimize abrasion during transfer operations. To prevent vehicles from departing before disconnection of the transfer hose, spill prevention techniques provide for:

- The setting up of barriers or warning signs to prevent a truck from leaving before the completion of unloading.
- Placing wheel chocks on truck tires to prevent vehicle movement during unloading.
- Closely inspecting the lowermost drain and all outlets for discharges.
- Ensuring truck drains/outlets are tightened, adjusted, or replaced as needed.

The Construction Contractor(s) shall take the following measures to prevent spills prior to, during, and after unloading:

- **Prior to unloading:** Fuel levels shall be verified, connections rechecked, and hoses examined for integrity. Signs shall be posted warning all vehicular traffic operating in the transfer area to use caution.
- **During unloading:** Only trained personnel authorized to conduct the transfer shall be utilized. The transfer and pumping system shall be continually monitored for leaks and the fuel level in the receiving container shall be frequently monitored to prevent overfilling.
- **After unloading:** The transfer hose shall be properly drained and disconnected, and all tank truck drains and connections shall be checked for proper closure prior to departure.

Vehicle refueling and servicing activities will be performed in designated construction zones located more than 100 feet from wetlands and intermittent streams and more than 500 feet from perennial steams in accordance with Applicant Committed EMM TWE-24. If unique conditions require refueling within 100 feet of a water body, wetland, or within designated municipal watersheds, a determination of necessary emergency response actions shall be conducted prior to commencing refueling activities. Additionally, absorbent materials or other spill containment materials shall be available for immediate application prior to commencing refueling activities. Fuel trucks transporting fuel to on-site equipment shall travel only on approved access roads.

Each construction crew shall have readily available and sufficient supplies of absorbent, barrier materials, and USDOT-approved containers to allow for rapid spill containment and recovery.

S6.2 Secondary Containment and/or Diversionary Structures

All hazardous materials-containing equipment that has the potential to discharge to water bodies shall be equipped with secondary containment or other appropriate spill prevention measures. The Construction Contractor(s) shall develop oil transfer/unloading procedures (section S6.1) and have spill response materials available that can be used as soon as possible to respond to a discharge, should an incident occur.

S6.3 Inspections and Personnel Training

S6.3.1 Inspections

The Construction Contractor(s) shall conduct weekly inspections of oil-containing equipment and facilities. These inspections shall include the items below, as applicable, and be recorded either with paper inspection forms or electronically:

- Container foundation
- Container shell condition
- Tank level control
- Piping condition
- Piping supports
- Piping flange or expansion joints
- Piping valve glands and bodies
- Locking of valves
- Oil levels
- Oil gauges
- Oil leaks of any type
- Stains and accumulated free product on the ground

S6.3.2 Personnel Training

The Construction Contractor's personnel shall receive hazardous material awareness training in accordance with Applicant Committed EMM TWE-57. More specifically, prior to the start of construction activities, the Construction Contractor(s) shall train hazardous material-handling personnel on methods to prevent, control, and respond to a hazardous material spill. Newly hired

personnel who work in facilities where hazardous materials are stored shall be informed of storage locations and the emergency plan procedure in the event of an accidental spill. New personnel who work with hazardous materials shall be trained in the proper management of those materials under normal operating circumstances and under emergency circumstances. Hazardous material-handling personnel shall be trained on the following topics:

- Operation and maintenance of equipment to prevent discharges
- Applicable state and federal laws, rules, and regulations
- Spill reporting procedures
- Spill containment and recovery procedures
- Storage of waste materials
- Safety and health considerations
- General facility operations
- Contents of the Spill Prevention and Response Plan

S7.0 SPILL CONTROL AND COUNTERMEASURES

Should a spill occur, the Applicant and its Construction Contractor(s) shall commit the manpower, equipment, and materials necessary to respond to and control a hazardous material spill in accordance with Applicant Committed EMM TWE-57. Prior to construction, the Construction Contractor(s) shall submit an Emergency Preparedness and Response Plan (Appendix F). The plan shall comply with all applicable federal, state, and local regulations. The plan shall describe emergency response operations, including, but not limited to spill control, cleanup, notification, characterization, and disposal procedures. All contractor supervisors and personnel handling hazardous substances shall be familiar with these procedures.

As part of the Emergency Preparedness and Response Plan, the Construction Contractor(s) shall establish procedures and individual responsibilities regarding spill discovery, response, clean-up, and disposal. Prior to beginning construction, the Construction Contractor(s) shall be required to submit a list of spill response contractors and commercial disposal facilities to TransWest for approval. Per West-wide Energy Corridor (WWEC) Best Management Practice (BMP) PHS-15 in the Final Environmental Impact Statement (FEIS), hazardous material spills shall be removed and the affected area(s) cleaned to meet applicable standards.

The Emergency Preparedness and Response Plan will describe measures to respond to and control hazardous material spills. Following a spill, all reasonable efforts shall be made to control the source of the discharge and contain the spill. Absorbent materials shall be deployed with efforts directed to limiting the area of contamination. All reasonable efforts shall be made to prevent a spill from reaching wetlands or waterbodies. If a spill should reach surface waters, the Construction Contractor(s) shall deploy straw bales, booms, and absorbent materials to contain and reduce downstream migration of the spilled material. Once a spill is contained, cleanup activities shall begin as soon as possible. All spilled material, contaminated soil, and absorbent material shall be picked up and contained for disposal. In the event of a large spill or a spill that migrates into surface waters, the spill response contractors will be called to assist in cleanup efforts. Attachment A includes a list of typical spill containment measures.

S8.0 AGENCY NOTIFICATION

S8.1 Emergency Contacts

A hazardous material spill in such quantity as may, with reasonable probability, injure or be detrimental to human health, animal, plant life, property, or may unreasonably interfere with the public welfare or the use of property will be reported. In addition to recent spills, the discovery of evidence of previous unauthorized discharges, such as contaminated soil or groundwater, also must be reported. As soon as possible after beginning spill control and cleanup activities, the Construction Contractor(s) shall notify TransWest, who will determine if the spill is reportable. TransWest will notify the appropriate authorities of reportable spills.

In accordance with Applicant Committed EMM TWE-57, Table S1 lists the federal and state contacts that the Construction Contractor(s) shall notify in the event of a reportable hazardous material spill from a Project facility or construction site. The agencies listed are based on the jurisdictions crossed by the Agency Preferred Alternative in the FEIS. In accordance with WWEC BMP PHS-13 in the FEIS, the Construction Contractor(s) shall document the spill and provide the documentation to the land management agency's authorized officer. The Construction Contractor(s) shall also note the cause of the spill and note corrective measures taken to prevent another spill from occurring.

TABLE S1 FEDERAL AND STATE EMERGENCY CONTACTS

AGENCY TO BE CONTACTED	CONTACT NAME	PHONE/ADDRESS
Federal		
EPA Region 8 Emergency Response Center	TBD	303.312.6312
EPA Region 9 Emergency Response Center	TBD	415.947.8000
BLM, Rawlins Field Office	TBD	307.328.4200
BLM, Little Snake Field Office	TBD	970.826.5000
BLM, White River Field Office	TBD	970.878.3800
BLM, Vernal Field Office	TBD	435.781.4400
BLM, Salt Lake Field Office	TBD	801.977.4300
BLM, Richfield Field Office	TBD	435.896.1500
BLM, Fillmore Field Office	TBD	435.743.3100
BLM, Cedar City Field Office	TBD	435.865.3000
BLM, Ely District Office	TBD	775.289.1800
BLM, Las Vegas Field Office	TBD	702.515.5000
USFS, Uinta National Forest	TBD	801.999.2103
USFS, Manti-La Sal National Forest	TBD	435.637.2817
State		
Wyoming Department of Environmental Quality	TBD	307.777.7781
Colorado Department of Public Health and Environment	TBD	877.518.5608
Utah Department of Environmental Quality	TBD	801.536.4123
Nevada Division of Environment al Protection	TBD	888.331.6337

S9.0 ENVIRONMENTAL PROTECTION

The following Applicant committed mitigation measures shall be applied Project-wide and shall address the concerns associated with spills.

TWE-24: Vehicle refueling and servicing activities will be performed in designated construction zones located more than 100 feet from wetlands and intermittent streams and more than 500 feet from perennial streams. Spill prevention and containment measures or practices will be incorporated as needed.

TWE-57: As part of the POD, the Applicant will provide a Spill Prevention and Response Plan. The Plan will address compliance with all applicable federal, state, and local regulations, and will include: spill prevention measures, notification procedures in the event of a spill, employee awareness training, and commitment of manpower, equipment, and materials to respond to spills, if they occur.

The following BLM Field Office stipulations along the Agency Preferred Alternative were identified in the FEIS.

Vernal Field Office No Surface Use and Controlled Surface Use Restrictions

Ute Ladies Tresses: (Excerpt) Place produced oil, water and condensate tanks in centralized locations, away from occupied habitat.

For a list of additional mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

ATTACHMENT A
TYPICAL SPILL CONTAINMENT MEASURES

APPENDIX T
FRAMEWORK STORMWATER POLLUTION PREVENTION PLAN

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ACRONYMS

Applicant	TransWest Express LLC, also TransWest
BMP	Best Management Practice
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
CWA	Clean Water Act
EPA	United Stated Environmental Protection Agency
NAC	Nevada Administration Code
NDEP	Nevada Division of Environmental Protection
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NTP	Notice to Proceed
Plan	Stormwater Pollution Prevention Plan, also SWPPP
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
ROD	Record of Decision
SWMPs	Stormwater Management Plans
SWPPP	Stormwater Pollution Prevention Plan, also Plan
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
UDEQ	Utah Department of Environmental Quality
WDEQ	Wyoming Department of Environmental Quality
WYPDES	Wyoming pollutant Discharge Elimination System

T1.0 INTRODUCTION

This framework Stormwater Pollution Prevention Plan (SWPPP or Plan) addresses measures to be undertaken by TransWest Express LLC (TransWest or Applicant) and its Construction Contractor(s) to prevent stormwater pollution to comply with Section 402 of the Clean Water Act (CWA) administered by the United States Environmental Protection Agency (EPA) for the TransWest Express Transmission Project (TWE Project or Project). All construction site operators engaged in clearing, grading, and excavating activities that disturb one acre or more, must obtain a National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharges (Code of Federal Regulations [CFR], Title 40, Parts 122 and 123). NPDES permits (also called Construction General Permits) are issued by the EPA or similar authorized state entity following submittal of a Notice of Intent (NOI) for construction activities, and preparation of a SWPPP that describes how erosion and sediment transport will be minimized to adjacent water bodies.

SWPPPs will be necessary for the TWE Project to support NPDES permitting through the following state agencies: Wyoming Department of Environmental Quality (WDEQ), Colorado Department of Public Health and Environment (CDPHE), Utah Department of Environmental Quality (UDEQ), and Nevada Division of Environmental Protection (NDEP).

T2.0 PLAN PURPOSE

The purpose of a SWPPP is to identify and implement stormwater pollution prevention measures to reduce the quantity of impacted runoff and to deal with runoff in a manner that minimizes environmental impacts during construction of the Project. The proper implementation of mitigation measures associated with a SWPPP is imperative during all construction activities. These activities will be conducted in an environmentally sensitive and responsible manner so no discharge of sediment or contaminants may be conveyed as either direct or indirect discharge to wetlands, other waters of the U.S. or state waters. For a list of mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

Final development, implementation and maintenance of the SWPPP will be the responsibility of the Construction Contractor. The SWPPP will do the following:

- Define the characteristics of the site and the types of construction that will occur at each site.
- Describe the practices which will be implemented to control erosion and the release of pollutants in stormwater.
- Create an implementation schedule to ensure the practices described in the SWPPP are in fact implemented and to evaluate the plan's effectiveness in reducing erosion, sedimentation and pollutant levels in stormwater discharge from the site.
- Describe the final stabilization design to minimize erosion and prevent stormwater impacts after construction is complete.

T3.0 PLAN UPDATES

Preliminary maps showing general locations of stormwater best management practices (BMPs) in relation to disturbed areas and water resources along the Agency Preferred Alternative are provided as part of the TWE Project Constraints, Access Roads, and Work Area Details map books in Appendix AA. The Plan for the Notice to Proceed (NTP) POD will be updated based on final detailed engineering and design layouts and construction segments or spreads. The Construction Contractor(s) will be responsible for preparing the final SWPPPs for each state agency and submittal of the NOI prior to start of construction.

T4.0 NOTIFICATION REQUIREMENTS AND IMPLEMENTATION

Before construction begins, the Construction Contractor(s) will be responsible for developing final SWPPPs and obtaining coverage under the applicable NPDES Construction General Permits by filing NOIs and appropriate fees with WDEQ, CDPHE, UDEQ, and NDEP for a Large Construction General Permit in accordance with NOI instructions. The Construction Contractor(s) will be responsible for implementing site-specific SWPPPs and is required to perform routine inspections throughout the duration of construction activities.

The primary intent of the erosion and sediment control measures is to control and minimize erosion at the source. The main source of potential stormwater contamination will be erosion of soils from construction activities. It will be the responsibility of the Construction Contractor(s) to implement erosion control measures where necessary, in order to minimize pollutants in stormwater and to keep the Project in compliance with EPA, WDEQ, CDPHE, UDEQ, and NDEP regulations.

The following SWPPPs will be required for construction of the Project:

- Wyoming SWPPP – The State of Wyoming Large Construction General Permit for stormwater discharges associated with large construction activities (Permit WYR 100000) regulates stormwater discharges from all construction activities that disturb five or more acres. Under this permit, “operators” who are required to obtain a Wyoming Pollutant Discharge Elimination System (WYPDES) permit to discharge stormwater must prepare a SWPPP and submit it along with a NOI to the WDEQ 30 days before beginning construction activities. The SWPPP describes potential pollution sources and the BMPs which will be used to prevent stormwater contamination. The NOI describes the construction project and route(s) that stormwater may take from the construction site to surface waters of the state.

  WDEQ reviews the NOI to determine if the operator may discharge stormwater under the general permit, or if an individual WYPDES permit is required.

- Colorado Stormwater Management Plans (SWMPs) – The General Permit in Colorado for stormwater discharges associated with construction activities (Permit COR 030000) regulates stormwater discharges from all construction activities that disturb one acre or more. Prior to commencement of construction, a SWMP shall be developed and implemented for each facility covered by the general permit. A certification that the SWMP is complete must be submitted with the permit application. The SWMP shall identify potential sources of pollution (including sediment) which may reasonably be expected to affect the quality of stormwater discharges associated with construction activity. In addition, the plan shall describe the BMPs which will be used to reduce the pollutants in stormwater discharges from the construction site. Operators must implement the provisions of their SWMP as a condition of this permit.

If, after evaluation of the application (or additional information, such as the SWMP), it is found that this general permit is not appropriate for the operation, then the application will be processed as one for an individual permit.

- Utah SWPPP – The Utah Stormwater General Permit for Construction Activities (Permit UTR 300000) regulates stormwater discharges from all construction activities that disturb one acre or more. A SWPPP shall be developed for each construction project covered by this permit prior to submission of an NOI. A SWPPP shall be prepared in accordance with good engineering practices. The SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater discharges from the construction site, shall describe and ensure the implementation of practices which will be used to reduce the pollutants in stormwater discharges associated with construction activity at the construction site and to assure compliance with the terms and conditions of this permit and shall otherwise meet the requirements of this permit.

  This authorization is subject to the authority of the Utah Water Quality Board or the Executive Secretary of the Utah Water Quality Board to reopen this permit, or to require a discharger to obtain an individual permit or use an alternative general permit.

- Nevada SWPPP – The Nevada Construction Stormwater General Permit (NVR100000) regulates stormwater discharges from all construction activities that disturb at least one acre. Prior to submitting the NOI and filing fee, the SWPPP shall be completed and available for inspection at the project site for each construction project and material plant or operation covered by this permit. The purpose of the SWPPP is to identify stormwater pollution sources, reduce their impacts, and comply with the conditions of this permit. The SWPPP shall be prepared in accordance with good engineering practices and shall consist of project information, BMPs, inspection and maintenance, controls for non-stormwater discharges, and a description of permanent stormwater controls that will be built as part of the project.

  NDEP may require the holder of a general stormwater permit to apply for and obtain an individual permit in accordance with Nevada Administrative Code (NAC) 445A.269.

A copy of the applicable SWPPP shall remain with the Construction Manager on the construction site or at a staging area(s). The SWPPP must be readily available while the transmission line, terminals, ground electrodes and all other associated facilities are under construction, from the start of construction activities until the Notice of Termination.

The Construction Contractor(s) must retain a set of construction site maps for the duration of the Project and for three years after the Notice of Termination, that delineates the following items:

- Areas of soil disturbance that have been stabilized;
- Areas to be graded along with a time schedule;
- Areas of potential soil erosion where control practices will be implemented;
- Types of control practices and time schedule for implementation;
- Locations of any post-construction projects; and
- Copies of all inspections performed over the duration of the Project.

T5.0 PROJECT MODIFICATIONS

The Construction Contractor(s) is responsible for maintaining a current SWPPP and shall amend the SWPPP whenever there is a change in construction or operations that may affect the discharge of pollutants to surface waters or groundwater. The SWPPP shall also be amended if it is in violation of the General Permit or has not achieved the general objective of eliminating pollutants in stormwater discharges. The SWPPP shall be amended and implemented in a timely manner, but in no case more than 14 days after it has been determined that the SWPPP is inadequate. All amendments should be dated and directly attached to the SWPPP per agency regulations.

T6.0 OTHER SPECIFIC STIPULATIONS AND METHODS

T6.1 Mitigation Maintenance, Inspection, Repair, and Monitoring

The Construction Contractor(s) shall at all times properly operate and maintain all erosion and sediment control treatments, measures and techniques. Proper operation and maintenance will also include appropriate quality assurance procedures.

As part of the SWPPP, the Construction Contractor(s) will be required to develop an inspection schedule and conduct routine inspections to identify conditions that could lead to discharges of pollutants or contact stormwater with storm drainages or surface waters. Schedules will be established for regular inspections of equipment, and erosion and sediment control measures. Inspections of the construction site shall occur in accordance with each applicable state General Permit to identify areas contributing to a stormwater discharge and to evaluate whether industry standards are in place and functioning properly. During inspections, the Construction Contractor(s) will also determine if the industry standards identified in the SWPPP are adequate and whether additional control measures are needed. All monitoring and inspection records which have been produced in association with the SWPPP will be retained for a period of at least three years.

To monitor the mitigation's effectiveness and to evaluate whether additional mitigation measures are required a monitoring program and reporting system will be established by the Construction Contractor(s) and followed per the applicable state and federal requirements and guidelines.

T6.2 Training

The Construction Contractor(s) will be responsible for the SWPPP implementation, amendments and revisions. On-site construction personnel will be responsible for installation and maintenance of on-site mitigation measures.

Properly trained personnel are more capable of preventing spills, responding safely and effectively to accidents and recognizing situations that could lead to stormwater contamination. The Construction Contractor(s) will be responsible for familiarizing personnel with the information contained in the SWPPP. Training meetings will need to be held for new personnel who join the Project after the initial training has been provided. The purpose of these meetings will be to review the proper installation methods and maintenance of all erosion control measures to be used for the TWE Project. The monitoring/inspection program and all required maintenance and repair will be conducted by trained personnel.

T6.3 Post-Construction Stormwater Management

Mitigation measures used to reduce pollutants in stormwater discharges after all construction phases are complete, should take into account local post-construction stormwater management requirements, policies and guidelines, as well as site-specific and seasonal conditions. Post-construction mitigation

measures will be assessed during future transmission line maintenance. Any areas disturbed by Project construction that are observed to be eroding sediment into drainages will be assessed for the appropriate permanent mitigation measure to control sediment movement off the disturbed area. Disturbed areas will also be reclaimed per Appendix Q – Reclamation Plan.

APPENDIX U
FRAMEWORK TRAFFIC AND TRANSPORTATION MANAGEMENT PLAN

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ACRONYMS

Applicant	TransWest Express LLC, also TransWest
BLM	Bureau of Land Management
BMP	Best Management Practice
FEIS	Final Environmental Impact Statement
NTP	Notice to Proceed
Plan	Traffic and Transportation Management Plan
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
ROD	Record of Decision
ROW	right-of-way
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
USFS	United States Forest Service

U1.0 INTRODUCTION

This framework Traffic and Transportation Management Plan (Plan) presents mitigation measures to be used by TransWest Express LLC (TransWest or Applicant) and its Construction Contractor(s) to minimize impacts on roads, traffic, and other users of roads that could result from construction of the TransWest Express Transmission Project (TWE Project or Project). A detailed Plan will be prepared by the Construction Contractor(s) for each construction segment or spread that demonstrates how the measures specified herein will be implemented in the field.

U2.0 PLAN PURPOSE

The purpose of this Plan is to mitigate, supplement, and further outline measures required of TransWest and its Construction Contractor for safe equipment access to the right-of-way (ROW) and temporary work areas during project construction and to address potential transportation related impacts and provide for public safety. The primary objective of this Plan is to prevent adverse impacts to human health and safety, property, and the environment that could potentially occur as a result of the construction, operation and maintenance of the TWE Project.

U3.0 PLAN UPDATES

This Plan will be updated for the Notice to Proceed (NTP) POD that will include updates as needed based on final design and engineering. The Construction Contractor(s) will be responsible for preparing and implementing the final Plan in compliance with local, state, and federal regulations pertaining to project impacts to traffic and transportation.

U4.0 REGULATORY

A number of agencies have jurisdiction over the transportation related components of the TWE Project. These include the Bureau of Land Management (BLM), United States Forest Service (USFS), Federal Highway Administration, Nevada Department of Transportation, Utah Department of Transportation, Wyoming Department of Transportation, Colorado Department of Transportation, State Highway Patrols, and local county road departments and law enforcement. Encroachment permit applications will need to be filed with the applicable jurisdictional agencies in areas where the transmission line crosses public roads or where construction activities would take place within road ROW. Depending on the type of construction and encroachment, TransWest and its Construction Contractor(s) may be required to develop and have approved a traffic control plan prior to construction.

Cities, counties, and other public agencies typically require an encroachment permit or similar authorization for locations where road construction activities would occur within or above the public road ROW. The specific requirements of the encroachment permit from the applicable transportation agency would be individually determined based on Project and jurisdiction specifics. The encroachment permit issued by federal, state, and local jurisdictions may include the following requirements:

- Identify all roadway locations where special construction techniques such as night construction would be used to minimize impacts to traffic flow;

- If necessary, develop circulation and detour plans to minimize impacts to local street circulation, which may include the use of signing and flagging to guide vehicles through and/or around the construction zone;

- To the extent practicable, schedule truck trips outside of peak morning and evening commute hours;
- Limit lane closures during peak hours to the extent practicable;
- Include detours for areas potentially affected by Project construction;
- Install temporary traffic control devices as specified in the Federal Highway Administration's 2009 Manual of Uniform Traffic Control Devices for Streets and Highways; and
- Store construction materials only in designated areas.

Encroachment permit requirements would be specified by the agency having jurisdiction. Implementation of the terms and conditions of an encroachment permit would reduce impacts associated with road closures.

U5.0 TRAFFIC MANAGEMENT PRACTICES

TransWest and its Construction Contractor(s) will require surface access to all structures and work areas during construction and operation of the Project to allow construction vehicles and equipment to access the location of each transmission structure or Project facility. In most cases, existing public roads and highways (identified as the backbone access network) would be used to transport construction equipment to the approved work areas. The backbone access network for the Agency Preferred Alternative is shown on the TWE Project Constraints, Access Roads, and Work Area Details map books in Appendix AA. Helicopters may be used to support some construction activities in select locations as determined by agency requirements and Construction Contractor work planning. All vehicles will obey the posted speed limits and local traffic speed regulations. The final Plan will establish speed limits for each road type in compliance with federal, state, and local regulations in coordination with land management agencies and private landowners.

Every effort will be made to minimize the effects of the Project construction activities on public transportation and to provide for public safety. The Construction Contractor(s) will maintain a communication network consisting of one or both of the following devices: two-way radios or cellular phones. This will allow for coordination of equipment traffic along existing access roads so that public safety, traffic impacts, and resource impacts are minimized. In addition, all necessary permits for the transportation of equipment and materials will be obtained and complied with.

Although the number of construction vehicles needed for the Project is not expected to substantially increase traffic volumes, the delivery of large pieces of equipment or material as part of the construction process may slow or interrupt traffic on state or county roads on a short-term basis. The duration of these types of traffic disruption are typically very short, a few minutes or less while the delivery truck passes down a roadway or turns a corner. The limited number of large pieces of equipment or material that are delivered to any one portion of the Project tends to make traffic disruptions infrequent and generally unnoticed by the motoring public. Additionally, short-term traffic diversions and brief road closures (if needed) may be required to complete wire stringing activities. All traffic impacts resulting from any construction activities including short-term traffic diversions, traffic congestion, traffic warning systems and brief road closures (if needed).

Incremental increases in traffic would not cause congestion that exceeds appropriate levels of service. Only minor delays from road and railroad crossings might occur. If road and lane closures are needed,

the appropriate regulatory agencies, affected parties, and emergency service providers will be notified in advance and required procedures followed.

U6.0 DESIGN FEATURES AND BMPS

In addition to applicable design and operational standards, regulations, laws, and permit requirements, the following design features and best management practices (BMPs) have been developed by TransWest to avoid or minimize potential traffic and safety related impacts.

TWE-9: All construction vehicle movement outside the ROW normally will be restricted to pre-designated access or public roads.

For a list of additional mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

APPENDIX V
VISUAL RESOURCES MANAGEMENT PLAN

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ACRONYMS

Applicant	TransWest Express LLC, also TransWest
BLM	Bureau of Land Management
BMP	Best Management Practice
CFR	Code of Federal Regulations
COA	Condition of Approval
CSU	Controlled Surface Use
DEM	digital elevation model
EIS	Environmental Impact Statement
EMM	Environmental Mitigation Measure
FEIS	Final Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act of 1976
FO	Field Office
GPS	global positioning system
KOP	Key Observation Point
LRMP	Land and Resource Management Plan
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NPS	National Park Service
NSU	No Surface Use
NTP	Notice to Proceed
OHV	off-highway vehicle
OSHA	Occupational Safety and Health Administration
Plan	Visual Resource Management Plan
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
RMP	Resource Management Plan
ROD	Record of Decision
ROW	right-of-way
SIO	Scenic Integrity Objective
SMS	Scenery Management System
SRMA	Special Recreation Management Area
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
U.S.C.	United States Code
USFS	United States Forest Service
VMS	Visual Management System
VQO	Visual Quality Objective
VRM	Visual Resource Management
WWEC	West-wide Energy Corridor

V1.0 INTRODUCTION

This Visual Resources Management (Plan) describes the measures to be implemented by TransWest Express LLC (TransWest or Applicant) and the Construction Contractor(s) to reduce visual impacts for the TransWest Express Transmission Project (TWE Project or Project).

This Plan focuses on the implementation of West-wide Energy Corridor (WWEC) Final Programmatic Environmental Impact Statement (EIS) Best Management Practices (BMPs), Applicant Committed Design Features, State and Bureau of Land Management (BLM) Stipulations, United States Forest Service (USFS) Standards and Guidelines, and mitigation measures identified in the BLM Record of Decision (BLM ROD) and other project approvals designed to reduce visual impacts of the TWE Project, as applicable. These measures are collectively referred to as Environmental Mitigation Measures (EMMs).

V1.1 Plan Purpose

The focus of this Plan is to minimize visual contrasts created by Project construction, operation, and maintenance, and to provide an implementation strategy for EMMs. This Plan is applicable to the Selected Alternative in the BLM ROD. TransWest and its Construction Contractor(s) would be responsible for carrying out the methods described in this Plan. This Plan is based on the existing conditions, visual impacts, and mitigation measures identified in the TWE Project Final Environmental Impact Statement (FEIS). Project design features, BMPs, and required stipulations are applicable to the design, construction and operation of the TWE Project.

The goals of this Plan are to minimize visual contrasts created by the TWE Project in compliance or conformance with agency or landowner visual management requirements by:

1. Summarizing areas of visual concern in Project affected areas;

2. Providing guidance during the design, construction and operation of the Project to applicable parties that address visual impacts and impact-reducing measures identified during the National Environmental Policy Act of 1969 (NEPA) process; and

3. Providing a methodology for the implementation of impact-reducing EMMs.

V1.2 Agency-Specific Laws, Regulations and Standards

The USFS, National Park Service (NPS), and the BLM are responsible for managing scenery on public lands by ensuring that visual and scenic values of public lands are considered before allowing uses that may have negative effects on those values.

The Federal Land Policy and Management Act (FLPMA) of 1976 directs the way public lands are administered by the BLM. The following sections of the FLPMA relate to the management of visual resources on federal lands:

- § 102(a) (8) states that "…the public lands be managed in a manner that will protect the quality of the…scenic…values…"

- § 103(c) identifies "scenic values" as one of the resources for which public land will be managed.

- § 201(a): states that "The Secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resources and other values (including…scenic values)."

- § 202(c)(1-9): "...in developing land use plans, the BLM shall use…the inventory of the public lands; consider present and potential uses of the public lands, consider the scarcity of the values involved and the availability of alternative means and sites for realizing those values; weigh long-term benefits to the public against short term benefits."

- § 505(a): "Each right-of-way shall contain terms and conditions which will … (ii) minimize damage to the scenic and esthetic values" (BLM 2001).

NEPA, 43 United States Code (U.S.C.) § 4321 *et seq*. also addresses scenic values of public lands:

- § 101(b)(2) "assure for all Americans...esthetically…pleasing surroundings;"

- § 102 (A) Requires agencies to "utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making."

As mandated under the Organic Act (16 U.S.C. §1; NPS 1916), all visual resources and scenic quality within national parks are to be conserved and managed in an unimpaired condition for the enjoyment of future generations. However, the Agency Preferred Alternative does not cross lands managed by the NPS, although it may be within the viewshed of park lands or primary roads accessing those lands.

National trails were established under the National Trail System Act of 1968 (16 U.S.C. §1241-51), designating and protecting national scenic trails, national historic trails, and national recreational trails. National trails are administered by the BLM, NPS, and USFS; these agencies provide coordination and oversight for the entire length of a trail. However, as these trails traverse both public and private lands as well as lands controlled by various agencies, on-site management activities are performed by the jurisdictional agency, the state, or the landowner (NPS 2008).

The National Historic Preservation Act (NHPA) includes language protecting the visual integrity of sites listed or eligible for the National Register of Historic Places: "Examples of adverse effects… …include…introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features…" (36 Code of Federal Regulations [CFR] Part 800.5). Impacts to visual resources protected by the NHPA and associated mitigation measures are discussed in Appendix D - Cultural Resources Protection and Management Plan.

V1.2.1 Bureau of Land Management

The BLM manages land under its jurisdiction according to the goals and policies outlined in their Resource Management Plans (RMPs). Visual Resource Management (VRM) classifications are developed by BLM based on landscape character, scenic quality, sensitivity levels, distance zones, and management direction as outlined in BLM Manual 8400, Handbook H-8410-Visual Resource Management (BLM 1986a). Each of four VRM Classes has an objective that prescribes the amount of change allowed in the characteristic landscape: Class I (no change); Class II (minor change); Class III (moderate change); and Class IV (major change). Compliance with VRM Classes is determined by evaluating project contrasts, estimating project contrast level, and comparing the contrast level with the established VRM Class (see Table V1 below). Contrast is determined using BLM Handbook H-8431-1-Visual Resource Contrast Rating (BLM 1986b).

Mitigation measures were prescribed in the FEIS where the TWE Project would be non-compliant with the VRM Classes based on contrast ratings. Mitigation measures may also be applied in other areas to reduce TWE Project contrast. For a list of mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

TABLE V1 BLM VISUAL MANAGEMENT SYSTEM CLASS DESCRIPTIONS

VRM CLASS	VISUAL OBJECTIVE
Class I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II	The objective to this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV	The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the effects of these activities through careful location, minimal disturbance, and repeating the basic elements.

V1.2.2 United States Forest Service

The USFS Land and Resource Management Plans (LRMP) developed for each forest guides all natural resource management activities and establishes management standards and guidelines for scenery within the national forests. The LRMP identifies Scenic Integrity Objectives (SIOs) (management level) in forest management areas established under the most current Scenery Management System (SMS). Visual Quality Objectives (VQOs) were developed under the Visual Management System (VMS), which was superseded by the SMS (USFS 1995). SIOs and VQOs each prescribe the level of visible change allowable within forest boundaries (see Table V2 below). Consistency with SIOs and VQOs is determined by comparison of the objective or integrity level of the applicable VQO or SIO, respectively, with the object or integrity level resulting from the proposed project.

Mitigation measures were identified in the FEIS where the TWE Project would be inconsistent with the VQOs or SIOs. . For a list of mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

TABLE V2 USFS VISUAL MANAGEMENT SYSTEMS AND CLASS DESCRIPTIONS

USFS VISUAL MANAGEMENT SYSTEM-VISUAL QUALITY OBJECTIVES (VQO)	
Management Level	Visual Objective
Preservation	This visual quality objective allows ecological changes only. Management activities, except for very low visual-effect recreation facilities, are prohibited.
Retention	This visual quality objective provides for management activities which are not visually evident. Under retention activities may only repeat form, line, color, and texture which are frequently found in the characteristic landscape. Changes in their qualities of size, amount, intensity, direction, pattern, etc., should not be evident.
Partial Retention	Management activities are visually evident but subordinate to the characteristic landscape when managed according to the partial retention visual quality objective. Activities may repeat form, line, color, or texture common to the characteristic landscape but changes in their qualities of size, amount, intensity, direction, pattern, etc., remain visually subordinate to the characteristic landscape.
Modification	Under the modification visual quality objective management activities may visually dominate the original characteristic landscape. However, activities of vegetative and land form alteration must borrow from naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area or character type.
Maximum Modification	Management activities of vegetative and landform alterations may dominate the characteristic landscape. However, when viewed as background, the visual characteristics must be those of natural occurrences within the surrounding area or character type. When viewed as foreground or middle-ground, they may not appear to completely borrow from naturally established form, line, color, or texture. Alterations may also be out of scale or contain detail which is incongruent with natural occurrences as seen in foreground or middle ground.
USFS SCENERY MANAGEMENT SYSTEM-SCENIC INTEGRITY OBJECTIVES (SIO)	
Management Level	Visual Objective
Very High	Landscapes where the valued landscape character “is” intact with only minute if any deviations. The existing landscape character and sense of place is expressed at the highest possible level.
High	Landscapes where the valued landscape character “appears” intact. Deviations may be present, but must repeat the form, line, color, texture and pattern common to the landscape character so completely and at such scale that they are not evident.
Moderate	Landscapes where the valued landscape character “appears slightly altered”. Noticeable deviations must remain visually subordinate to the landscape being viewed.
Low	Landscapes where the valued landscape character “appears moderately altered”. Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes or architectural styles outside the landscape being viewed. They should not only appear as valued character outside of the area being viewed but compatible or complimentary to the character within.
Very Low	Landscapes where the valued landscape character “appears heavily altered”. Deviations may strongly dominate the valued landscape character. They may not borrow from valued landscape attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes or architectural styles within or outside the landscape being viewed. However deviations must be shaped and blended with the natural terrain (landforms) so that elements such as unnatural edges, roads, landings, and structures do not dominate the composition.

V1.2.3 Other Agencies and Private Landowners

No other federal, state, or local visual resource management laws, ordinances, regulations or standards have been identified during the NEPA process according to the FEIS.

V1.3 Timeline

The implementation of mitigation measures will occur during design, construction, operation and decommissioning phases of the Project.

V1.4 Responsible Parties

TransWest will have the overall responsibility of directing and monitoring the visual mitigation efforts for the TWE Project. TransWest will be responsible to ensure its Construction Contractors implement these measures.

V2.0 EXISTING VISUAL RESOURCES

Sensitive visual resources were identified in the FEIS, and include the following features.

V2.1 Sensitive Viewpoints

Sensitive viewpoints include sensitive viewers and Key Observation Points (KOPs) such as residential areas, parks, overlooks, trails, roads, etc., applicable to the Agency Preferred Alternative. Areas of High and Moderate impacts and levels of sensitivity are identified in the FEIS..

V2.2 Sensitive Landscapes

The locations of scenic areas based on landscape scenery applicable to the Agency Preferred Alternative and areas of Class A and Class B scenery are identified in the Final Environmental Impact Statement (FEIS). Areas of High and Moderate impacts, based on the NEPA analysis are also summarized in the FEIS

V2.3 Agency Visual Management Objectives

Detailed applicable agency management classifications and objectives (BLM VRM and USFS SIO/VQOs), as well as local laws, ordinances, regulations and standards applicable to the Agency Preferred Alternative are summarized in the FEIS

V2.4 Private Landowner Concerns

Detailed areas of concern for private landowners where additional mitigation measures would be implemented for the Project will be identified during negotiations with private landowners. Any additional visual mitigation measures for private landowners will be incorporated into the applicable easement(s).

V3.0 ENVIRONMENTAL MITIGATION MEASURES

The following sections include EMMs related to visual resources and strategies for implementation of each EMM. The identified EMMs may be updated, changed, or eliminated as necessary to conform to BLM's ROD. For a list of mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management

Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

In addition, visual resource EMMs are often directly related to other resource EMMs. The implementation of other resource EMMs are covered in other plans developed for the POD. Implementation strategies for visual resource EMMs will overlap with the following plans:

- Appendix A: Access Road Siting and Management Plan
- Appendix D: Cultural Resources Protection and Management Plan
- Appendix Q: Reclamation Plan
- Appendix R: ROW Preparation and Vegetation Management Plan

V3.1 Applicant Committed Design Features

TransWest has committed to implementing design features as part of the TWE Project to reduce impacts to visual resources. Table V4 outlines the Applicant committed EMMs or design features proposed by TransWest. Additional Applicant committed EMMs or design features that may be applicable to this Plan are listed in Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at Table 16 - Applicant Committed Environmental Mitigation Measures.

TABLE V4 APPLICANT COMMITTED DESIGN FEATURES

FEIS NO.	PHASE(S)[1]	DESIGN FEATURE DESCRIPTION
TWE-12	P, C, O	Except for repairs necessary to make roads passable, no widening or upgrading of existing access roads will be undertaken in the area of construction and operation, where soils or vegetation are sensitive to disturbance. In designated areas, structures will be placed to avoid sensitive features such as, but not limited to, riparian areas, water courses and cultural sites, or to allow conductors to clearly span the features within limits of standard structure design. This will minimize the amount of disturbance to the sensitive feature or reduce visual contrast.
TWE-14	P, C	The POD will show the location of borrow sites, from which material will be obtained. Borrow pits will be stripped of topsoil to a depth of approximately six inches. Stripped topsoil will be stockpiled and, upon completion of borrow excavation, spread to a uniform depth of six inches over areas of borrow pits from which removed. Before replacing topsoil, excavated surfaces will be reasonably smooth and uniformly sloped. The sides of borrow pits will be brought to stable slopes with slope intersection shaped to carry the natural contour of adjacent undisturbed terrain into the pit to give a natural appearance. When necessary, borrow pits will be drained by open ditches to prevent accumulation of standing water.
TWE-44	P, C, O	Non-specular conductors will be used to reduce potential visual impacts.
TWE-46	P, C, O	The Applicant will comply with federal permitting agency stipulations regarding visual resources through development of a Visual Resources Management Plan.

[1] Phase definitions: P-Planning, C-Construction, O-Operation, D-Decommission

V3.2 BLM Field Office Stipulations

The BLM Field Offices have identified visual resource stipulations as detailed in their respective RMPs. No Surface Use (NSU) and Controlled Surface Use (CSU) visual resources stipulations are identified for each BLM Field Office in Table V5. These stipulations typically apply to activities within VRM Class I and Class II designations. Additional BLM Field Office stipulations that may be

applicable to this Plan are listed in Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative.

TABLE V5 BLM FIELD OFFICE USE RESTRICTIONS RELATED TO VISUAL RESOURCES

AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	BUFFER/AVOIDANCE AREA
	Rawlins Field Office		
VRM Class I and II areas	Surface disturbance will be prohibited within important scenic areas (Class I and II Visual Resource Management Areas).	NSU	No buffer
Upper Platte SRMA	Surface disturbing activities on public lands within one-quarter mile on either side of the river will be intensively managed to maintain the quality of the visual resource off-highway vehicle (OHV) use is limited to designated roads or vehicle routes. Open to oil and gas leasing with an NSO stipulation. Existing oil and gas leases will be intensively managed. Surface disturbing and disruptive activities will be restricted to maintain the quality of the visual resource.	CSU	0.25 mile
	White River Field Office		
VRM Class II and III areas within White River FO	Measures may be required to protect scenic and natural landscape values. These design and measures may include transplanting trees and shrubs, mulching and fertilizing disturbed areas, use of low profile permanent facilities, and painting to minimize visual contrasts. Surface disturbing activities may be moved up to 200 meters to avoid sensitive areas or to reduce the visual effects of the proposal. These measures would be applied to the following VRM Class II and III areas: Canyon Pintado National Historic District; Highways 13, 40, 64, and 139 corridors; Viewsheds in the Blue Mountain/Moosehead GRA; White River Corridor; Douglas and Baxter Pass divide; Cathedral Bluffs; and VRM Class II areas around Meeker. These measures may also be applied to other areas on a case by case basis.	CSU	No buffer
	Richfield Field Office		
Existing ROWs	To avoid potential conflicts with the construction, operation, maintenance, and termination of facilities and improvements located on existing ROWs on public land, apply the following: Where a ROW grant specifically identifies an area and/or width, the VRM class within the specified area/width would be VRM Class IV. Where no width is specified, the VRM class within the interior boundaries of the area disturbed when the facility or improvement was initially constructed would be VRM Class IV.	CSU	No buffer
All VRM classes	All ROWs must comply with the applicable VRM classification objectives.	CSU	No buffer
	Salt Lake Field Office		
Ridge Tops, Narrow Drainages	ROWs, whether within or outside a corridor, will avoid lands where an above-ground ROW would be an obvious visual or physical intrusion such as ridge tops or narrow drainages.	CSU	No buffer
VRM Class II and III areas within Salt Lake FO	ROWs, whether within or outside a corridor, will avoid lands within VRM Class II and III areas.	CSU	No buffer
	Fillmore Field Office		
Interstate Highway 15 ROW corridor	All ROWs must comply with the applicable Visual Resource Management Class guidelines. New rights of way shall be limited to below the surface of the ground uses only.	CSU	No buffer
Highway 50, 6, and 257 ROW corridor	All land disturbed by new ROW except authorized new access roads shall be rehabilitated to as close to natural conditions as possible, All ROWs must comply with the applicable Visual Resource Management	CSU	No buffer

AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	BUFFER/AVOIDANCE AREA
	Class guidelines. Roads that are needed for construction of a new ROW shall be temporary and fully rehabilitated. The road or highway within the ROW corridor shall be used to the maximum extent possible for construction and maintenance of new ROWs.		
VRM II areas	VRM Class II areas [within the Warm Springs Resource Area] are ROW avoidance areas.		

V4.0 MONITORING AND COMPLIANCE

Prior to beginning construction, TransWest will assemble an environmental compliance and inspection team to oversee all aspects of construction of the Project (Appendix G). The team will ensure full compliance with BMPs, stipulations, standards and mitigation measures contained in the POD. Supplemental field support for visual resources will be available as needed to provide monitoring and compliance support where necessary. These visual resource analysts will be available to assist in the application and interpretation of visual mitigation measures. Visual support staff would also be available to consult with BLM, USFS or other agency staff or stakeholders.

V5.0 REFERENCES

Bureau of Land Management (BLM). 1986a. Manual H-8410-1 - Visual Resource Inventory. Bureau of Land Management, Washington, D.C.

_____. 1986b. Manual H-8431. Visual Resource Contrast Rating. Bureau of Land Management, Washington, D.C.

_____. 2001. Federal Land Policy and Management Act of 1976 (90 Stat. 2743; 43 United States Code §1601, *et seq*.).

National Park Service (NPS). 2008. National Trail System Act of 1968 (16 United States Code §1241-51).

United States Forest Service (USFS). 1995. Agriculture Handbook Number 701 - Landscape Aesthetics, a Handbook for Scenery Management.

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FRAMEWORK WATER RESOURCES PROTECTION PLAN

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ACRONYMS

Applicant	TransWest Express LLC, also TransWest
ATV	all-terrain vehicle
BLM	Bureau of Land Management
BMP	Best Management Practice
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
CWA	Clean Water Act
DEQs	Departments of Environmental Quality
EPA	United States Environmental Protection Agency
FEIS	Final Environmental Impact Statement
NDEP	Nevada Division of Environmental Protection
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NTP	Notice to Proceed
NWP	Nationwide Permit
OHWM	ordinary high water mark
Plan	Water Resources Protection Plan
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
ROD	Record of Decision
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
U.S.C.	United States Code
UDEQ	Utah Department of Environmental Quality
UDNR	Utah Department of Natural Resources
USACE	Unites States Corps of Engineers
USFWS	Unites States Fish and Wildlife Service
WDEQ	Wyoming Department of Environmental Quality
WQC	Water Quality Certification

W1.0 INTRODUCTION

This framework Water Resources Protection Plan (Plan) describes TransWest Express LLC's (TransWest or Applicant) approach for avoiding and minimizing impacts to water resources from the proposed TransWest Express Transmission Project (TWE Project or Project). The permit requirements of the U.S. Army Corps of Engineers (USACE) are described in this Plan; however, these requirements will be addressed separately in coordination with the USACE permitting process.

W1.1 Plan Purpose

This framework Plan represents the commitment on the part of TransWest to protect water resources. The overall objective is to provide measures to protect these resources from potential impacts during construction, operation, and maintenance. This plan is intended for use as a guide to determine the appropriate site-specific measures to be implemented during construction activities. The goals of this plan are to control Project-related erosion and sedimentation into streams and wetlands and minimize disturbance and erosion of streambeds and banks. This document provides a template for the final Water Resources Protection Plan to be developed by the Construction Contractor(s).

W1.2 Plan Updates

For the Notice to Proceed (NTP) POD, the Plan will be updated based on final detailed engineering and design and the results of pre-construction surveys. The Construction Contractor(s) will be responsible for implementing the final Water Resources Protection Plan.

W2.0 REGULATORY OVERVIEW

Construction, operation, and maintenance of the Project would include ground disturbing activities that could impact wetlands and waters of the U.S. and aquatic resources. The following regulations and associated permits and authorizations may be required for the Project.

W2.1 Federal Regulations

The Clean Water Act (CWA) (33 United States Code [U.S.C.] §1251 et seq., formerly the Federal Water Pollution Control Act of 1972) was enacted with the intent of restoring and maintaining the chemical, physical and biological integrity of the waters of the U.S. Specific sections of the CWA that may apply to the Project are described below, followed by a brief description of the associated permits.

W2.1.1 Clean Water Act – Section 303(d) List of Impaired Waters

Section 303(d) of the federal CWA requires states to assess the condition of state waters to determine where water quality is impaired (does not fully support uses identified in the stream classification or does not meet all water quality standards) or threatened (is likely to become impaired in the near future). The result of this review is the compilation of a 303(d) list, which states must submit to the U.S. Environmental Protection Agency (EPA) biannually.

W2.1.2 Clean Water Act – Section 130.7 Total Maximum Daily Load

Section 130.7 of the CWA required states to establish Total Maximum Daily Load (TMDL) programs, which are approved by the EPA for streams and lakes that do not meet adopted water quality standards. A TMDL includes a quantitative assessment of water quality problems, contributing sources, and load reductions or control actions needed to restore and protect water bodies. A TMDL budget takes into account loads from point, nonpoint, and natural background sources. National Pollutant Discharge Elimination System (NPDES) permits address point-source

pollution to surface waters. Non-point source pollution is addressed by the application of Best Management Practices (BMPs) and environmental mitigation measures.

In compliance with the federal CWA, the Wyoming Department of Environmental Quality (WDEQ), Colorado Department of Public Health and Environment (CDPHE), Utah Department of Environmental Quality (UDEQ), and Nevada Division of Environmental Protection (NDEP) have identified Section 303(d) water quality limited streams and lakes for development of TMDL criteria. TMDLs have been established for surface waters in Colorado, Utah, and Nevada. WDEQ has developed few TMDLs at this time since they are just implementing the TMDL program. From the time a water body is listed as impaired, a TMDL for that water body would be developed within one to five years. A list of impaired water bodies on the 303(d) list will be identified for the selected Agency Preferred Alternative.

W2.1.3 Clean Water Act - Section 401 Water Quality Certification

Pursuant to Section 401 of the federal CWA, any permit or license issued by a federal agency for an activity that may result in a discharge into waters of the U.S. requires certification from the state in which the discharge originates. This requirement allows each state to have input into federally approved projects that may affect its waters (rivers, streams, lakes, and wetlands) and to ensure the projects will comply with state water quality standards and any other water quality requirements of state law. State certification ensures that the project will not adversely impact impaired waters (waters that do not meet water quality standards) and that the project complies with applicable water quality improvement plans (total maximum daily loads). The States must grant, deny, or waive water quality certification for a project before a federal permit or license can be issued. The Departments of Environmental Quality (DEQs) for Wyoming, Colorado, Utah, and Nevada must provide Section 401 Water Quality Certifications (WQCs) for the federally issued permits, including the 404 permits in all four states.

W2.1.4 Clean Water Act – Section 402 National Pollutant Discharge Elimination System Permits

To comply with criteria in EPA's CWA, all construction site operators engaged in clearing, grading, and excavating activities that disturb one acre or more, must obtain an NPDES permit for stormwater discharges (Code of Federal Regulations [CFR], Title 40, Parts 122 and 123). NPDES permits (also called Construction General Permits) are issued by the EPA or similar authorized state entity following submittal of a Notice of Intent (NOI) for construction activities, and preparation of a Stormwater Pollution Prevention Plan (SWPPP) that describes how erosion and sediment transport will be minimized to adjacent water bodies.

W2.1.5 Clean Water Act – Section 404 Waters of the U.S. Permits

Waters of the U.S., including wetlands, are subject to the USACE jurisdiction under Section 404 of the CWA. A Section 404 permit is required for the discharge of dredged or fill material into waters of the U.S. Section 404 of the CWA applies to all jurisdictional waters of the U.S., including wetlands that have significant nexus to interstate commerce. The USACE jurisdiction over non-tidal waters of the U.S. extends to the "ordinary high water mark provided the jurisdiction is not extended by the presence of wetlands" (33 CFR Part 328.4); and under Title 40 CFR Part 230.3 (s)(1). Jurisdictional waters include surface waters, such as navigable waters and their tributaries, all interstate waters and their tributaries, natural lakes, all wetlands adjacent to other jurisdictional waters and all impoundments of these waters.

The majority of the Project lies within the Sacramento District of the USACE. The Nevada portion of the Project lies within the Los Angeles District of the USACE and a small portion of the Project near

Rawlins, Wyoming is within the Omaha District of the USACE. The Districts within which unavoidable wetland impacts would occur would provide regulatory review and permitting services for the Project.

Under Section 404, the USACE issues a number of Nationwide Permits for different types of activities that result in minimal individual and cumulative adverse effects on the aquatic environment and Individual Permits for larger and more complex impacts.

W2.1.6 Rivers and Harbors Appropriation Act of 1899, Section 10

Under Section 10 of the Rivers and Harbors Appropriation Act of 1899 (33 U.S.C.§403; Chapter 425, March 3, 1899; 30 Stat. 1151), the building of any wharfs, piers, jetties and other structures is prohibited without Congressional approval, and excavation or fill within navigable waters requires the approval of the Chief of Engineers. Authority of the USACE to issue permits for the discharge of refuse matter into or affecting navigable waters under Section 13 of the 1899 Act (33 U.S.C. §401; 30 Stat. 1152) was modified by title IV of P.L. (33 U.S.C. §§1341-1345; 86 Stat. 877), as amended, which established the NPDES permits.

USACE permits are required under Section 10 for construction in, over or under navigable waters of the United States except as otherwise noted by USACE. Certain activities specified in 33 CFR Part 330 are permitted by that regulation ("nationwide general permits"). Other activities may be authorized by district or division engineers on a regional basis ("regional general permits"). If an activity is not exempted by USACE or authorized by a general permit, an individual Section 10 permit will be required for the proposed activity.

The Fish and Wildlife Coordination Act (16 U.S.C. §§661-667e; 48 Stat. 401), as amended, provides authority for the U.S. Fish and Wildlife Service (USFWS) to review and comment on the effects on fish and wildlife of activities proposed to be undertaken or permitted by the USACE.

W2.1.7 Executive Order 11990 Protection of Wetlands

The requirements for all regulatory actions specified in Executive Order 11988 are summarized in Section 1 from the order: *"(a) Each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities. (b) This Order does not apply to the issuance by Federal agencies of permits, licenses, or allocations to private parties for activities involving wetlands on non-Federal property."*

W2.1.8 Executive Order 11988 Floodplain Management

The requirements for all regulatory actions specified in Executive Order 11988 are summarized in Section 1 from the order: "*Each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands, and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities."*

W2.1.9 Wild and Scenic Rivers

Wild and Scenic Rivers were established by the Wild and Scenic Rivers Act of 1968 to protect and preserve designated rivers throughout the nation in their free-flowing condition and to protect and preserve their immediate environments. To meet the eligibility criteria, a waterway must be "free-flowing" and, along with its adjacent land area, must possess at least one "outstandingly remarkable value." The Act provides three levels of protection: wild, scenic, and recreational. "Wild" rivers are free of dams, generally inaccessible except by trail, and represent vestiges of primitive America. "Scenic" rivers are free of dams, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads. "Recreational" rivers are readily accessible by road or railroad, may have some development along their shorelines, and may have been dammed in the past.

The Wild and Scenic Rivers Act describes procedures and limitations for control of lands in federally administered components of the system and for dealing with disposition of lands and minerals under Federal ownership.

W2.2 State Regulations

Many States regulate waterways and adjacent wetlands, either through specific regulatory programs or via Section 401 of the CWA, also known as 401 WQC. State regulatory programs may incorporate permitting procedures to authorize jurisdictional impacts to waterways and wetlands and may require compensatory mitigation for unavoidable impacts. In the absence of a specific regulatory program, States may utilize 401 WQC to require measures over and above those required by the USACE Section 404 permit. Section 401 allows a state to review, authorize or deny, and implement requirements additional to those of the USACE 404 permit. If a state chooses to utilize its authority under Section 401, the Section 404 permit does not go into effect until the State issues the 401WQC.

The state agencies, authorizations and guidance that are applicable to wetlands and waters of the U.S. permitting and mitigation requirements for the TWE Project are summarized below.

W2.2.1 Wyoming

WDEQ, Water Quality Division:

- CWA Section 401 WQC.
- Request for WQC submitted to WDEQ by USACE for Section 404 permits.
- Section 401 certification issued by WDEQ prior to federal Section 404 approval.
- In 2012, the WDEQ certified, with certain conditions, the use of Nationwide Permit (NWP) 12 on all waters in Wyoming other than those designated as Class 1 waters.

W2.2.2 Colorado

CDPHE, Water Quality Control Division:

- CWA Section 401 WQC.
- Under the Colorado 401 Certification Regulation, all Nationwide CWA Section 404 permits are certified by statute and do not require a certification by the Water Quality Control Division.

- All WQCs for Individual CWA Section 404 permits and licenses are subject to specified state requirements. The TWE Project would comply with these additional requirements.

- For Individual CWA Section 404 permits, documents must be submitted to the Water Quality Control Division for CWA Section 401 certification.

- In 2012, the CDPHE Water Quality Control Division certified, with conditions, the use of NWP 12 in the State of Colorado.

W2.2.3 Utah

Utah Department of Natural Resources (UDNR), Division of Water Rights:

- Stream Channel Alteration Permit for alteration of bed or banks of a natural stream.

- State Engineer's Office has entered into a joint permitting program with the USACE to issue Section 404 approvals through the State Stream Alteration Program.

- Draft Mitigation Guidance.

- Utah Division of Water Rights, Stream Program Fact Sheet SA-5, Draft, Post-Construction Establishment of Vegetation.

UDEQ, Division of Water Quality:

- CWA Section 401 WQC.

- Request for certification submitted to UDEQ by USACE for Section 404 permits.

- Section 401 certification issued by UDEQ prior to federal Section 404 approval.

- In 2012, the UDEQ Division of Water Quality certified, with conditions, the use of NWP 12 in the State of Utah.

U.S. EPA:

- Section 404 permits on tribal lands will also require a Section 401 WQC from the EPA's regional office.

W2.2.4 Nevada

NDEP, Bureau of Water Pollution Control:

- CWA Section 401 WQC.

- Request for certification submitted to NDEP by USACE for Section 404 permits.

- Section 401 certification issued by NDEP prior to federal Section 404 approval.

- In 2012, the NDEP certified, with conditions, the use of NWP 12 in the State of Nevada.

U.S. EPA:

- Section 404 permits on tribal lands will also require a Section 401 WQC from the EPA's regional office.

W3.0 OVERVIEW OF WATER RESOURCES

W3.1 Jurisdictional Waters of the U.S.

Waters of the U.S. are defined in 40 CFR 230.3(s). Waters of the U.S. for the TWE Project would be determined by field surveys.

W3.1.1 Wetlands

Wetlands are defined for regulatory purposes as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR Part 328.3, 40 CFR Part 230.3). Wetlands are important ecological resources that perform many functions including groundwater recharge, flood flow attenuation and conveyance, erosion control, and water quality improvement. They also provide habitat for many plants and animals, including threatened or endangered species.

W3.1.2 Non-wetland Waters of the U.S.

The USACE regulates the discharge of fill material within the plane of the ordinary high water mark (OHWM) of streams, and also regulates the overhead crossing of navigable waterways. The OHWM is defined as the line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas (33 CFR Part 328.3(e)). These physical characteristics include a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area.

W3.2 Non-Jurisdictional Water Resources

Non-jurisdictional water resources may include intermittent, ephemeral streams and drainages, irrigation ditches and canals, wells, isolated wetlands and others.

W4.0 AVOIDANCE AND ENVIRONMENTAL MITIGATION MEASURES

In addition to adhering to USACE and state regulations and guidelines regarding waters of the U.S., the TWE Project will avoid and minimize adverse impacts to other water resources to the extent practicable. This section describes the environmental mitigation measures that TransWest and its Construction Contractor(s) will implement and the access road designs used by TransWest to minimize impacts to water resources. For a list of additional mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

W4.1 Environmental Mitigation Measures

TransWest has prepared other framework plans included in the ROD POD for consideration during the National Environmental Policy Act (NEPA) analysis. Many of these plans provide protection to water resources either directly or indirectly and are listed in Table W1 below.

TABLE W1 OTHER FRAMEWORK PLANS CONTRIBUTING TO THE PROTECTION OF WATERS OF THE U.S.

FRAMEWORK PLAN	WATER PROTECTION MEASURES	ROD POD APPENDIX
Access Road Siting and Management Plan	This plan will outline methods to prevent adverse impacts to the environment that could result from access road siting and management.	A
Blasting Plan	This plan will outline methods to prevent adverse impacts to the environment that could potentially result from the use of explosives and blasting procedures during Project construction.	C
Emergency Preparedness and Response Plan	Measures identified in this plan will be in compliance with applicable state and federal laws and policies while allowing access to the Project in a timely, cost effective and safe manner.	F
Environmental Compliance and Monitoring Plan	This is the centralized Project environmental compliance reference and is intended to facilitate environmental compliance across the entire Project.	G
Hazardous Materials Management Plan	This plan will reduce the risks associated with the use, storage, transportation, production and disposal of hazardous materials.	L
Noxious Weed Management Plan	This plan will ensure noxious weeds are identified and controlled during construction of Project facilities and all federal, state, county and local requirements are satisfied.	N
Reclamation Plan	This plan will combine TransWest's project-wide BMPs with site-specific mitigation developed in consultation with agencies.	Q
ROW Preparation and Vegetation Management Plan	This plan will present the measures for vegetation management within the right-of-way for operation and maintenance activities for the Project.	R
Spill Prevention and Response Plan	This plan will include measures for spill prevention practices, requirements for refueling and equipment operation near water bodies, procedures for emergency response and incident reporting and training requirements.	S
Stormwater Pollution Prevention Plan	This plan will include measures for temporary and permanent erosion and sediment control that will be used during construction, operation and maintenance of the Project facilities.	T
Wildlife and Plant Conservation Measures Plan	This plan will present the measures for avoidance and minimization of impacts to special status wildlife species as related to construction activities for the Project.	X

TransWest has committed to implementing design features as part of the TWE Project to reduce impacts to water resources. Table W2 outlines the Applicant committed EMMs or design features proposed by TransWest.

TABLE W2 APPLICANT COMMITTED DESIGN FEATURES

FEIS NO.	PHASE(S)[1]	DESIGN FEATURE DESCRIPTION
TWE-12	P,C,O	Except for repairs necessary to make roads passable, no widening or upgrading of existing access roads will be undertaken in the area of construction and operation, where soils or vegetation are sensitive to disturbance. In designated areas, structures will be placed to avoid sensitive features such as, but not limited to, riparian areas, water courses and cultural sites, or to allow conductors to clearly span the features within limits of standard structure design. This will minimize the amount of disturbance to the sensitive features or reduce visual contrast.
TWE-16	C	Watering facilities (tanks, natural springs and/or developed springs, water lines, wells, etc.) will be repaired or replaced, if damaged or destroyed by construction activities, to their pre-disturbed condition as required by the landowner or land management agency.
TWE-20	P	As part of the Clean Water Act (CWA) 404 Permit for the TWE Project, the POD will include a Water Resources Protection Plan, which will incorporate measures to avoid and minimize impacts to wetlands and waters of the U.S. to the extent practical. The POD will include a SWPPP. The Applicant will identify all streams in the vicinity of the proposed project sites that are listed as impaired under Section 303(d) of the CWA and develop a management plan to avoid, reduce, and/or minimize adverse impacts to those streams.
TWE-21	P	The Applicant will obtain a National Pollutant Discharge Elimination System (NPDES) permit from the Environmental Protection Agency (EPA) prior to construction.
TWE-22	C	Runoff from excavated areas, construction materials or wastes (including truck washing and concrete washes), and chemical products such as oil, grease, solvents, fuels, and pesticides will be controlled. Excavated material or other construction material will not be stockpiled or deposited near or on stream banks, lake shorelines, ditches, irrigation canals, or other areas where runoff could impact the environment.
TWE-23	C	Washing of concrete trucks or disposal of excess concrete in any ditch, canal, stream, or other surface water will not be permitted. Concrete wastes will be disposed of in accordance with all federal, state and local regulations.
TWE-24	C,O	Vehicle refueling and servicing activities will be performed in designated construction zones located more than 100 feet from wetlands and intermittent streams and more than 500 feet from perennial streams. Spill prevention and containment measures or practices will be incorporated as needed.
TWE-25	P	A dewatering permit will be obtained from the appropriate agencies if required for construction dewatering activities.

[1] Phase definitions: P-Planning, C-Construction, O-Operation, D-Decommission

The BLM Field Offices have identified water resource stipulations as detailed in their respective RMPs. No Surface Use (NSU) and Controlled Surface Use (CSU) visual resources stipulations are identified for each BLM Field Office in Table W3.

TABLE W3 BLM FIELD OFFICE USE RESTRICTIONS RELATED TO WATER RESOURCES

AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	BUFFER/AVOIDANCE AREA
	Rawlins Field Office		
100-year floodplains	Surface disturbing activities will be avoided in identified 100-year floodplains	CSU	No buffer
All surface water	Surface disturbance will be prohibited within 500 feet of surface water. Stream crossings for roads and pipelines will be constructed during the period of lowest flow (i.e., late summer or fall) and perpendicular to flow. No surface water or shallow ground waters in connection with surface waters will be utilized for proposed projects. Proper erosion control techniques, such as water bars, netting, rip-rap, etc.	NSU	500 feet
Ephemeral drainages	Surface disturbing activities will be avoided within 100 feet from the inner gorge of ephemeral channels.	CSU	100 feet
	Little Snake Field Office		
Perennial streams	Establish no surface occupancy (NSO) stipulations for up to 0.25 mile from perennial water sources, if necessary, depending on type and use of the water source, soil type, and slope steepness.	NSU	0.25 mile
	White River Field Office		
Riparian areas	Surface disturbing activities would be required to avoid riparian habitat.	CSU	No buffer
	Vernal Field Office		
100-year floodplains, municipal/culinary/public water/reservoirs, riparian areas	Allow no new surface-disturbing activities within active flood plains, public water reserves, or 100 meters of riparian areas unless there are no practical alternatives, impacts will be fully mitigated, and the action is designed to enhance the riparian resources. The following mitigation measures could be included as applicable: Keep construction of all new stream crossings to a minimum. Stream crossings with culverts will be designed and constructed to allow fish passage, where needed. All stream crossings will be designed and constructed to keep impacts to riparian and aquatic habitat to a minimum. Relocate existing routes out of riparian areas where feasible or necessary to restore watershed and riparian stability.	NSU	100 meters (328 feet)
	Richfield Field Office		
Perennial streams; intermittent streams	Prohibit surface disturbing activities within the 100-year floodplain or 330 feet on either side from the centerline, whichever is greater, of streams with intermittent or perennial reaches, resulting in NSO in this area, for protection of habitat for riparian-obligate species.	NSU	300 feet or 100-yr floodplain, whichever greater
Riparian areas	A buffer zone of the 100 year floodplain or 330 feet either side of centerline, whichever is greater, will be maintained around riparian areas (NSO).	NSU	300 feet or 100-yr floodplain, whichever greater
Springs	Maintain buffer zones of no surface disturbance and/or occupancy around natural springs. Base the size of the buffer on hydrological, riparian, and other factors necessary to protect the water quality of the springs. If these factors cannot be determined, maintain a 330-foot buffer zone from outer edge. (Maintain a buffer zone of the 100-year floodplain or 330 feet on either side from the centerline, whichever is greater.)	NSU	300 feet or 100-yr floodplain, whichever greater
Springs	Maintain buffer zones of no surface disturbance and/or occupancy around natural springs. Base the size of the buffer on hydrological, riparian, and other factors necessary to protect the water quality of the springs. If these factors cannot be determined, maintain a 330-foot buffer zone from outer edge. (Maintain a buffer	NSU	300 feet or 100-yr floodplain, whichever greater

AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	BUFFER/AVOIDANCE AREA
	zone of the 100-year floodplain or 330 feet on either side from the centerline, whichever is greater.)		
Wetlands	No surface occupancy on wetland soils or soils identified as having hydric properties. Consider exceptions to NSO if a site-specific environmental analysis determines that other placement alternatives would cause undue or unnecessary degradation to resources. In addition, require the operator to submit a plan prior to commencing operations that addresses: • Erosion control strategies • Mitigation to protect surface from rutting, compaction, and displacement, and disruption of surface and subsurface hydrologic function • Mitigation or restoration measures to restore hydrologic function to site • Proper survey and design by a certified engineer.	NSU	No buffer
	Cedar City Field Office		
Municipal/culinary/public water/reservoirs/wells	Within a designated corridor, blasting and other surface disturbances would be prohibited within 500 feet of reservoirs or water wells.	NSU	500 feet
Springs	Within a designated corridor, blasting and other surface disturbances would be prohibited within 500 feet of all live springs.	NSU	500 feet
Stream channels, areas of unstable soils, and seeps	Construct roads to avoid stream channels, areas of unstable soils, and seeps. Avoid constructing long, down slope straightaways, providing instead curves with water drainages off the road bed.	CSU	No buffer

W4.2 Water Body Crossings

The TWE Project is designed to utilize existing access roads wherever practicable in order to minimize environmental impacts associated with new road construction. Design engineering avoided new crossings of perennial streams, river and artificial water conveyances where practicable. TransWest plans to use existing water body crossings (e.g., river, stream, and drainage channel) where feasible and practicable. New roads are planned to cross water bodies only where avoidance is infeasible and largely where water bodies are ephemeral or intermittent. Preliminary water body crossings have been identified for the Agency Preferred Alternative and are listed below. Final water body crossing and culvert standards will be determined for the NTP POD. The specific loads and the stream conditions will dictate the type of stream crossing.

Perennial streams (based on National Hydrologic Data) which are crossed by access roads (existing roads requiring improvement and new roads only) are listed below based on their proximity to preliminary structure locations shown on the TWE Project Constraints, Access Roads and Work Area Details map books in Appendix AA. None of these streams have special status such as wild and scenic river designation and only one stream, Soldier Creek, is 303(d) listed.

- Wyoming
    - Smith Draw on BLM property at structure number 82..

- Colorado - none

- Utah
    - Unnamed stream on private property at structure number VL 215..
    - Unnamed stream on private property at structure number VL 216.
    - Tie Fork on USFS property at structure number F 835.
    - Sheep Creek on USFS property at structure number F 849.
    - Soldier Creek (303(d) listed) on private property southeast of structure SL 43.
    - Left Fork Spencer Canyon on private property between structure number F 872 and F 873.
    - Old Channel Sevier River on BLM property at structure number FM 359.

- Nevada
    - Mud Springs on BLM property at structure number CL 96.
    - Meadow Valley Wash on BLM property at structure number LV 67.

Project amenities (access roads, structures and work areas) which are currently located within National Wetland Inventory wetlands (based on USGS 2012 data) include the following:

- Wyoming
    - Between structures RL 35 and RL 37 on private and BLM property.
    - Between structures RL 179 and RL 181 on private property.
    - By structure RL 186 on BLM property.

- Colorado
    - By structure WR 71 on BLM property.

- Utah
    - By structure VL 193 on private property.
    - By structure VL 194 on private property.
    - By structure VL 201 on private property.
    - By structure VL 213 on private property.
    - By structure VL 216 on private property.

  - Between structures VL 217 and VL 223 on private property.
  - By structure VL 232 on private property.
  - By structure VL 241 on private property.
  - By structure VL 245 on private property.
  - Between structures VL 246 and VL 247 on private property.
  - By structure VL 259 on private property.
  - By structure VL 290 on private property.
  - By structure VL 397 on private property.

- Nevada
  - By structure LV 253 on private property.

Roads will be built as near as possible at right angles to the streams and washes. Culverts will be installed where necessary. All construction and maintenance activities will be conducted in a manner that will minimize disturbance to vegetation, drainage channels and intermittent or perennial stream banks. Typical road designs for low water and culvert crossings are shown in Figure W1. The following water body crossings would be used where avoidance is not practicable:

- **Drive through (Arizona crossing):** Crossing of a channel with only minimal vegetation removal and no cut or fill is needed. This is typical for much of the low precipitation sagebrush country characterized by rolling topography and streams that rarely flow with water.

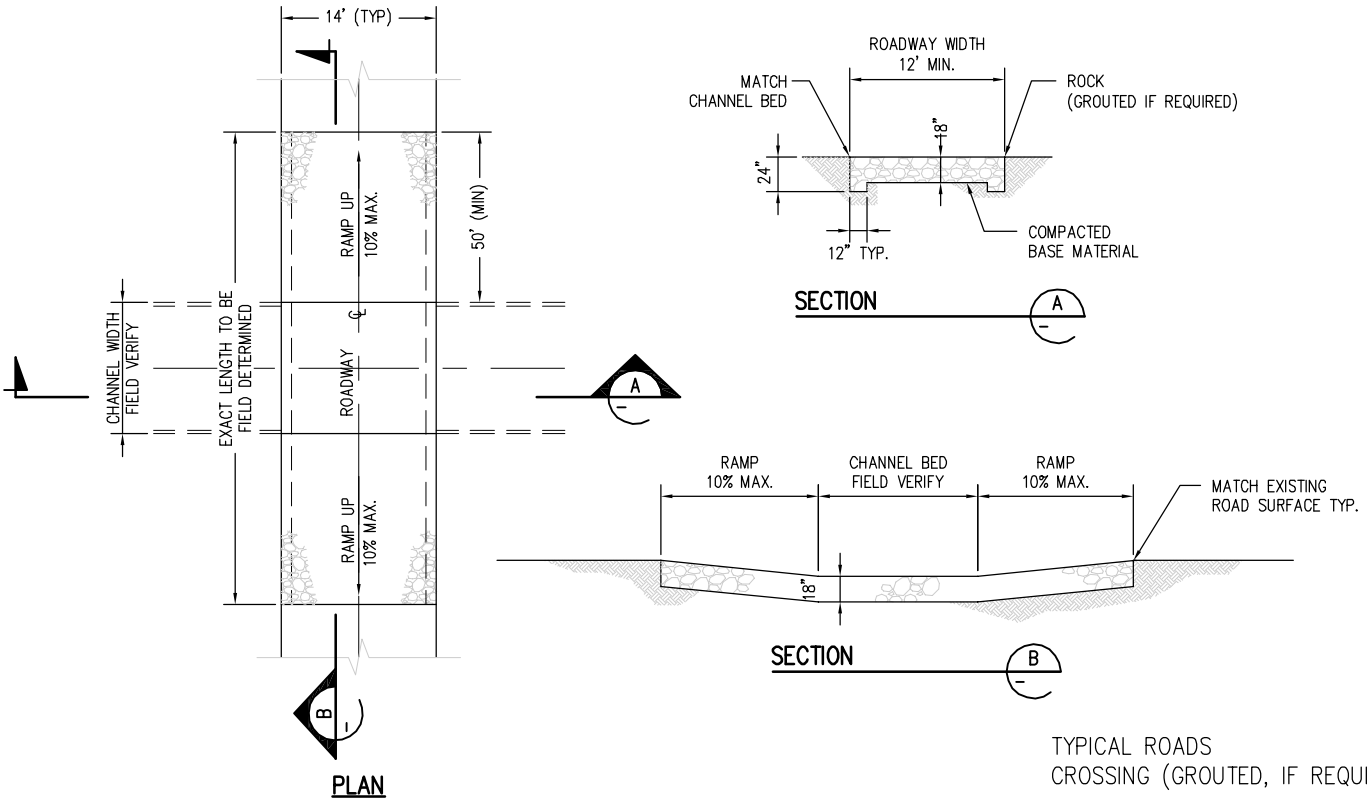
- **Ford:** Crossing of a channel that includes grading and stabilization. Stream banks and approaches will be graded and stabilized with rock or other erosion control devices to allow vehicle passage. Coarse rock would be installed in the streambed in a manner such that it would not raise the level of the streambed, allowing continued movement of water, fish and debris. This typically would be used on intermittent, larger ephemeral streams, or smaller perennial streams that would be expected to remain passable during a typical runoff season (e.g., estimated average peak stream flow in the magnitude of 100 cubic-feet per second or less and considering water velocity and depth).

- **Culvert:** Crossing of a water body that includes installation of a culvert and a stable road surface established over the culvert for vehicle passage. Construction will occur during periods of low water. Culverts must be a minimum 18-inch diameter and able to pass a 10-year flow event. They typically would be partially buried in the streambed to maintain streambed material in the culvert. Non-erosive material would be placed around culverts to prevent scour or water flow outside the culvert. Stream banks and approaches also might be stabilized with rock or other erosion control devices. Culvert crossings could be used to limit impacts from in-stream erosion due to traffic within intermittent and smaller perennial streams. Ground disturbing activities will comply with agency approved BMPs where practicable.

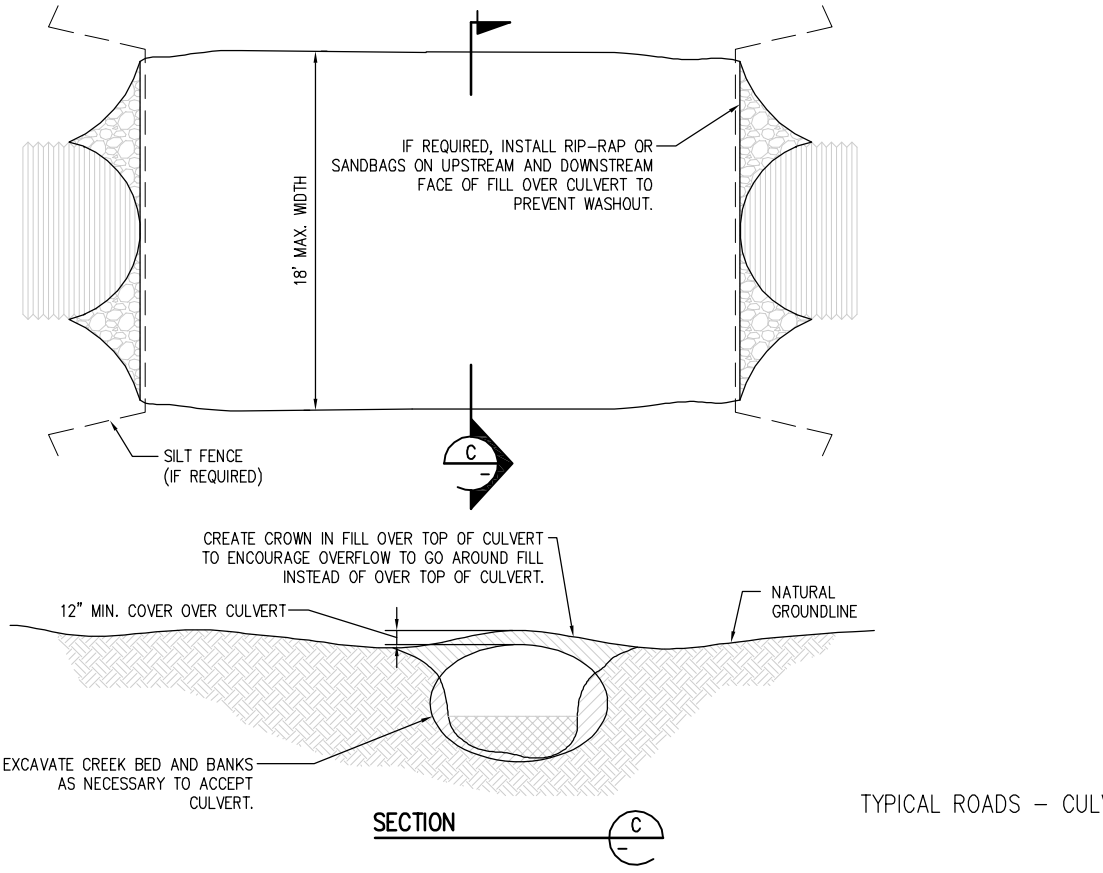
During final design, consultation would be conducted with the land managing agency regarding relevant standards and guidelines for water body road crossing methods. Wherever needed, culverts, low water crossings and other agency approved designs would be used to accommodate estimated peak flows of waterways (e.g., 10-year or 50-year flow event) according to the relevant land managing agency requirements. Each water body crossing would be designed and reviewed as advanced engineering is completed. Construction disturbances of banks and beds of water bodies would be minimized during this design process. Performance of low water stream crossings (i.e., drive through and ford) and culvert installations would be monitored for the life of the access road, and maintained as necessary.

For 303(d) listed streams with sediment as the primary contaminant of concern, additional erosion and sediment control methods will be used if flow is present during installation of in-stream structures and other BMPs are not effective. Additional BMPs contained in agencies' land management guidance (BLM Field

Office and forest-specific) would apply to further minimize impacts, such as avoidance zones from waterways and specific requirements for access road crossing design.



TYPICAL ROADS
CROSSING (GROUTED, IF REQUIRED)



TYPICAL ROADS – CULVERT

POWER ENGINEERS
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TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE W1

TYPICAL ROAD DESIGNS FOR
LOW WATER & CULVERT CROSSINGS

W4.3 Wetland Crossings

During construction and for routine and emergency operations, access roads across wetlands to structure locations may be necessary. A combination of methods for road access across wetlands is proposed:

- Construction of permanent above grade roads that will be utilized during construction, operation and maintenance. This will typically entail placement of permanent fill in wetlands such that the travel surface would be higher in elevation than the OHWM. The construction of above grade access roads allows for the use of the types of equipment needed for construction, operation, maintenance and for expedited access for emergency restoration throughout the year.

- Construction or use of temporary roads during construction, followed by restoration of the disturbance after construction. TransWest only proposes this approach in areas where there may be extensive wetlands. Smaller wetland and riparian area crossings would be constructed using permanent crossing methods because it would not be feasible to provide for temporary crossing materials for scattered crossings along 750 miles of Project. Where temporary roads will be used, construction equipment may travel overland if the area is dry. If construction occurs when the ground is solidly frozen, ice roads could be used.

If construction must occur when the ground is wet, temporary matting materials will be installed to allow for heavy vehicles and equipment. The mats typically come in the form of heavy timbers bolted together. They are often used over a geotextile that is applied directly over the wet soil surface. When construction use is complete, the mats are removed and the geotextile taken up. This approach will be used where feasible since it further reduces vegetation damage and compaction and reduces the time for full restoration.

Where temporary road access is utilized, road areas will be rehabilitated after construction. Any geotextiles and matting used will be removed and wetland vegetation allowed to re-grow. No permanent roads will be available for routine inspections or repairs. Operational inspections and repairs will be scheduled for times when the ground is dry or frozen and access will be overland along the road alignment by all-terrain vehicle (ATV). Emergency repairs requiring heavy equipment will access the damaged area using matting if necessary. After emergency repairs are completed, matting will be removed and the wetland areas will be allowed to restore naturally.

W5.0 REFERENCES

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APPENDIX X
FRAMEWORK WILDLIFE AND PLANT CONSERVATION MEASURES PLAN

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ACRONYMS

Applicant	TransWest Express LLC, also TransWest
BA	Biological Assessment
BE	Biological Evaluation
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	Biological Opinion
CO-E	Colorado Endangered Species
CO-SE	Colorado – State Endangered
CO-ST	Colorado State Threatened
CSU	Controlled Surface Use
CWA	Clean Water Act
FEIS	Final Environmental Impact Statement
EMM	Environmental Mitigation Measure
ESA	Endangered Species Act of 1973
FC	Federal Candidate
FE	Federally Endangered
FEIS	Final Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act of 1976
FT	Federally Threatened
HMA	Herd Management Area
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act of 1969
NMFS	National Marine Fisheries Service
NSU	No Surface Use
NTP	Notice to Proceed
NV-CE	Nevada Critically Endangered
NV-CY	Nevada Protected Cactus/Yucca
NV-P	Nevada - Protected
NV-PCE	Nevada Proposed Critically Endangered
PAC	Protected Activity Center
Plan	Wildlife and Plant Conservation Measures Plan
POD	Plan of Development
Project	TransWest Express Transmission Project, also TWE Project
Reclamation	Bureau of Reclamation
ROD	Record of Decision
ROW	right-of-way
SUA	Special Use Authorization
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project
U.S.C.	United States Code
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
UT-CAS	Utah Conservation Agreement Species
UT-SC	Utah Special Concern
UT-SS	Utah Special Status Species
Western	Western Area Power Authority
WWEC	West-wide Energy Corridor

X1.0 INTRODUCTION

This document presents the framework Wildlife and Plant Conservation Measures Plan (Plan) to be undertaken by TransWest Express LLC (TransWest or Applicant) and its Construction Contractor(s) for the avoidance and minimization of impacts to special-status wildlife and plant species as related to construction activities for the TransWest Express Transmission Project (TWE Project or Project). The Plan summarizes the avoidance and minimization measures implemented during siting and routing of the TWE Project and outlines Environmental Mitigation Measures (EMM) to be implemented to protect state- or federally-listed species, Bureau of Land Management (BLM) sensitive species, or United Stated Forest Service (USFS) special-status species or their habitats that are identified within, or adjacent to, the TWE Project right-of-way (ROW).

X1.1 Plan Purpose

The purpose of the Plan is to describe and recommend management actions that will meet regulatory requirements for ROW clearing, habitat disturbance, and impacts to special-status wildlife and plant species. This document provides a framework for the final Plan to be developed prior to initiation of construction.

The objectives of the Plan are to recognize the substantial effort already invested by TransWest in avoiding and minimizing impacts and to present a comprehensive plan that does the following:

- Meets the intent of the current BLM and USFS management guidance for federal lands;
- Ensures compliance with the Endangered Species Act (ESA) and other state and federal protections for special-status species;
- Applies protection measures from a practical perspective based on differences in land ownership and management patterns of the Project; and
- Balances cost, practicality and feasibility of Project implementation with avoiding or minimizing environmental impacts.

X1.2 Plan Updates

This Plan will be updated for the Notice to Proceed (NTP) POD based on final BMPs and Mitigation Measures identified in the ROD, final engineering and design, and the results of the pre-construction field surveys. The Construction Contractor(s) will be responsible for implementing the final Wildlife and Plant Conservation Measures Plan.

X1.3 Agency-Specific Requirements

Federal and state agency regulations concerning special status wildlife and plant species are presented in the following sections.

X1.3.1 All Lands

Relevant regulations applicable to all lands include:

- ESA, as amended Section 7(a)(2)
- Fish and Wildlife Conservation Act (16 United States Code [U.S.C.] §§2901 – 2912)

- Bald and Golden Eagle Protection Act (16 U.S.C. §668 et seq.)

X1.3.2 Bureau of Land Management

Relevant regulations applicable to BLM lands include:

- National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. §4321)
- Federal Land Policy and Management Act (FLPMA) 43 U.S.C. §1701
- BLM Field Office Resource Management Plans
- Wild Free-Roaming Horses and Burro Act (Public Law 92-195)

X1.3.3 United States Forest Service

Relevant regulations applicable to USFS lands include:

- FLPMA
- Special Use Authorization (SUA) under the National Forest Management Act (16 U.S.C. §§1601-1614)
- USFS Land and Resource Management Plans
- Forest Service Manual 2670.22, 2670.32

X1.3.4 Bureau of Reclamation

Relevant regulations applicable to Bureau of Reclamation (Reclamation) lands include:

- FLPMA
- Right of Use Authorization

X1.3.5 States

Relevant requirements applicable to operations within each affected state include:

- Wyoming Statutes 23-3-102, 23-3-103
- Colorado Revised Statutes 33-1-101
- Utah Code 23-15-6, 23-15-7, and 23-20-3
- Nevada Administrative Code 503-015-104 and Nevada Revised Statutes 503.584-589 and 503.610

X2.0 SPECIAL STATUS SPECIES PROTECTION MEASURES

The special status species protection measures presented in this section will be finalized based on mitigation measures identified in the BA/BO as adopted in the ROD. Updated mitigation measures will be included in the NTP POD version of this Plan. Sections X3.2 and X3.3 provide a description

of what may be required in future versions of this Plan. All actions described below are subject to change in future versions of this Plan. For a list of mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

Pre-construction surveys for certain species will be conducted prior to initiation of construction (See Section X3.2). During these surveys, habitat and/or locations of these species will be identified. Appropriate buffers or restricted areas, identified through current BLM and USFS management plans, state and federal documents, and additional agency consultation, will be applied based on these surveyed locations.

Portions of the TWE Project are located within identified habitats or in proximity to biological resources that may be constrained from construction during certain times of the year (seasonal) or while a resource is present. The FEIS identifies timing and spatial use restrictions for the states of Wyoming, Colorado, Utah and BLM field office jurisdiction crossed by the TWE Project. No Surface Use (NSU) areas are areas where surface use or permanent structures are not allowed. Controlled Surface Use (CSU) restrictions involve areas where use is permitted under certain constraints such as construction methods or survey requirements. Timing limitations restrict use during key time periods essential to a resource. These restrictions may include a buffer to define the restricted area around a resource. It is important to note that there are additional timing and spatial restrictions related to nesting birds. These measures are discussed in the Avian Protection Plan (Appendix B).

Table X1 provides the species-specific timing limitations and buffers identified in the FEIS from current BLM Resource Management Plans (RMPs), as applicable to the Agency Preferred Alternative. Restrictions identified in the FEIS but not encountered by the Agency Preferred Alternative are not included in this Plan. Restrictions identified by BLM are to be applied on lands which fall under its jurisdiction. For a list of additional BLM stipulations that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative.

The restrictions presented below are not to be considered complete at this time.

TABLE X1 BLM FIELD OFFICE WILDLIFE AND BOTANICAL STIPULATIONS ALONG AGENCY PREFERRED ALTERNATIVE

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
RAWLINS FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
Wildlife-Raptors	Bald eagle	Roosts	No ground disturbing activities will be permitted within 0.5 miles of active bald eagle communal winter roost sites year-round. This buffer zone restriction may be adjusted based on site-specific information through coordination with (including written concurrence) the Service, Wyoming Field Office.	NSU	--	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	Year round, well locations, roads, ancillary facilities, and other surface structures requiring a repeated human presence will not be allowed within 1,200 feet of active ferruginous hawks nests. Distance may vary depending on factors such as nest activity, natural topographic barriers, and line-of-sight distances.	NSU, CSU	--	1,200 feet
Wildlife-Raptors	Bald eagle	Nests	Surface disturbing and disruptive activities potentially disruptive to nesting raptors are prohibited within a 1-mile buffer (no seasonal buffer).	NSU	--	1 mile
Wildlife-SSS	Western boreal toad	Known habitat	Any action that would result in stream channel instability, erosion, and sedimentation within known Western boreal toad habitat will be avoided.	CSU	--	No buffer
Vegetation-SSS	Ute ladies'-tresses	0.25 miles from any known orchid habitat	All proposed rights-of-way projects (powerlines, pipelines, roads, etc.) will be designed and locations selected at least 0.25 miles from any known orchid habitat to minimize disturbances. If avoidance of adverse effects is not possible, the Bureau will re-initiate consultation with the Service.	CSU	--	0.25 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	Bald eagle	Nests	Well locations, roads, and ancillary facilities, and other surface structures requiring a repeated human presence, will not be allowed within 1/2 mile of active bald eagle nests. The distance may vary depending on factors such as nest activity, nest topographic barriers, and line-of-sight distance. Surface disturbing and other identified activities, as well as habitat alterations, that may disturb bald eagles will be restricted within suitable habitats that occur within the following bald eagle buffer zones: Zone 1: This area is intended to protect active and alternative nests located within ½ mile of the proposed surface disturbing activity. Between February 1 and August 15, minimal human activity levels will be allowed during the period of first occupancy to two weeks after fledging in this area. Zone 2: This area is intended to protect bald eagle primary use areas located within ½-1 mile of the proposed surface disturbing activity. Light human activity levels will be allowed in this area. Zone 3: This area is designated to protect foraging/concentration areas year-round and would include one of two larger areas, depending on habitat types: a) 2.5 miles extending in all directions from the nest or b) ½ mile from the stream-bank of all streams within 2.5 miles of the nest. Site-specific habitat types and foraging areas will be evaluated to determine which Zone 3 buffer applies. Zone delineation depends on habitat types. No ground disturbing activities will be permitted within 1 mile of active roost sites year round. Other activities that may disturb bald eagles within 1 mile of known communal winter roosts will be restricted during the period of November 1 through April 1.	CSU	--	825 feet
Wildlife-Raptors	Raptors, all	Nests	Year-round, well locations, roads, ancillary facilities, and other surface structures requiring a repeated human presence will not be allowed within 825 feet of active raptor nests (ferruginous hawks, 1,200 feet). Distance may vary depending on factors such as nest activity, species, natural topographic barriers, and line-of-sight distances.	CSU	--	825 feet
Wildlife-SSS	Sage grouse	Leks	High-profile structures (overhead power lines) will be authorized on a case by-case basis from one-quarter mile to 1 mile of an occupied greater sage-grouse and sharp-tailed _grouse lek.	CSU	--	0.25 mile to 1 mile
Wildlife-SSS	Sage grouse	Leks	"Controlled surface use" stipulation will be applied to a one-half mile radius of active sage-grouse strutting grounds, including no aboveground facilities (power lines. storage tanks, fences, etc.).	CSU	--	0.5 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
RAWLINS FIELD OFFICE TIMING RESTRICTIONS						
Wildlife-Raptors	All unspecified	Nests	Seasonal buffer of February 1–July 15.	TL	2/1 to 7/15	0.5 to 1.0 mile
Wildlife-Raptors	All unspecified	Nests	To protect important raptor nesting habitat, activities or surface use will not be allowed from February 1 to July 31. Areas encompassed by the authorization (½ or 1 mile of raptor nests) may be shortened, depending on nesting chronology of individual species, nest site location, and topography).	TL	2/1 to 7/31	0.5 to 1 mile
Wildlife-Raptors	All unspecified	Winter concentration areas	Activities or surface use will not be allowed from November 15 to April 30.	TL	11/15 to 4/30	No buffer
Wildlife-Raptors	Barn owl	Nests	Seasonal buffer of February 1–July 15.	TL	2/1 to 7/15	0.75 mile
Wildlife-Raptors	Burrowing owl	Nests	Seasonal buffer April 15–September 15.	TL	4/15 to 9/15	0.75 mile
Wildlife-Raptors	Cooper's hawk	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Ferruginous hawk	Nests	Seasonal buffer of March 1–July 31.	TL	3/1 to 7/31	1.0 mile
Wildlife-Raptors	Golden eagle	Nests	Seasonal buffer of February 1–July 15.	TL	2/1 to 7/15	1.0 mile
Wildlife-Raptors	Great horned owl	Nests	Seasonal buffer of February 1–July 15.	TL	2/1 to 7/15	0.75 mile
Wildlife-Raptors	Kestrel	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Long-eared owl	Nests	Seasonal buffer of March 1–July 31.	TL	3/1 to 7/31	0.75 mile
Wildlife-Raptors	Merlin	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Northern goshawk	Nests	Seasonal nest buffer of April 1–August 31.	TL	4/1 to 8/31	0.75 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	Northern harrier	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Osprey	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Peregrine falcon	Nests	Seasonal buffer of March 1–July 31.	TL	3/1 to 7/31	0.75 mile
Wildlife-Raptors	Prairie falcon	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Red-tailed hawk	Nests	Seasonal buffer of February 1–July 15.	TL	2/1 to 7/15	0.75 mile
Wildlife-Raptors	Screech owl	Nests	Seasonal buffer of March 1–July 31.	TL	3/1 to 7/31	0.75 mile
Wildlife-Raptors	Sharp-shinned hawk	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Short-eared owl	Nests	Seasonal buffer of March 1–July 31.	TL	3/1 to 7/31	0.75 mile
Wildlife-Raptors	Swainson's hawk	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Swainson's hawk	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-SSS	Sage grouse	Leks, nesting and early brood rearing habitat	Nesting/early brood-rearing habitat: Avoid surface disturbing and disruptive activities, geophysical surveys, and organized recreational activities (events) that require a special use permit in suitable greater sage-grouse and sharp-tailed grouse nesting and early brood rearing habitat within 2 miles of the perimeter of an occupied greater sage-grouse lek, and within 1 mile of the perimeter of a sharp-tailed grouse lek, or in identified greater sage-grouse and sharp-tailed grouse nesting and early brood rearing habitat, from March 1 to July 15. Avoidance of surface disturbance or other disruptive activity from March 1 through July 15 within 2 miles from an "active" lek or in suitable greater sage-grouse nesting and early brood rearing habitat.	TL	3/1 to 7/15	1 mile sharp-tailed, 2 miles greater sage grouse
Wildlife-SSS	Sage grouse	Nesting habitat	To protect important sage and sharp-tailed grouse nesting habitat, activities or surface use will not be allowed from February 1 to July 31 within certain	TL	2/1 to 7/31	None specified

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			areas encompassed by the authorization.			
Wildlife-SSS	Sage grouse	Winter concentration areas	Surface disturbing and disruptive activities potentially disruptive to delineated greater sage-grouse and sharp-tailed grouse winter concentration areas are prohibited during the period of November 15 to March 14 for the protection of greater sage-grouse and sharp-tailed grouse winter concentration areas.	TL	11/5 to 3/14	No buffer
Wildlife-SSS	Yellow-billed cuckoo	Identified habitat	Surface disturbing or other disruptive activities will be prohibited within 1/2-mile of identified habitat during the period April 15 to August 15 for the protection of nesting Western yellow-billed cuckoos.	TL	4/15 to 8/15	0.5 mile
LITTLE SNAKE FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
Vegetation-SSS	All	Occupied habitat	There will be CSU stipulations on habitat areas containing special status species, such as federally listed, proposed, and candidate species.	CSU	--	No buffer
Vegetation-SSS	Utes ladies'-tresses	Known habitat	All proposed ROW projects (powerlines, pipelines, roads, etc.) will be designed and locations selected at least 0.25 miles from any known Ute ladies'-tresses orchid habitat to minimize disturbances. If avoidance of adverse effects is not possible, the Bureau will re-initiate consultation with the Service.	CSU	--	0.25 mile
Wildlife-Aquatic Species-SSS	Colorado River fishes	Critical or occupied habitat	Require NSO stipulations within critical or occupied habitat of Colorado pikeminnow (Ptychocheiluslucius), razorback sucker (Xyrauchentexanus), humpback chub (Gila cypha), and bonytail (Gila elegans).	NSU	--	No buffer
Wildlife-Raptors	All except bald eagle and peregrine falcon	Nests	0.25 miles from nest sites raptors (golden eagle, osprey, all accipiters, falcons [except the kestrel], buteos, and owls, and not including special status species raptors Bald Eagle and Peregrine Falcon).	NSU	--	0.25 mile
Wildlife-Raptors	Bald eagle	Nests, abandoned	NSO within 100 meter radius of abandoned nests (unoccupied for 5 consecutive years, but with all or part of the nest remaining).	NSU	--	328 feet
Wildlife-Raptors	Bald eagle	Nests, occupied and unoccupied	Year-round NSO will be applied within a 0.25 mile radius of roost sites and both occupied and unoccupied nests. The definition of an “occupied nest” (from the Northern States Bald Eagle Recovery Plan 1983, page D4) includes (a) young were observed, (b) eggs were laid (eggs or eggshell fragments observed), (c) one adult was observed in incubating (“sitting low”) posture on the nest during the incubation period, (d) two adults were observed at an empty nest or within the breeding area, or (e) one adult eagle and one eagle in immature plumage were observed at or near a nest, especially if mating or reproductive behavior (display flights, copulation,	NSU	--	0.25 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			nest repair, etc.) was observed.			
Wildlife-Raptors	Bald eagle	Roosts	New roads and bridges on BLM lands should be located at least 1/2 mile from critical night roosts.	CSU	--	0.5 mile
Wildlife-Raptors	Peregrine Falcon	Cliff nesting complexes	NSO will be allowed within a 0.25 mile radius of cliff nesting complexes. NSO areas may be altered depending upon the active status of the nesting complex or upon the geographical relationship of topographical barriers and vegetation screening.	NSU	--	0.25 mile
Wildlife-SSS	All	T&E and candidate species habitat	There will be CSU stipulations on habitat areas containing special status species, such as federally listed, proposed, and candidate species.	CSU	--	No buffer
Wildlife-SSS	Black-footed ferret	Black-footed ferret reintroduction areas	Active white-tailed prairie dog colonies will continue to be avoidance areas for surface disturbing activities within the black-footed ferret reintroduction area.	CSU	--	No buffer
Wildlife-SSS	Black-footed ferret	Occupied habitat	Occupied black-footed ferret habitat is designated as a ROW avoidance area. ROWs on public land with the potential to disturb occupied black-footed ferret habitat will be rerouted to avoid those prairie dog towns.	CSU	--	No buffer
Wildlife-SSS	Black-footed ferret	Prairie dog towns	ROWs on public land with the potential to disturb occupied black-footed ferret habitat will be rerouted to avoid those prairie dog towns.	CSU	--	No buffer
Wildlife-SSS	Mountain plover	Plover nest site	Establish 0.125 mile NSO stipulations around all plover nest sites. The boundaries of the stipulated area may be modified if the authorized officer determines that surface occupancy will not harm the integrity of the nest or nest location.	NSU	--	0.125 mile
Wildlife-SSS	Prairie dog, white-tailed	Colonies	Surface disturbing activities occurring over more than 1 acre will not be permitted in active prairie dog towns less than 10 acres in size. These activities will be relocated to the edge of the active prairie dog town.	NSU	--	No buffer
Wildlife-SSS	Sage grouse, greater	Leks	To reduce potential impacts on greater sage-grouse lek integrity, NSO will be applied within a 0.6 mile radius of a lek site. The NSO area may be altered depending upon the active status of the lek, habitat characteristics, or the geographical relationship of topographical barriers and vegetation screening to the lek site.	NSU	--	0.6 mile
Wildlife-SSS	Yellow-billed cuckoo	Suitable habitat	Prohibit permanent surface disturbing activities within 0.25 mile of any suitable yellow-billed cuckoo habitat. Exceptions should be evaluated on a case-by-case basis to avoid adverse impact.	NSU	--	0.25 mile
Wildlife-	Waterfowl	Waterfowl habitat management	NSO will be allowed on significant production areas, such as waterfowl habitat management areas and rookeries. NSO areas may be altered	NSU	--	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Waterfowl		areas and rookeries	depending upon the active status of the production areas or upon the geographical relationship of topographical barriers and vegetation screening.			
LITTLE SNAKE FIELD OFFICE TIMING RESTRICTIONS						
Wildlife-Big Game	All	Winter habitat, crucial	Crucial winter habitat will be closed to surface disturbing activities from December 1 to April 30, with the intent that this stipulation will be applied after the big game hunting season.	TL	12/1 to 4/30	No buffer
Wildlife-Big Game	Elk	Parturition areas	Elk calving areas will be closed to surface disturbing activities from April 16 to June 30.	TL	4/16 to 6/30	No buffer
Wildlife-Big Game	Pronghorn	Parturition areas	Pronghorn antelope fawning areas will be closed to surface disturbing activities from May 1 to July 15.	TL	5/1 to 7/15	No buffer
Wildlife-Fish	Colorado River fishes	Critical or occupied habitat	No work in the active river channel will take place between July 1 and September 30 to prevent adverse effects from sedimentation during spawning; also, no work will take place when larval fishes are drifting in the river channel. Other than pipelines, controlled surface uses crossing any critical or occupied habitat of the Colorado River fishes will require separate Section 7 consultation.	TL	7/1 to 9/30	No buffer
Wildlife-Raptors	Bald eagle	Critical night roosts	Human activity within 0.5 miles of bald eagle critical night roosts on BLM land should be restricted from November 15 to March 15. Buffers can be reduced to 0.25 miles for night roosts if the activity is visually screened by vegetation or topography. Development may be permitted at other periods. If periodic visits, such as those that occur with oil well maintenance work, are required within the buffer zone after development, such activity should be restricted to between the hours of 10 a.m. and 2 p.m. during the period November 15 to March 15.	TL	11/15 to 3/15	0.5 mile
Wildlife-Raptors	Bald eagle	Critical night roosts	If BLM chooses to construct a road or bridge within 1/2 mile of critical night roosts, then the road must be closed to all use from November 15 to March 15. If topography or vegetation provides a visual screen, the buffer can be reduced to 1/4 mile, but the seasonal closure would still be required.	TL	11/15 to 3/15	No buffer
Wildlife-Raptors	Bald eagle	Nests, occupied	No human activity or surface disturbance will be allowed within a 0.5 mile radius of occupied nests from November 15 through July 31.	TL	11/15 to 7/31	0.5 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	Bald eagle	Winter hunting perches	Human activity within 0.25 miles of known bald eagle winter hunting perches should be restricted from November 15 to March 15. Buffers can be reduced to 0.125 miles for hunting perches if the activity is visually screened by vegetation or topography. Development may be permitted at other periods. If periodic visits, such as those that occur with oil well maintenance work, are required within the buffer zone after development, such activity should be restricted to between the hours of 10 a.m. and 2 p.m. during the period November 15 to March 15.	TL	11/15 to 3/15	0.25 mile
Wildlife-Raptors	Ferruginous hawk	Nesting and fledgling habitat	From February 1 to August 15, a 1 mile buffer around nesting and fledgling habitat will be closed to surface disturbing activities to avoid nest abandonment.	TL	2/1 to 8/15	1 mile
Wildlife-Raptors	Osprey	Nesting and fledgling habitat	Osprey nesting and fledgling habitat will be closed to surface disturbing activities from April 1 to August 31. This closure will apply to a 0.5 mile buffer zone around the habitat to avoid nest abandonment.	TL	4/ tp 8/15	0.5 mile
Wildlife-Raptors	Peregrine falcon	Nesting complex	Peregrine falcon cliff nesting complexes will be closed to surface disturbing activities from March 16 to July 31 within a 0.5 mile buffer area around the nesting complex to prevent abandonment and desertion of established territories. However, during years when a nest is unoccupied, or unoccupied by or after May 15, the seasonal stipulation may be excepted. The stipulations may also be excepted once the young have fledged and dispersed from the nest.	TL	3/16 to 7/31	0.5 mile
Wildlife-Raptors	Raptors (golden eagle, osprey, all accipiters, falcons [except the kestrel], buteos, and owls)	Nests	Raptor nesting and fledgling habitat will be closed to surface disturbing activities from February 1 to August 15 within a 0.25 mile buffer zone around the nest site. However, during years when a nest site is unoccupied, or unoccupied by or after May 15, these seasonal limitations may be excepted; they may also be excepted once the young have fledged and dispersed from the nest.	TL	5/1 to 8/15	0.25 mile
Wildlife-SSS	Greater sage-grouse	Leks	To prevent disturbing up to 75 percent of nesting birds, between March 1 and June 30, greater sage-grouse nesting and early brood-rearing habitat (Map 5) will be stipulated as CSU for oil and gas operations and avoidance areas for other surface disturbing activities within a 4 mile radius of the perimeter of a lek. All surface disturbing activities will avoid only nesting and early brood-rearing habitat within the 4 mile radius of the lek during this time period. Exceptions, modification, or waivers will be granted according to criteria established in Appendix B. The actual area to be avoided will be determined on a case-by-case basis, depending on applicable scientific research and site-specific analysis and in coordination with commodity	TL	3/1 to 6/30	4 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			users and other appropriate entities.			
Wildlife-SSS	Greater sage-grouse	Winter habitat, crucial	Crucial winter habitat will be closed from December 16 to March 15. In addition, exceptions would be granted according to criteria established in Appendix B.	TL	12/16 to 3/15	No buffer
Wildlife-SSS	Mexican spotted owl	PACs	Activities in PACs that are not surface disturbing will avoid the Mexican spotted owl breeding season, which runs from March 1 through August 31.	TL, CSU	3/1 to 831	No buffer
Wildlife-SSS	Mountain plover	Nest sites	Prohibit surface occupancy and use from April 1 to July 15 within 0.25 mile of all plover nest sites.	TL	4/1 to 7/15	0.25 mile
Wildlife-SSS	Prairie dog, white-tailed	Prairie dog towns	To protect prairie dog pups, surface disturbing activities will not be permitted in prairie dog towns between April 1 and June 15.	TL	4/1 to 6/15	No buffer
Wildlife-SSS	Yellow-billed cuckoo	Suitable habitat	Construction of roads, pipelines, and powerlines through riparian habitat should be placed near the edge of the current YBC habitat. This construction should not occur from June 1 through August 1. Roads, new trails, and rights of way (ROW) should be combined where possible, and stream crossings should be at right angles to YBC habitat to minimize impacts.	TL	6/1 to 8/1	No buffer
WHITE RIVER FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
Vegetation-SSS	All	BLM sensitive plants and RVAs	No surface occupancy will be allowed within known populations of BLM sensitive plants and remnant vegetation associations (RVAs). Motorized travel within known locations of sensitive plants and high priority RVAs that are located outside ACECs is limited to designated roads and trails.	NSU, CSU	--	No buffer
Vegetation-SSS	All	Federally listed species known and potential habitat	No Surface Occupancy (NSO) stipulation will be placed on known and potential habitat of federally listed and candidate T/E plants. New T/E plant habitat mapped as a result of future surveys will also be protected by a NSO stipulation. This stipulation will apply to all surface disturbing activities within these areas. All known and potential T/E habitat, including ACECs, will be exclusion areas for new Rights-of-Way authorizations. Land use authorizations will be denied in exclusion areas, with the exception of short-term land use permits involving no development, and projects that are consistent with management objectives for the area.	NSU	--	No buffer
Wildlife-Raptors	Bald eagle	Nests	Surface Occupancy is not allowed within 0.25 mile of Bald Eagle nests. Prior to authorizing surface disturbance within Nest, Roost, and Perch habitat, and pending conferral consultation with the USFWS as required by the Endangered Species Act, the Area Manager may require the proponent/applicant to submit a plan of development that would	NSU, CSU	--	0.25 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			demonstrate that: 1) involvement of cottonwood stands or cottonwood regeneration areas have been avoided to the extent practicable; 2) special reclamation measures or design features are incorporated that would accelerate recovery and/or reestablishment of affected cottonwood communities: 3) the pre-development potential of affected floodplains to develop or support riverine cottonwood communities has not been diminished: and 4) the current/future utility of such cottonwood substrate for bald eagle use would not be impaired.			
Wildlife-Raptors	Bald eagle	Roosts	Surface Occupancy is not allowed within 0.25 mile of Bald Eagle Roost/Concentration Areas. Prior to authorizing surface disturbance within Nest, Roost, and Perch habitat, and pending conferral consultation with the USFWS as required by the Endangered Species Act, the Area Manager may require the proponent/applicant to submit a plan of development that would demonstrate that: 1) involvement of cottonwood stands or cottonwood regeneration areas have been avoided to the extent practicable; 2) special reclamation measures or design features are incorporated that would accelerate recovery and/or reestablishment of affected cottonwood communities: 3) the pre-development potential of affected floodplains to develop or support riverine cottonwood communities has not been diminished: and 4) the current/future utility of such cottonwood substrate for bald eagle use would not be impaired.	NSU, CSU	--	0.25 mile
Wildlife-Raptors	Raptors, non-SSS	Nests	Disruptive surface occupation or adverse habitat modification will be prohibited within l/8 mile of non-listed members (i.e. not listed, proposed, candidate, and BLM sensitive) of the raptor group.	NSU	--	0.125 mile
Wildlife-Raptors	Raptors, SSS (listed, proposed, candidate, and BLM sensitive)	Nests	Disruptive surface occupation or adverse habitat modification will be prohibited within l/4 mile of functional nest sites of special status species (i.e. listed, proposed, candidate, and BLM sensitive).	NSU	--	0.25 mile
Wildlife-SSS	Sage grouse	Leks	This area encompasses sage grouse leks. Surface Occupancy is not allowed within l/4 mile of identified lek sites.	NSU	--	0.25 mile
Wildlife-Aquatic Species	Colorado cutthroat trout	Aquatic trout habitat (habitats occupied by populations of Colorado River cutthroat trout)	Prior to authorizing surface disturbance of occupied stream reaches or within watersheds contributing to occupied habitats, the Area Manager may require the proponent/applicant to submit a plan of development that would demonstrate that the proposed action would not: 1) increase stream gradient: 2) result in a net increase in sediment contribution; 3) decrease stream channel sinuosity: 4) increase the channel width to depth ratio; 5) increase water temperature; 6) decrease vegetation derived stream shading; and 7) degrade existing water quality parameters, including	CSU	--	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			specific conductance, turbidity, organic/inorganic contaminant levels, and dissolved oxygen in occupied reaches or contributing perennial or intermittent tributaries. If approvals are granted and development results in these standards being exceeded, additional measures would be required to correct the deficiencies.			
Wildlife-Avian	Avian	Nest sites of all special status and tree-nesting species	Permitted land use activities within l/4 mile of functional nest sites of cavity, cliff, and ground-nesting species, and within l/2 mile of functional nest sites of special status and tree-nesting species, will be subject to relocation or design modifications to preclude, or reduce to acceptable levels, long-term reduction or deterioration.	CSU	--	No buffer
Wildlife-SSS	Black-footed ferret	Potential habitat for wild or reintroduced populations	Lands within this lease parcel involve prairie dog ecosystems that constitute potential habitat for wild or reintroduced populations of the federally endangered black footed ferret. Conservation and recovery efforts for the black-footed ferret are authorized by the Endangered Species Act of 1973 (as amended). The successful lessee may be required to perform special conservation measures prior to and during lease development. These measures may include one or more of the following: 1. Performing site-specific habitat analysis and/or participating in ferret surveys. 2. Participating in the preparation of a surface use plan of operations with BLM, USFWS, and COW, which integrates and coordinates long term lease development with measures necessary to minimize adverse impacts to black-footed ferrets or their habitat. 3. Abiding by special daily and seasonal activity restrictions on construction, drilling, product transport, and service activities. 4. Incorporating special modifications to facility siting, design, construction, and operation. 5. Providing in-kind compensation for habitat loss and/or displacement (e.g. special on-site rehabilitation/revegetation measures or off-site habitat enhancement).	CSU	--	No buffer
Wildlife-SSS	Black-footed ferret	Black-footed ferret Reintroduction Area	Prior to authorizing activities in this area, the Area Manager will confer or consult with the USFWS as required by Section I of the Endangered Species Act. Depending on the scope of the proposed action, a plan of development may be required that demonstrates how the proposed activities would be conducted or conditioned to: 1) avoid the direct or indirect loss of black-footed ferrets: or 2) avoid affecting the capability of the site to achieve reestablishment objectives. The Area Manager may impose land use measures and limitations derived from a site specific ferret reintroduction and management plan. The measures and limitations would be designed to avoid, or reduce to acceptable levels, the short and long term adverse effects on ferret survival, behavior, reproductive activities, and/or the area's capacity to sustain ferret population objectives.	CSU	--	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-SSS	Sage grouse	Sage grouse habitat	Conversion or adverse modification of the following sage grouse habitats will be avoided: 1) sagebrush stands with ≤50 percent canopy and ≤30" in height, and ≤2 miles from a lek; 2) sagebrush stands with ≤30 percent canopy and ≤30" in height; >2 miles from a lek on occupied summer ranges; 3) any sagebrush stand on slopes ≤0 20 percent in defined winter concentration areas; and 4) sagebrush stands on slopes ≤20 percent showing evidence of winter use.	CSU	--	2 mile
WHITE RIVER FIELD OFFICE TIMING RESTRICTIONS						
Wildlife-Big Game	All	Winter range, severe	No development activity in big game severe winter range is allowed from December 1 through April 30. Exceptions apply.	TL	12/1 to 4/30	No buffer
Wildlife-Big Game	Mule deer, elk	Summer range	This stipulation will not take effect until direct and indirect impacts to suitable summer range habitats exceed 10% of that available within the individual Game Management Units. When this threshold has been reached, no further development activity will be allowed from May 15 through August 15. Exceptions apply.	TL	5/15 to 8/15	No buffer
Wildlife-Raptors	All listed, candidate T/E &/ BLM sensitive species except bald eagle and ferruginous hawks)	Nests	No development activities are allowed within ½ mile of identified nest sites from February 1 through August 15, or until fledgling and dispersal of young. Exceptions apply.	TL	2/1 to 8/15	0.25 mile
Wildlife-Raptors	All raptors other than T/E and candidate T/E species	Nests	No development activities are allowed within ¼ mile of identified nests from February 1 through August 15, or until fledgling and dispersal of young. Exceptions apply.	TL	2/1 to 8/15	0.125 mile
Wildlife-Raptors	Bald eagle	Nests	No development is allowed within 1/2 mile of identified nests from December 15 through July 15, or until fledgling and dispersal of young.	TL	12/15 to 7/15	0.5 mile
Wildlife-Raptors	Bald eagle	Roosts, winter concentration areas	No development is allowed within ½ mile of identified sites from November 15 through April 15. Exceptions apply.	TL	11/15 to 4/15	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	No development is allowed within one (1) mile of identified nests from February 1 through August 15, or until fledgling and dispersal of young. Exceptions apply.	TL	2/1 to 8/15	1.0 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-SSS	Sage grouse	Leks	If direct and indirect impacts to suitable nesting cover exceeds 10 percent of the habitat available within 2 miles of identified leks, further development will not be allowed from April 15 through July 7. (Development can occur until 10 percent of the habitat associated with a lek is impacted, from then on, additional activity can occur from July 8 through April 14).	TL	4/15 to 7/7	2 miles
Wildlife-SSS	Sage grouse	Winter habitat	This area encompasses sagebrush habitats that are occupied by wintering concentrations of grouse, or represent the only habitats that remain available for use during periods of heavy snowpack. No development activity will be allowed between December 16 and March 15.	TL	12/16 to 3/15	No buffer
VERNAL FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
Vegetation-SSS	Ute ladies'-tresses	Occupied habitat	Within occupied habitat, project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants: a. Follow the above (#3) recommendations for project design within suitable habitats; b. Buffers of 300 feet minimum between right of way (roads and surface pipelines) or surface disturbance (well pads) and plants and populations will be incorporated; c. Surface pipelines will be laid such that a 300-foot buffer exists between the edge of the right of way and the plants, using stabilizing and anchoring techniques when the pipeline crosses habitat to ensure the pipelines don't move towards the population; f. Designs will avoid altering site hydrology and concentrating water flows or sediments into occupied habitat; g. Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat, with berms and catchment ditches to avoid or minimize the potential for materials to reach occupied or suitable habitat.	CSU	--	300 feet
Wildlife-Aquatic species-SSS	Bonytail, Colorado pikeminnow, humpback chub, and razorback sucker	Colorado, Green, Duchesne, Price, White, and San Rafael rivers.	Colorado Pikeminnow, Humpback Chub, and Razorback Sucker Conservation Measures: 3.b. Surface-disturbing activities [other than oil and gas activities] maybe restricted within 1/4 mile of the channel centerline of the Colorado, Green, Duchesne, Price, White, and San Rafael Rivers.	NSU	--	.025 miles of channel centerline
Wildlife-Big Game	Deer	Crucial deer winter range	Within crucial deer winter range, no more than 10% of such habitat will be subject to surface disturbance and remain un-reclaimed at any given time. (Exception: This stipulation may be excepted if either the resource values change or the lessee/operator demonstrates to BLMs satisfaction that impacts can be mitigated.)	CSU	--	No buffer
Wildlife-Big Game	Deer	Crucial deer winter range – recommendation	It is preferred that surface-disturbing actions within crucial deer winter range will be located in pinyon juniper rather than browse where both vegetation types occur.	CSU	--	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
		only				
Wildlife-Raptors	Raptors, all	Nests	Raptor management will be guided by the use of "Best Management Practices for Raptors and Their Associated Habitats in Utah" (Utah BLM, 2006, Appendix A), utilizing seasonal and spatial buffers, as well as mitigation, to maintain and enhance raptor nesting and foraging habitat, while allowing other resource uses. Spatial and temporal buffers applied to disturbances in the vicinity of nesting raptors will be tailored to the individual raptor species involved and based on factors such as line of sight distance between nest and disturbance, type and duration of disturbance, nest structure security, sensitivity of the species to disturbance, observed responses to related disturbances, and the amount of other disturbances already occurring in the vicinity. Land use activities which would have an adverse impact on an occupied raptor nest, would not be allowed within the spatial or seasonal buffer.	NSU	--	Refer to Raptor Guide
Wildlife-SSS	Prairie dog, white-tailed	White-tailed prairie dogs	No surface-disturbing activities within 660 feet of prairie dog colonies identified within prairie dog habitat. No permanent aboveground facilities are allowed within the 660-foot buffer. Exception: An exception may be granted by the AO if the applicant submits a plan that indicates that impacts of the proposed action can be adequately mitigated or, if due to the size of the town, there is no reasonable location to develop a lease and avoid colonies the AO will allow for loss of prairie dog colonies and/or habitat to satisfy terms and conditions of the lease. The AO may modify the boundaries of the stipulation area if portions of the area does not include prairie dog habitat or active colonies are found outside the current defined area, as determined by the BLM.	NSU	--	660 feet from colonies
Wildlife-SSS	Sage grouse	Leks	No surface-disturbing activities within 0.25 mile of active Sage-grouse leks will be allowed year round.	NSU	--	.025 mile
Wildlife-SSS	Sage grouse	Leks	No permanent facilities or structures will be allowed within 2 miles of active sage grouse leks when possible.	CSU	--	2 miles
Wildlife-SSS	Sage grouse	Leks	Within 0.5 mile of known active leks, the best available technology will be used to reduce noise, e.g., installation of multi-cylinder pumps, hospital sound-reducing mufflers, and placement of exhaust systems.	CSU	--	0.5 miles
VERNAL FIELD OFFICE TIMING RESTRICTIONS						
Wildlife- Big Game	Deer, elk	Winter habitat, crucial	Activities that will result in adverse impacts to deer and elk within crucial winter range will not be allowed from December 1 through April 30. This restriction will not apply if deer and/or elk are not present, or if it is determined through analysis and coordination with UDWR that impacts will	TL	12/1 to 4/30	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			be mitigated. Factors to be considered will include snow depth, temperature, snow crusting, location of disturbance, forage quantity and quality, animal condition, and expected duration of disturbance. The stipulation could be modified based on findings of collaborative monitoring and analysis. For example, the winter range configuration and time frames could be changed if current animal use patterns are determined to be inconsistent with the dates and boundaries established. This stipulation could be waived if it is determined through collaborative monitoring and analysis that the area is not crucial winter range or that timing restrictions are unnecessary.			
Wildlife- Big Game	Pronghorn	Parturition areas	Do not allow activities that will result in adverse impacts to antelope from May 1 through June 30 to minimize stress and disturbance during crucial antelope birthing time. An exception may be granted to these dates by the authorized officer if the operator submits a plan which demonstrates that impacts from the proposed action can be adequately mitigated or if it is determined the habitat is not being utilized for fawning in any given year. The authorized officer may modify the boundaries of the stipulation area if a portion of the area is not being used as fawning grounds or if habitat is being utilized outside of stipulation boundaries as crucial fawning grounds and needs to be protected. May be granted if the fawning grounds are determined to be unsuitable or unoccupied and there is no reasonable likelihood of future use of the fawning grounds.	TL	5/1 to 6/30	No buffer
Wildlife- Raptors	Bald eagle	Nests	No surface disturbance within a 1 mile buffer of active nests from 1/1 – 8/31, unless the area has been surveyed according to protocol and determined to be unoccupied.	TL	1/1 to 8/31	1 mile
Wildlife- Raptors	Boreal owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 7/31.	TL	2/1 to 7/31	0.25 mile
Wildlife- Raptors	Burrowing owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife- Raptors	California condor	Nests	No surface disturbance within 1 mile buffer of active nests during breeding season (undefined).	TL	undefined	1.0 mile
Wildlife- Raptors	Cooper's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife- Raptors	Ferruginous hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.5 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	Flammulated owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 9/30.	TL	4/1 to 9/30	0.25 mile
Wildlife-Raptors	Golden eagle	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 1/1 – 8/31.	TL	1/1 to 8/31	0.5 mile
Wildlife-Raptors	Great horned owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 12/1 – 9/31.	TL	12/1 to 9/31	0.25 mile
Wildlife-Raptors	Long-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 8/15.	TL	2/1 to 8/15	0.25 mile
Wildlife-Raptors	Merlin	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Mexican spotted owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	Northern goshawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern harrier	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/15.	TL	4/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern pygmy owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/1.	TL	4/1 to 8/1	0.25 mile
Wildlife-Raptors	Northern saw-whet owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	Osprey	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Peregrine falcon	Nests	No surface disturbance within a 1 mile buffer of active nests from 2/1 – 8/31.	TL	2/1 to 8/31	1 mile
Wildlife-Raptors	Prairie falcon	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.25 mile
Wildlife-Raptors	Red-tailed hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Sharp-shinned hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Wildlife-Raptors	Short-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.25 mile
Wildlife-Raptors	Swainson's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.5 mile
Wildlife-Raptors	Turkey vulture	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 5/1 – 8/15.	TL	5/1 to 8/15	0.5 mile
Wildlife-Raptors	Western screech owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.25 mile
Wildlife-SSS	Black-footed ferret	Known home ranges	Activities involving the development or construction of temporary or permanent surface disturbances would be prohibited within 1/8 mile boundaries of known home ranges of female ferrets during the "critical" period from May 1 thru July 15. Exceptions: Ephemeral surface disturbance (disturbance in prairie dog habitat for less than six months, after which it again becomes or can be made suitable for prairie dog use), such as prescribed fire or herbicide treatment, may be conducted within 1/8 mile of the boundary of the home range of a female from March 1 to May 1. In general, the disturbance should be completed before the critical period begins. The Service, UDWR, and the land management agencies would determine if this exemption applies. Normal travel and surveying activities would not be restricted.	TL	5/1 to 7/15	0.125 mile
Wildlife-SSS	Sage grouse	Leks	No surface-disturbing activities within two miles of active Sage-grouse leks will be allowed from March 1 through June 15.	TL	March 1 through June 15	2 miles
SALT LAKE FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
None	--	--	--	--	--	--
Salt Lake Field Office Timing Restrictions						
Wildlife-Big Game	Elk	Winter range, crucial	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities within crucial elk winter range December 1 to April 30.	TL	12/1 to 4/30	Wildlife-Big Game
Wildlife-Big Game	Mule deer	Winter range	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other	TL	12/1 to 4/15	Wildlife-Big Game

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			disturbing activities excluding maintenance activities within mule deer winter range December 1 to April 15.			
Wildlife-Raptors	All	Nests	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities within 0.5 mile of active raptor nest sites between March I to July 15.	TL	3/1 to 7/15	Wildlife-Raptors
Wildlife-Raptors	Bald eagle	Roosts	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities within .5 mile radius of the roosts sites from November 15 to March 15.	TL	11/15 to 3/15	Wildlife-Raptors
RICHFIELD FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
Wildlife-Raptors	Bald eagle	Nests	No permanent infrastructure will be placed within 1.0 mile of nest sites.	NSU	--	1.0 mile
Wildlife-Raptors	Bald eagle	Roosts	No permanent structures are permitted within 0.5 miles of bald eagle winter concentration areas/roosts.	CSU	--	0.5 mile
Wildlife-Raptors	Bald eagle	Roosts	No permanent infrastructure will be placed within 0.5 miles of winter roost areas.	NSU	--	0.5 mile
RICHFIELD FIELD OFFICE TIMING RESTRICTIONS						
Wildlife-Big Game	All	Winter range, crucial	Surface disturbing activities are restricted in crucial winter habitat from December 15 through April 15.	TL	12/15 to 4/15	No buffer
Wildlife-Raptors	Bald eagle	Nests	No surface disturbance within a 1 mile buffer of active nests from 1/1 – 8/31. Temporary activities or habitat alterations that could disturb nesting bald eagles are restricted from 1/1 – 8/31 within 1 miles of nest sites, unless the area has been surveyed according to protocol and determined to be unoccupied.	TL	1/1 to 8/31	1.0 mile
Wildlife-Raptors	Bald eagle	Roosts	Temporary activities within 0.5 miles of winter roost areas, e.g., cottonwood galleries, will not occur during the winter roost season of November 1 to March 31, unless the area has been surveyed according to protocol and determined to be unoccupied. In addition, require daily activities approved through subsequent consultation within these spatial buffers to start after 9 a.m. and terminate at least 1 hour before sunset to ensure that bald eagles using these roosts have the opportunity to vacate their roost in the morning	TL	11/1 to 3/31	0.5 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			and return undisturbed in the evening.			
Wildlife-Raptors	Boreal owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 7/31.	TL	2/1 to 7/31	0.25 mile
Wildlife-Raptors	Burrowing owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	California condor	Nests	Temporary activities within 1.0 mile of nest sites will not occur during the breeding season.	TL	breeding season (undefined)	1.0 mile
Wildlife-Raptors	California condor	Roosts	Temporary activities within 0.5 miles of established occupied roosting sites or areas will not occur between 8/1 – 11/31.	TL	8/1 – 11/31	0.5 mile
Wildlife-Raptors	Cooper's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.5 mile
Wildlife-Raptors	Flammulated owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 9/30.	TL	4/1 to 9/30	0.25 mile
Wildlife-Raptors	Golden eagle	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 1/1 – 8/31.	TL	1/1 to 8/31	0.5 mile
Wildlife-Raptors	Great horned owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 12/1 – 9/31.	TL	12/1 to 9/31	0.25 mile
Wildlife-Raptors	Long-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 8/15.	TL	2/1 to 8/15	0.25 mile
Wildlife-Raptors	Merlin	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Northern goshawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern harrier	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/15.	TL	4/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern pygmy owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/1.	TL	4/1 to 8/1	0.25 mile
Wildlife-	Northern saw-whet	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 –	TL	3/1 to 8/31	0.25 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Raptors	owl		8/31.			
Wildlife-Raptors	Osprey	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Peregrine falcon	Nests	No surface disturbance within a 1 mile buffer of active nests from 2/1 – 8/31.	TL	2/1 to 8/31	1.0 mile
Wildlife-Raptors	Prairie falcon	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.25 mile
Wildlife-Raptors	Red-tailed hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Screech owl, western	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.25 mile
Wildlife-Raptors	Sharp-shinned hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Short-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.25 mile
Wildlife-Raptors	Swainson's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.5 mile
Wildlife-Raptors	Turkey vulture	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 5/1 – 8/15.	TL	5/1 to 8/15	0.5 mile
Wildlife-SSS	Mexican spotted owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
FILLMORE FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
None	--	--	--	--	--	--
FILLMORE FIELD OFFICE TIMING RESTRICTIONS						
Wildlife-Raptors	Raptor management will be guided by the use of "Best Management Practices for Raptors and Their Associated Habitats in Utah" (Utah BLM, 2006, Appendix A), utilizing seasonal and spatial buffers, as well as mitigation, to maintain and enhance raptor nesting and foraging habitat, while allowing other resource uses. Spatial and temporal buffers applied to disturbances in the vicinity of nesting raptors will be tailored to the individual raptor species involved and based on factors such as line of sight distance between nest and disturbance, type and duration of disturbance, nest structure security, sensitivity of the species to disturbance, observed responses to related disturbances, and the amount of other disturbances already occurring in the vicinity. Land use activities which would have an adverse impact on an occupied raptor nest, would not be allowed within the spatial or seasonal buffer.					
Wildlife-	Bald eagle	Nests	No surface disturbance within a 1-mile buffer of active nests from 1/1 – 8/31	TL	1/1 to 8/31	1.0 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Raptors						
Wildlife-Raptors	Boreal owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 7/31.	TL	2/1 to 7/31	0.25 mile
Wildlife-Raptors	Burrowing owl	Nests	No surface disturbance or occupancy within a 0.25 mile buffer of active nests during breeding/nesting season (from 3/1 – 8/31).	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	California condor	Nests	Temporary activities will not occur within 1.0 mile of occupied nest sites during breeding season. A temporary action is completed prior to the following important season of use, leaving for habitat functionality.	TL	Breeding season (undefined)	1.0 mile
Wildlife-Raptors	Cooper's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	No surface disturbance or occupancy within a 0.5 mile buffer of active nests during breeding/nesting season (from 3/1 – 8/1).	TL	3/1 to 8/1	0.5 mile
Wildlife-Raptors	Flammulated owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 9/30.	TL	4/1 to 9/30	0.25 mile
Wildlife-Raptors	Golden eagle	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 1/1 – 8/31.	TL	1/1 to 8/31	0.5 mile
Wildlife-Raptors	Great horned owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 12/1 – 9/30.	TL	12/1 to 9/30	0.25 mile
Wildlife-Raptors	Long-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 8/15.	TL	2/1 to 8/15	0.25 mile
Wildlife-Raptors	Merlin	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Mexican spotted owl	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.5 mile
Wildlife-Raptors	Northern goshawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern harrier	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/15.	TL	4/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern pygmy owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/1.	TL	4/1 to 8/1	0.25 mile
Wildlife-	Northern saw-whet	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 –	TL	3/1 to 8/31	0.25 mile

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
Raptors	owl		8/31.			
Wildlife-Raptors	Osprey	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Peregrine falcon	Nests	No surface disturbance within a 1 mile buffer of active nests from 2/1 – 8/31.	TL	2/1 to 8/31	1.0 mile
Wildlife-Raptors	Prairie falcon	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.25 mile
Wildlife-Raptors	Red-tailed hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/15.	TL	3/15 to 8/15	0.5 mile
Wildlife-Raptors	Screech owl, western	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.25 mile
Wildlife-Raptors	Sharp-shinned hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Short-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.25 mile
Wildlife-Raptors	Swainson's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.5 mile
Wildlife-Raptors	Turkey vulture	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 5/1 – 8/15.	TL	5/1 to 8/15	0.5 mile
CEDAR CITY FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
Wildlife-multiple species	--	Deer habitat, prairie dog, sage grouse, bald & golden eagle dens, burrows, nests, and roosting sites.	Following the advice of a qualified wildlife biologist as designated by the appropriate federal official, roads, railroads, towers, and other ground disturbing activities would be located 200 yards from identified active dens, burrows, nests, or roosting sites to protect deer, Utah prairie dog, bald and golden eagles, and sage grouse.	NSU	--	200 yards (600 feet)
Wildlife-SSS	Prairie dog, Utah	Prairie dog towns	Prairie dogs require Category 3 protection of no occupancy or drilling within prairie dog towns.	CSU	--	No buffer
CEDAR CITY FIELD OFFICE TIMING RESTRICTIONS						
Wildlife-Raptors	All raptors	Nests	Raptors are protected during their nesting season by a special stipulation which requires no drilling or exploration around nest sites from February 15	TL	2/15 to 6/31	No buffer

RESOURCE	SPECIES (IF APPLICABLE)	AREA OF RESTRICTION	DESCRIPTION	CONSTRAINT TYPE	TIMING	BUFFER/ AVOIDANCE AREA
			through June 30.			
Wildlife-Raptors	All raptors	Nests	In order to protect important raptor nesting areas, exploration, drilling, and other development activity will be allowed only during the period from July 1 to February 14. TL-Feb 15 to June 30.	TL	2/15 to 6/30	No buffer
ELY FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
None	--	--	--	--	--	--
ELY FIELD OFFICE TIMING RESTRICTIONS						
Wildlife-Big Game	All	Parturition areas	Where appropriate, restrict permitted activities in big game calving/fawning/kidding/lambing grounds and crucial summer range from April 15 through June 30.	TL	4/15 to 6/30	No buffer
Wildlife-Big Game	Big horn sheep	Occupied habitat	Where appropriate, restrict permitted activities within occupied desert bighorn sheep habitat from March 1 through May 31 and from July 1 through August 31.	TL	3/1 to 5/31	No buffer
Wildlife-Big Game	Big horn sheep	Occupied habitat	Where appropriate, restrict permitted activities within occupied desert bighorn sheep habitat from March 1 through May 31 and from July 1 through August 31.	TL	7/1 to 8/31	No buffer
Wildlife-Raptors	Raptors	Nests	Where appropriate, restrict permitted activities from May 1 through July 15 within 0.5 mile of raptor nest sites unless the nest site has been determined to be inactive for at least the previous 5 years.	TL	6/1 to 7/15	0.5 mile
Wildlife-SSS	Desert tortoise	Habitat	Where appropriate, restrict permitted activities from March 1 through October 31 within desert tortoise habitat.	TL	3/1 to 10/31	No buffer
LAS VEGAS FIELD OFFICE NO SURFACE USE AND CONTROLLED SURFACE USE RESTRICTIONS						
None	--	--	--	--	--	--
LAS VEGAS FIELD OFFICE TIMING RESTRICTIONS (NONE APPLICABLE TO AGENCY PREFERRED ALTERNATIVE)						
None	--	--	--	--	--	--

X3.0 WILDLIFE AND PLANT PROTECTION MEASURES

Through a process of scoping, public review, and development of the FEIS, wildlife species of concern have been identified for the TWE Project. Appropriate protection measures to avoid and minimize impacts to sensitive species will be implemented as provided for in the BA/BO, as adopted in theROD. For a list of mitigation measures that may apply to this Plan, please refer to Section 8 of the TWE Project Plan of Development, Environmental Mitigation Measures, at: Table 16 - Applicant Committed Environmental Mitigation Measures; Table 17 - Additional Mitigation Measures for the TWE Project; Table 18 - BLM Field Office Stipulations Along Agency Preferred Alternative; Table 19 - Westwide Energy Corridor Final Programmatic EIS Best Management Practices; Table 20 – National BMP's for Water Quality Management, and Table 21 – ESA Species Conservation Measures adopted in the ROD.

X3.1 TWE Applicant Committed Mitigation Measures

The following were identified as Applicant committed environmental mitigation measures or design features proposed by TransWest to further reduce impacts to plant and wildlife resources. The following measures will be applied to all portions of the TWE Project.

- **TWE-29:** The POD will include a Wildlife and Plant Conservation Measures Plan, which will identify important, sensitive, or unique habitats and BLM-sensitive, USFS-sensitive, and state-listed species in the vicinity of the TWE Project. The POD will identify measures to be taken to avoid, minimize, or mitigate impacts to these habitats and species.

- **TWE-31:** Mitigation measures that will be developed during the consultation period with the BLM and the U. S. Fish and Wildlife Service under Section 7 of the ESA and adopted in the ROD will be adhered to, along with mitigation developed in conjunction with state authorities as required in any applicable permit.

- **TWE-32:** Seasonal restrictions may be implemented in certain areas to mitigate impacts on wildlife. With the exception of emergency repair situations, ROW construction, restoration, maintenance, and termination activities in designated areas will be modified or discontinued during sensitive periods (e.g., nesting and breeding periods) for candidate, proposed or listed threatened and endangered, or other sensitive animal species, as required by permitting agencies. Potential seasonal restrictions and avoidance buffers for nesting raptors will be identified in the FEIS. The Wildlife and Plant Conservation Measures Plan will incorporate the seasonal restrictions and stipulations contained in the federal agency RODs.

- **TWE-33:** Prior to the start of construction, the Applicant will provide training to all Contractor and Subcontractor personnel and others involved in construction activities where/if there is a known occurrence of protected species or habitat in the construction area. Sensitive areas will be considered avoidance areas. Prior to any construction activity, avoidance areas will be marked on the ground and maintained through the duration of the Contract. The Applicant will remove markings during and following final inspection of the TWE Project.

- **TWE-34:** If evidence of a protected species not previously identified or known is found in the TWE Project area, the Contractor will immediately notify the appropriate land management agencies and provide the location and nature of the findings.

X3.2 Pre-Construction Surveys

There are two types of pre-construction surveys: (1) habitat assessments conducted prior to NTP which will be incorporated into the NTP POD and used in the final Project design to avoid and minimize impacts to special status species to the extent practicable; and (2) clearance surveys which will be conducted immediately prior to construction to determine current habitat occupancy for purposes of applying avoidance, minimization, and conservation measures. Both surveys will inform the Construction Contractor(s) of locations for exclusion, avoidance, timing restrictions, or areas where construction may continue with no restriction. The wildlife and plant stipulations and protection measures will only be applied where applicable and where species of concern have been identified by TransWest and the land management agencies as occurring in the Project area. Preconstruction surveys will be conducted for plant and wildlife species using protocols approved by the applicable state and federal agencies in order to determine activity levels prior to construction as well as to inform the final design of the Project to avoid areas occupied by species of concern to the extent practicable. Preconstruction surveys will be conducted within suitable habitats during the appropriate seasonal timeframe for the species described in Table X2. In addition, TransWest will work cooperatively with BLM and the other land managing agencies to develop a Biological Resource Monitoring Plan that incorporates these requirements and identifies any additional survey requirements for other special status species.

TABLE X2 PRE-NTP AND PRE-CONSTRUCTION SURVEYS AND PROTOCOLS[1,2]

SPECIES	SURVEY TYPE	COMMENTS	PROTOCOL	CLEARANCE/PROTOCOL SURVEY WINDOW
Black-footed Ferret	Pre-NTP habitat assessment	The need for pre-construction clearance surveys will be determined in accordance with the ROD following the habitat assessment.	USFWS 1989	Year-round
Desert Tortoise	Pre-construction clearance surveys	Clearance surveys would be ongoing during construction in desert tortoise habitat and would be conducted in accordance with the ROD.	USFWS 2009	Active season – March 1-October 31, Inactive season – November 1-February 28
Southwestern Willow Flycatcher	Pre-NTP habitat assessment	The need for pre-construction clearance surveys will be determined in accordance with the ROD following the habitat assessment.	Sogge et al. 2010	May 1 – August 15
Utah Prairie Dog	Pre-construction protocol surveys		USFWS 2014	April 1 – August 31
Western Yellow-billed Cuckoo	Pre-NTP habitat assessment	The need for pre-construction clearance surveys will be determined in accordance with the ROD following the habitat assessment.	Halterman et al. 2015	June 1 – August 31
Clay phacelia	Pre-NTP habitat assessment	The need for pre-construction clearance surveys will be determined in accordance with the ROD following the habitat assessment.	USFWS 2011	June 15 – July 31
Deseret milkvetch	Pre-NTP habitat assessment	The need for pre-construction clearance surveys will be determined in accordance with the ROD following the habitat assessment.	USFWS 2011	May 1 – May 30
Ute ladies'-tresses	Pre-NTP habitat assessment	The need for pre-construction clearance surveys will be determined in accordance with the ROD following the habitat assessment.	USFWS 1992	Late July - August

[1] Where survey protocols are not established, e.g. migratory birds or raptors, TransWest or the Construction Contractor will work cooperatively with the applicable land management agency to identify appropriate protocols and survey windows. Timing of clearance/protocol surveys for each species will follow the dates identified in Table X2; however, pre-NTP habitat assessments may be completed outside of these date ranges.

[2] The Pre-NTP and Pre-Construction Surveys will only be completed in locations where the land management agencies have identified the species as potentially occurring in the Project area

SPECIES	SURVEY TYPE	COMMENTS	PROTOCOL	CLEARANCE/PROTOCOL SURVEY WINDOW
Migratory Birds	Pre-construction surveys	Only if vegetation clearing cannot be conducted prior to the onset of the avian breeding season (generally April 15 through July 31	Protocols to be developed in coordination with the appropriate resource management agency and field office	April 15 – July 31
Raptors, including eagles	Pre-construction nest surveys	Known raptor nests will be surveyed to determine occupancy if construction activities cannot adhere to species-specific spatial and timing stipulations identified in the ROD.	Helicopter aerial surveys	April 1 – May 15
Newly-listed ESA Species	N/A	Pre-construction surveys will be conducted for any additional species that become listed under the ESA prior to the beginning of construction that could occur within the Project area.	N/A	N/A

X3.3 Monitoring and Reporting

Wildlife and plant monitoring may be required during construction along portions of the TWE Project area within designated habitat for special status species. Monitoring needs will be determined by presence or absence of special status species and/or viable habitat as determined by pre-construction surveys. The precise requirements for monitoring will be determined as part of the FEIS, BO, and through consultation with BLM, USFS, Reclamation, and state agencies and will be described in future versions of this Plan.

Monitors will likely be responsible for flagging or otherwise marking buffers around special status species areas. Exact methods of marking these areas will be determined through coordination with the Construction Contractor(s) to ensure all personnel know what the markings mean.

Biological Monitors may be required to document and spatially record all activities involving special status wildlife and plants. Their observations may be recorded in the Construction Data Management System. A report may be developed and prepared for TransWest and agencies on a regular basis. Exact frequency will be developed through future agency coordination. At a minimum, reports may include dates of activity, which species' habitats were impacted, which species were encountered, details of encounters (date, location, what occurred in the encounter), and what areas were avoided and by what means.

X4.0 REFERENCES

Halterman, M., M.J. Johnson, J.A. Holmes and S.A. Laymon. 2015. A Natural History Summary and Survey Protocol for the Western Distinct Population Segment of the Yellow-billed Cuckoo: U.S. Fish and Wildlife Techniques and Methods, 45 p.

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U.S. Fish and Wildlife Service (USFWS). 2014. Utah prairie dog occupancy and habitat survey protocol for federal section 7 consultations U.S. Fish and Wildlife Service, May 2014.

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APPENDIX Y
PROJECT DESIGN AND IMPLEMENTATION PLAN OF DEVELOPMENT REFINEMENT PROCESS

TRANSWEST EXPRESS TRANSMISSION PROJECT

Project Design and Implementation

Plan of Development Refinement Process

Project Background

TransWest Express LLC (TransWest) proposes to construct, operate and maintain the TransWest Express Transmission Project (TWE Project or Project). The TWE Project is an extra-high voltage (EHV) direct current (DC) transmission system extending from south-central Wyoming to southern Nevada. The TWE Project begins at a northern terminal near Sinclair, Wyoming and terminates at a southern terminal at the Marketplace Hub in the Eldorado Valley near Boulder City, Nevada. At each of the terminals, there will be an alternating current/direct current (AC/DC) converter station designed to convert the DC current carried by the TWE Project to AC current to be carried on the western United States AC electrical grid (the northern and southern terminals). The TWE Project is planned to interconnect into the Eldorado Substation, the McCullough Switching Station, the Marketplace Substation and the Mead Substation. Western Area Power Administration, a Federal power marketing administration within the United States Department of Energy, has partnered with TransWest in the development of the TWE Project.

Because it is necessary for the TWE Project to cross federal lands, a ROW application was filed with BLM in 2007. The application was amended by TransWest in 2008 and again in 2009 and 2010. To comply with the National Environmental Policy Act (NEPA), BLM and Western are preparing an Environmental Impact Statement (EIS). Public scoping was conducted in 2011 and in July 2013 BLM and Western published the Draft Environmental Impact Statement for the TWE Project (DEIS). The Proposed Action is approximately 726 miles in length. In addition, approximately 2,263 miles of Alternatives were analyzed in the DEIS.

Plan of Development

A Plan of Development (POD) documents a federal right-of-way applicant's construction, operation, rehabilitation and environmental protection plan. *See 43 CFR 2804.25* The POD is a dynamic document updated as a project progresses through the NEPA review and analysis process. A POD may require different information from the applicant depending upon the environmental resources that may be impacted, the location of the proposed project, and the timing of the project. There may be information required from one applicant that is not required by another applicant because of the issues or resources involved. Additional supplementary information may be required from the applicant in order to prepare the NEPA analysis and complete the review process but is not required to be submitted with the initial POD. This

information is developed as further data is gathered and as detailed designs and mitigation measures are incorporated into a final POD. *See BLM Instruction Memorandum No. 2009-043*[1]

TWE Project Plan(s) of Development

The POD for the TWE Project serves many purposes. For the Project, the POD will:

- Provide the project description and technical information necessary for the federal agencies to conduct required environmental reviews of the Project, including compliance with the NEPA.
- Identify TransWest's construction plans and specifications, including federal agency stipulations, conditions of approval, environmental requirements and best management practices (BMPs).
- Support the federal agencies Record of Decision (ROD) for the Project.
- Meet all federal land management agency requirements for issuance of right-of-way (ROW) grants or special use permits.
- Provide the basis for the federal land management agencies to issue Notices to Proceed (NTP) for construction, operation and maintenance of the Project.
- Balance project design development with the extent of available siting opportunities and constraints data throughout the federal approval process.

For the TWE Project, the working assumptions for preparing the POD at each stage of the Project are:

1. PODs are submitted at corresponding major Project milestones with a level of detail appropriate to the federal agencies' analysis and decision timeline. POD versions are as follows:
    a. November 2007 Preliminary SF 299 POD (prepared by National Grid)
    b. January 2009 Preliminary Scoping POD
    c. July 2010 Preliminary DEIS POD, supplemented and amended by Project Description Technical Report (PDTR) dated October 2012
    d. February 2014 (estimate) Preliminary Final EIS (FEIS) POD
    e. September 2014 (estimate) Preliminary ROD POD
    f. 2015-2016 (estimate) Final NTP PODs
2. Each involved federal agency (BLM, USFS, USBOR and NPS) will issue its own Record of Decision, all to be issued concurrently.
3. ROW Grants and Special Use Permits are to be issued concurrently with the RODs
4. Multiple NTPs are anticipated, each to be issued on a construction segment basis as appropriate to address agency jurisdiction, seasonal constraints, preconstruction surveys, acquisition of private ROW, agency review of the NTP POD, work planning and scheduling, etc.
5. ROW Grants/Special Use Permits will authorize the following facilities on federal lands:

[1] IM 2009-43 is specific to wind energy projects on public lands administered by BLM; however, the general discussion on plans of development is applicable to any Federal Land Policy and Management Act (FLPMA) right-of-way application.

a. BLM – Permanent 250 ft. wide ROW for the transmission line and permanent access roads within the transmission ROW defined in the ROD POD plus permanent ROW for non-linear facilities (Terminals, Ground Electrode Facilities, Series Compensation Stations for Design Alternatives).
b. BLM – Permanent 50 ft. wide ROW for access roads outside of the transmission line ROW.
c. BLM – Temporary work areas and access roads outside of and in addition to the ROW Grant for the permanent ROWs.
d. USFS – Permanent 250 ft. ROW for the transmission line and permanent access roads within the corridors defined in the FEIS.
e. USFS – Permanent 50 ft. wide ROW for access roads outside of the transmission line ROW.

Definitions, Abbreviations and Acronyms

Definitions, abbreviations and acronyms used in this document are contained in Exhibit A attached.

TWE Project Progression

Proper siting of a transmission project involves an initial evaluation at a regional level, followed by more focused studies that inform refinement of siting options leading to the eventual selection of a ROW location. Corridor studies serve to focus attention on relevant siting issues at each stage of the process. Narrowing Transmission Line Corridors at key milestones based on best available information is a logical progression as a project procedes through the siting process. For instance, for the TWE Project six-mile wide Transmission Line Corridors focused attention primarily on land jurisdiction and landscape level issues. The generally two-mile wide Transmission Line Corridors resulted in more focused attention on biological habitats, visual impacts, and local land uses. As the Transmission Line Corridors are narrowed for the FEIS, resources at the micro-scale will be examined and relative values and trade-offs considered such that the resulting project will be sited to avoid and minimize impacts to the extent practicable preventing undue and unnecessary degradation of public lands.

The discussion below first focuses on PODs for each Project milestone, describing the purpose and contents of each. With that backgound and context, a discussion of corridor narrowing follows with a descripton of the process and procedures employed by TransWest to identify the final ROW location.

Milestone Plans of Development

TransWest's POD development approach is consistent with federal agency policy to provide a dynamic project development plan containing information relevant to the agencies' analysis of the ROW application and the federal decision to be made. The following outlines the PODs to be submitted at each Project milestone and the available data utilized in preparing each POD. For each POD, a set of graphics are provided at the end of this document (Figures 1 through 8).

The graphics focus on two hypothetical public lands settings in rolling terrain to highlight the differences between typical siting in co-located settings versus greenfield settings.

1. SF 299 POD (November 2007, submitted by National Grid)

   The SF 299 POD was filed along with an initial ROW application (SF 299) for construction, operation and maintenance of a proposed high-voltage transmission line(s) extending between eastern Wyoming and the desert Southwest. The application and SF 299 POD was submitted by National Grid, the initial Project developer.

   The SF 299 POD contained a very preliminary description of the Project and identified a regional study area and preliminary corridors. The Project facilities description was based upon industry 'typicals' and the POD did not provide information on routes or detailed engineering.

   Data utilized consisted of publically available regional environmental data and transmission and utility infrastructure.

2. Scoping POD (January 2009)

   The Scoping POD was filed along with an amended ROW application to reflect a revised purpose and need for the Project after TransWest became the developer. The Scoping POD facilitated internal and cooperating agency scoping meetings and defined the initial scope of the NEPA analysis.

   The Scoping POD identified proposed and alternative routes within six-mile wide Transmission Line Corridors based upon regional studies. The Project facilities description was revised for a 600 kV DC transmission line and two AC/DC convertor stations. Information on construction, operation and maintenance of a DC transmission system was provided based upon a very preliminary level of engineering.

   Data utilized consisted of publically available regional environmental data and transmission and utility infrastructure and mitigation and environmental protection measures from the West-Wide Energy Corridors Final Programmatic EIS.

3. DEIS POD (July 2010) as amended and supplemented by the PDTR (October 2012), Attachment D to the DEIS (July 2013)

   The DEIS POD provided a description of the TWE Project Proposed Action, project description, including construction, operation and maintenance practices, and preliminary environmental mitigation measures and BMPs. These Practices were provided in preliminary format as frameworks and descriptions of specific plans that will be developed and included within subsequent versions of the POD with all plans completed and included in the NTP POD. The DEIS POD also provided a description of the TWE Project Design Alternatives.

Transmission Line Corridors (generally two-miles wide) and Reference Lines within those Transmission Line Corridors for all alternatives identified by BLM were included in the DEIS POD. Transmission Line Corridors were sized such that potential new access roads would be located within the Transmission Line Corridors.

The DEIS POD/PDTR included indicative disturbance data tables for all DEIS Alternatives based on a methodology to model potential disturbance (PDTR Section 3.5.2.1 and Appendix A including March 1, 2011 Memorandum, TransWest Express Transmission Project – Access Road Methodology).

The DEIS POD/PDTR was utilized by the BLM to provide the project description for the DEIS upon which impacts analysis was conducted.

The generally two-mile wide Transmission Line Corridors in the DEIS POD provided the public an opportunity to comment on Transmission Line Corridors at a regional level (e.g., should the line be sited in the West-Wide Energy Corridor along U.S. Highway 40 or through a greenfield route in the southern Uinta Basin?) and at a local level (e.g., opportunity for siting through a pasture next to previously disturbed pipeline ROW or avoid siting through irrigated agricultural field).

Data utilized consisted of available BLM field office and USFS district office environmental data, State environmental data, National Wetlands Inventory data, Natural Heritage Program data, commercially available satellite imagery supplemented by TransWest aerial imagery.

Engineering design was based upon selection of suitable structure types, preliminary engineering of terminals and ground electrode facilities and experience with other transmission projects in similar terrains.

Figures 1 and 2 below depict a typical, conceptual section of the generally two-mile wide Transmission Line Corridor with a Reference Line and the level of engineering information available for the DEIS POD.

4. <u>FEIS POD (data to be provided November 2013, document to be provided February 2014)</u>

The FEIS POD will provide a description of the TWE Project Proposed Action, Preliminary Agency Preferred Alternative from the DEIS and other Alternatives carried forward into the FEIS. The FEIS POD will contain an updated project description, including construction, operation and maintenance practices, environmental mitigation measures, and BMPs. The construction, operation and maintenance practices provided in the DEIS POD/PDTR will be updated to provide more current detailed information.

The FEIS POD will provide Preliminary Engineered Alignments based upon additional engineering, aerial terrain surveys, field engineering surveys, and siting opportunity and

constraint data from the DEIS. The FEIS POD may also consider public comments on the DEIS based upon BLM's direction. The Transmission Line Corridors (generally two-miles wide) will be refined and narrowed based on currently available siting constraints information and potential for further siting refinements. In refining and narrowing the Transmission Line Corridors, consideration will be given to terrain, access restrictions, existing access, designated utility corridors, environmental constraints, jurisdictional constraints, co-location, landowner requests and the potential for changes between the FEIS POD and the ROD POD. The variables that principally impact the certainty of the Final Engineered Alignment of the TWE Project are terrain, jurisdiction (federal, state or private) and the proximity of the alignment to existing transmission lines and other infrastructure. The FEIS POD will provide revised indicative disturbance data tables using the methodology described in the PDTR Appendix A to determine potential acreages of temporary and permanent disturbance for all Alternatives as was used in the DEIS analysis. The modeled data will include revisions to capture the relatively smaller disturbance footprint associated with new access roads tied into the existing access road network of co-located transmission lines.

Figures 3 and 4 below depict a typical, conceptual section of the refined Transmission Line Corridor with Preliminary Engineered Alignments and the level of engineering information that will be available for the FEIS POD.

5. Record of Decision POD

The ROD POD will provide revised Preliminary Engineered Alignments for the FEIS Agency Preferred Alternative (or the selected alternative if different) in consideration of any new or additional data provided by agencies or from field surveys (i.e., biological or other resource surveys), additional LIDAR data and field engineering data.

Based on detailed design, the ROD POD will provide initial layout of all temporary work areas including wire-pulling, tensioning (stringing sites) and splicing sites, staging areas/fly yards, terminals, ground electrodes, and regeneration sites and all existing and new access roads to each structure location for the Agency Preferred Alternative.

The ROD POD will contain the Framework Traffic and Transportation Management Plan along with detailed mapping of all proposed structure locations, backbone access network, existing access, existing access with improvements, overland access and proposed new access.

Figures 5 and 6 below depict a typical section of the refined Transmission Line Corridor and the Preliminary Engineered Alignment and the level of engineering information that will be available for the ROD POD. Additional corridor refinements in select areas may be made at the direction of the federal agencies for special management areas or areas with extreme environmental constraints.

6. Notice To Proceed POD

The NTP POD will be the final POD and will incorporate the Construction, Operation and Maintenance Plan (COMP). The NTP POD will detail TransWest's construction plans and specifications, and construction practices and procedures for the selected alternative. The NTP POD will also describe the processes and procedures TransWest will employ to comply with the requirements of the RODs for the Project and include the Environmental Compliance Management Plan. The NTP POD is intended to be appended to the BLM ROW Grant and the USFS Special Use Permit.

Due to the length and complexity of the TWE Project, multiple NTPs are anticipated; therefore, TransWest envisions preparing a Project NTP POD and POD Appendices. Proceeding in this manner is anticipated to minimize the number of variance requests for the Project as each NTP POD Appendix will be based upon field verified segment-specific construction plans incorporating all known resource data including field survey results.

Project NTP POD. The Project NTP POD will address overall TWE Project guidelines, compliance with agency mitigation requirements, and stipulations and conditions of approval common to the entire Project. It will also include construction practices and compliance plans common to the entire Project.

NTP POD Appendices. The NTP POD Appendices will consist of construction segment-specific project descriptions; final detailed engineering; mapping describing structure locations, access road layouts, temporary work areas, etc.; segment-specific COMP practices and compliance plans, and stipulations and conditions of approval for the Project segment covered by the request for a NTP. Any changes to the Preliminary Engineered Alignment necessitated by results of preconstruction surveys will be incorporated into the NTP POD Appendices, resulting in a Final Engineered Alignment.

In accordance with the overall objectives outlined above, the following activities will be performed after the issuance of the RODs and ROW Grants/Special Use Permits:

a. Acquisition of ROW on state and private lands
b. Completion of final engineering to include final structure locations, final access road layout including field verification of structure locations and proposed access roads for the selected alternative
c. Layout and field verification of all temporary work areas to include material storage yards, fly yards/laydown areas and portable concrete batch plants
d. Class III cultural resource and biological preconstruction surveys, completion of analysis and preparation of summary reports
e. Jurisdictional Waters of the U.S. delineation and any other resource surveys required to support permitting
f. Acquisition of remaining federal permits and acquisition of required state and local permits

g. Preparation of the main body of the Project NTP POD to address all mitigation measures, stipulations and conditions of approval set forth in the RODs, including fully developed management plans for the following:[2]
    i. General Construction, Operation and Maintenance Practices
    ii. Avian Protection Plan
    iii. Cultural Resources/Historic Properties Treatment Plan
    iv. Fire Protection Plan
    v. Greater Sage Grouse Habitat Equivalency Analysis, Mitigation and Monitoring Plan
    vi. Vegetation Management Plan
    vii. Noxious Weed Management Plan
    viii. ROW Preparation, Rehabilitation, Restoration and Monitoring Plan
    ix. Wetlands and Waters of the US Mitigation Plan
    x. Wildlife Species Conservation Measures Plan
    xi. Paleontological Resources Treatment Plan
    xii. Traffic and Transportation Management Plan
    xiii. Storm Water Pollution Prevention Plan
    xiv. Spill Prevention, Containment and Countermeasures Plan
    xv. Dust Control and Air Quality Plan
    xvi. Blasting Plan
    xvii. Hazardous Material Management Plan
    xviii. Emergency Preparedness and Response Plan

Figures 7 and 8 below depict the typical process involved in progressing from the Preliminary Engineered Alignment to the Final Engineered Alignment based on preconstruction field surveys (Cultural Class III surveys in these examples). Once the Final Engineered Alignment is complete, mapping will be prepared and presented as an Appendix to the NTP POD for agency review and approval.

Corridor Refinement Process

Siting and evaluation of transmission facilities is a dynamic process. Experience has proven that starting with a broad evaluation area, and then refining that area as more information is obtained and public input gathered leads to informed and defensible decision making. Analyzing a representative reference line within a wider Transmission Line Corridor is appropriate for the DEIS level of impact analysis. This approach allows the federal agencies to be responsive to cooperating agency concerns as well as public feedback obtained through the DEIS public comment period. Indeed, one of the purposes of the DEIS public comment period is to ensure that all relevant information and public views are considered prior to the federal agencies making a final decision. Analyzing impacts on a broader scale than the 250-foot transmission line ROW in the DEIS provides greater disclosure of potential impacts - the fundamental purpose of NEPA. This DEIS corridor can then be narrowed as the environmental analysis progresses through the

[2] Note: This is a preliminary list subject to revision.

FEIS, ROD and issuance of a Notice to Proceed, allowing adjustments to the final ROW to be made as information continues to be gathered, resulting in avoiding and minimizing impacts to resources to the greatest extent practicable. "Decide and Defend" where a proponent and agency decide on an exact ROW location prior to all the facts being known and then defends the decision is an outdated mode of transmission line permitting that neither allows for public involvement nor permits consideration of new information to avoid and minimize impacts.

The TWE Project was initially evaluated on a regional basis (SF 299 POD). Transmission Line Corridors were then refined to approximately six miles wide based upon a non-engineered reference line (Scoping POD). As further information was gathered and reviewed, Transmission Line Corridors were reduced to generally two-miles wide (DEIS POD/PDTR). TransWest proposes to further refine the DEIS Transmission Line Corridors (FEIS POD) for analysis in the FEIS based on new information and DEIS public comments. TransWest anticipates that these refined Transmission Line Corridors will be carried through to the RODs and ROW Grants/Special Use Permits but that the POD will continue to be refined with a focus on the selected alternative (ROD POD). The NTP POD and Appendices will define the final ROW for TWE Project facilities. Outlined below is the process under which the Transmission Line Corridors will be refined for the FEIS POD and the NTP POD and Appendices.

Terrain is one of the fundamental design parameters used in the design and siting of transmission lines, structures and access roads. In the early stages of a project, available terrain data is usually limited to USGS topographic data (±30 feet). As a project progresses, satellite imagery, aerial photography and LIDAR (± 3 feet) are usually obtained. Transmission line design and siting to develop specific structure locations and heights utilizes tools, such as PLS CADD, that optimize (e.g. minimize the number of towers and access roads while avoiding and minimizing environmental impacts) the alignment of the transmission line based on the design criteria and terrain. An Engineered Alignment developed using these tools but with poor quality terrain data cannot be optimized and likely will require redesign with significant differences in structure locations either when high quality terrain data, such as LIDAR, is obtained later in the design/permitting process or during construction. To augment the quality of the design and siting, field verification of preliminary structure sites and in particular the angle or 'PI' (point of intersection) structure sites are often conducted to ensure the viability of these sites. Data from these field surveys are then used to refine the design and siting.

Rugged terrain presents unique challenges to siting transmission lines and introduces more uncertainty with respect to the final location of structures and access roads absent the full complement of technical and environmental data. As a consequence, greater differences between the Preliminary Engineered Alignments and Final Engineered Alignments in rugged terrain are more likely than in flat terrain. For example, a siting constraint located in mountainous terrain may require relocation of the transmission line to a farther ridge or hollow as opposed to a nearby cliff face or other highly undesirable location. Therefore, TransWest has developed criteria as described in the PDTR for various terrain types and categorized each Alternative segment by these terrain types ranging from flat, rolling, steep, to mountainous.

In order to assist in the design and siting optimization of the Project, TransWest has contracted to obtain LIDAR data based upon a 'best guess' as to the viable alternatives that may comprise the alternative route selected in the ROD. Where available, LIDAR data, along with additional field verification data, will be used to refine corridors throughout development of the FEIS POD and the ROD POD. The NTP POD and Appendices will be based upon digital terrain models generated using high-quality LIDAR data for the selected alternative.

TransWest has also developed different criteria for federal lands and private lands (for purposes of corridor refinement, TransWest is treating state lands as private lands). This is because additional flexibility is required on private lands to address any unique landowner concerns or circumstances that may arise during the ROW acquisition process.

Another important parameter in the design and siting of a transmission line within a given segment is the proximity of other transmission lines. In locations where there is an existing transmission line, the design of the new line is somewhat advanced and at the same time complicated by the existing lines. Overall, co-locating a line adjacent to an existing transmission line results in more certainty of the final design as the existing line has already established the general alignment and an access road network that can potentially be used by the new line. In instances where the existing transmission line does not run parallel to field lines or development has sprung up adjacent to the existing transmission line, co-location may actually be difficult to accomplish without creating greater impacts. However, most often co-location presents more opportunities than constraints as the siting of the existing transmission line likely selected an alignment of least resistance. Therefore for a given terrain type and land ownership type, the certainty of the transmission line location is higher in co-located settings versus greenfield settings.

As shown in Table 1. TransWest has developed a recommended Transmission Line Corridor width for each of these settings as defined by these fundamental design parameters, and has categorized each segment by these parameters and designated each segment for a particular Transmission Line Corridor width. The three typical refined Transmission Line Corridor widths are 500 feet, 1,800 feet and 3,600 feet.

In addition to the typical Transmission Line Corridor widths outlined above and in Table 1, TransWest is also refining Transmission Line Corridors based on review of environmental constraints information. These constraints are identified in the DEIS and provided by the agencies as shapefiles for GIS analysis. The BLM identified areas and issues to consider for Transmission Line Corridor refinement including:

1. Special Management Areas (SMAs) that are managed as no surface use (NSU) by the agencies.

2. Special Status Species (SSS) known occurrence and modeled habitat to minimize and more accurately define the geographic extent of survey requirements. Sage-grouse leks and NSU buffers, and Preliminary Priority Habitat exclusion areas are included.

3. National Historic and Scenic Trails (NHT, NST, respectively) crossings (contributing segments) and related Special Recreation Management Areas (SRMAs).

4. Landslide-prone Areas where flexibility for routing should be maintained.

5. USFS Inventoried Roadless Areas (IRAs) and Unroaded/Undeveloped (URUD) areas that can be completely avoided and removed from corridor.

6. Designated utility corridors should be utilized in desert tortoise crucial habitat and supporting Areas of Critical Environmental Concern (ACEC).

Table 1 – General Refined Corridor Widths in Accordance with Setting and Approximate Miles of Each Width

Setting Variables				Comparison of Alternatives			
Terrain Type	Land Ownership	Proximity to Other Transmission Lines		Applicant Proposed Alternative		Agency Preferred Alternative	
		Co-located	Greenfield				
		Corridor Widths (feet)		Miles	%	Miles	%
Flat	Federal	500		336	46%	319	42%
Rolling		500	1,800				
Flat	Private	1,800		256	35%	268	36%
Rolling							
Steep	Federal	1,800	3,600				
	Private	3,600		134	18%	165	22%
Mountainous	Federal or Private						
			Total	726	100%	752	100%

Table 1 Notes:

A. Federal Land type also included Federal/Private checkerboard in Wyoming.
B. Exceptions to these corridor widths will be made to accommodate micro-siting options and exclusion areas where possible.

Figure 1 – DEIS Transmission Line Project Description – Greenfield

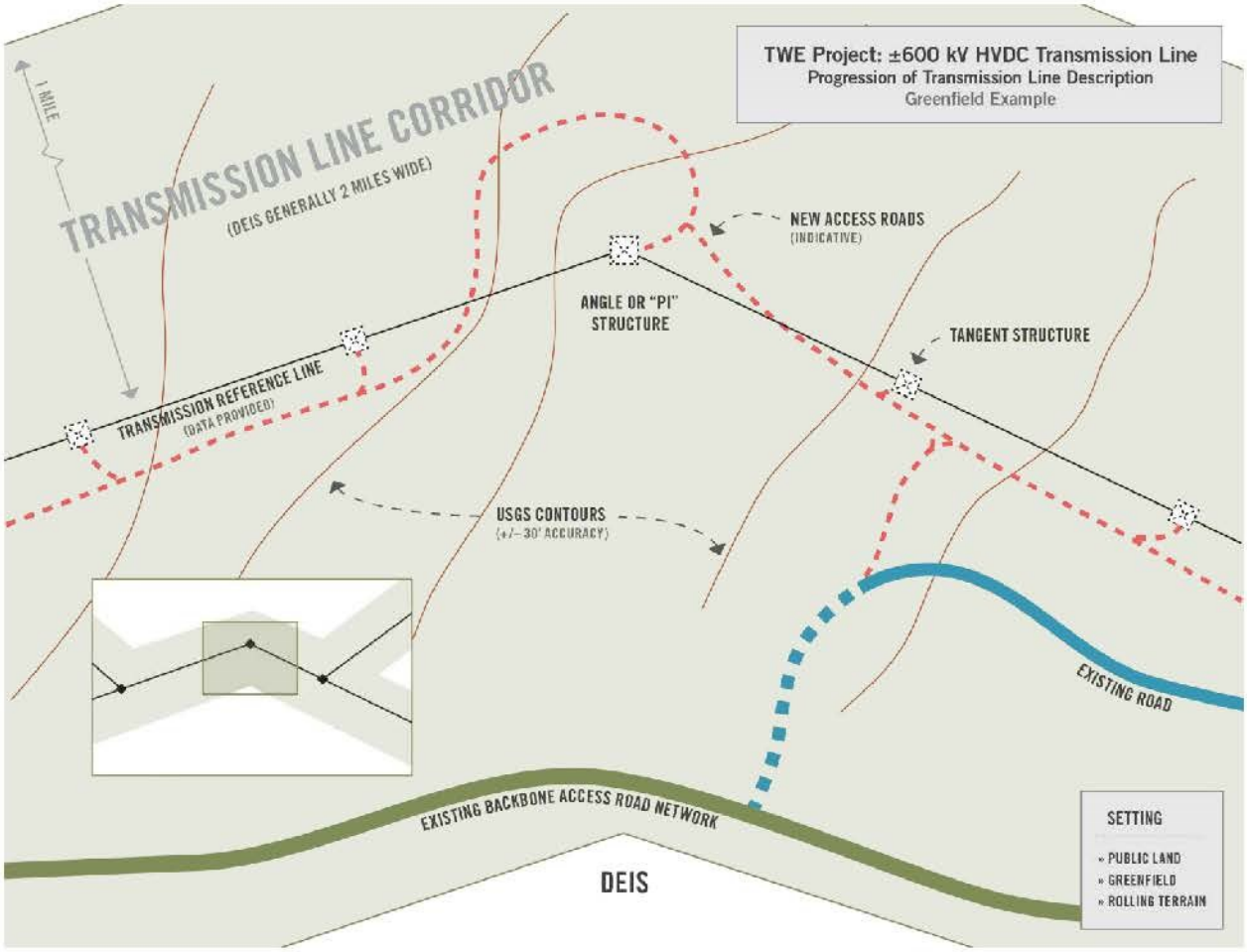


Figure 1 Notes:

A. Structure and Access road disturbance information, including improvements to existing roads provided as modeled data for analysis in the DEIS. The dashed structure and access road locations shown in dashed format are indicative of the modeled data provided.

Figure 2 – DEIS Transmission Line Project Description – Co-location

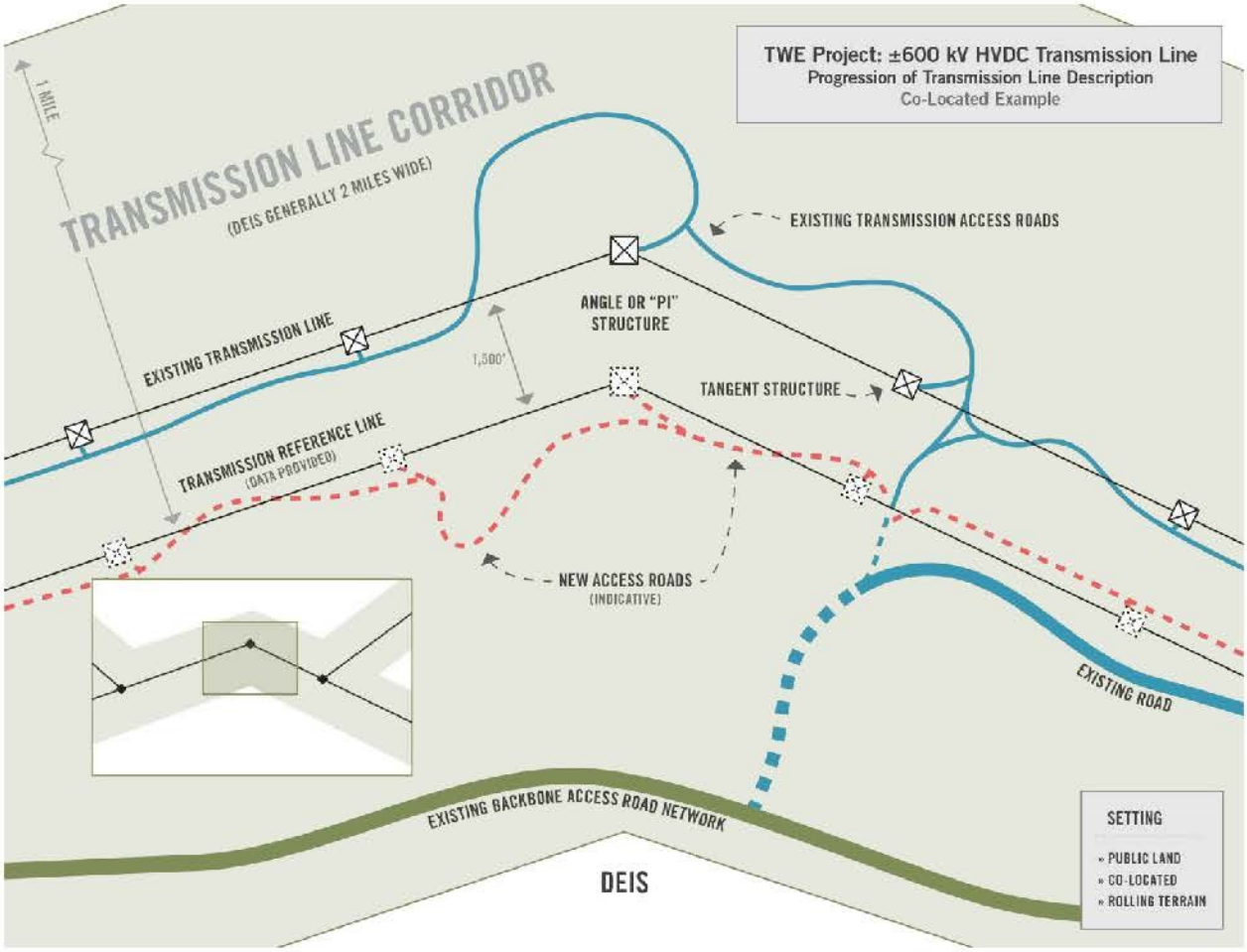


Figure 2 Notes:

A. Structure and Access road disturbance information, including improvements to existing roads provided as modeled data for analysis in the DEIS. The dashed structure and access road locations shown in dashed format are indicative of the modeled data provided.

B. Transmission Reference Line for the TWE Project used a 1,500' separation from existing high voltage transmission lines. Modeled access road disturbance data based on assumption that a separate access road network would be required.

Figure 3 – FEIS Transmission Line Project Description – Greenfield

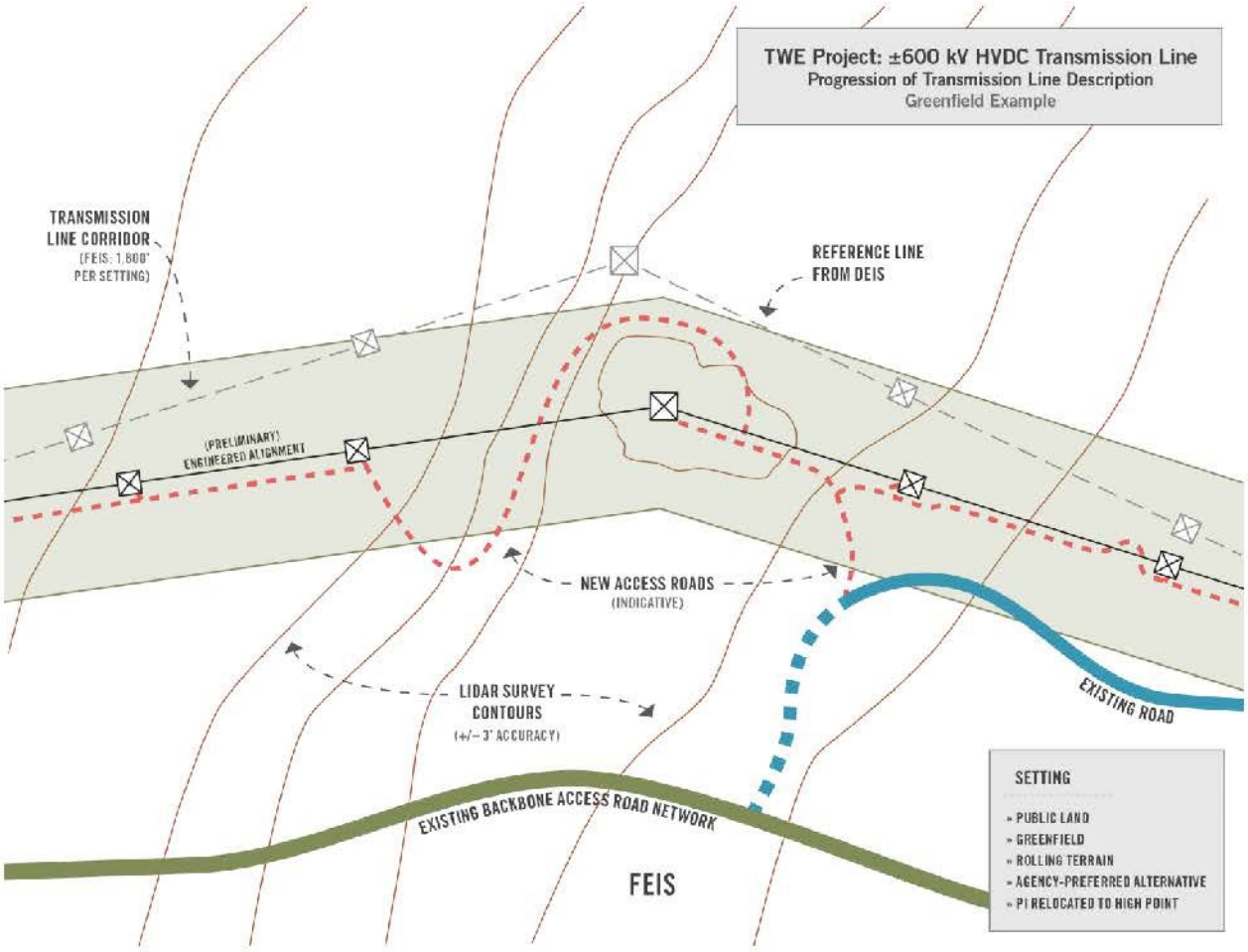


Figure 3 Notes:

A. This example shows how the more accurate survey data leads to a relocation of the Angle (PI) structure and the centerline to a high spot instead of a cliff face.
B. The Transmission Line Corridor for this setting has been narrowed to 1,800'.
C. Structure and Access road disturbance information, including improvements to existing roads provided as indicative data.

Figure 4 – FEIS Transmission Line Project Description – Co-location

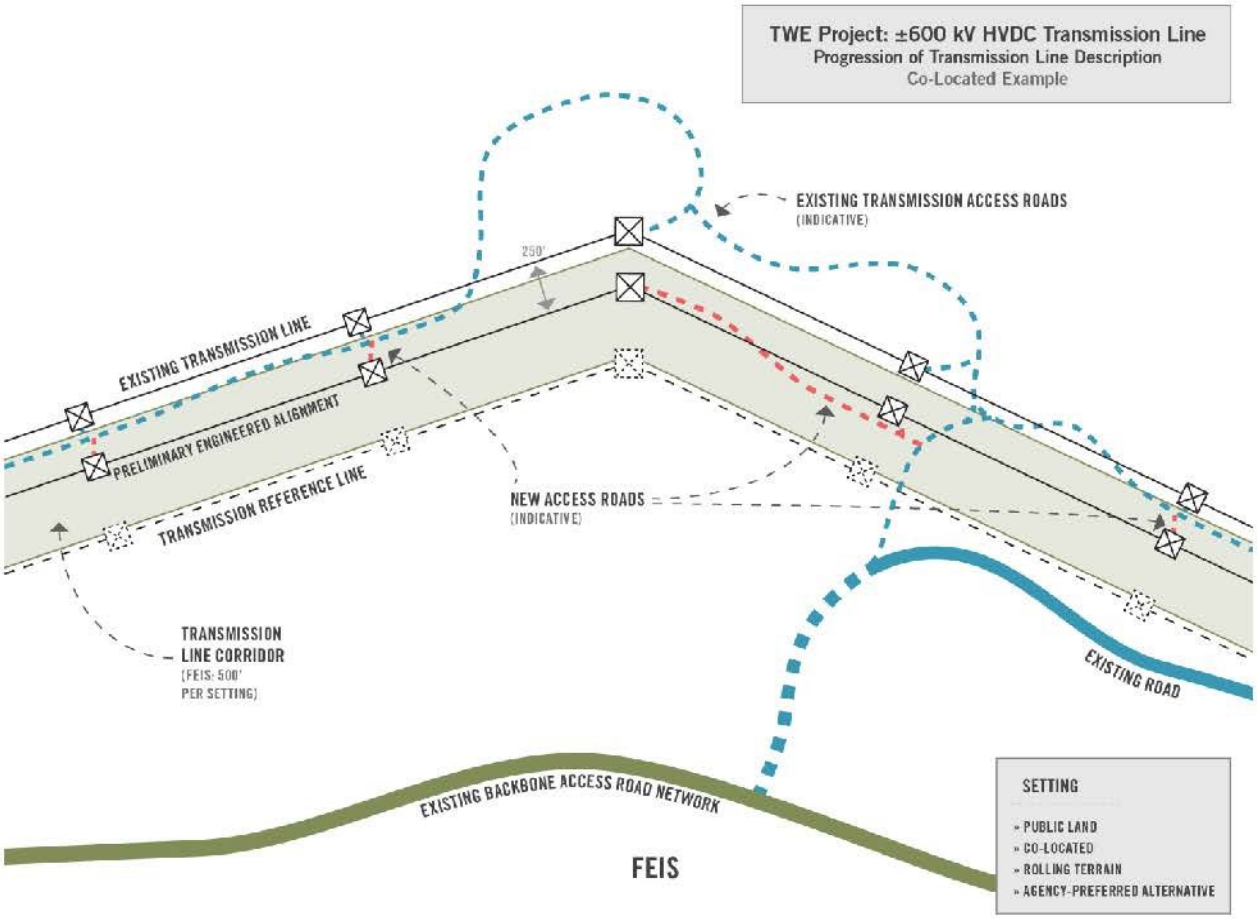


Figure 4 Notes:

A. This example shows how the revised co-location criteria allow the TWE Project to be sited 250' from the existing transmission line and how the existing access road network can be utilized for the TWE Project.
B. The Transmission Line Corridor for this setting has been narrowed to 500'.
C. Structure and Access road disturbance information, including improvements to existing roads provided as indicative data.

Figure 5 – ROD/ROW Grant Transmission Line Project Description – Greenfield

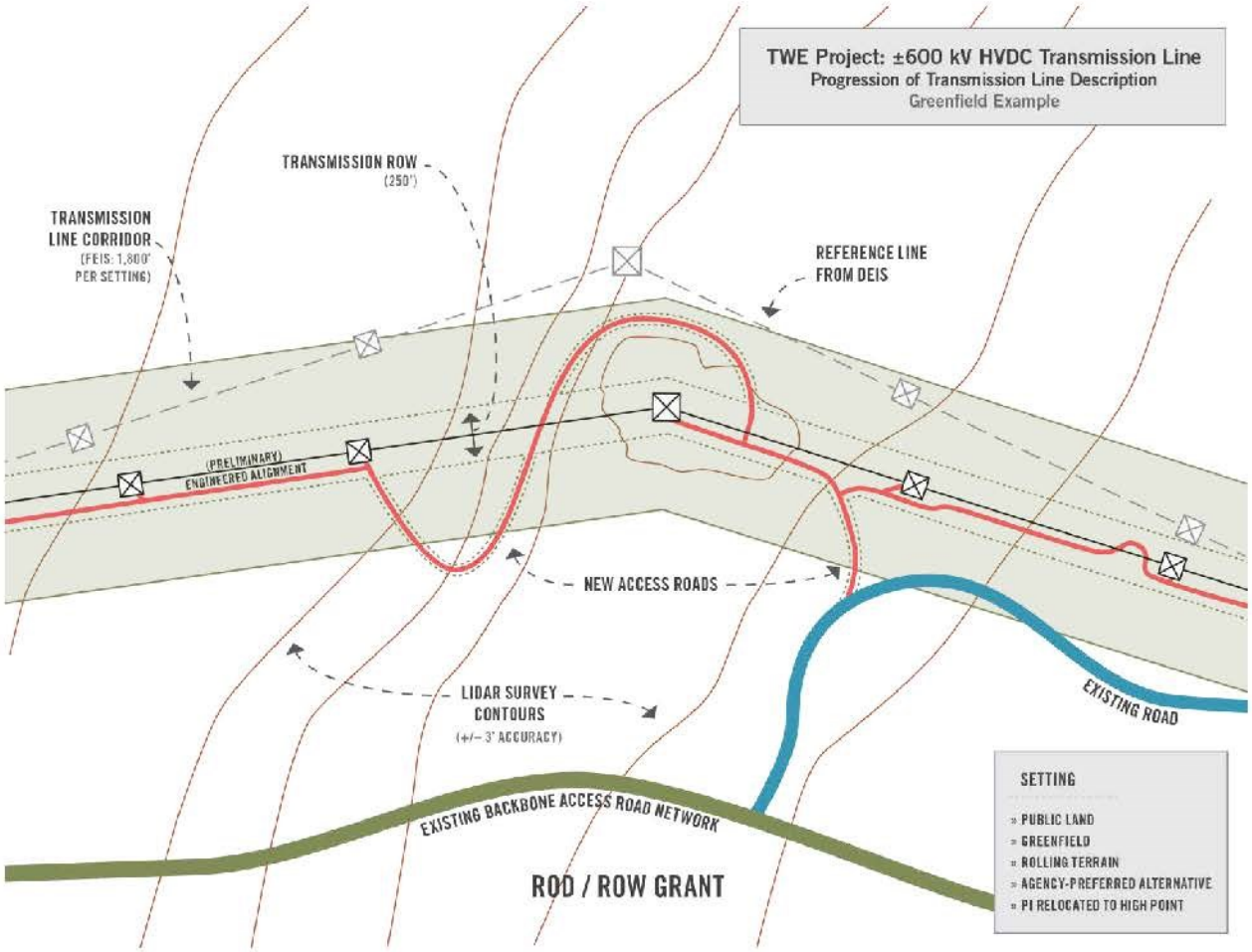


Figure 5 Notes:

A. This example shows how the more accurate survey data leads to a relocation of the Angle (PI) structure and the centerline to a high spot instead of a cliff face.
B. The Transmission Line Corridor for this setting has been narrowed to 1,800'.
C. Structure and Access road disturbance information, including improvements to existing roads provided as GIS data.

Figure 6 – ROD/ROW Grant Transmission Line Project Description – Co-location

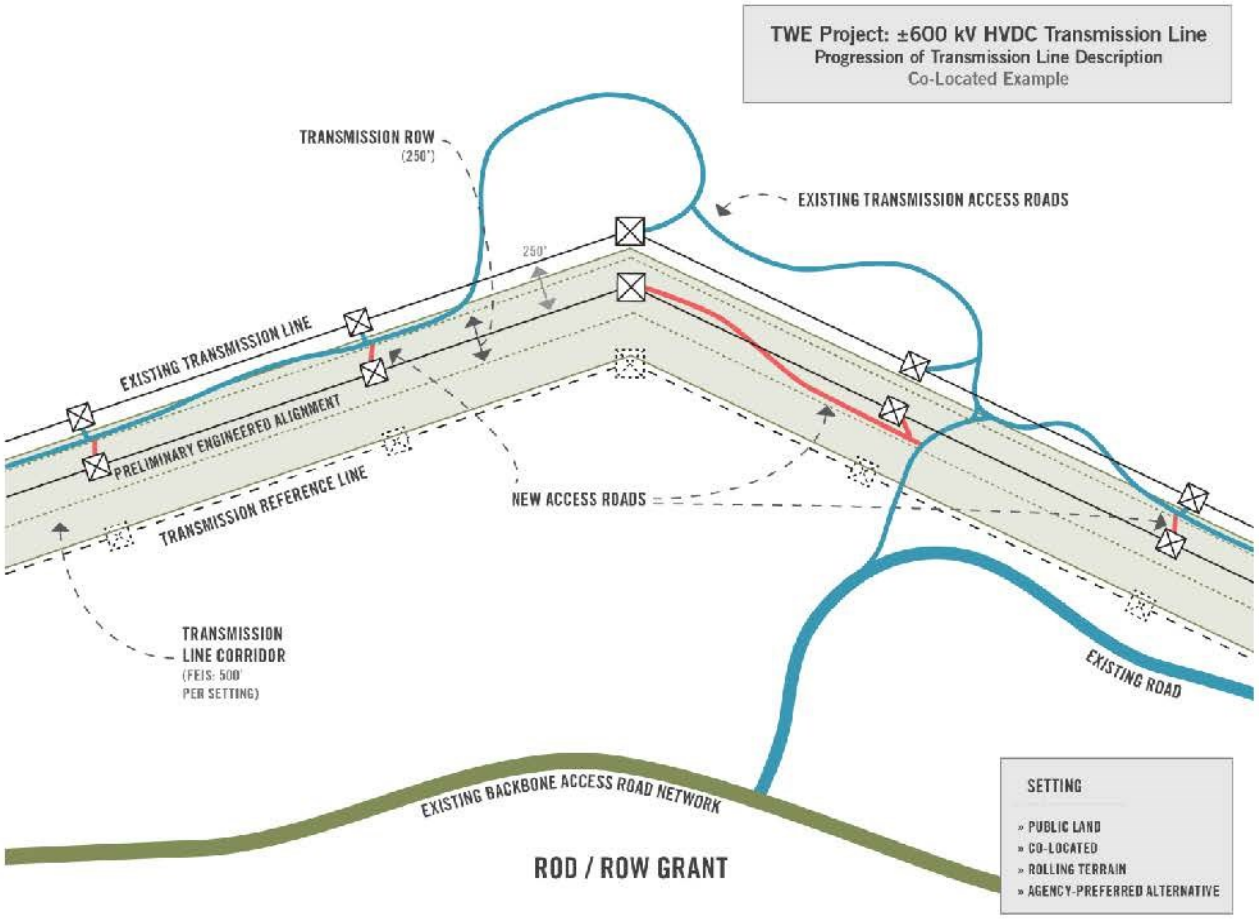


Figure 6 Notes:

A. This example shows how the revised co-location criteria allow the TWE Project to be sited 250' from the existing transmission line and how the existing access road network can be utilized for the TWE Project.
B. The Transmission Line Corridor for this setting has been narrowed to 500'.
C. Structure and Access road disturbance information, including improvements to existing roads provided as GIS data.

Figure 7 – NTP Transmission Line Project Description – Greenfield

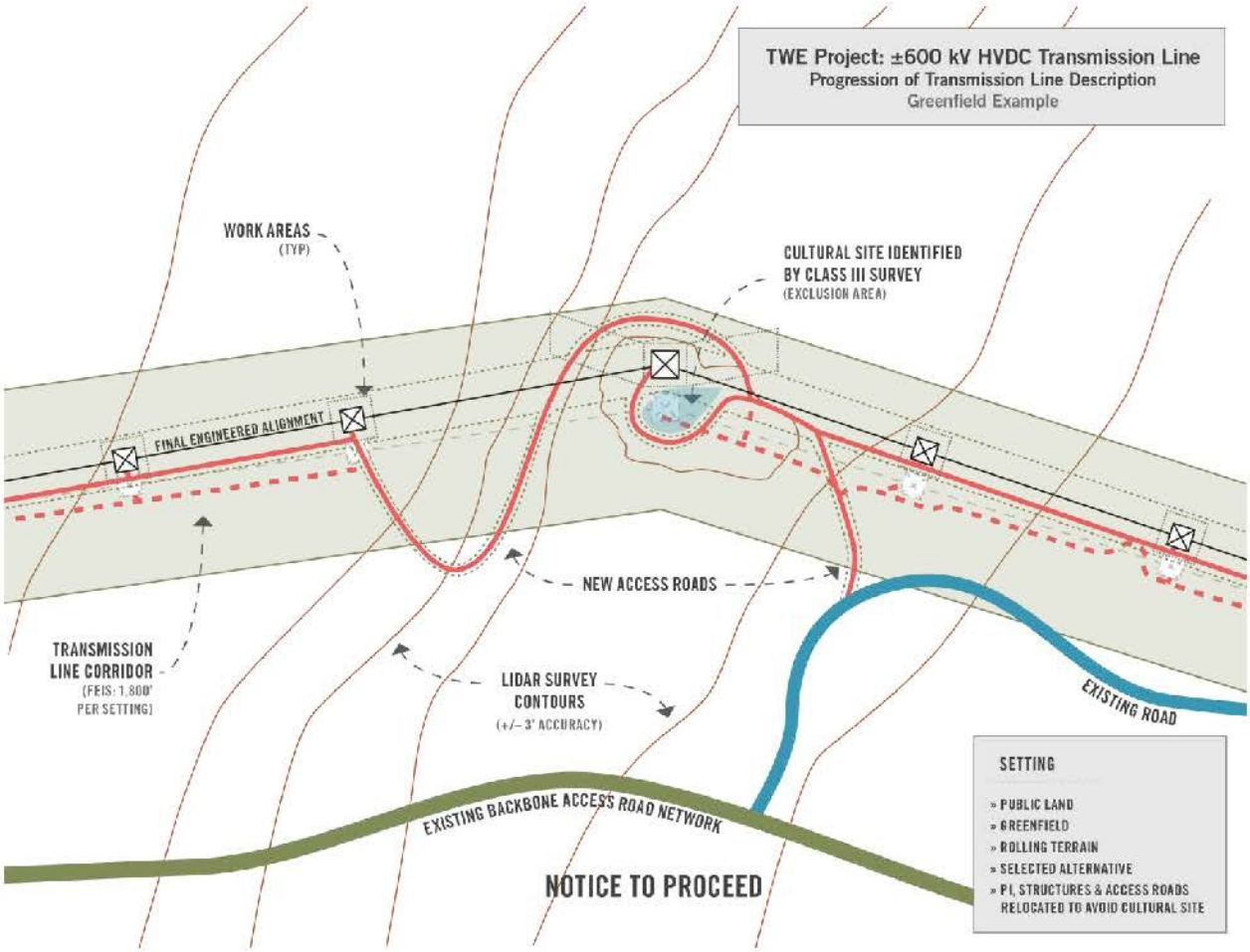


Figure 7 Notes:

A. This example shows how field surveys detected a resource that required the relocation of the Angle (PI) structure and the centerline.
B. The Transmission Line Corridor for this setting of 1,800' is sufficient to accommodate this change.
C. The Final Engineered Alignment, final structure locations, ROW extents, temporary work areas and access road locations shown will be provided in the NTP POD and Appendices.

Figure 8 – NTP Transmission Line Project Description – Co-location

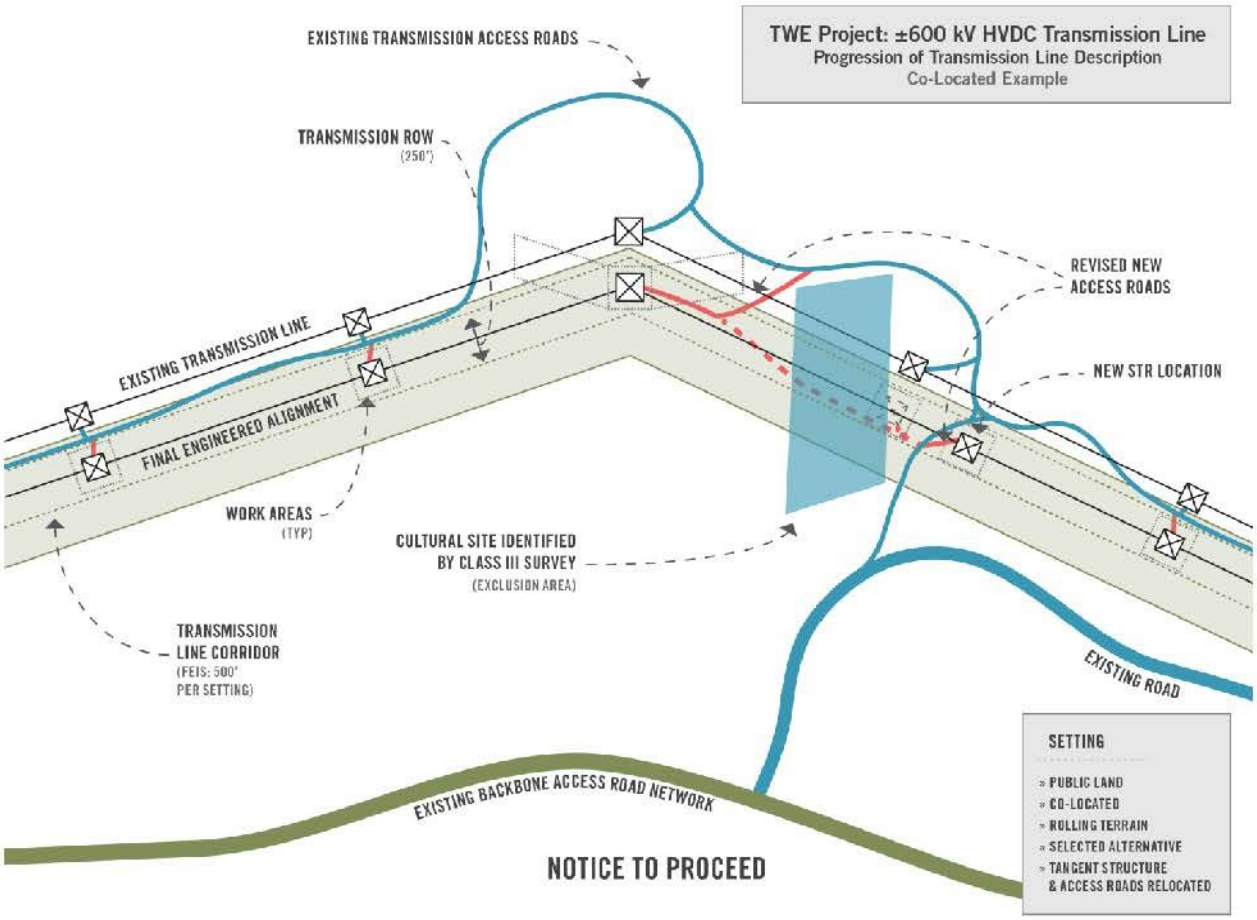


Figure 8 Notes:

A. This example shows how field surveys detected a resource that required the relocation of the Access Road.
B. The Transmission Line Corridor for this setting of 500' is sufficient to accommodate this change.
C. The Final Engineered Alignment, final structure locations, ROW extents, temporary work areas and access road locations shown will be provided in the NTP POD and Appendices.

EXHIBIT A – DEFINITIONS, ABBREVIATIONS AND ACRONYMS

Acronyms

AC	Alternating Current
BLM	Bureau of Land Management
BMP	Best Management Practice
COMP	Construction, Operation and Maintenance Plan
DC	Direct Current
DEIS	Draft Environmental Impact Statement for the TransWest Express Transmission Project (BLM July 2013)
EHV	Extra High Voltage
EIS	Environmental Impact Statement
FEIS	Final Environmental Impact Statement for the TransWest Express Transmission Project
NEPA	National Environmental Policy Act
NPS	National Park Service
NTP	Notice to Proceed
PDTR	Project Description Technical Report (TransWest July 2011)
POD	Plan of Development
ROD	Record of Decision
ROW	Right-of-way
TWE	TransWest Express
USBOR	U.S. Bureau of Reclamation
USFS	United States Forest Service

Definitions

Final Engineered Alignment – An engineered transmission line alignment reflecting the final location of the transmission line and right-of-way based upon completion of all required field surveys (Class III surveys, Threatened and Endangered Species surveys, etc.), terrain conditions determined from high-quality LIDAR data (typically at three foot elevation intervals), and final engineering review and design. The transmission line alignment and right-of-way has been field inspected and surveyed and construction procedures and practices are in compliance with the record of decision and right-of-way grant/special use permit, or exceptions noted and documented and the variance process initiated.

Greenfield – a Reference Line that is not co-located near or parallel to an existing transmission line or other linear utility infrastructure.

LIDAR – A remote sensing technology that measures distance by illuminating a target with a laser and analyzing the reflected light and is popularly used as a technology used to make high resolution maps.

Plan of Development – documentation of a federal right-of-way applicant's construction, operation, rehabilitation and environmental protection plan. *See 43 CFR 2804.25*

Preliminary Engineered Alignment – An engineered transmission line alignment reflecting a possible final location of the transmission line and right-of-way based upon known environmental and land use opportunities and constraints, terrain conditions ascertainable from public and commercially available information (USGS maps, satellite imagery, commercially available purchased imagery, etc.), and initial engineering review and design. The alignment has been field inspected and no major issues concerning construction, operation and maintenance of the line have been identified.

Reference Line – Reference Lines are preliminary, non-engineered routes within Transmission Line Corridors that were determined based on environmental and engineering constraints and constructability review. The reference line is generally bounded on each side by one mile of corridor. For purposes of the DEIS analysis, Reference Lines serve as preliminary centerlines for the location of the ±600 kV DC transmission line ROW. Reference line locations will be refined within the Transmission Line Corridors throughout the NEPA process.

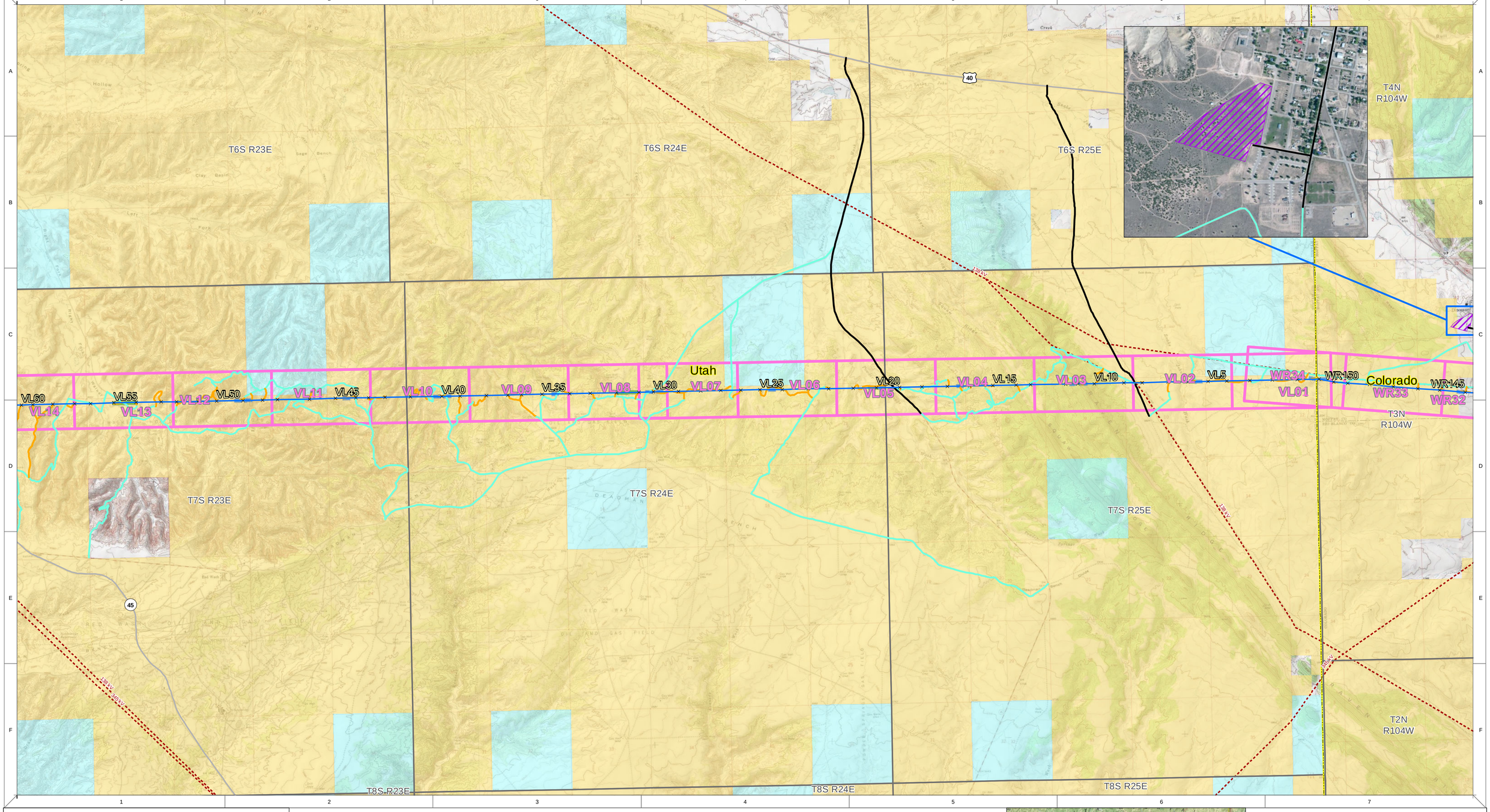
Transmission Line Corridors – Corridors are defined as geographic areas generally varying in width within which the proposed 250 foot-wide TWE Project transmission line right-of-way (ROW) would be located. Corridor widths have varied among the various studies completed for TWE Project planning. For purposes of the DEIS analysis, the Proposed and Alternative Transmission Line Corridors have been refined to generally two miles wide. In limited areas, the corridor widths may be greater or lesser due to routing constraints, as requested by the joint lead agencies. These Transmission Line Corridors will be evaluated in the DEIS to document the range of resource impacts which could result from transmission line construction, operation, and maintenance within the Transmission Line Corridors. Corridor locations and widths have been, and will continue to be, refined throughout the National Environmental Policy Act (NEPA) process.

Design Alternatives – Design alternatives are alternative transmission configurations, which may have the potential to meet the TWE Project purpose and need, depending on future energy market conditions and permitting decisions for other regional transmission systems. Two design alternatives are described in the PDTR.

Plan of Development

Appendix AA- Las Vegas and Vernal Overview and Detail Maps

Vernal Overview and Detail Maps



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1:72,000 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- × Proposed Tower Location (every 5th structure is labeled)
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road
- Fly Yard/Staging Area on Public Land
- Wire-Pulling, Tensioning, Splicing Site on Public Land
- Material Yard on Public Land

Jurisdiction

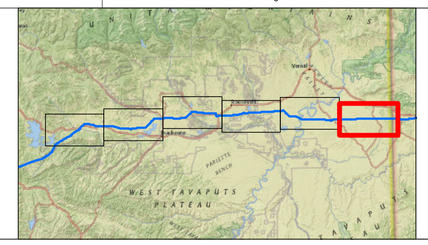
- BLM
- State

Boundaries

- Township
- Detailed Map Index

Existing Utilities

- Existing Transmission (115 kV or Higher)



Vernal FO Overview

Date: 3/18/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

ATTENTION: This map contains information that is Proprietary & Confidential. It is for the intended recipient(s) only and is exempt from disclosure pursuant 5 U.S.C. §552(b)(4).

T5S R20E

T5S R21E

T6S R20E

T6S R21E

T6S R22E

T7S R20E

T7S R21E

T7S R22E

T7S R23E

Utah

VL31 VL130 VL30 VL29 VL125 VL28 VL120 VL27 VL115 VL26 VL110 VL25 VL105 VL24 VL100 VL23 VL22 VL95 VL21 VL90 VL20 345 kV VL85 VL19 VL80 VL18 VL75 VL17 VL16 VL70 VL15 VL65 VL14

0 1,500 3,000 6,000 Feet

1:36,000 when printed on 34x22 inch sheet
1:72,000 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- × Proposed Tower Location (every 5th structure is labeled)
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road
- Fly Yard/Staging Area on Public Land
- Wire-Pulling, Tensioning, Splicing Site on Public Land
- Material Yard on Public Land

Jurisdiction

- Tribal
- BLM
- State
- USFWS

Boundaries

- Township
- Detailed Map Index

Existing Utilities

- Existing Transmission (115 kV or Higher)

Vernal FO Overview

Date: 3/18/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

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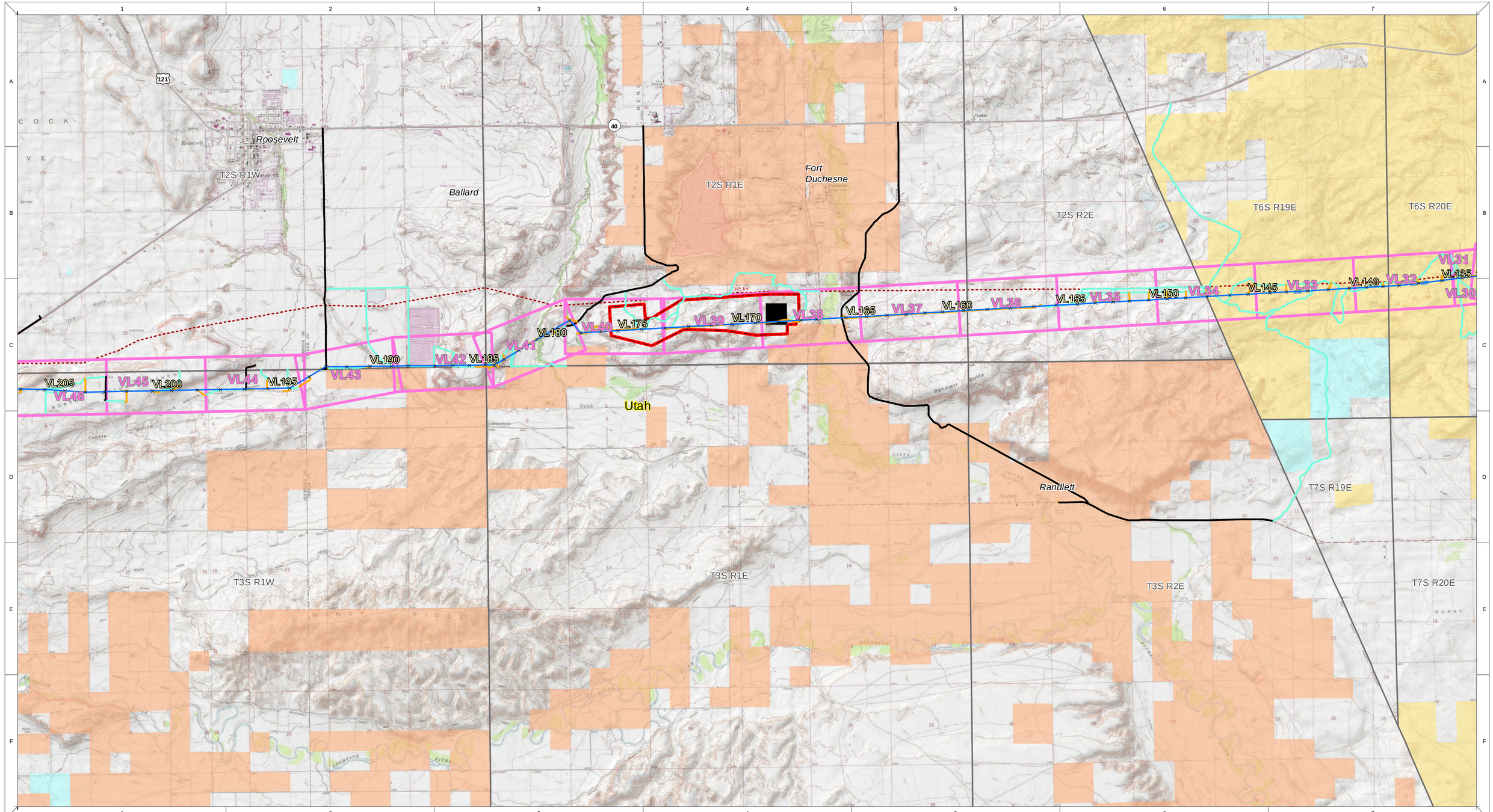

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1:72,000 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

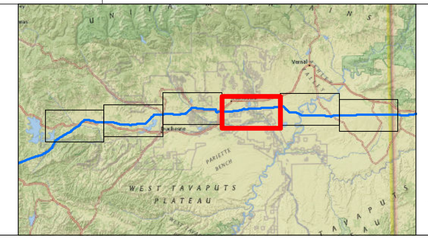
Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- × Proposed Tower Location (every 5th structure is labeled)
- Capacitor Station Area
- Capacitor Station Site
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road
- Wire-Pulling, Tensioning, Splicing Site on Public Land
- Material Yard on Public Land

Jurisdiction
- Tribal
- BLM
- State

Boundaries
- Township
- Detailed Map Index

Existing Utilities
- Existing Transmission (115 kV or Higher)



Vernal FO Overview

Date: 3/18/2015

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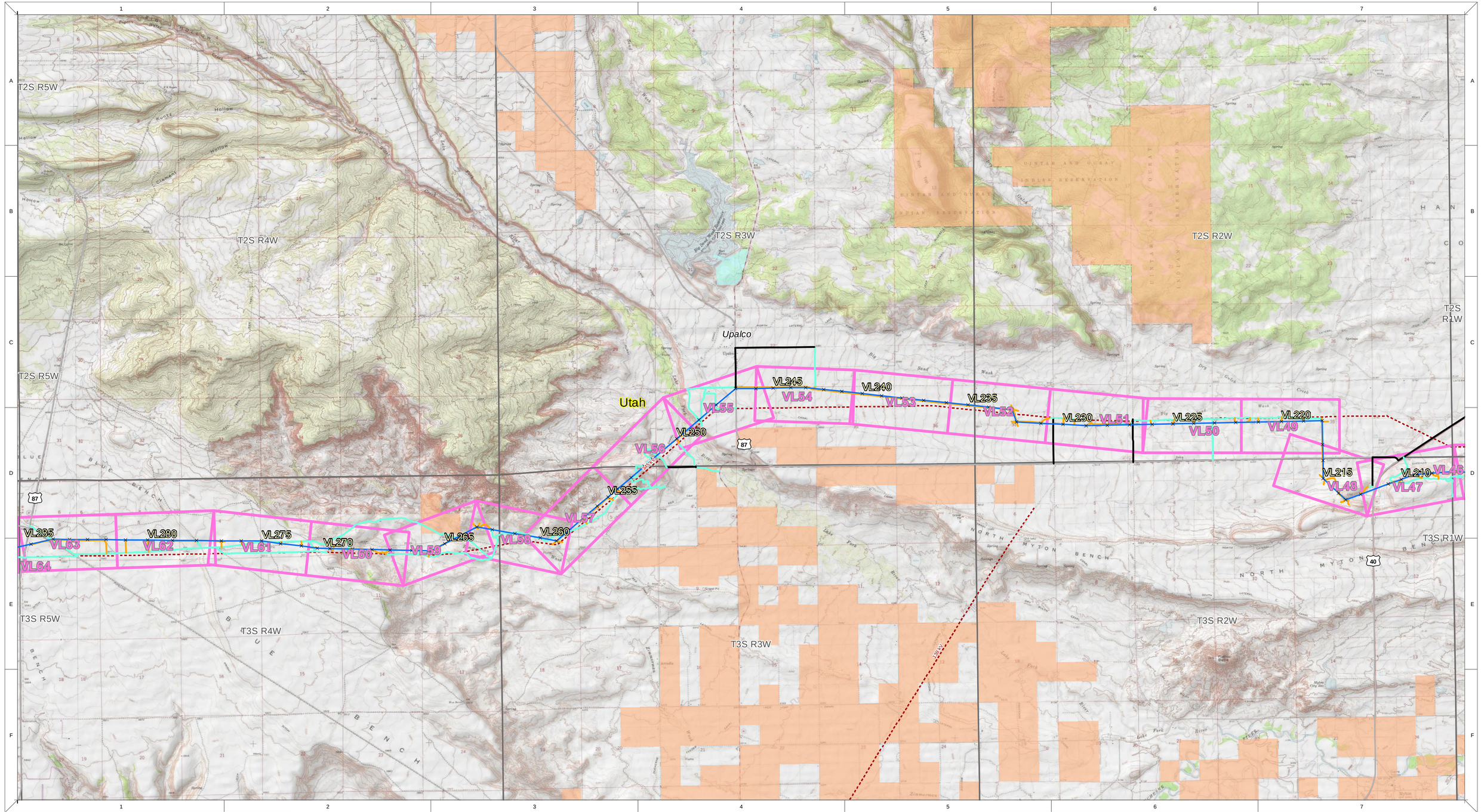

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- Proposed Tower Location (every 5th structure is labeled)
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road
- Material Yard on Public Land

Jurisdiction

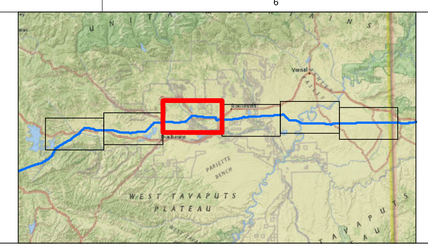
- Tribal
- State

Boundaries

- Township
- Detailed Map Index

Existing Utilities

- Existing Transmission (115 kV or Higher)



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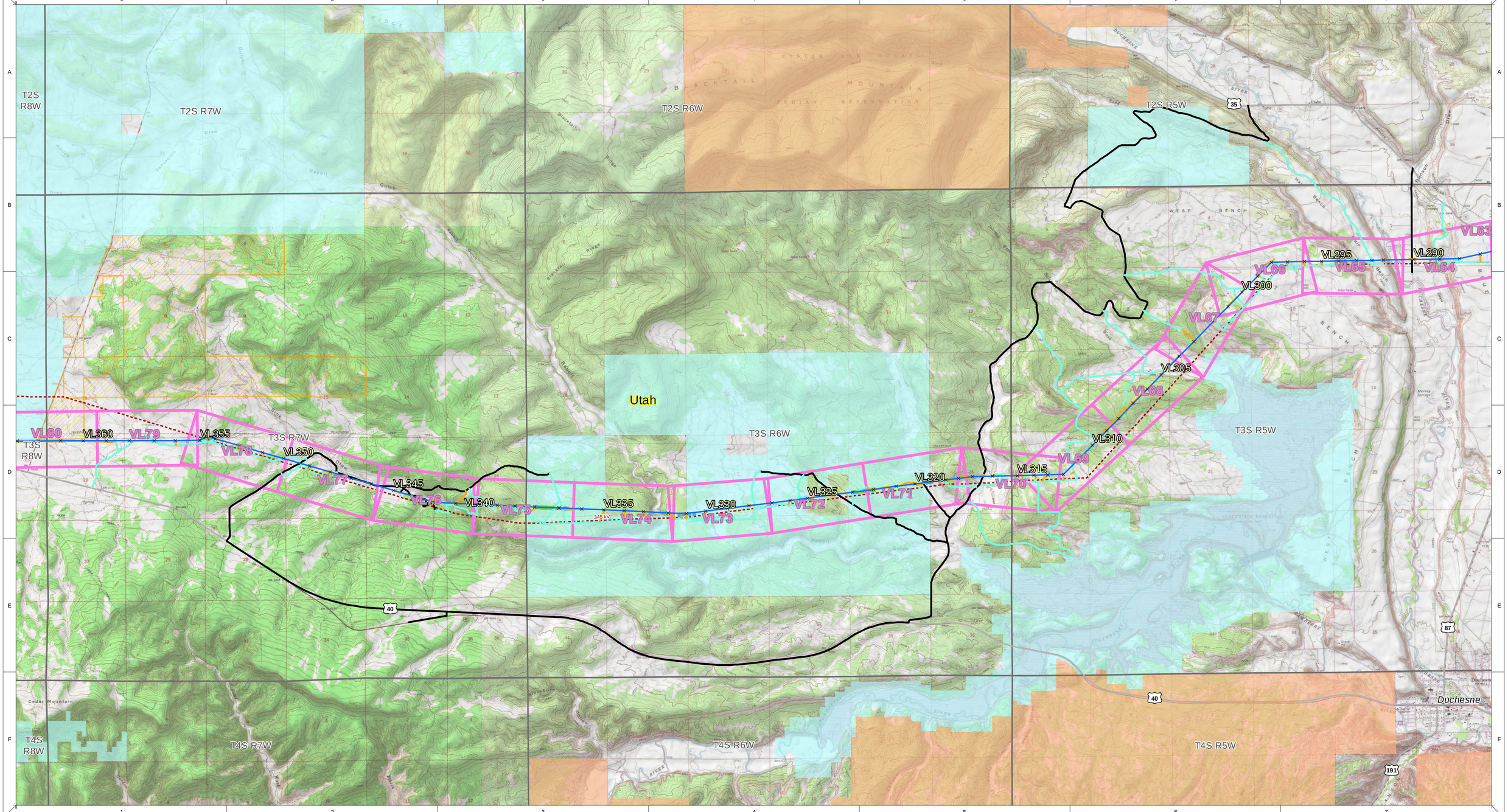

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1:72,000 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- Proposed Tower Location (every 5th structure is labeled)
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road
- Fly Yard/Staging Area on Public Land
- Wire-Pulling, Tensioning, Splicing Site on Public Land
- Material Yard on Public Land

Jurisdiction

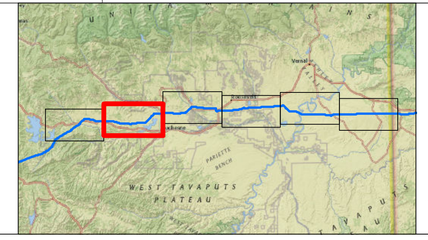
- Tribal
- State
- URMCC

Boundaries

- Township
- Detailed Map Index

Existing Utilities

- Existing Transmission (115 kV or Higher)



Vernal FO Overview

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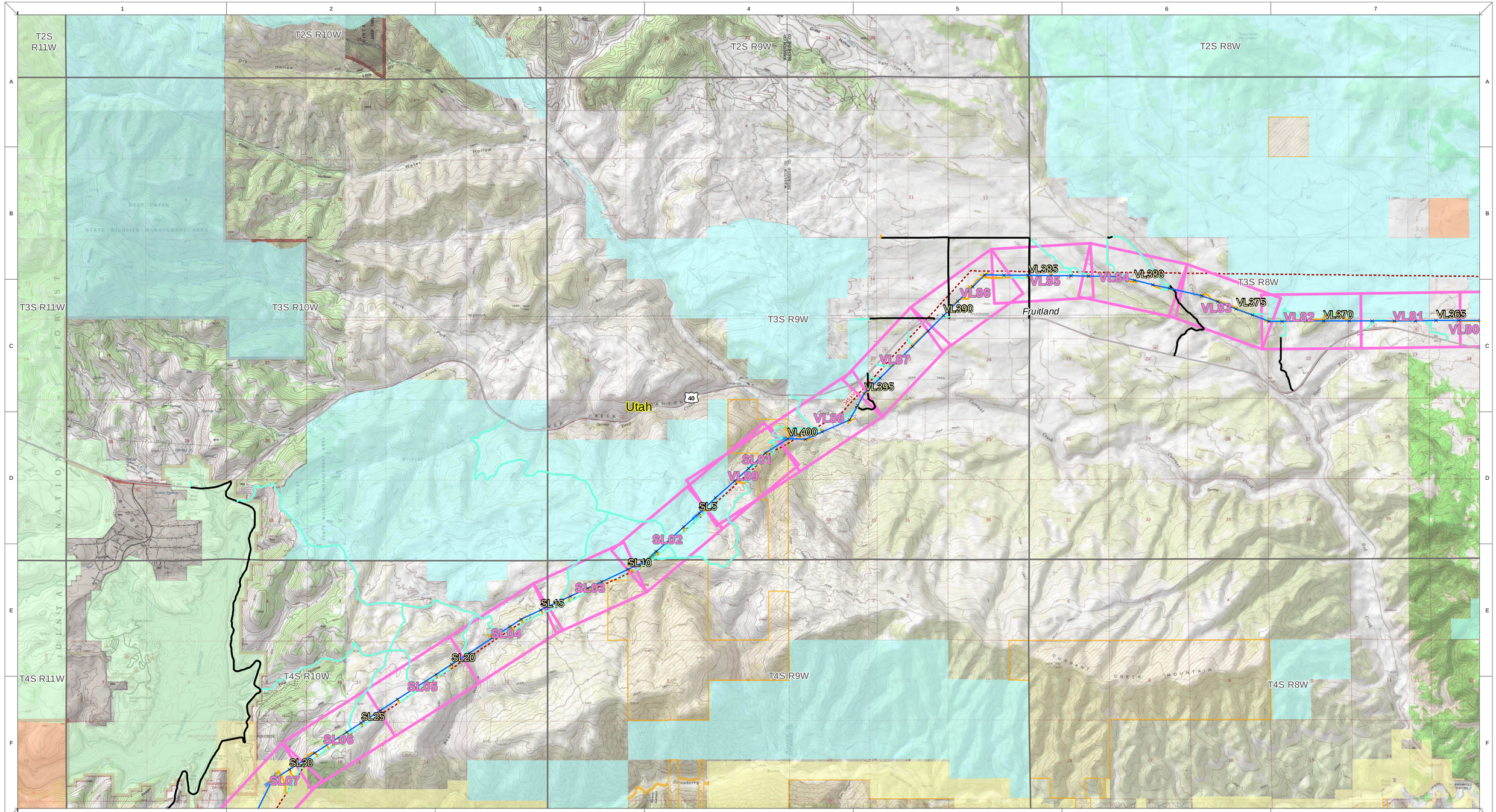

0 1,500 3,000 6,000 Feet

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1:72,000 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- Proposed Tower Location (every 5th structure is labeled)
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road
- Fly Yard/Staging Area on Public Land
- Wire-Pulling, Tensioning, Splicing Site on Public Land
- Material Yard on Public Land

Jurisdiction

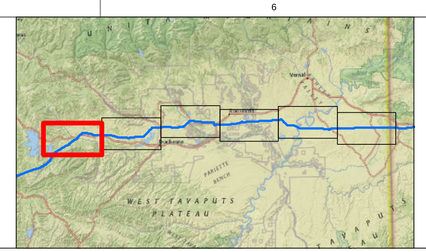
- Tribal
- BOR
- State
- URMCC
- USFS

Boundaries

- Township
- Detailed Map Index

Existing Utilities

- Existing Transmission (115 kV or Higher)



Vernal FO Overview

Date: 3/18/2015

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NOT FOR CONSTRUCTION**

**TRANSWEST EXPRESS TRANSMISSION PROJECT:
VERNAL FIELD OFFICE**

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T7S R25E S2

T7S R25E S1

T7S R25E S11

T7S R25E S12

T3N R104W S1

T3N R104W S15

T7S R25E S15

T7S R25E S1

T3N R104W S15

T3N R104W S12

T7S R25E S12

T3N R104W S15

T7S R25E S15

138 kV

VL3

VL2

VL1

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)
- Mule Deer Crucial Winter (UDWR 2013)
- Antelope Crucial Summer/Paturition (UDWR 2012)
- Ferruginous Hawk

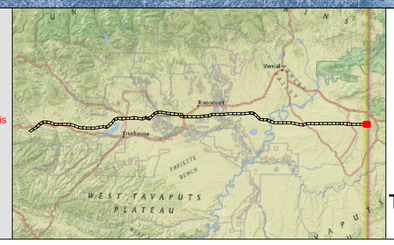
Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- State
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

Note 2: Section and jurisdiction misalignments are due to different data sets and will be reconciled once land surveying is completed.



Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

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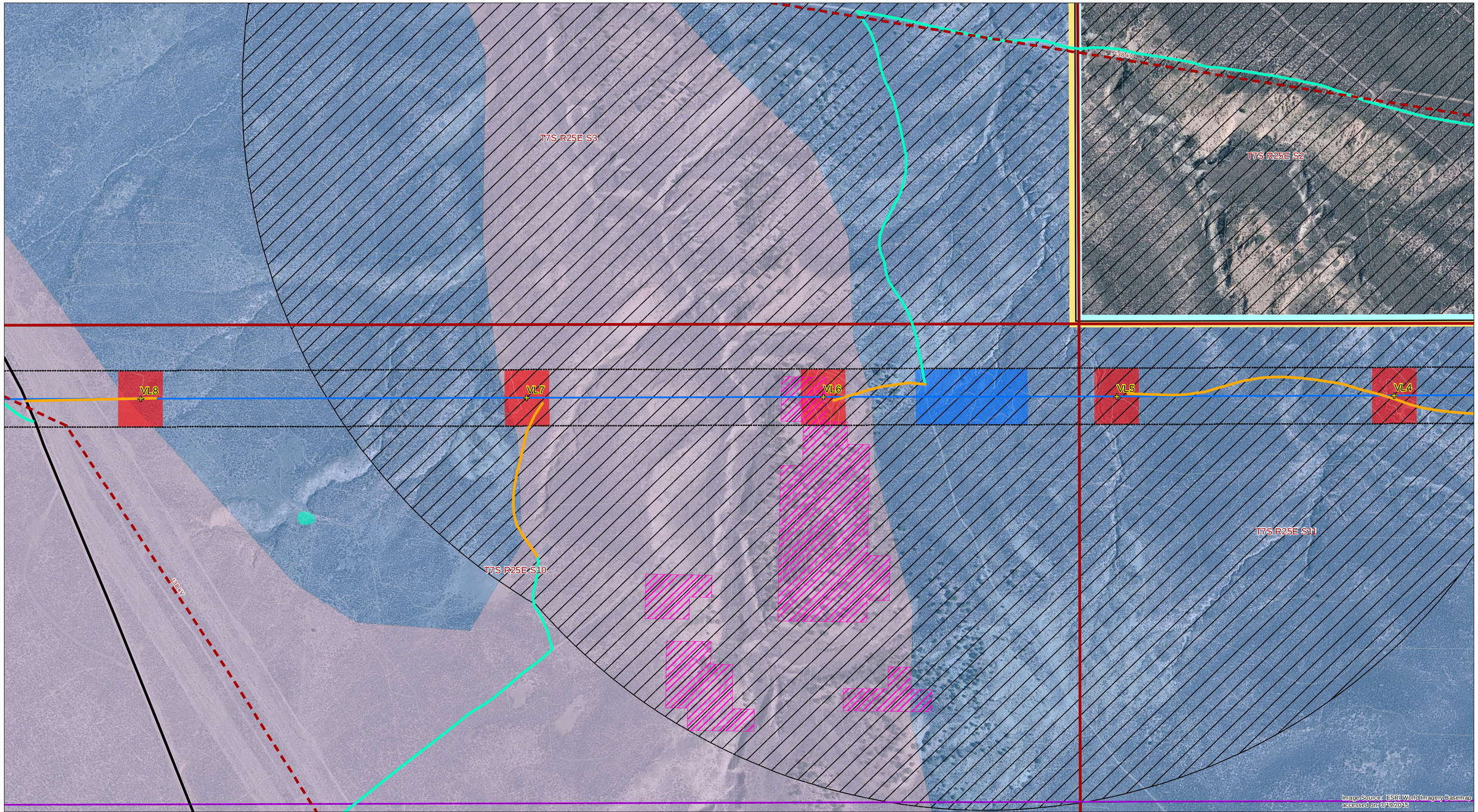


0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)
- Mule Deer Crucial Winter (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)
- Ferruginous Hawk

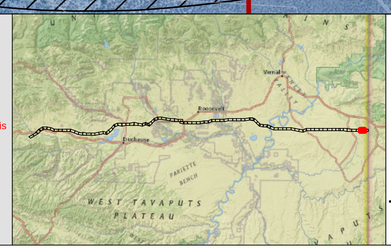
Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- State
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LIDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

Note 2: Section and jurisdiction misalignments are due to different data sets and will be reconciled once land surveying is completed.



Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

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T7S R25E S5

T7S R25E S4

T7S R25E S3

T7S R25E S8

T7S R25E S9

T7S R25E S10

138 kV

VL12

VL11

VL10

VL9

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)
- Mule Deer Crucial Winter (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

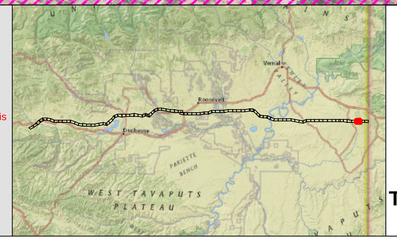
Jurisdiction
- BLM
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

Note 2: Section and jurisdiction misalignments are due to different data sets and will be reconciled once land surveying is completed.



Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

**PRELIMINARY DRAFT:
NOT FOR CONSTRUCTION**

**TRANSWEST EXPRESS TRANSMISSION PROJECT:
VERNAL FIELD OFFICE**

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T7S R25E S6

T7S R25E S5

T7S R25E S7

T7S R25E S8

VL17

VL16

VL15

VL14

VL13

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

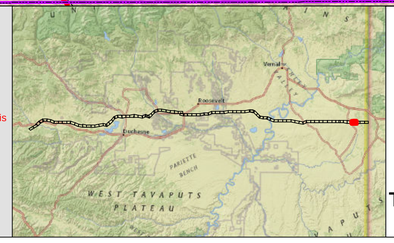
Environmental Resources
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)
- Sage Grouse Lek (UDWR 2013)
- Mule Deer Crucial Winter (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)
- White-tailed Prairie Dog (AECOM 2013)
- Ferruginous Hawk
- Red-tailed Hawk
- Grahams Penstemon Model Habitat (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

Note 2: Section and jurisdiction misalignments are due to different data sets and will be reconciled once land surveying is completed.



Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

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T7S R24E S1

T7S R25E S6

T7S R24E S12

T7S R25E S7

VL21

VL20

VL19

VL18

Image Source: ESRI World Imagery/Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Sage Grouse Lek (UDWR 2013)
- Mule Deer Crucial Winter (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)
- White-tailed Prairie Dog (AECOM 2013)
- Ferruginous Hawk
- Red-tailed Hawk
- Grahams Penstemon Model Habitat (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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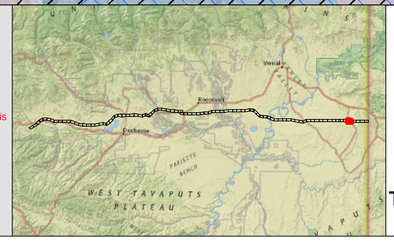

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

**PRELIMINARY DRAFT:
NOT FOR CONSTRUCTION**

**TRANSWEST EXPRESS TRANSMISSION PROJECT:
VERNAL FIELD OFFICE**

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T7S R24E S2

T7S R24E S1

T7S R24E S11

T7S R24E S12

VL26

VL25

VL24

VL23

VL22

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Level III Vegetation Management (AECOM 2014)
- Sage Grouse Lek (UDWR 2013)
- Mule Deer Crucial Winter (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)
- White-tailed Prairie Dog (AECOM 2013)
- Ferruginous Hawk

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- State
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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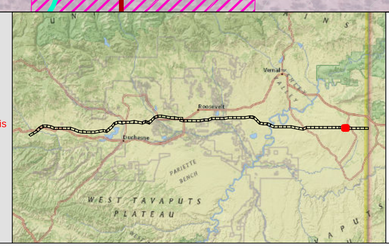

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T7S R24E S4

T7S R24E S3

T7S R24E S2

T7S R24E S9

T7S R24E S10

T7S R24E S11

VL30

VL29

VL28

VL27

Image Source : ESRI World Imagery Baseman accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
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- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Level III Vegetation Management (AECOM 2014)
- Sage Grouse Lek (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)
- White-tailed Prairie Dog (AECOM 2013)
- Ferruginous Hawk
- Red-tailed Hawk

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- State
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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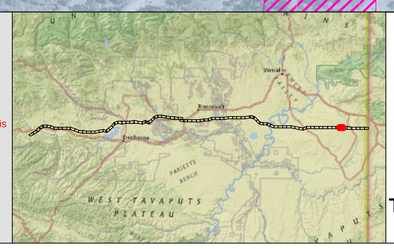

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

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T7S R24E S4

T7S R24E S3

VL34

VL33

VL32

VL31

VL30

T7S R24E S9

T7S R24E S10

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources

- Level III Vegetation Management (AECOM 2014)
- Sage Grouse Lek (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)
- Red-tailed Hawk

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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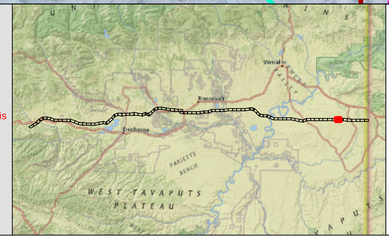

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T7S R24E S6

T7S R24E S5

T7S R24E S4

T7S R24E S9

T7S R24E S7

T7S R24E S8

VL38

VL37

VL36

VL35

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)
- Sage Grouse Lek (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)
- Red-tailed Hawk

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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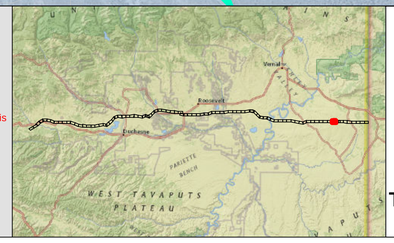

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T7S R23E S1

T7S R24E S6

T7S R23E S12

T7S R24E S7

VL42

VL41

VL40

VL39

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Level III Vegetation Management (AECOM 2014)
- Antelope Crucial Summer/Parturition (UDWR 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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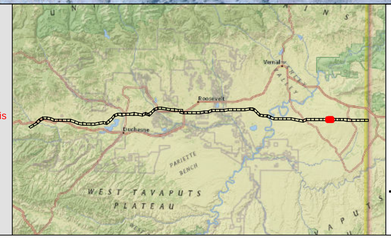

Vernal FO - Constraints, Access Roads, and Work Area Details

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T7S R23E S2

T7S R23E S1

T7S R23E S11

T7S R23E S12

VL47

VL46

VL45

VL44

VL43

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Level III Vegetation Management (AECOM 2014)
- Antelope Crucial Summer/Parturition (UDWR 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- State
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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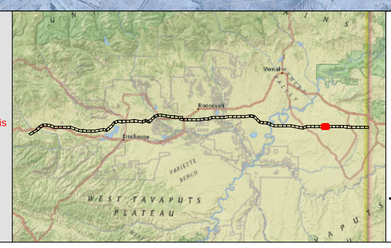

Vernal FO - Constraints, Access Roads, and Work Area Details

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T7S R23E S3

T7S R23E S2

VL52

VL51

VL50

VL49

VL48

T7S R23E S10

T7S R23E S11

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Level III Vegetation Management (AECOM 2014)
- Antelope Crucial Summer/Parturition (UDWR 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- State
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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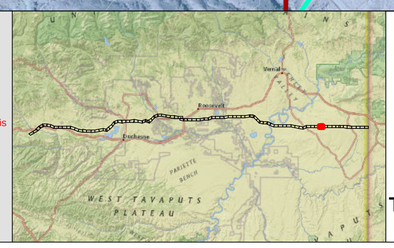

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T7S R23E S5

T7S R23E S4

T7S R23E S3

T7S R23E S10

T7S R23E S9

T7S R23E S8

VL57

VL56

VL55

VL54

VL53

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
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- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources

- NWI Wetland (USGS 2012)
- Antelope Crucial Summer/Parturition (UDWR 2012)

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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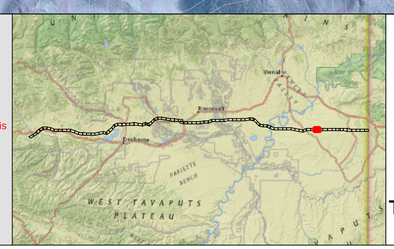

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T7S R23E S6

T7S R23E S5

T7S R23E S7

T7S R23E S8

VL62

VL61

VL60

VL59

VL58

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

Legend

Project Features (Agency Preferred Alternative)

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- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources

- Antelope Crucial Summer/Parturition (UDWR 2012)
- Golden Eagle
- Red-tailed Hawk

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- BLM
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Vernal FO - Constraints, Access Roads, and Work Area Details

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T7S R22E S1

T7S R23E S6

T7S R22E S12

T7S R23E S7

VL67

VL66

VL65

VL64

VL63

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
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- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Antelope Crucial Summer/Parturition (UDWR 2012)
- Golden Eagle
- Red-tailed Hawk

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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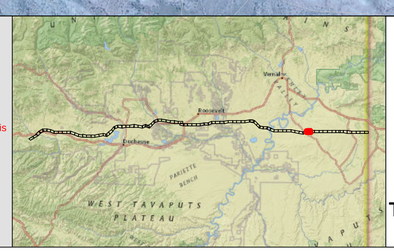

Vernal FO - Constraints, Access Roads, and Work Area Details

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T7S R22E S2

T7S R22E S1

T7S R22E S11

T7S R22E S12

VL72

VL71

VL70

VL69

VL68

VL67

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
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- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
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- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Antelope Crucial Summer/Parturition (UDWR 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- State
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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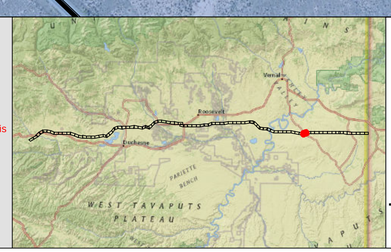

Vernal FO - Constraints, Access Roads, and Work Area Details

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T7S R22E S3

345 kV

VL76

VL75

VL74

VL73

VL72

T7S R22E S10

T7S R22E S11

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

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1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

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- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Antelope Crucial Summer/Parturition (UDWR 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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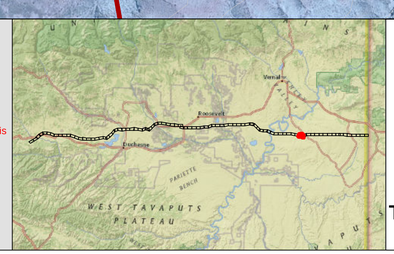
Note 2: Section and jurisdiction misalignments are due to different data sets and will be reconciled once land surveying is completed.



Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

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T7S R22E S4

T7S R22E S3

T7S R22E S10

345 kV

VL80

VL79

VL78

VL77

T7S R22E S9

T7S R22E S8

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Antelope Crucial Summer/Parturition (UDWR 2012)
- Ferruginous Hawk
- Red-tailed Hawk

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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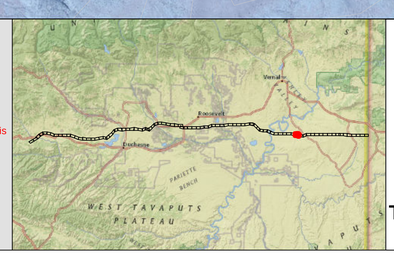

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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TRANSWEST EXPRESS TRANSMISSION PROJECT:
VERNAL FIELD OFFICE

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T7S R22E S4
T7S R22E S5
T7S R22E S6
T7S R22E S9
T7S R22E S8
T7S R22E S7
345 kV
VL85
VL84
VL83
VL82
VL81

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Antelope Crucial Summer/Parturition (UDWR 2012)
- Permanent Water Source (AECOM 2013)
- Ferruginous Hawk
- Golden Eagle
- Great Horned Owl
- Red-tailed Hawk

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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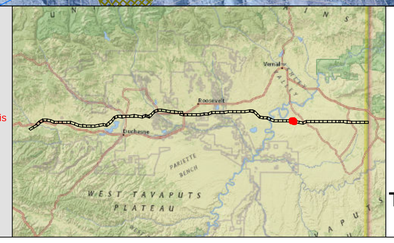

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T7S R21E S1

T7S R22E S6

T7S R21E S12

T7S R22E S7

345 kV

VL89

VL88

VL87

VL86

VL85

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Antelope Crucial Summer/Parturition (UDWR 2012)
- Golden Eagle
- Red-tailed Hawk

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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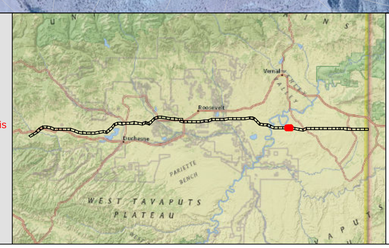

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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**TRANSWEST EXPRESS TRANSMISSION PROJECT:
VERNAL FIELD OFFICE**

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T7S R21E S2

T7S R21E S1

T7S R21E S11

T7S R21E S12

345 kV

VL93

VL92

VL91

VL90

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Bird Habitat Concentration Area (AECOM 2014)
- Antelope Crucial Summer/Parturition (UDWR 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- State
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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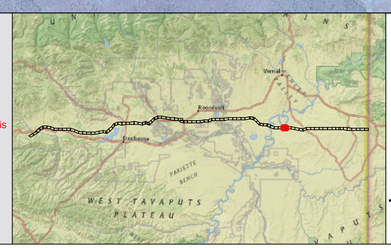

Vernal FO - Constraints, Access Roads, and Work Area Details

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T7S R21E S3

T7S R21E S2

T7S R21E S10

T7S R21E S11

348 kV

VL97

VL96

VL95

VL94

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Bird Habitat Concentration Area (AECOM 2014)
- Antelope Crucial Summer/Parturition (UDWR 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- State
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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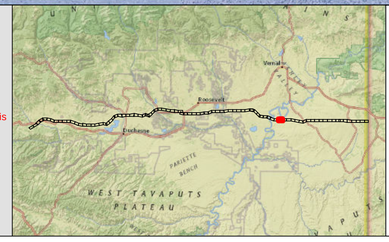

Vernal FO - Constraints, Access Roads, and Work Area Details

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T7S R21E S4

T7S R21E S3

T7S R21E S9

T7S R21E S10

345 kV

VL102

VL101

VL100

VL99

VL98

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Level III Vegetation Management (AECOM 2014)
- Antelope Crucial Summer/Parturition (UDWR 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LIDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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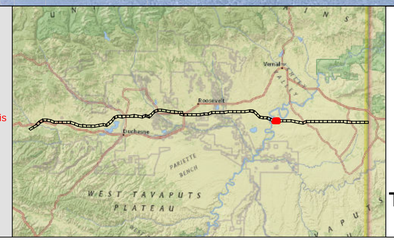

Vernal FO - Constraints, Access Roads, and Work Area Details

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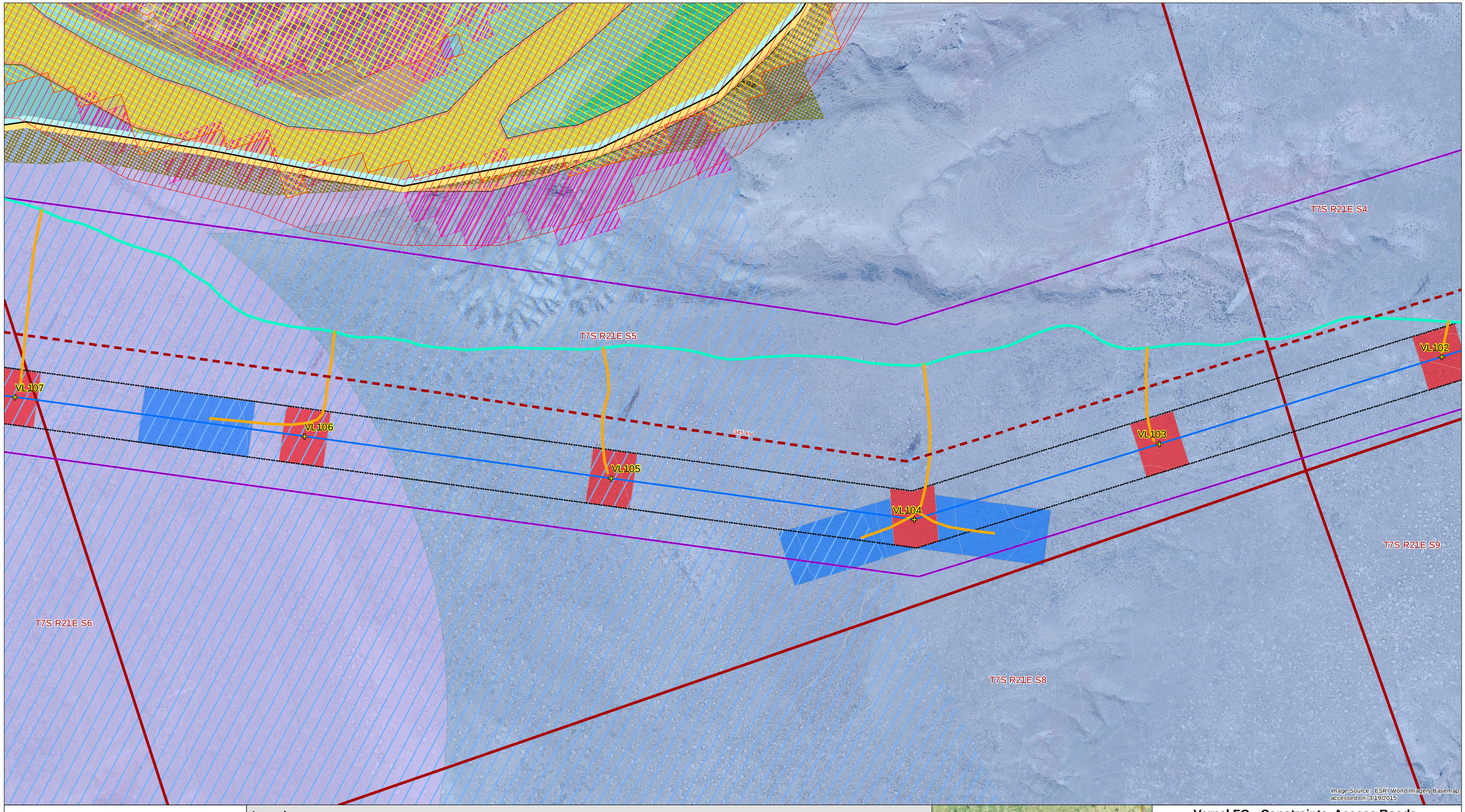

0 200 400 800 Feet

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1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)
- Western Yellow-billed Cuckoo Model Habitat (AECOM 2013)
- Bird Habitat Concentration Area (AECOM 2014)
- Antelope Crucial Summer/Parturition (UDWR 2012)
- Permanent Water Source (AECOM 2013)
- Bald Eagle Winter Roost (AECOM 2010)
- Colorado Pike Minnow (AECOM 2012)
- Razorback Sucker (AECOM 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- State
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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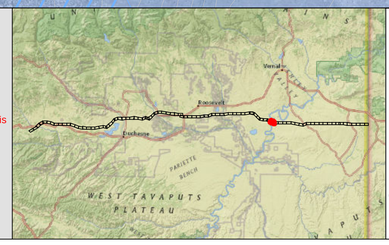

Vernal FO - Constraints, Access Roads, and Work Area Details

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T6S R21E S31

T6S R20E S36

T7S R21E S5

T7S R21E S6

T7S R20E S1

345 kV

VL112

VL111

VL110

VL109

VL108

VL107

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Structure Work Area
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- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)
- Western Yellow-billed Cuckoo Model Habitat (AECOM 2013)
- Bird Habitat Concentration Area (AECOM 2014)
- Sage Grouse Lek (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)
- Permanent Water Source (AECOM 2013)
- Bald Eagle Winter Roost (AECOM 2010)
- Colorado Pike Minnow (AECOM 2012)
- Razorback Sucker (AECOM 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- PRIVATE
- State
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LIDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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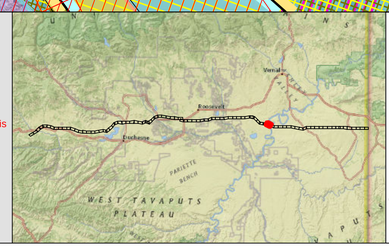

Vernal FO - Constraints, Access Roads, and Work Area Details

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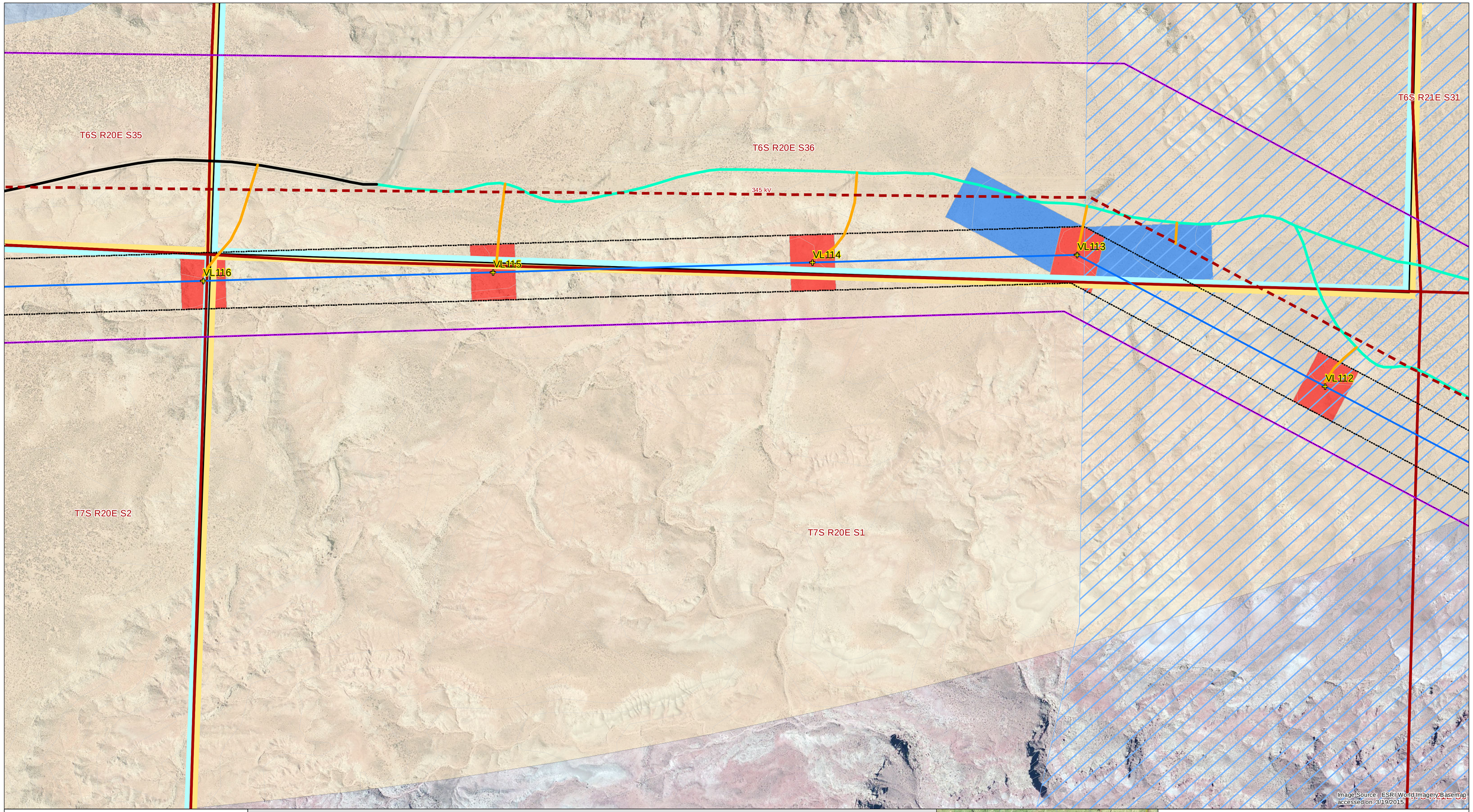

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1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Bird Habitat Concentration Area (AECOM 2014)
- Sage Grouse Lek (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- State
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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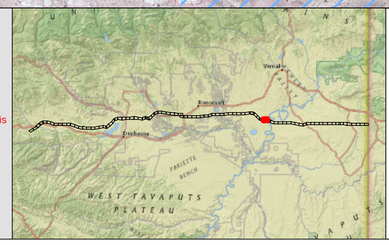

Vernal FO - Constraints, Access Roads, and Work Area Details

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T6S R20E S35

T6S R20E S34

345 kV

VL121

VL118

VL117

VL119

VL120

T7S R20E S2

T7S R20E S3

Image Source: ESRI World Imagery Basemap
accessed on: 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Sage Grouse Lek (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway
- State
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Jurisdiction
- BLM

Existing Utilities
- Existing Transmission (115 kV or Higher)

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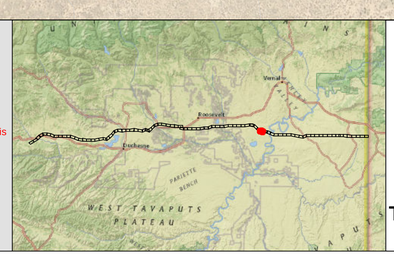

Vernal FO - Constraints, Access Roads, and Work Area Details

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T6S R20E S27

T6S R20E S35

T6S R20E S34

345 kV

VL125

VL124

VL123

VL122

VL121

T6S R20E S33

T7S R20E S3

Image Source: ESRI World Imagery Basemap
accessed on: 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- PRIVATE
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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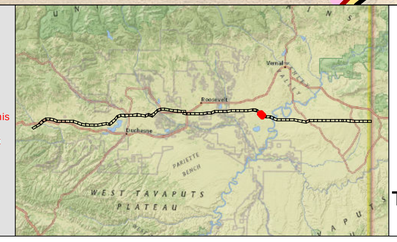

Vernal FO - Constraints, Access Roads, and Work Area Details

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T6S R20E S27

T6S R20E S34

T6S R20E S28

345 kV

VL129

VL128

VL127

VL126

T6S R20E S33

T6S R20E S29

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Sage Grouse Lek (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

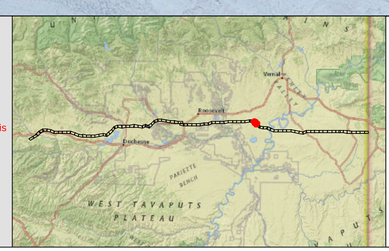
Jurisdiction
- BLM
- PRIVATE
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

Note 2: Section and jurisdiction misalignments are due to different data sets and will be reconciled once land surveying is completed.



Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

**PRELIMINARY DRAFT:
NOT FOR CONSTRUCTION**

**TRANSWEST EXPRESS TRANSMISSION PROJECT:
VERNAL FIELD OFFICE**

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T6S R20E S20

T6S R20E S21

T6S R20E S28

T6S R20E S29

345 kV

VL130

VL131

VL132

VL133

VL129

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Recreation Mitigation (AECOM 2014)
- Sage Grouse Lek (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)
- Red-tailed Hawk

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LIDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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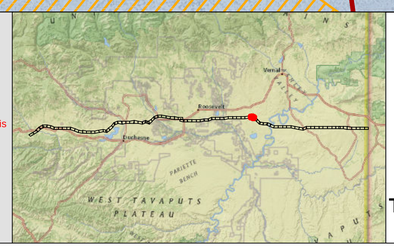

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T6S R20E S19

T6S R20E S20

T6S R20E S21

345 kV

VL134

VL133

VL132

VL131

VL130

T6S R20E S30

T6S R20E S29

T6S R20E S28

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Recreation Mitigation (AECOM 2014)
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)
- Sage Grouse Lek (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)
- Red-tailed Hawk

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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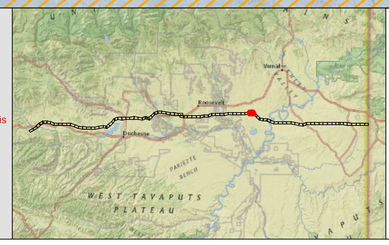

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

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T6S R19E S24

T6S R20E S19

T6S R20E S30

T6S R19E S25

345 kV

VL139

VL138

VL137

VL136

VL135

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Recreation Mitigation (AECOM 2014)
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)
- Sage Grouse Lek (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)
- Red-tailed Hawk

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LIDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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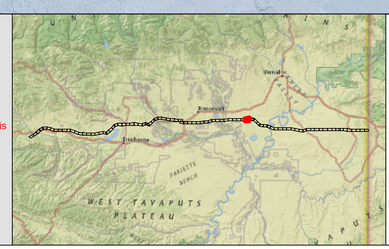

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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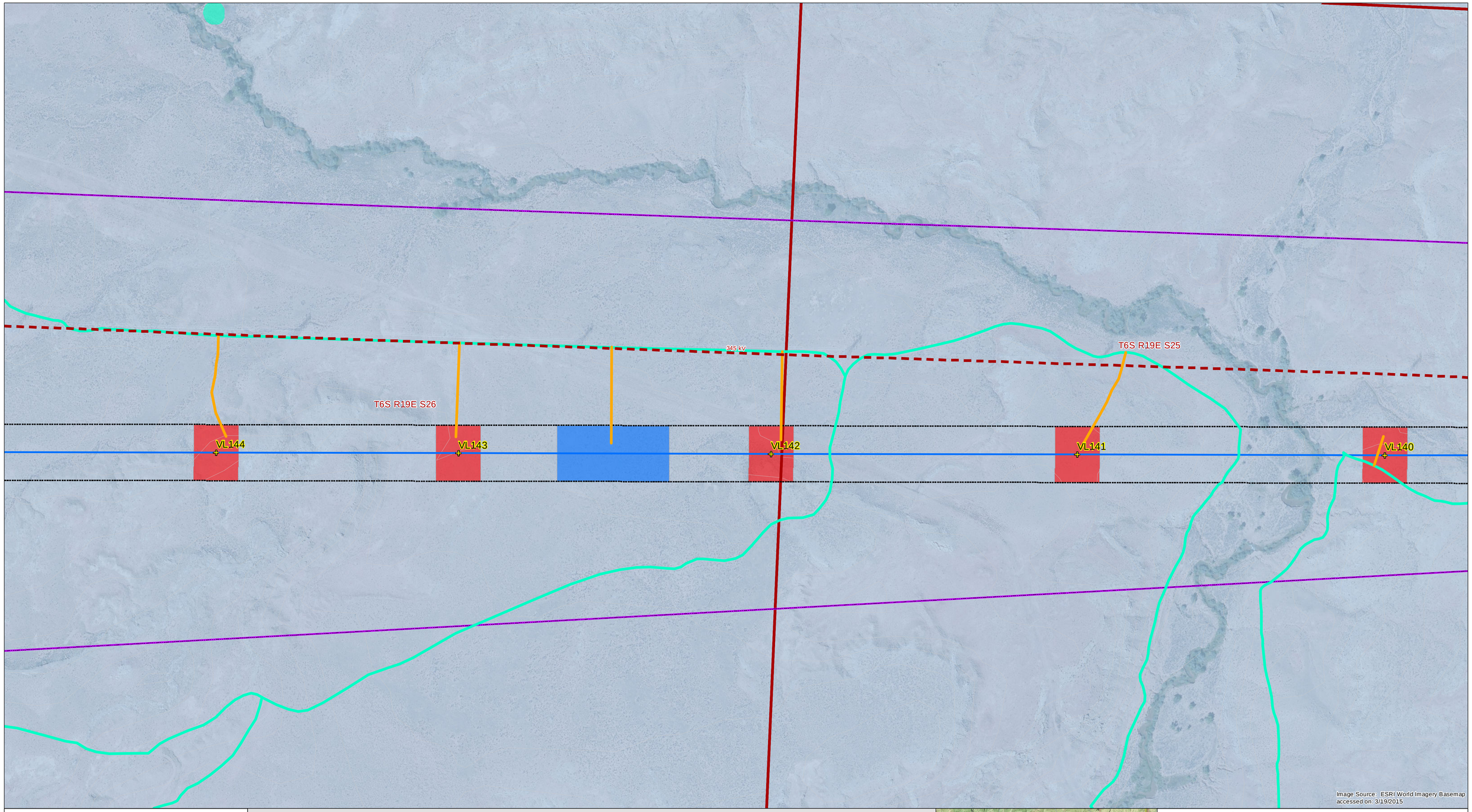

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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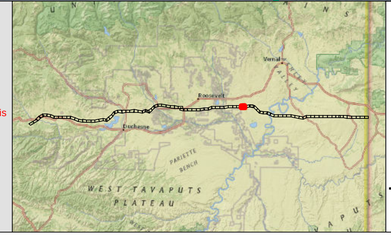

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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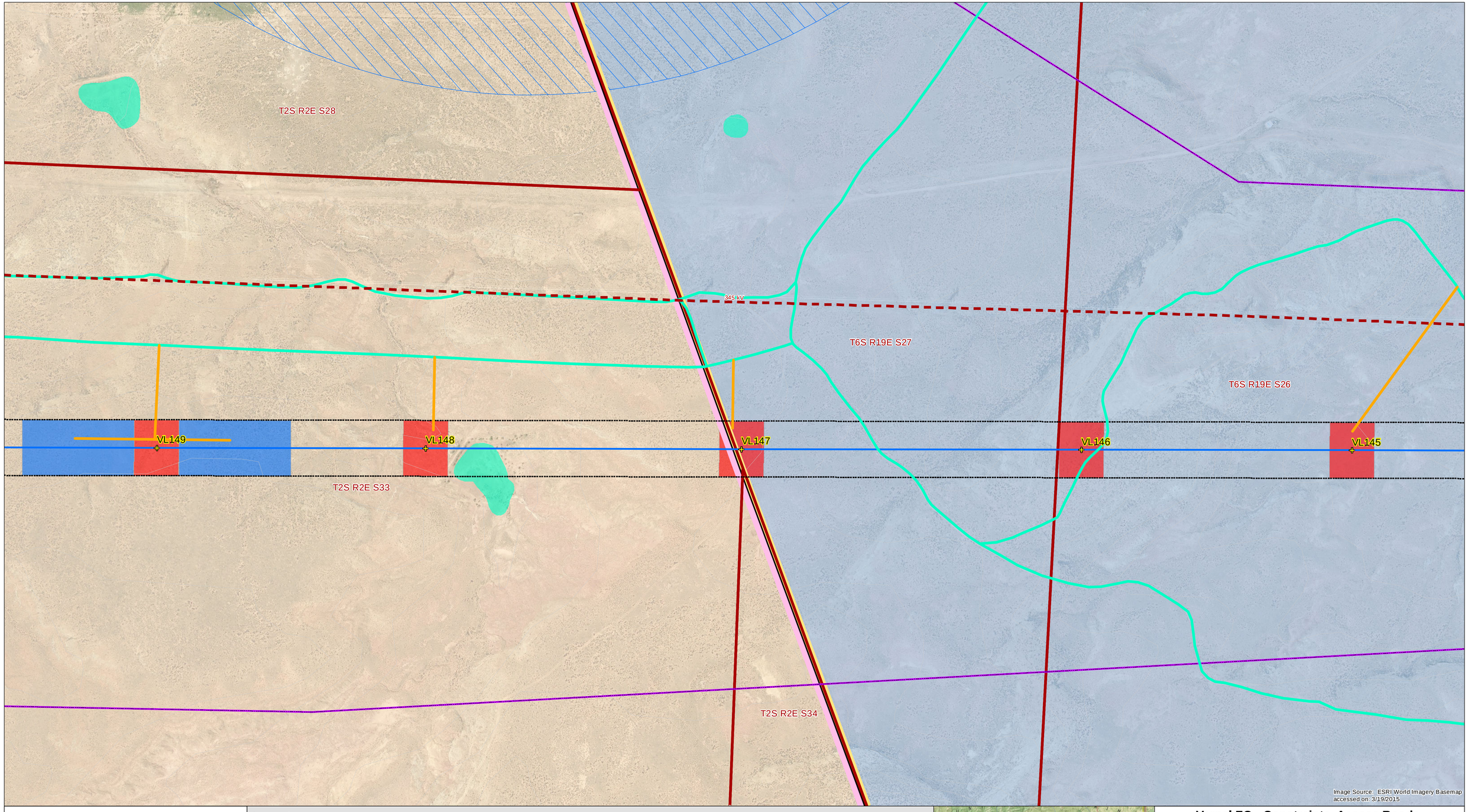

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)
- Antelope Crucial Summer/Parturition (UDWR 2012)
- Red-tailed Hawk

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- PRIVATE
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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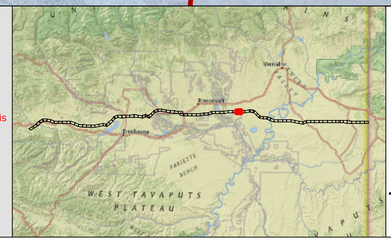

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T2S R2E S29

T2S R2E S28

345 kV

T2S R2E S32

VL154

VL153

VL152

VL151

VL150

T2S R2E S33

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources

- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities

- Existing Transmission (115 kV or Higher)

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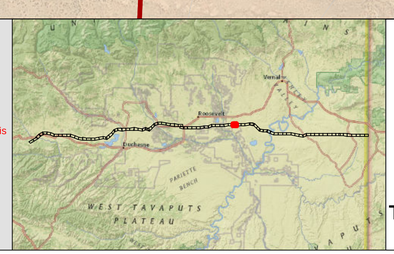

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T2S R1E S25

T2S R2E S30

T2S R2E S29

345 kV

T2S R1E S36

VL159

VL158

VL157

VL156

VL155

T2S R2E S32

T2S R2E S31

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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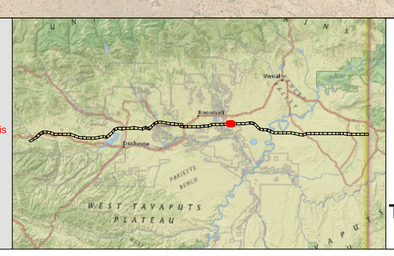

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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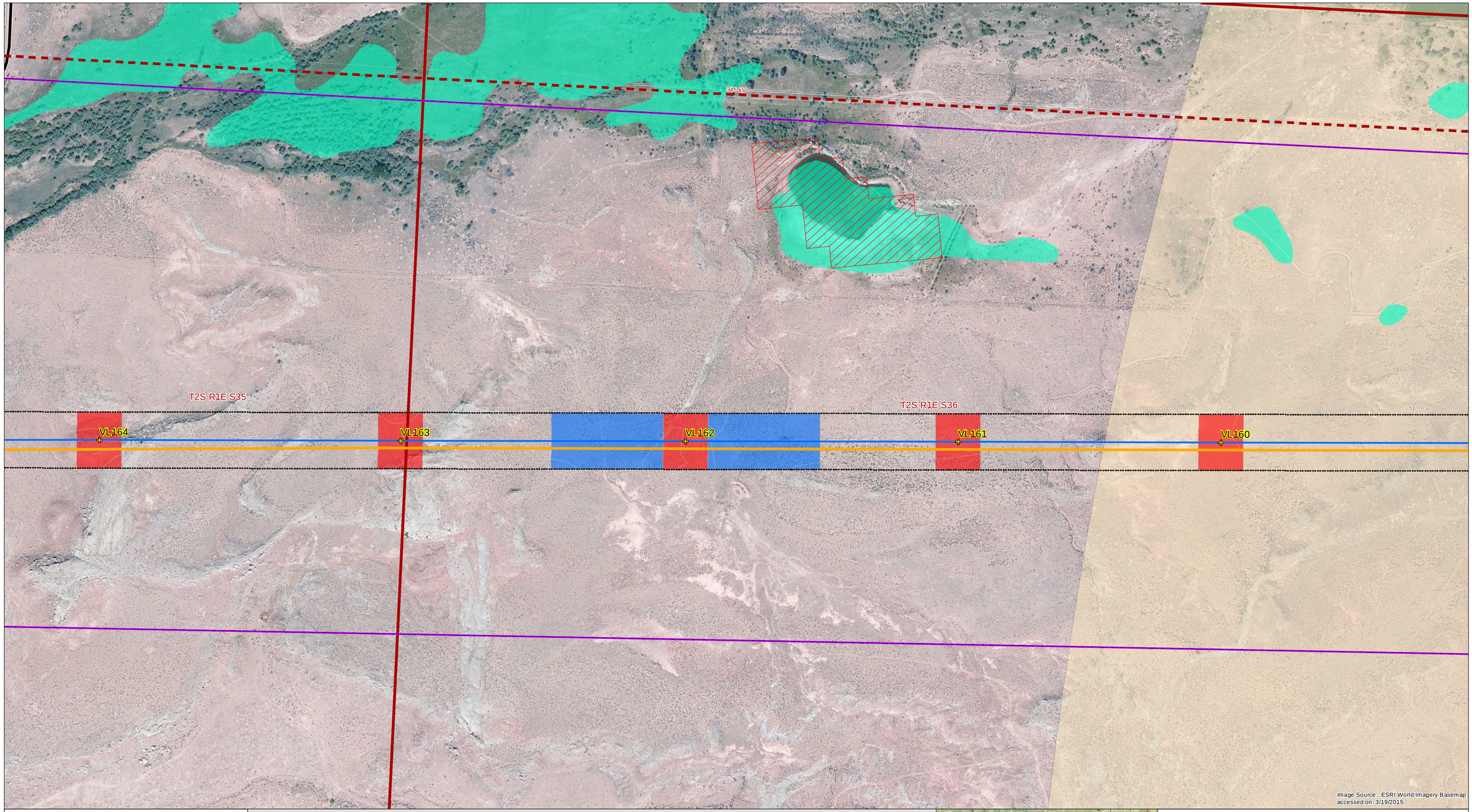

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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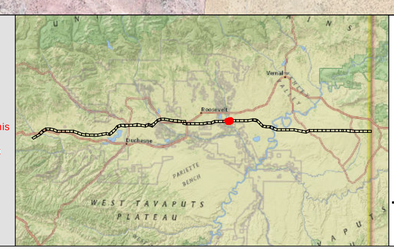

Vernal FO - Constraints, Access Roads, and Work Area Details

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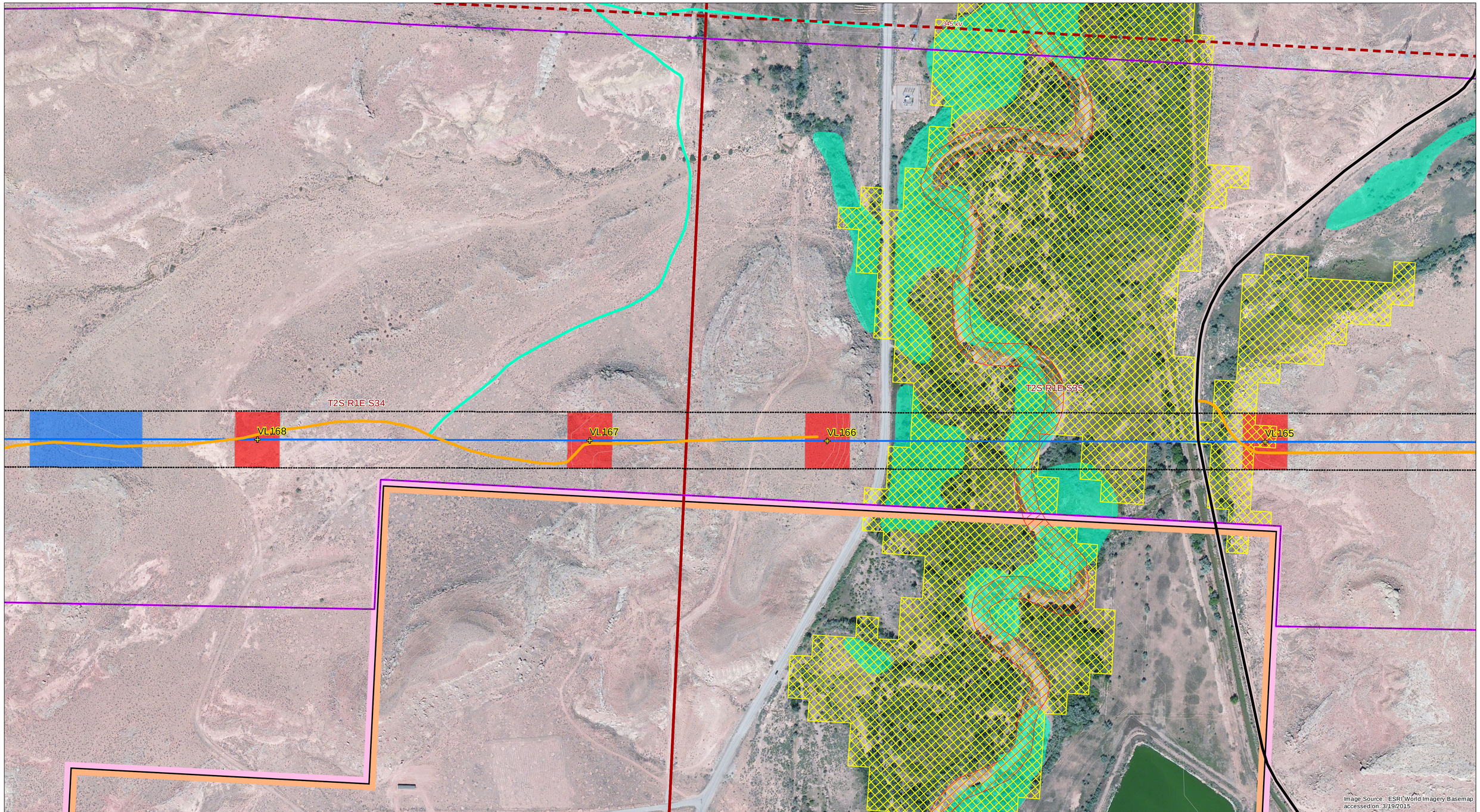

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Western Yellow-billed Cuckoo Model Habitat (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- Tribal
- PRIVATE
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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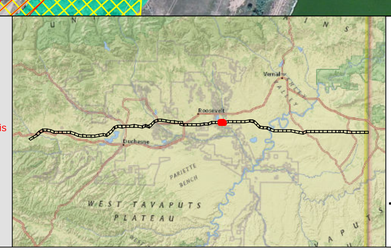

Vernal FO - Constraints, Access Roads, and Work Area Details

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T2S R1E S33

T2S R1E S34

VL173 VL172 VL171 VL170 VL169

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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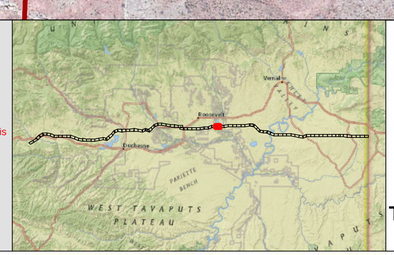

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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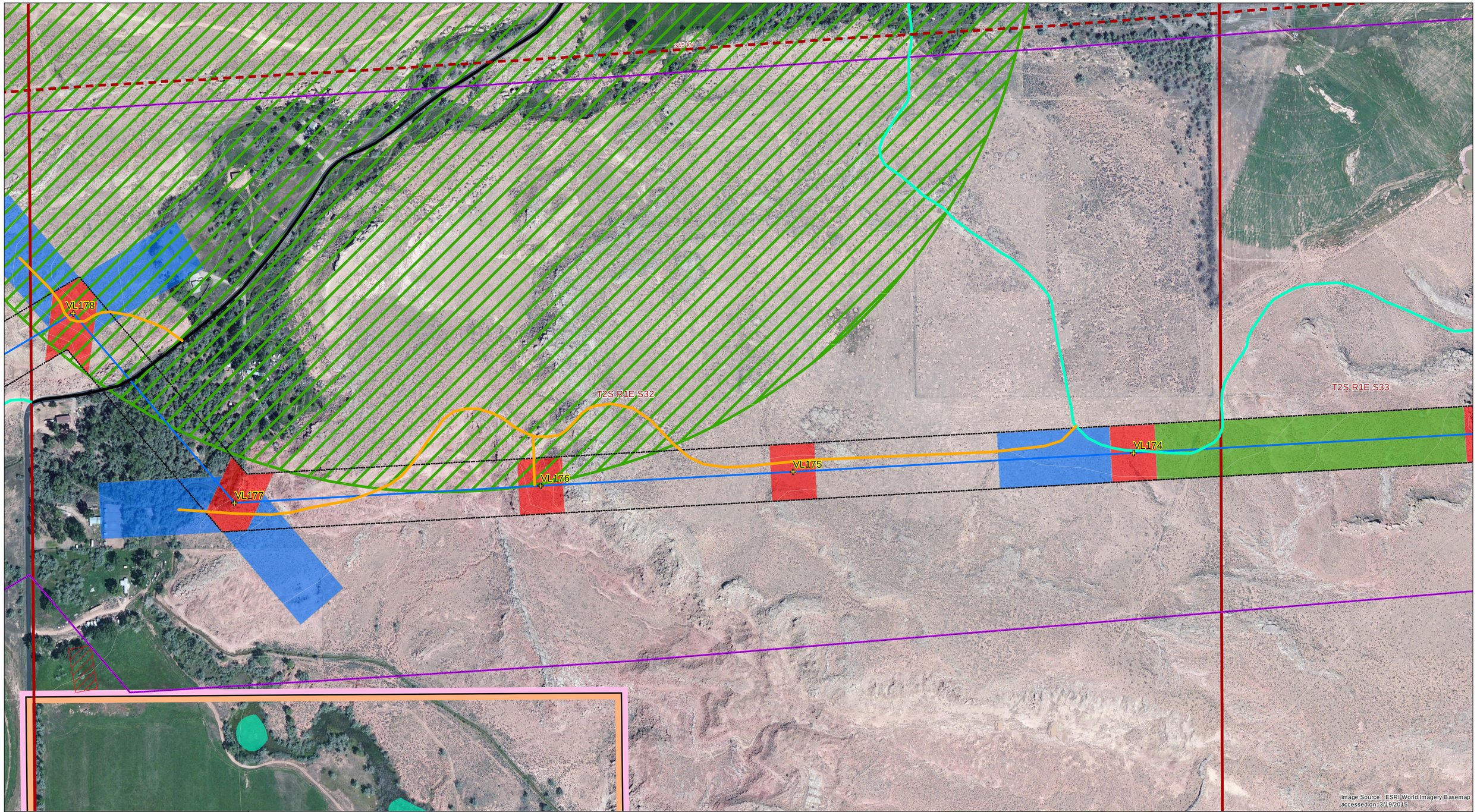

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- Structure Work Area
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- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Golden Eagle

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- Tribal
- PRIVATE
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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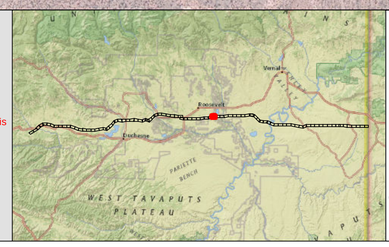

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T2S R1W S36

T2S R1E S31

T2S R1E S32

T3S R1W S1

T3S R1E S6

345 kV

VL178

VL179

VL180

VL181

VL182

VL183

VL184

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Western Yellow-billed Cuckoo Model Habitat (AECOM 2013)
- Golden Eagle

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- Tribal
- PRIVATE
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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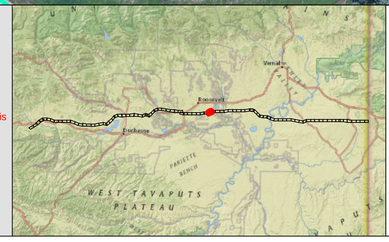

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

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T2S R1W S35

T2S R1W S36

T2S R1E S31

T3S R1W S1

T3S R1W S2

T3S R1E S6

VL188

VL187

VL186

VL185

VL184

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Western Yellow-billed Cuckoo Model Habitat (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- Tribal
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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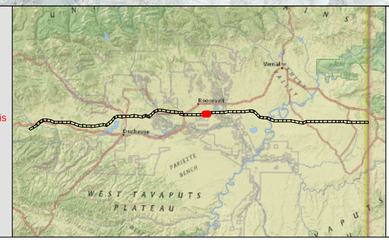

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T2S R1W S34

T2S R1W S35

T3S R1W S3

T3S R1W S2

VL192

VL191

VL193

VL190

VL189

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Western Yellow-billed Cuckoo Model Habitat (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- Tribal
- PRIVATE
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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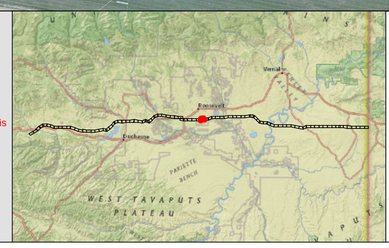

Vernal FO - Constraints, Access Roads, and Work Area Details

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T2S R1W S33

T2S R1W S34

VL197

VL196

VL195

VL194

T3S R1W S4

T3S R1W S3

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources

- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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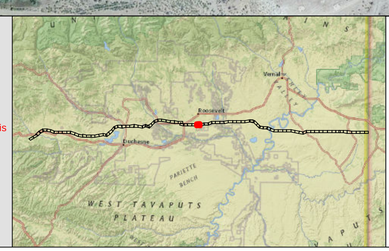

Vernal FO - Constraints, Access Roads, and Work Area Details

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T2S R1W S32

T2S R1W S33

VL201

T3S R1W S5

VL200

VL199

T3S R1W S4

VL198

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- High Landslide Potential (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

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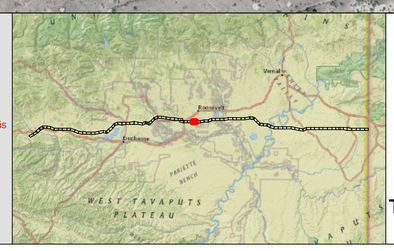

Vernal FO - Constraints, Access Roads, and Work Area Details

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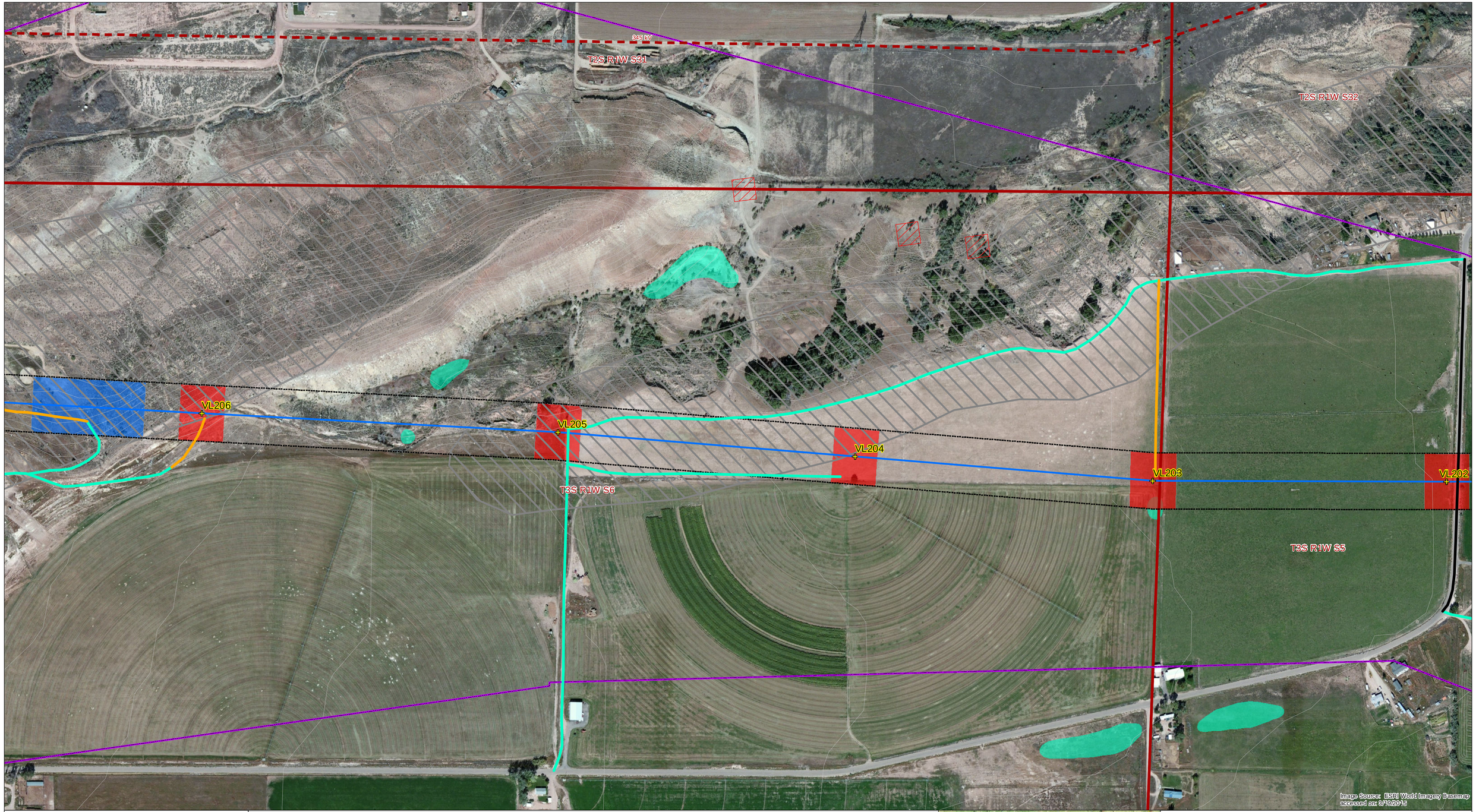

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1:2,400 when printed on 34x22 inch sheet
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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- Preliminary Tower Location
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- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- High Landslide Potential (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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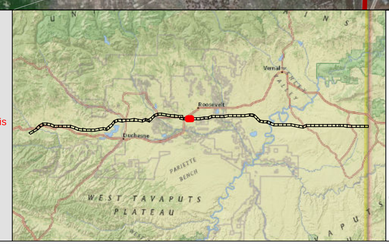

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

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T2S R2W S36

T2S R1W S31

T3S R2W S2

VL211

VL210

VL209

VL208

VL207

T3S R2W S1

T3S R1W S6

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Western Yellow-billed Cuckoo Model Habitat (AECOM 2013)
- High Landslide Potential (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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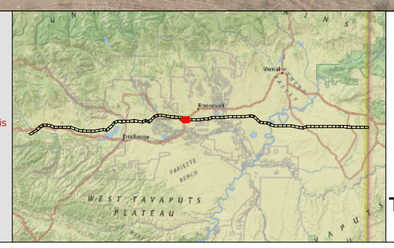

Vernal FO - Constraints, Access Roads, and Work Area Details

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T2S R2W S35

T2S R2W S34

T3S R2W S1

T3S R2W S2

T3S R2W S3

VL216

VL215

VL214

VL213

VL212

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
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- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources

- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- High Landslide Potential (AECOM 2013)

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- PRIVATE
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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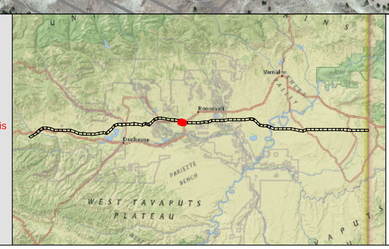

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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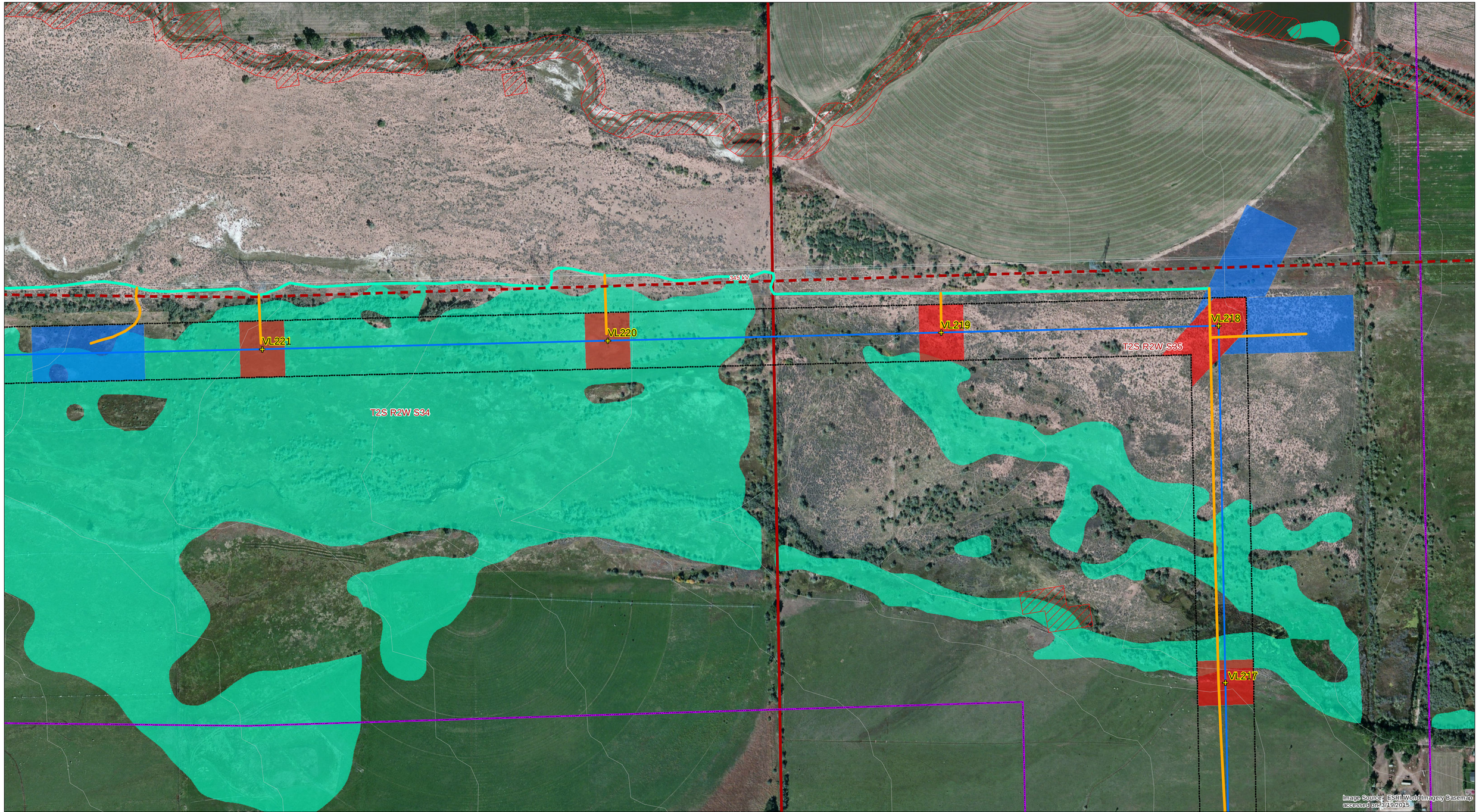

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1:2,400 when printed on 34x22 inch sheet
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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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Environmental Resources
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- NWI Wetland (USGS 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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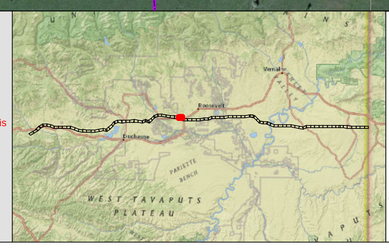

Vernal FO - Constraints, Access Roads, and Work Area Details

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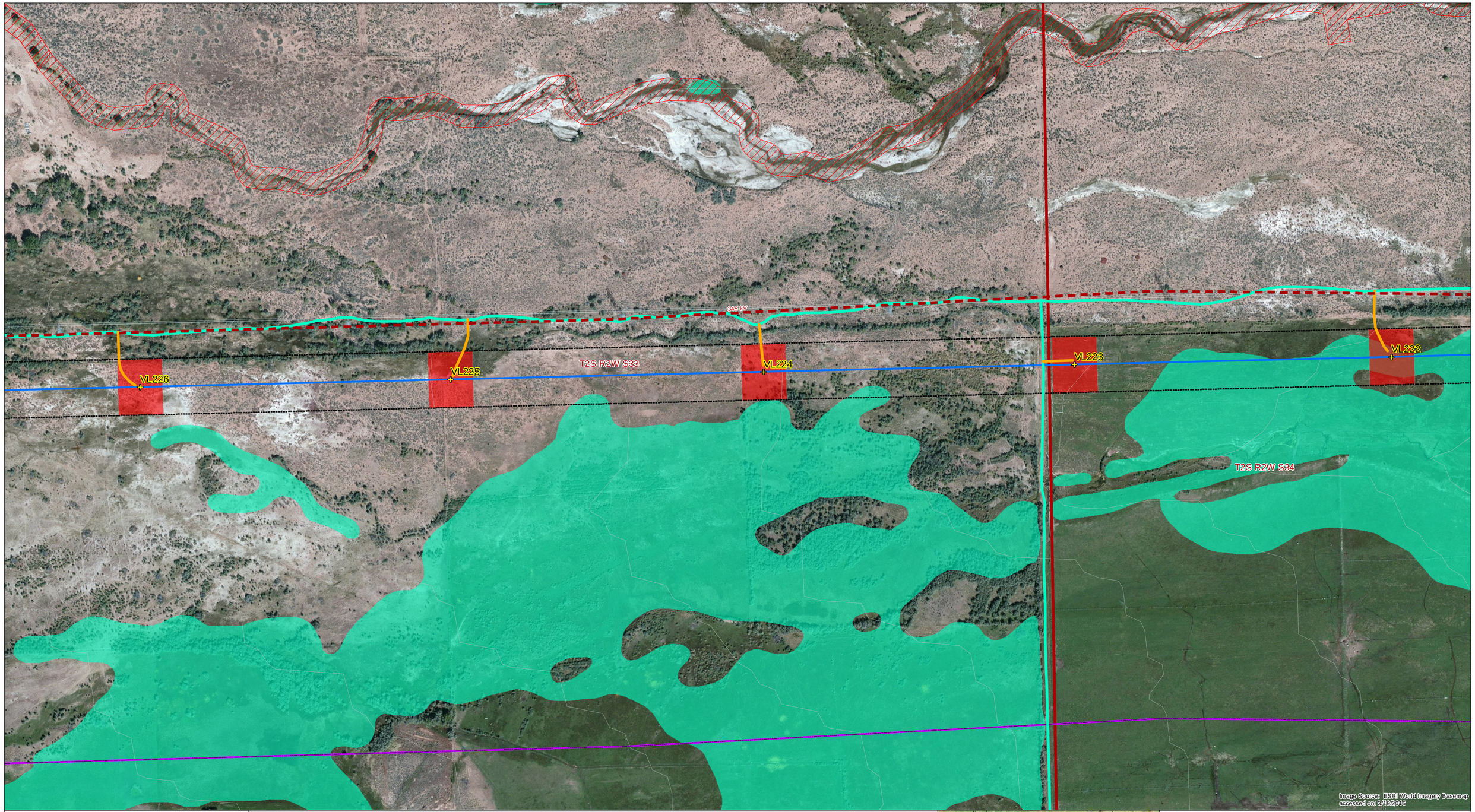

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

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- New Road

Environmental Resources
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- NWI Wetland (USGS 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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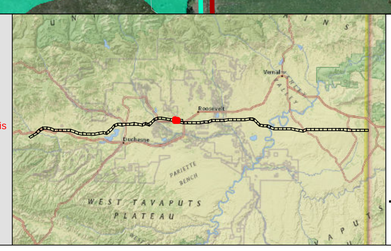

Vernal FO - Constraints, Access Roads, and Work Area Details

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T2S R2W S32

345 kV

T2S R2W S33

T2S R2W S31

VL227

VL228

VL229

VL230

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

0 200 400 800 Feet

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1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

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Environmental Resources

- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- PRIVATE
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities

- Existing Transmission (115 kV or Higher)

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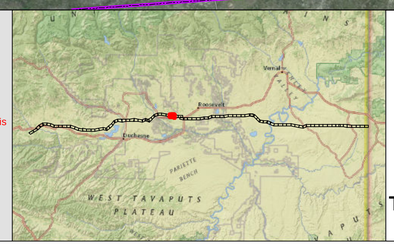

Vernal FO - Constraints, Access Roads, and Work Area Details

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T2S R3W S25

T2S R2W S30

T2S R3W S36

T2S R2W S31

345 kV

VL235

VL234

VL233

VL232

VL231

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

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- New Road

Environmental Resources
- NWI Wetland (USGS 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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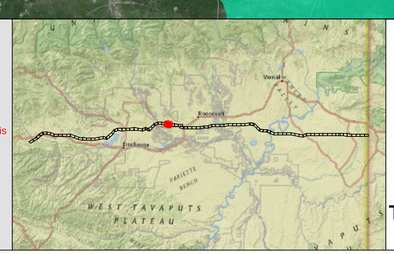

Vernal FO - Constraints, Access Roads, and Work Area Details

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T2S R3W S26

T2S R3W S25

VL240

VL239

VL238

VL237

VL236

T2S R3W S36

345 kV

T2S R3W S35

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

0 200 400 800 Feet

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
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- New Road

Environmental Resources

- NWI Wetland (USGS 2012)

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- PRIVATE
- Section

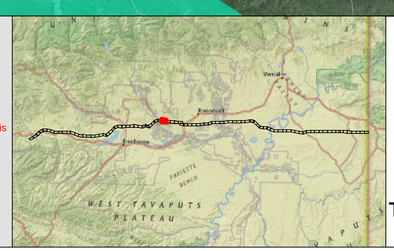
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities

- Existing Transmission (115 kV or Higher)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

Note 2: Section and jurisdiction misalignments are due to different data sets and will be reconciled once land surveying is completed.



Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

ATTENTION: This map contains information that is Proprietary & Confidential. It is for the intended recipient(s) only and is exempt from disclosure pursuant 5 U.S.C. §552(b)(4).

T2S R3W S27

T2S R3W S26

T2S R3W S34

T2S R3W S35

345 kV

VL246

VL245

VL244

VL243

VL242

VL241

Image Source: ESRI World Imagery Basemap accessed on: 3/10/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources

- NWI Wetland (USGS 2012)

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities

- Existing Transmission (115 kV or Higher)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

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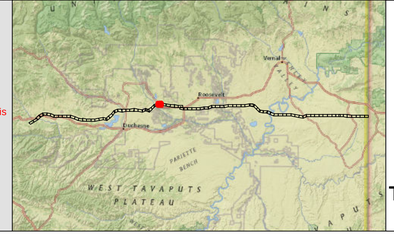

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

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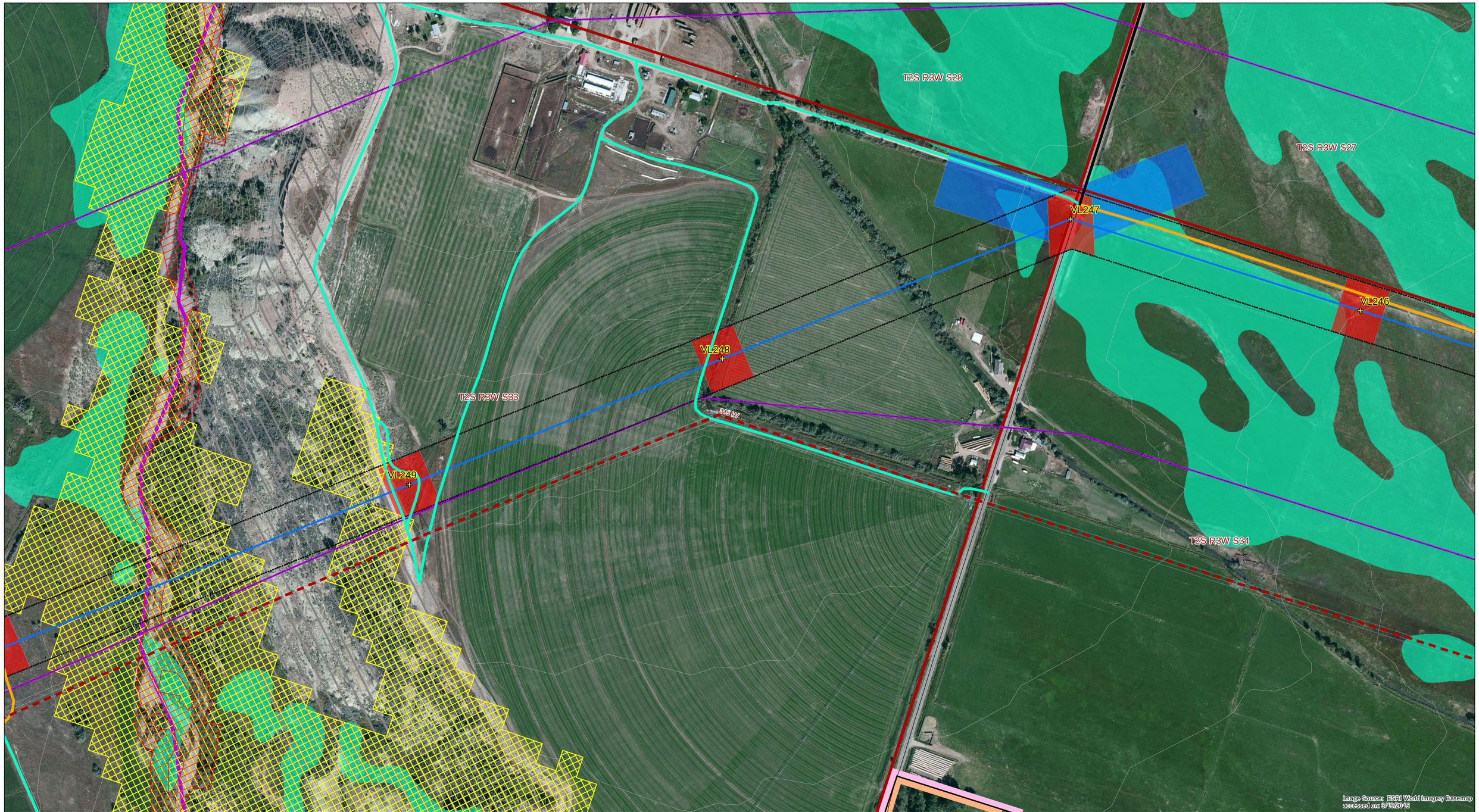

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Western Yellow-billed Cuckoo Model Habitat (AECOM 2013)
- 303D Impaired Waters (AECOM 2012)
- High Landslide Potential (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- Tribal
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LIDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

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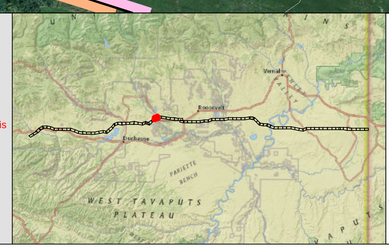

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT:
NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT:
VERNAL FIELD OFFICE

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T2S R3W S32

T2S R3W S33

T3S R3W S5

T3S R3W S4

VL254

VL253

VL252

VL251

VL250

345 kV

Image Source: ESRI World Imagery Basemap
Accessed on: 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Western Yellow-billed Cuckoo Model Habitat (AECOM 2013)
- 303D Impaired Waters (AECOM 2012)
- High Landslide Potential (AECOM 2013)

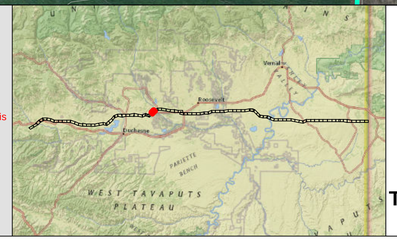
Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

Note 2: Section and jurisdiction misalignments are due to different data sets and will be reconciled once land surveying is completed.



Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

**PRELIMINARY DRAFT:
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**TRANSWEST EXPRESS TRANSMISSION PROJECT:
VERNAL FIELD OFFICE**

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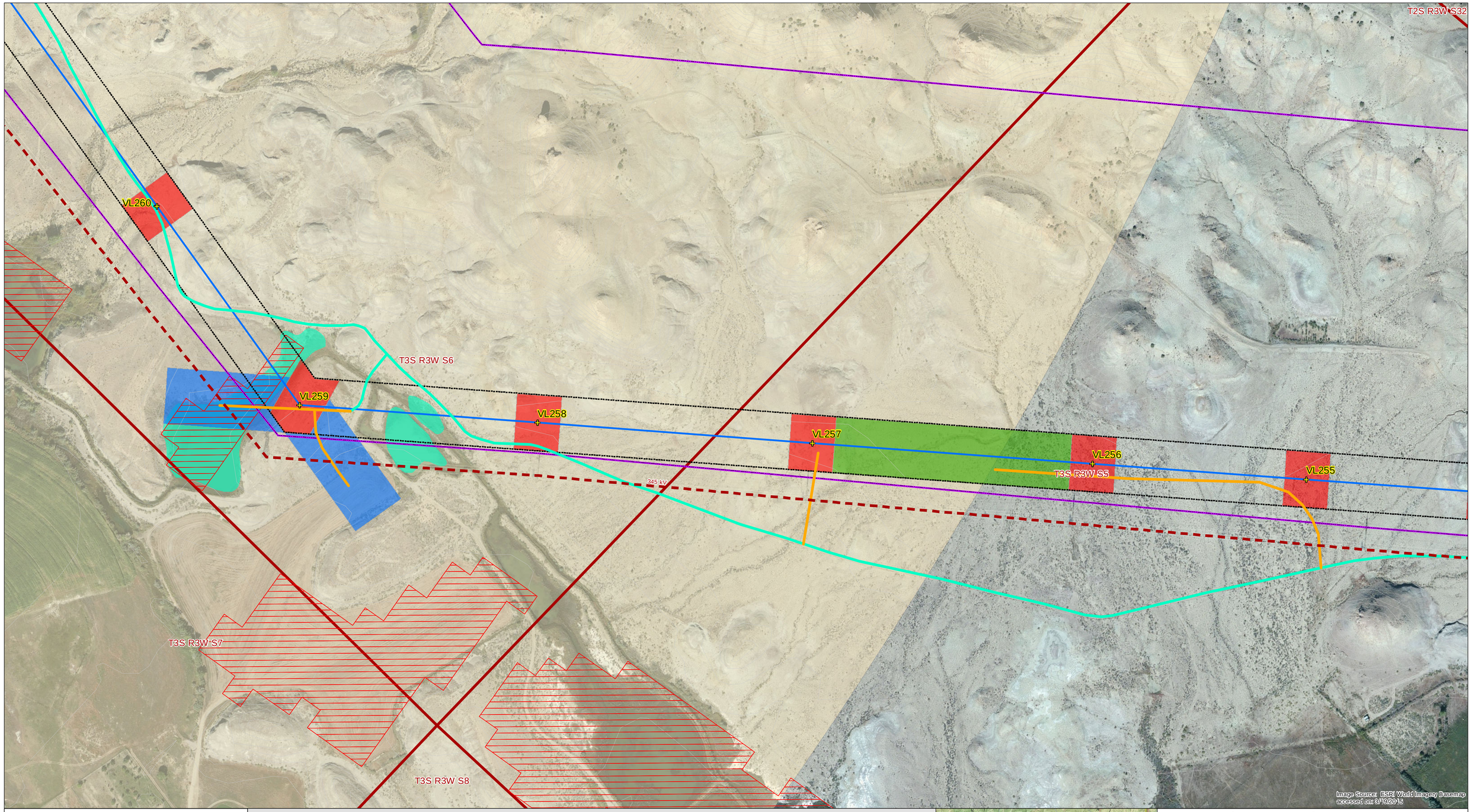

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE

- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

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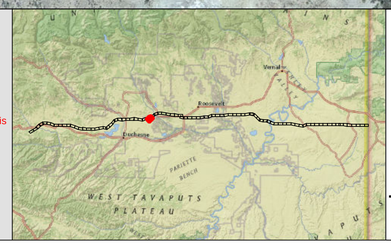

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

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T3S R3W S6

T3S R4W S1

T3S R3W S7

T3S R4W S12

345 KV

VL263

VL262

VL261

VL260

VL259

VL258

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)
- Golden Eagle

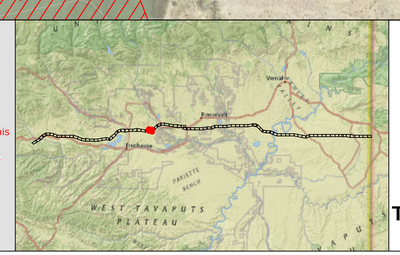
Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

Note 2: Section and jurisdiction misalignments are due to different data sets and will be reconciled once land surveying is completed.



Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT:
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TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

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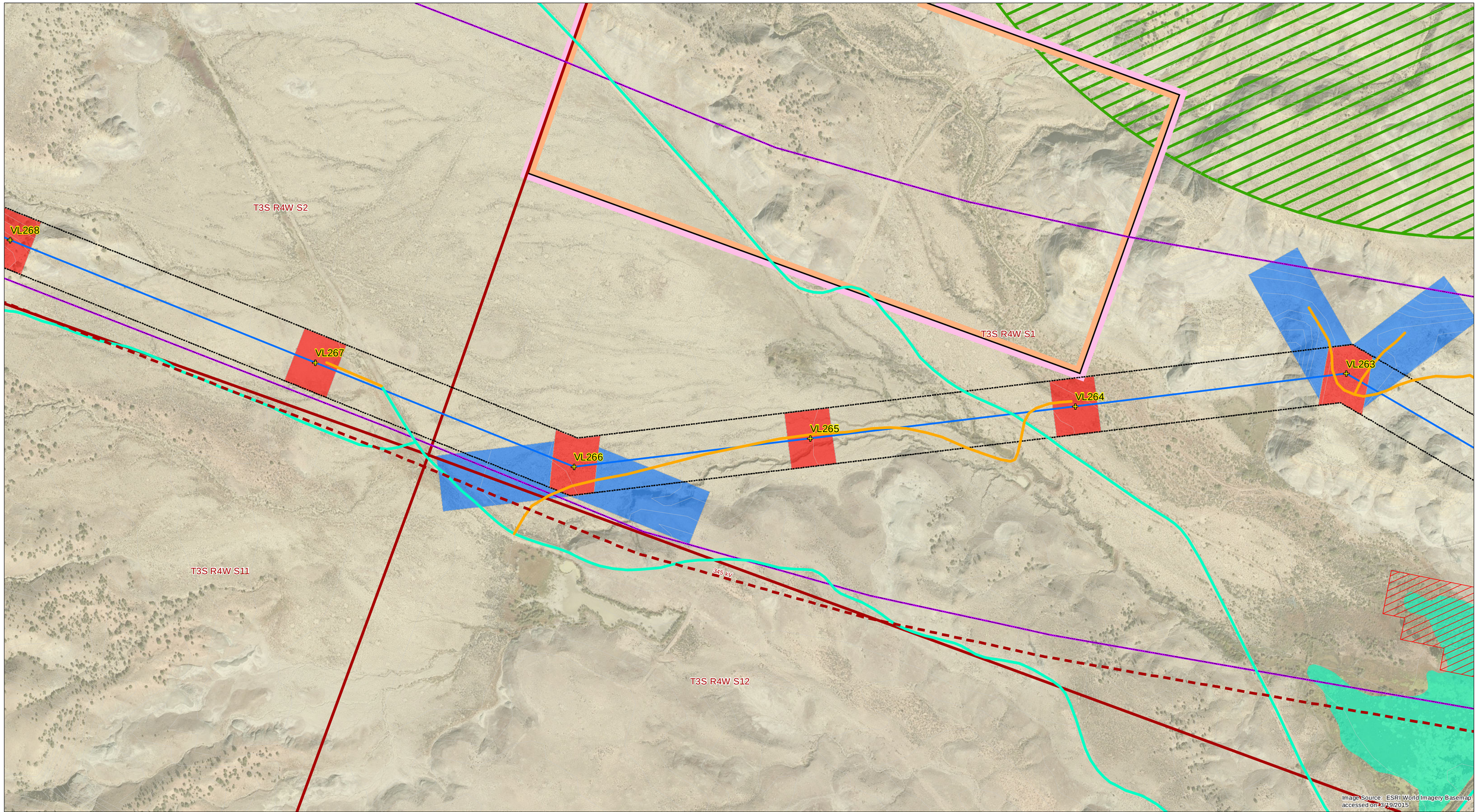

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)
- Golden Eagle

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- Tribal
- PRIVATE
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

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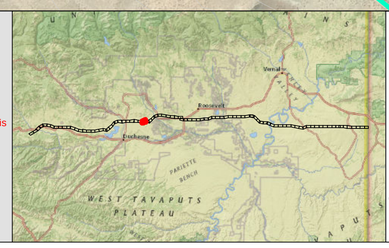

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

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T3S R4W S3

T3S R4W S2

T3S R4W S10

T3S R4W S11

VL272

VL271

VL270

VL269

VL268

345 kV

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Sage Grouse Lek (UDWR 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

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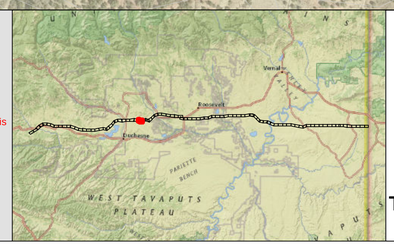

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

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T3S R4W S4

T3S R4W S3

T3S R4W S9

T3S R4W S10

VL277

VL276

VL275

VL274

VL273

345 kV

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources

- Sage Grouse Lek (UDWR 2013)

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities

- Existing Transmission (115 kV or Higher)

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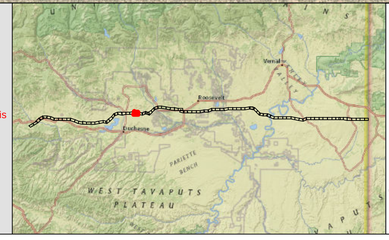

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T3S R4W S5

T3S R4W S4

VL281

VL280

VL279

VL278

345 kV

T3S R4W S8

T3S R4W S9

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Sage Grouse Lek (UDWR 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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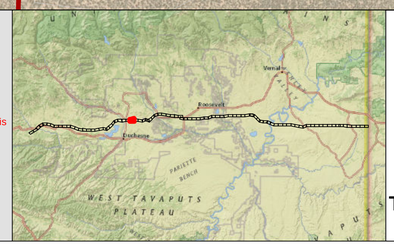

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T3S R5W S1

T3S R4W S6

T3S R4W S5

VL285

VL284

VL283

VL282

VL286

345 kV

T3S R5W S12

T3S R4W S7

T3S R4W S8

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources

- Sage Grouse Lek (UDWR 2013)

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- PRIVATE
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities

- Existing Transmission (115 kV or Higher)

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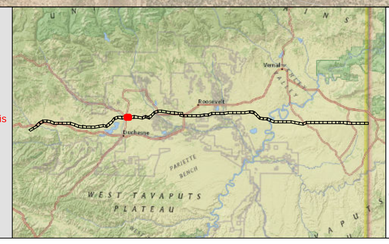

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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VERNAL FIELD OFFICE**

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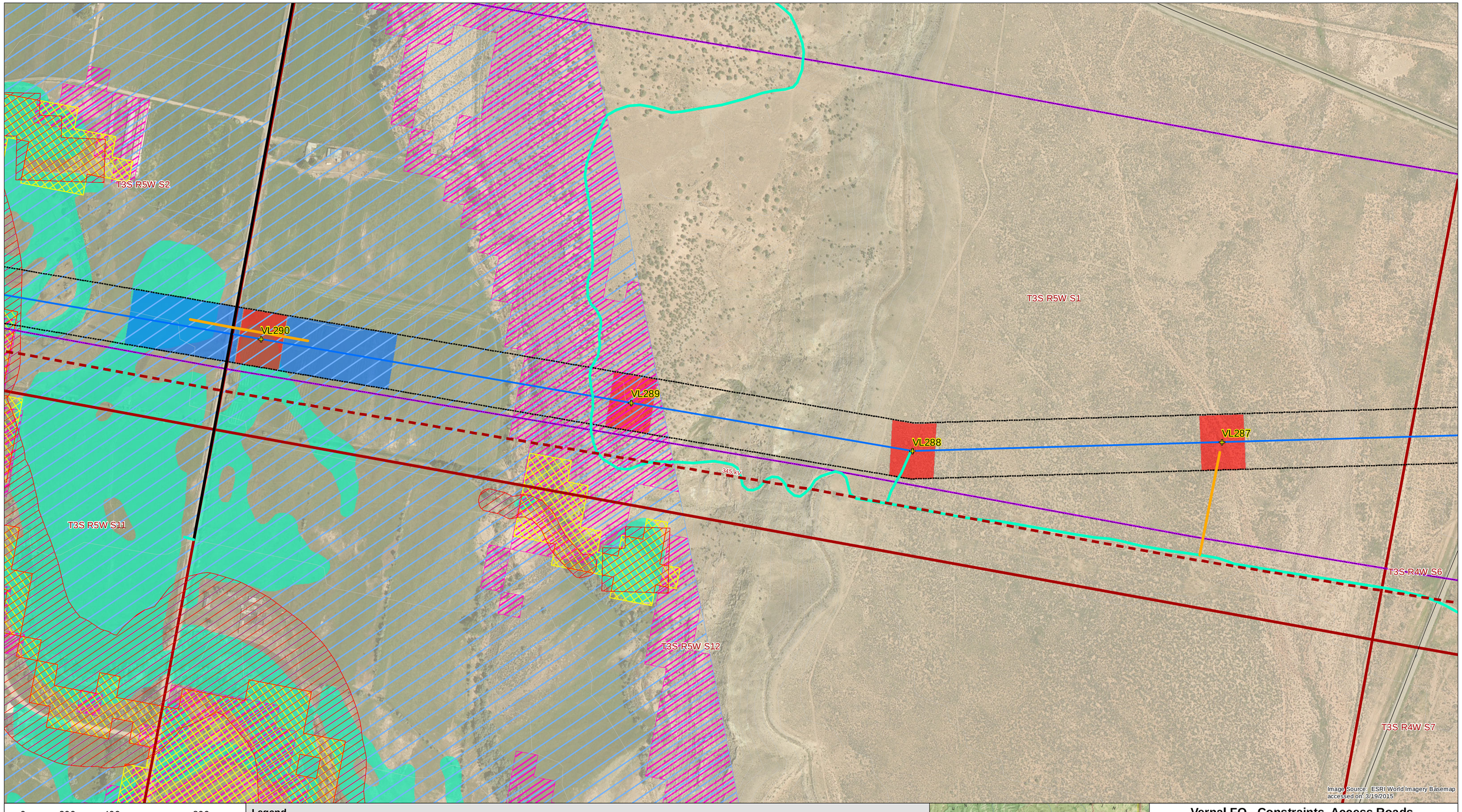

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)
- Western Yellow-billed Cuckoo Model Habitat (AECOM 2013)
- Bird Habitat Concentration Area (AECOM 2014)
- Sage Grouse Lek (UDWR 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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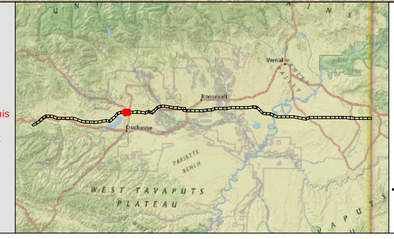

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

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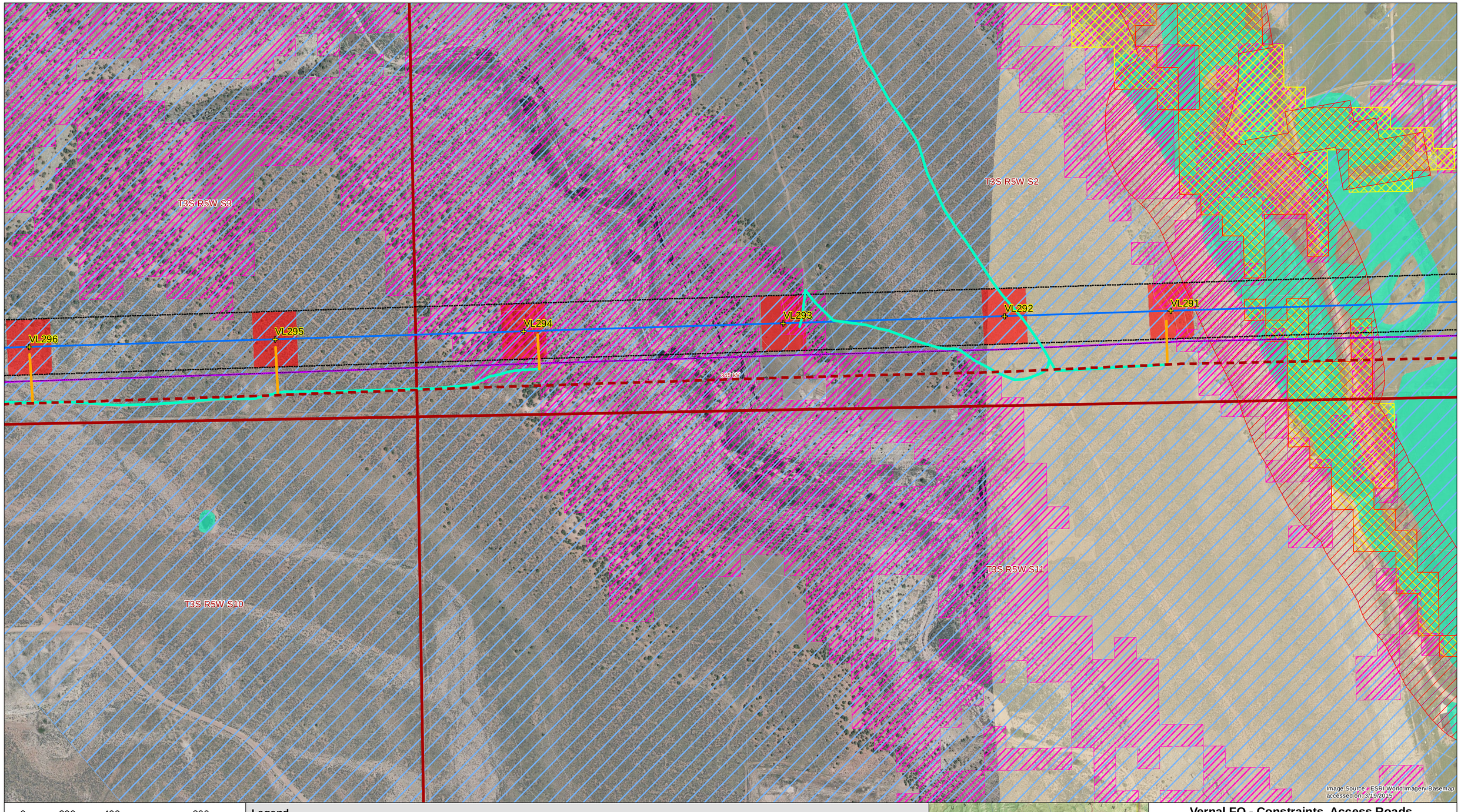

0 200 400 800 Feet

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1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)
- Western Yellow-billed Cuckoo Model Habitat (AECOM 2013)
- Bird Habitat Concentration Area (AECOM 2014)
- Sage Grouse Lek (UDWR 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE

- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

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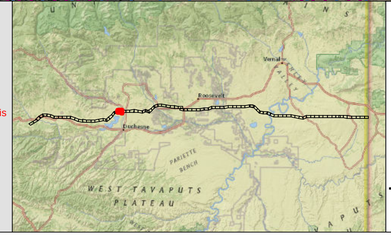

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

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T3S R5W S4

T3S R5W S3

T3S R5W S9

T3S R5W S10

VL296

VL297

VL298

VL299

VL300

VL301

345kV

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)
- Bird Habitat Concentration Area (AECOM 2014)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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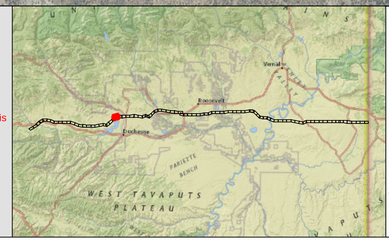

Vernal FO - Constraints, Access Roads, and Work Area Details

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T3S R5W S8

T3S R5W S17

T3S R5W S4

T3S R5W S9

T3S R5W S16

345 kV

VL304

VL303

VL302

VL301

VL300

Image Source: ESRI Worldimagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- State
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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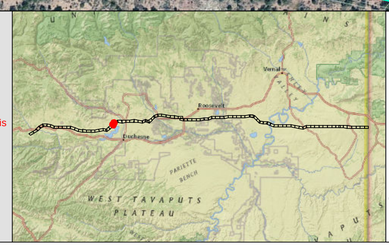

Vernal FO - Constraints, Access Roads, and Work Area Details

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T3S R5W S8

T3S R5W S9

T3S R5W S17

VL304

VL305

VL306

VL307

VL308

T3S R5W S16

345 kV

T3S R5W S20

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources

- NWI Wetland (USGS 2012)

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- PRIVATE
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities

- Existing Transmission (115 kV or Higher)

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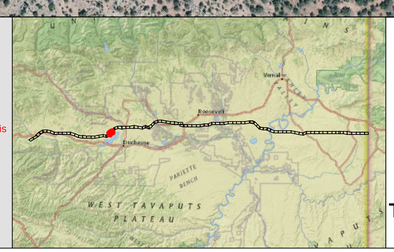

Vernal FO - Constraints, Access Roads, and Work Area Details

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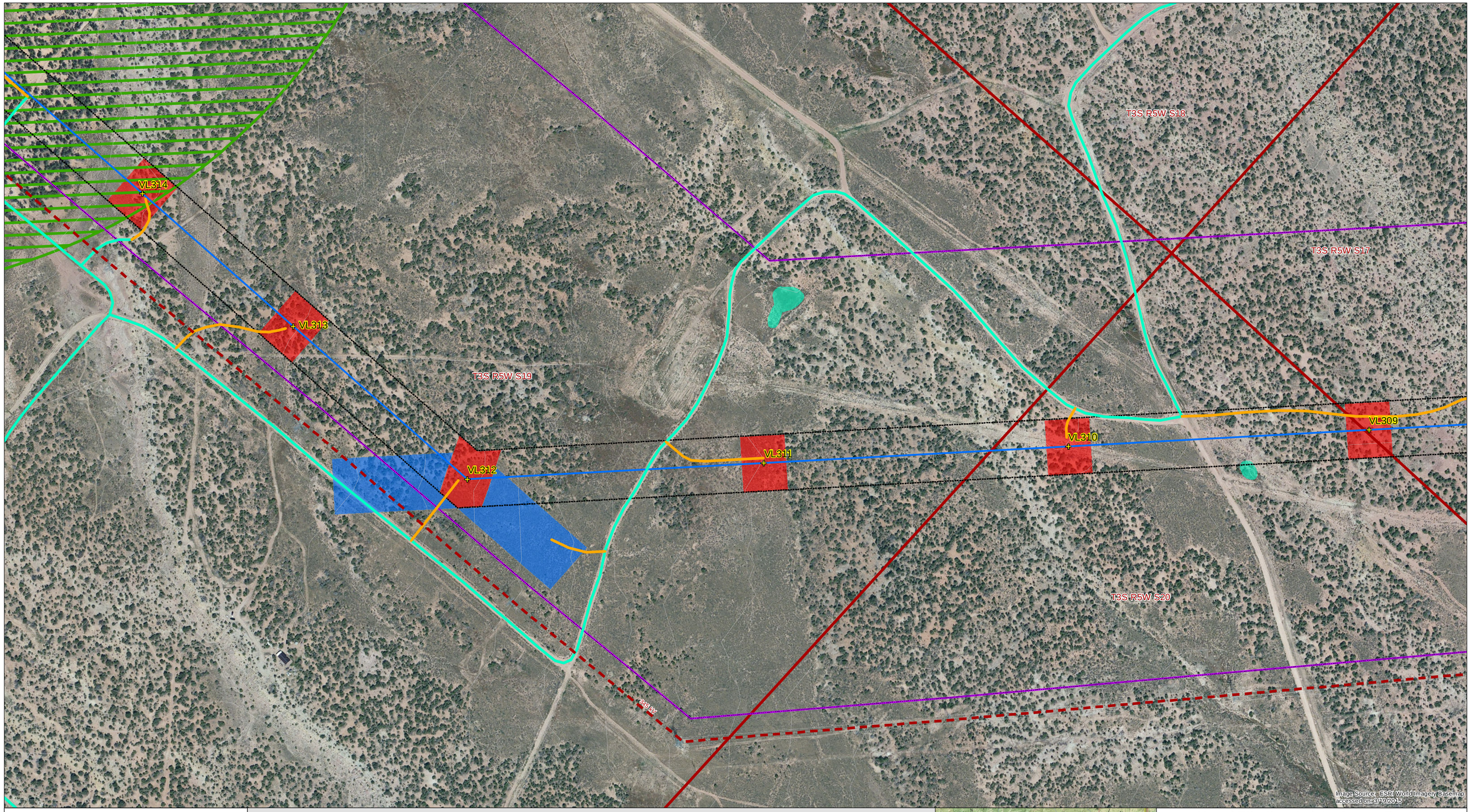

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1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Golden Eagle

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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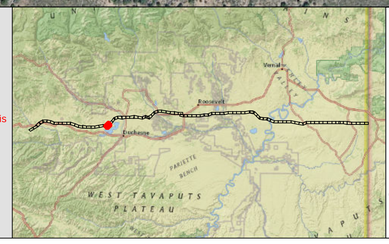

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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VL313
VL314
VL315
VL316
VL317
VL318
T3S R6W S24
T3S R5W S19
345 kV

Image Source: ESRI WorldImagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Golden Eagle

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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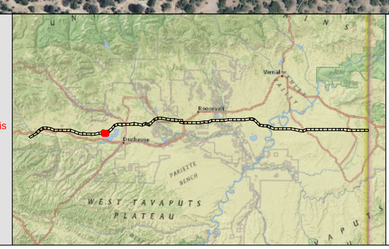

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T3S R6W S23

VL322

VL321

VL320

T3S R6W S24

VL319

VL318

345 kV

T3S R6W S26

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Level III Vegetation Management (AECOM 2014)
- Golden Eagle

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- State
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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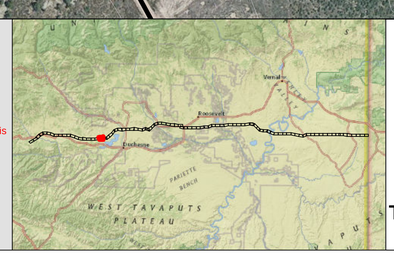

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T3S R6W S21

T3S R6W S22

T3S R6W S23

T3S R6W S27

T3S R6W S26

VL327

VL326

VL325

VL324

VL323

345 kV

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- State
- Section

Existing Utilities
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)
- Existing Transmission (115 kV or Higher)

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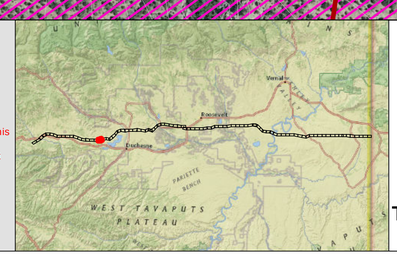

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T3S R6W S20

T3S R6W S21

T3S R6W S22

T3S R6W S29

T3S R6W S28

T3S R6W S27

VL331

VL330

VL329

VL328

345 kV

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)
- Barneby Ridgecress Model Habitat (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- State
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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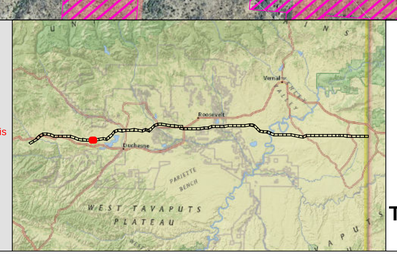

Vernal FO - Constraints, Access Roads, and Work Area Details

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T3S R6W S19

T3S R6W S20

T3S R6W S30

T3S R6W S29

VL336

VL335

VL334

VL333

VL332

345 kV

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources

- Level III Vegetation Management (AECOM 2014)
- Barneby Ridgecress Model Habitat (AECOM 2013)

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- PRIVATE
- State
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities

- Existing Transmission (115 kV or Higher)

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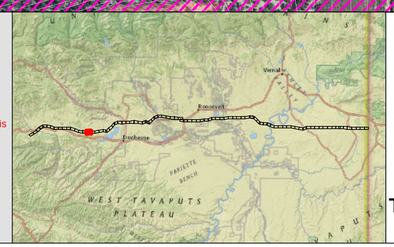

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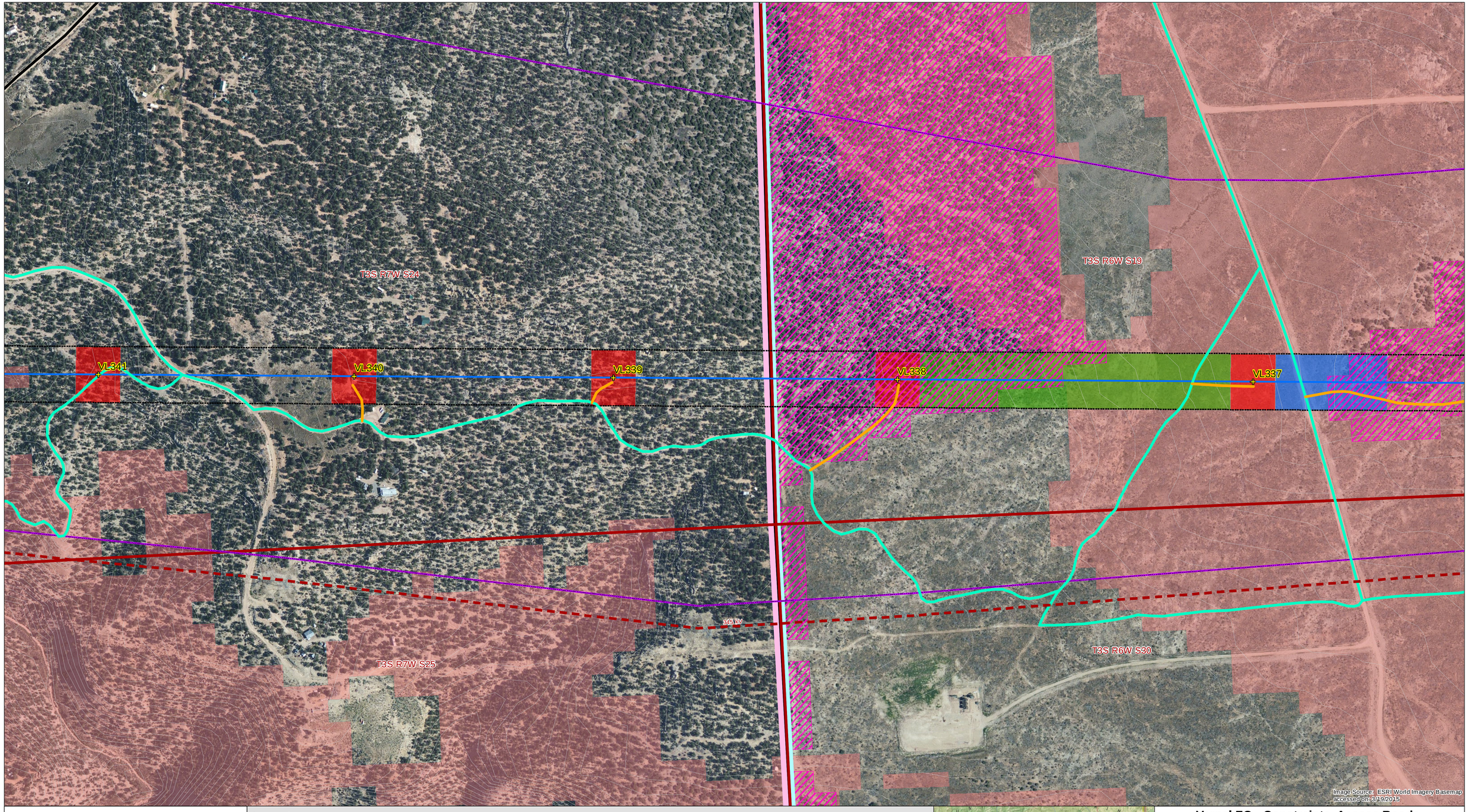

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- TWE Project Transmission Line ROW Edge
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- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Level III Vegetation Management (AECOM 2014)
- Barneby Ridgecress Model Habitat (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- State
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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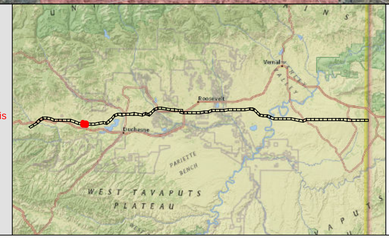

Vernal FO - Constraints, Access Roads, and Work Area Details

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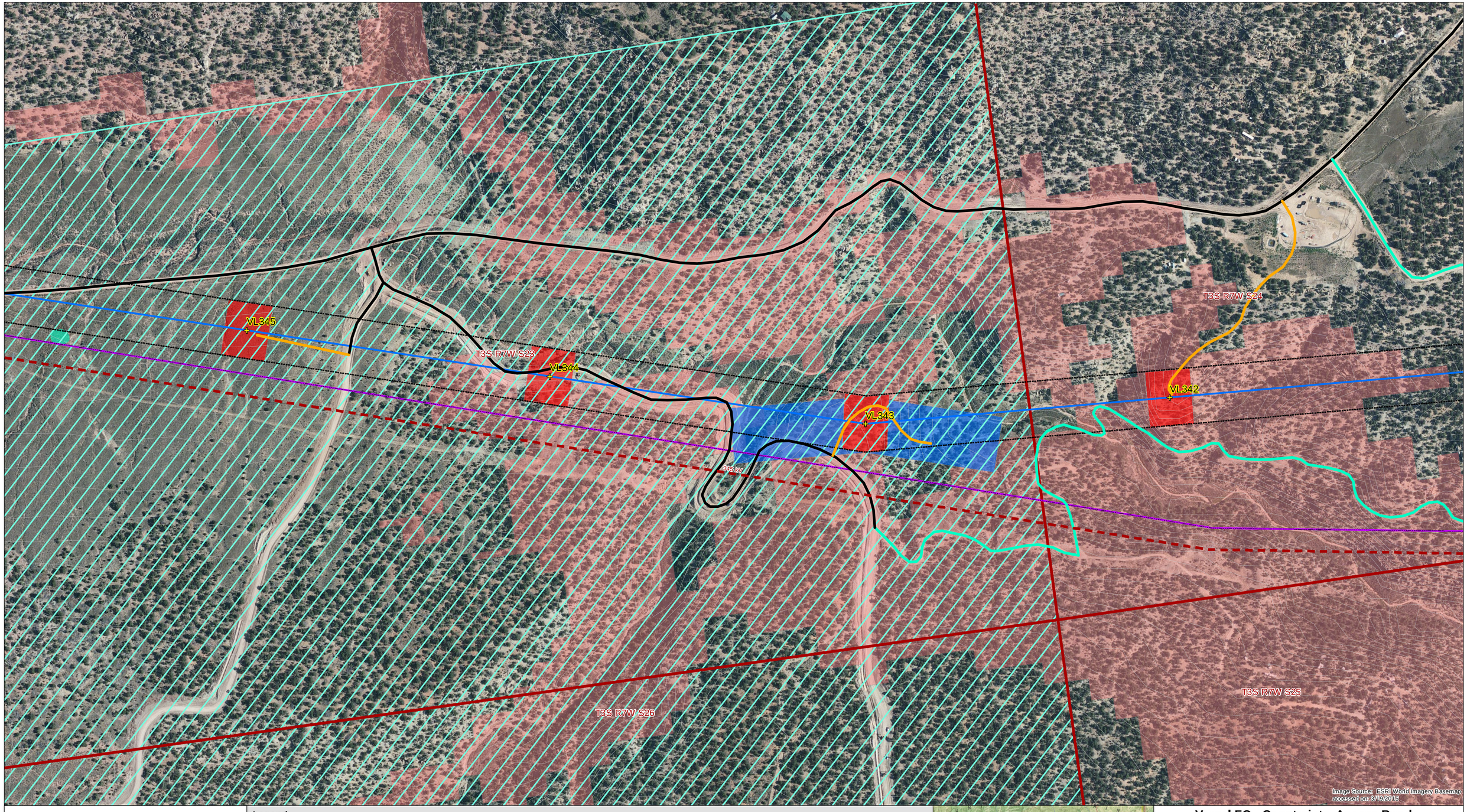

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Barneby Ridgecress Model Habitat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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Vernal FO - Constraints, Access Roads, and Work Area Details

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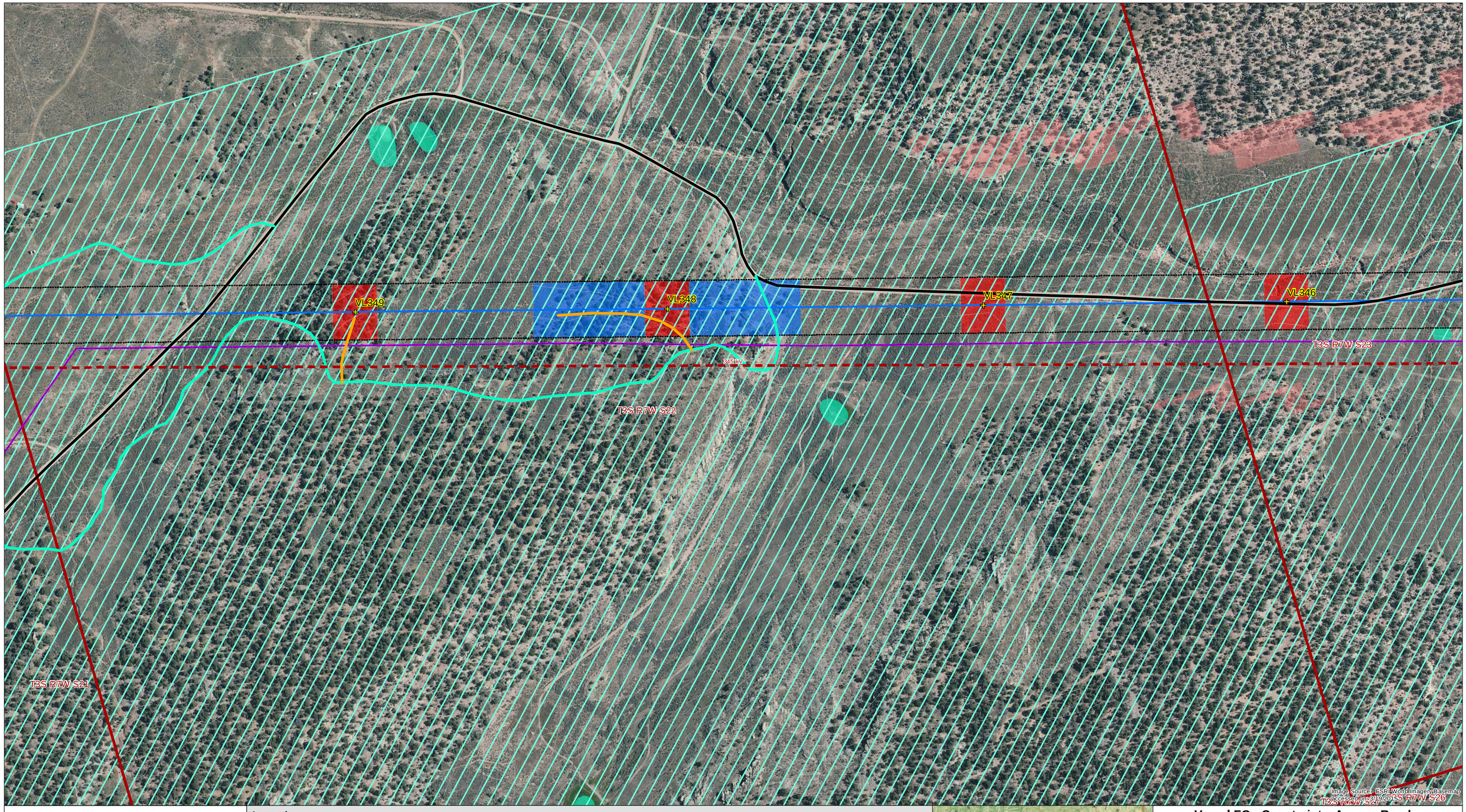

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

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- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
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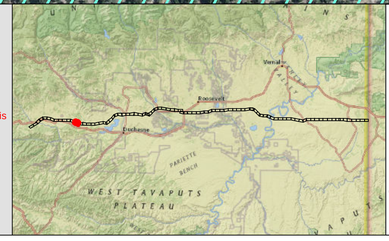

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

**PRELIMINARY DRAFT:
NOT FOR CONSTRUCTION**

**TRANSWEST EXPRESS TRANSMISSION PROJECT:
VERNAL FIELD OFFICE**

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T3S R7W S16

T3S R7W S17

T3S R7W S22

T3S R7W S21

T3S R7W S20

VL354

VL353

VL352

VL351

VL350

VL355

345 kV

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Golden Eagle
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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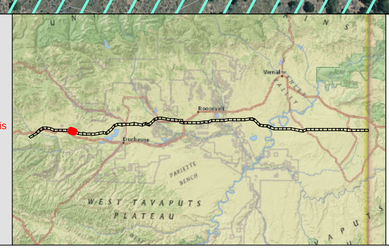

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT:
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TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

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T3S R7W S18

T3S R7W S17

345 kV

VL359

VL358

VL357

VL356

T3S R7W S19

T3S R7W S20

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)
- Golden Eagle
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LIDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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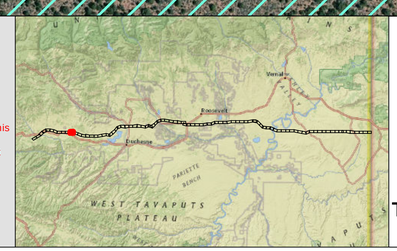

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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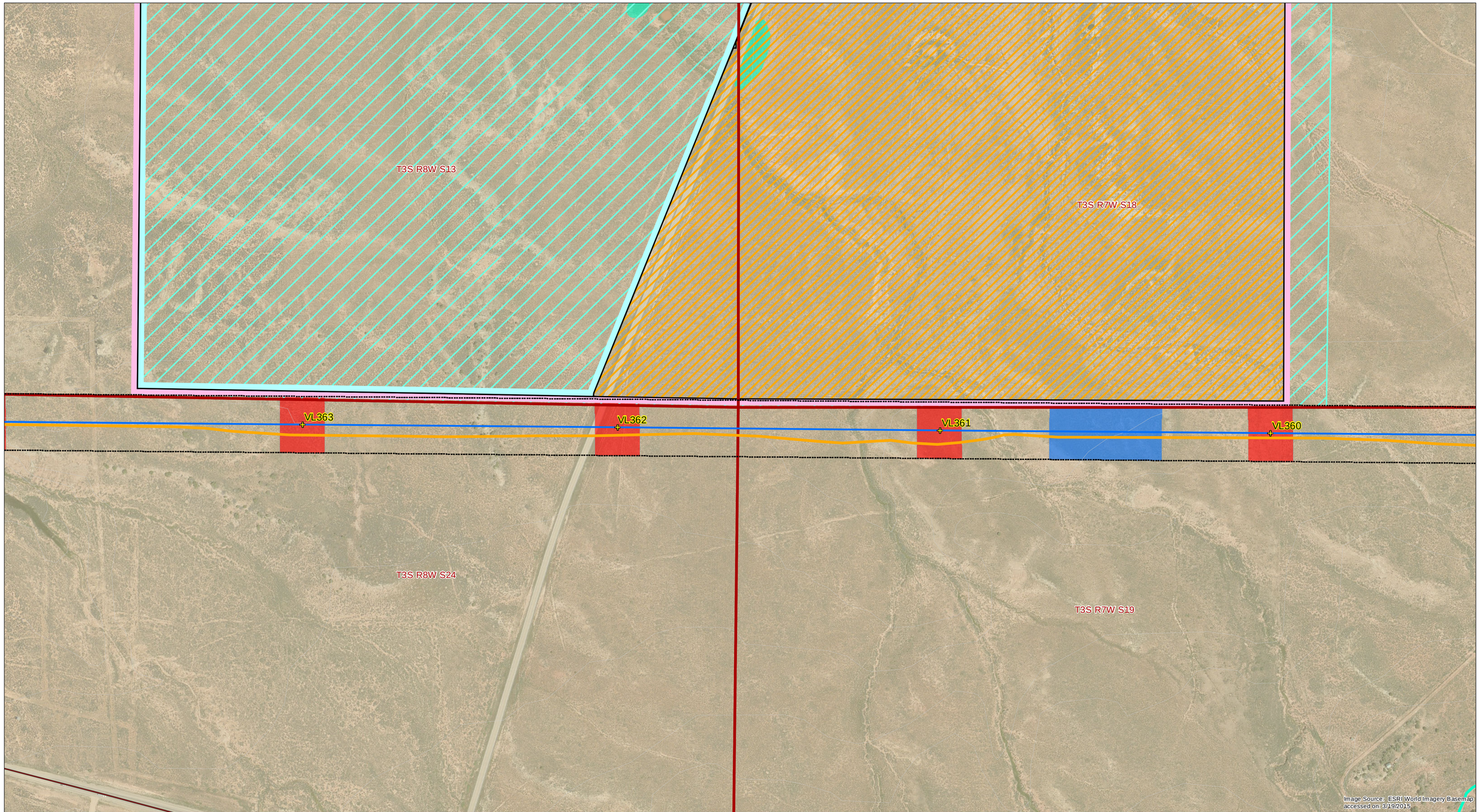

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Jurisdiction
- PRIVATE
- State
- URMCC

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

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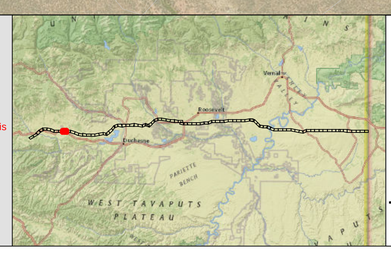

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT:
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TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

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T3S R8W S14

T3S R8W S13

VL368

VL367

VL366

VL365

VL364

T3S R8W S23

T3S R8W S24

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)
- Barneby Ridgecress Model Habitat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- State
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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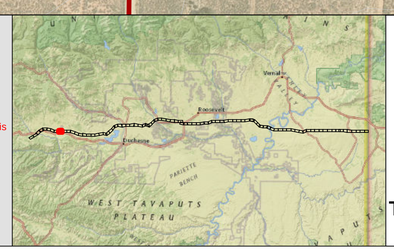

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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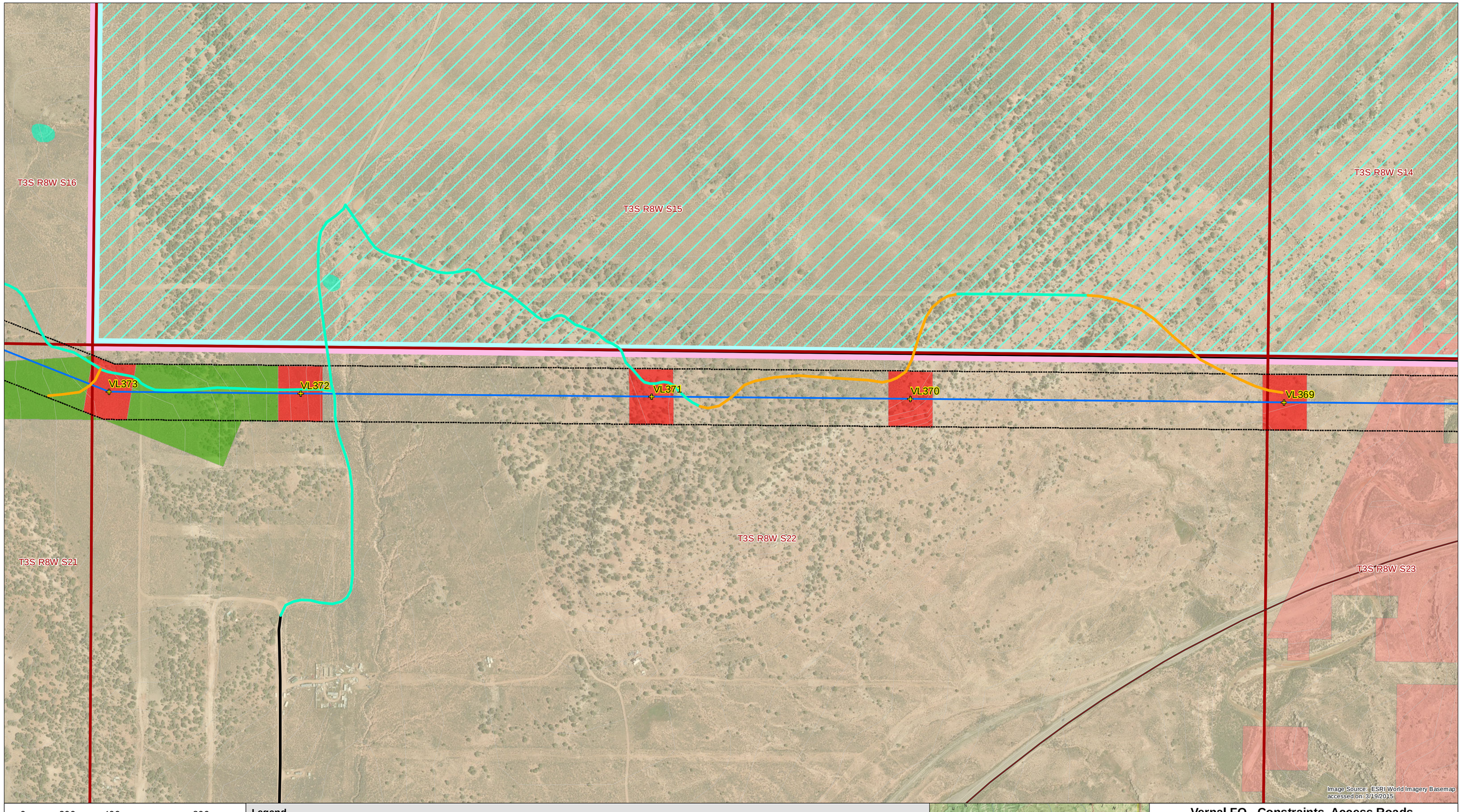

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)
- Barneby Ridgecress Model Habitat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- State
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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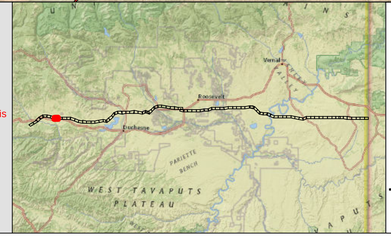

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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345 kV

T3S R8W S15

T3S R8W S16

T3S R8W S22

T3S R8W S21

T3S R8W S17

T3S R8W S20

VL377

VL376

VL375

VL374

VL373

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)
- Barneby Ridgecress Model Habitat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- State
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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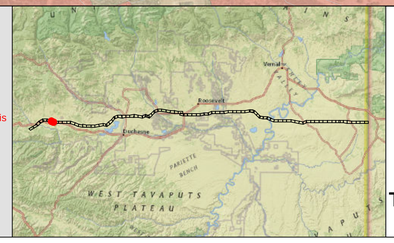

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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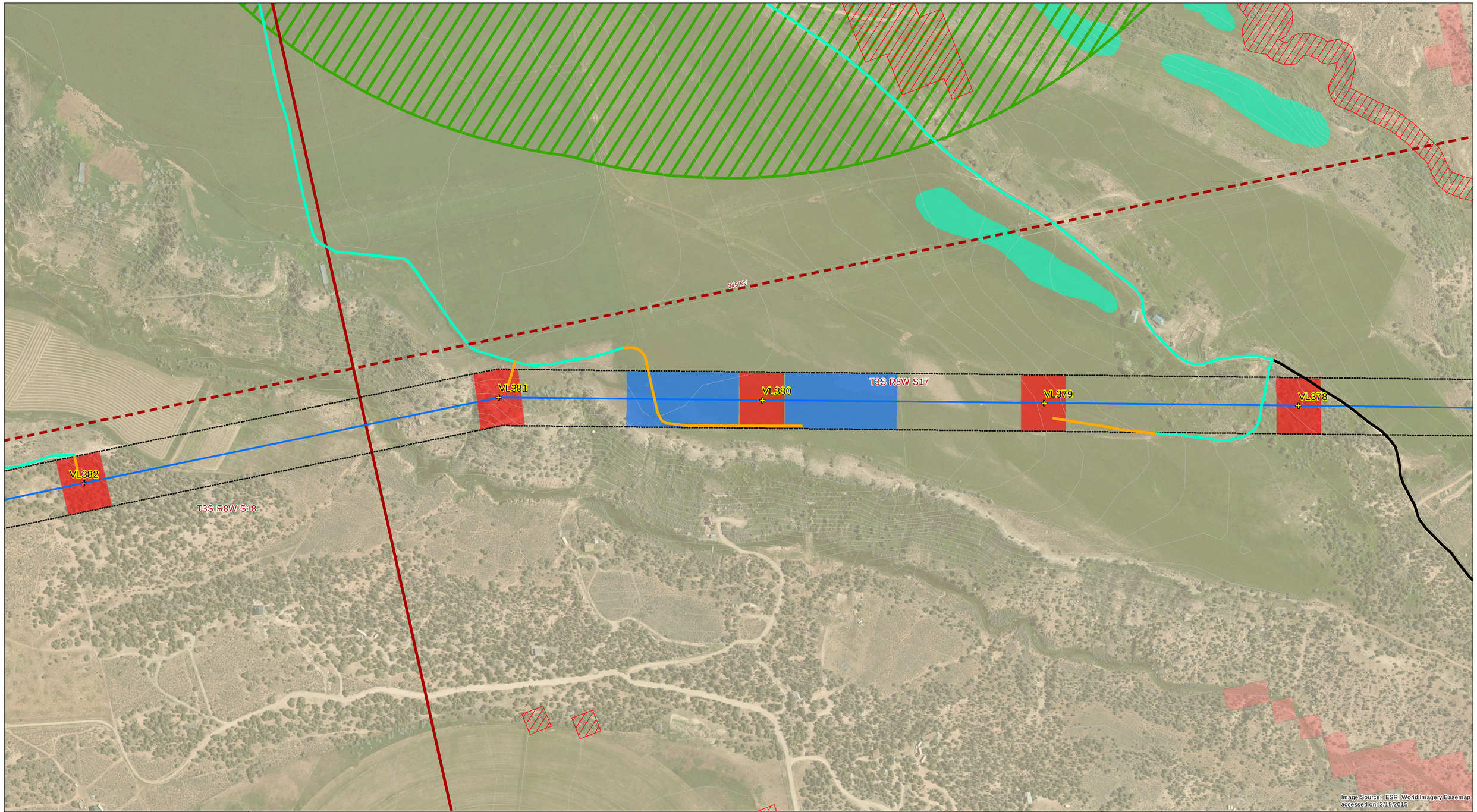

0 200 400 800 Feet

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1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)
- Golden Eagle
- Barneby Ridgecress Model Habitat (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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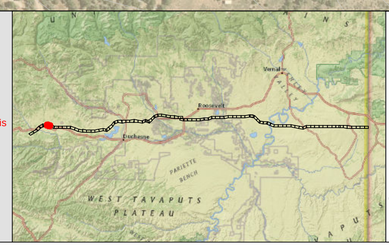

Vernal FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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VL386
T3S R9W S13
VL385
345 kV
T3S R8W S18
VL384
VL383
VL382

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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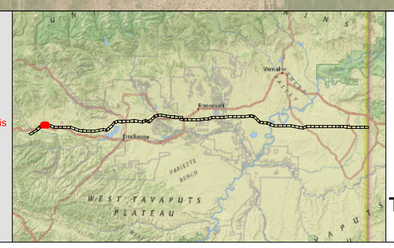

Vernal FO - Constraints, Access Roads, and Work Area Details

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T3S R9W S14

T3S R9W S23

T3S R9W S24

T3S R9W S13

345 kV

VL391

VL390

VL389

VL388

VL387

VL386

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Sage Grouse Lek (UDWR 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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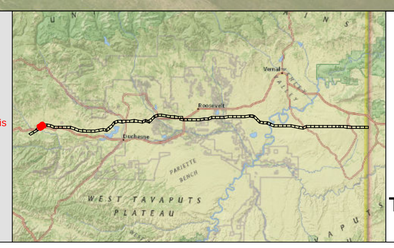

Vernal FO - Constraints, Access Roads, and Work Area Details

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T3S R9W S22

T3S R9W S14

345 kV

T3S R9W S23

VL395

VL394

VL393

VL392

VL391

T3S R9W S27

T3S R9W S26

T3S R9W S24

Image Source: ESRI World Imagery Basemap
accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)
- Sage Grouse Lek (UDWR 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- State
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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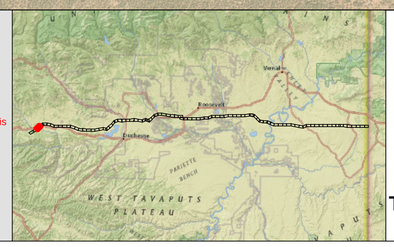

Vernal FO - Constraints, Access Roads, and Work Area Details

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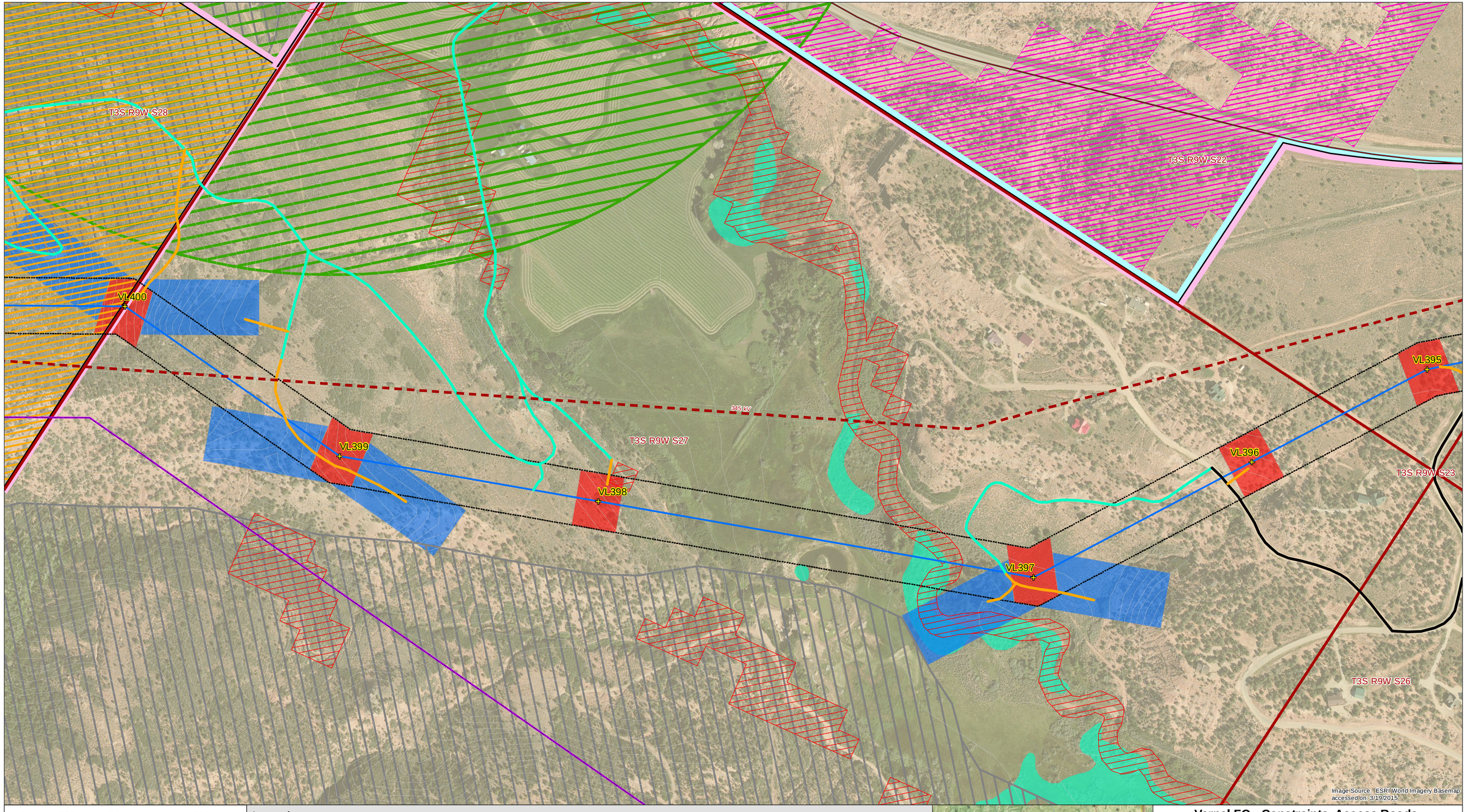

0 200 400 800 Feet

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1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- NWI Wetland (USGS 2012)
- Level III Vegetation Management (AECOM 2014)
- Sage Grouse Lek (UDWR 2013)
- Golden Eagle
- High Landslide Potential (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- PRIVATE
- State
- URMCC
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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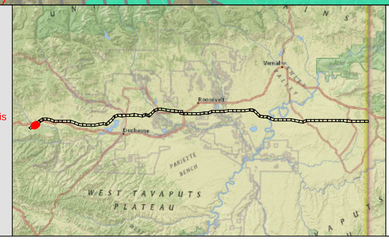

Vernal FO - Constraints, Access Roads, and Work Area Details

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T3S R9W S29

T3S R9W S32

T3S R9W S28

345 kV

T3S R9W S33

T3S R9W S27

T3S R9W S34

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Ute ladies Tresses Orchid (AECOM 2013)
- Level III Vegetation Management (AECOM 2014)
- Sage Grouse Lek (UDWR 2013)
- Golden Eagle
- High Landslide Potential (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

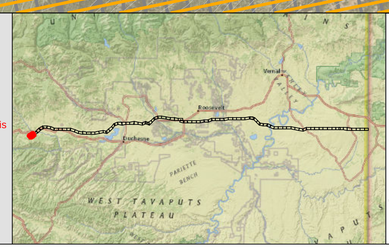
Jurisdiction
- PRIVATE
- State
- URMCC
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

Note 2: Section and jurisdiction misalignments are due to different data sets and will be reconciled once land surveying is completed.



Vernal FO - Constraints, Access Roads, and Work Area Details

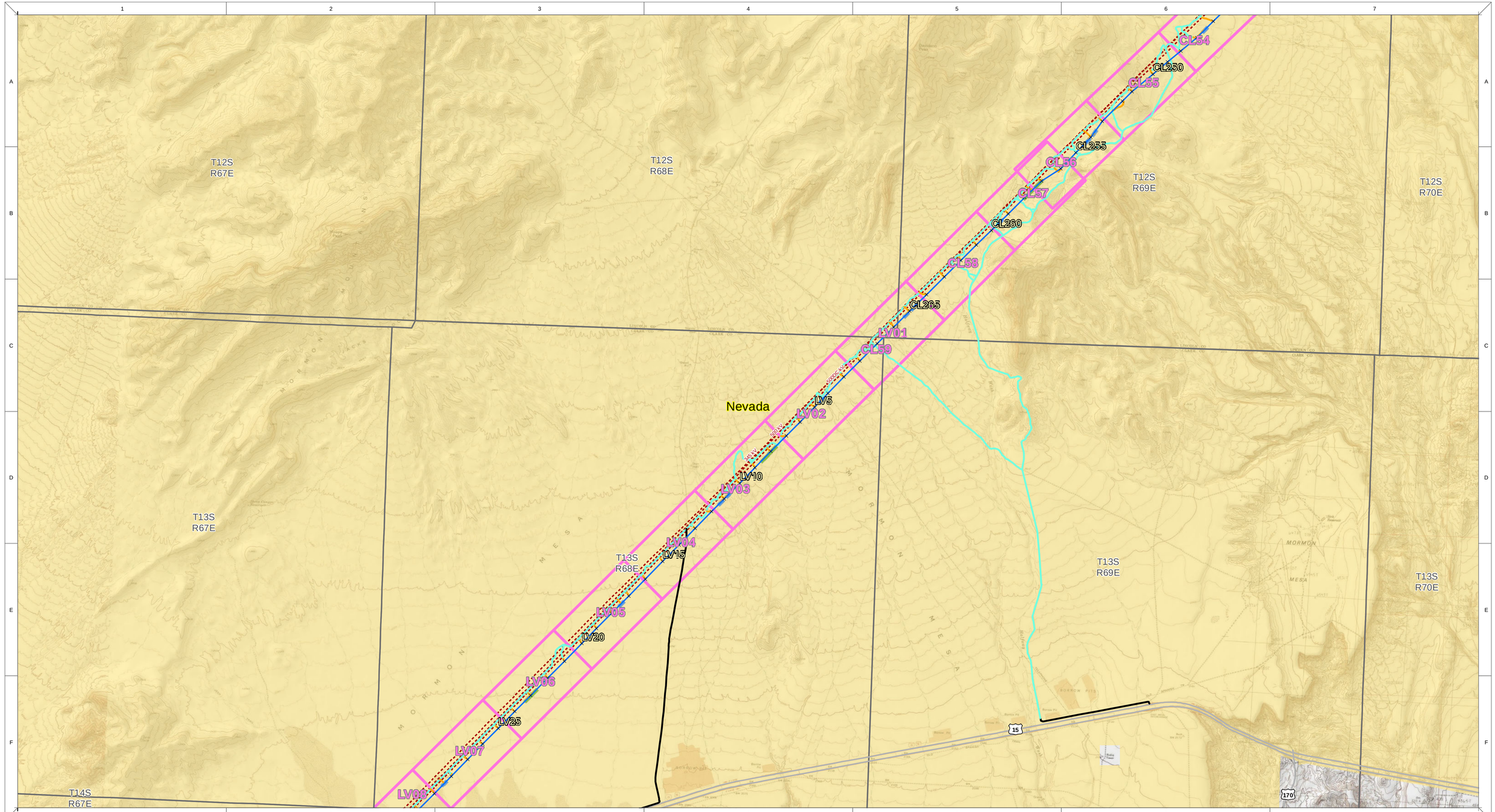
Date: 3/19/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT: VERNAL FIELD OFFICE

ATTENTION: This map contains information that is Proprietary & Confidential. It is for the intended recipient(s) only and is exempt from disclosure pursuant 5 U.S.C. §552(b)(4).

Las Vegas Overview and Detail Maps



0 1,500 3,000 6,000 Feet

1:36,000 when printed on 34x22 inch sheet
1:72,000 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- Proposed Tower Location (every 5th structure is labeled)
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road
- Fly Yard/Staging Area on Public Land
- Wire-Pulling, Tensioning, Splicing Site on Public Land

Jurisdiction

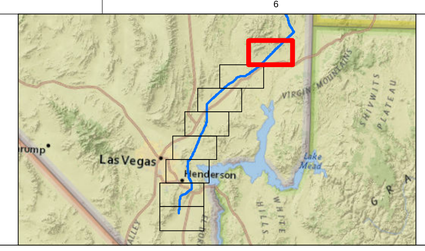
- BLM

Boundaries

- Township
- Detailed Map Index

Existing Utilities

- Existing Transmission (115 kV or Higher)



Las Vegas FO Overview

Date: 3/18/2015

**PRELIMINARY DRAFT:
NOT FOR CONSTRUCTION**

**TRANSWEST EXPRESS TRANSMISSION PROJECT:
LAS VEGAS FIELD OFFICE**

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For more detail on ground electrode layout refer to the Southern Electrode map set

Nevada

Moapa

Glendale

T14S R65E
T14S R66E
T14S R67E
T14S R68E
T15S R65E
T15S R66E
T15S R67E
T15S R68E

LV07 LV08 LV09 LV10 LV11 LV12 LV13 LV14 LV15 LV16 LV17 LV18 LV19 LV20 LV21 LV22 LV23 LV24
LV30 LV35 LV40 LV45 LV50 LV55 LV60 LV65 LV70 LV75 LV80 LV90 LV95 LV100

500 kV
345 kV
230 kV

0 1,500 3,000 6,000 Feet

1:36,000 when printed on 34x22 inch sheet
1:72,000 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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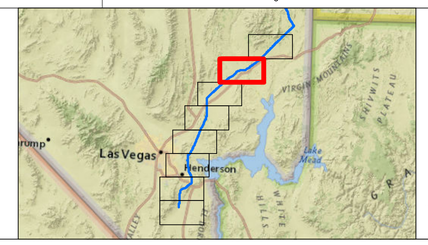
- × Proposed Tower Location (every 5th structure is labeled)
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road
- Fly Yard/Staging Area on Public Land
- Wire-Pulling, Tensioning, Splicing Site on Public Land

Jurisdiction
- Tribal
- BLM
- BOR
- USFWS

Boundaries
- Township
- Detailed Map Index

Existing Utilities
- Existing Transmission (115 kV or Higher)



Las Vegas FO Overview

Date: 3/18/2015

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TRANSWEST EXPRESS TRANSMISSION PROJECT: LAS VEGAS FIELD OFFICE

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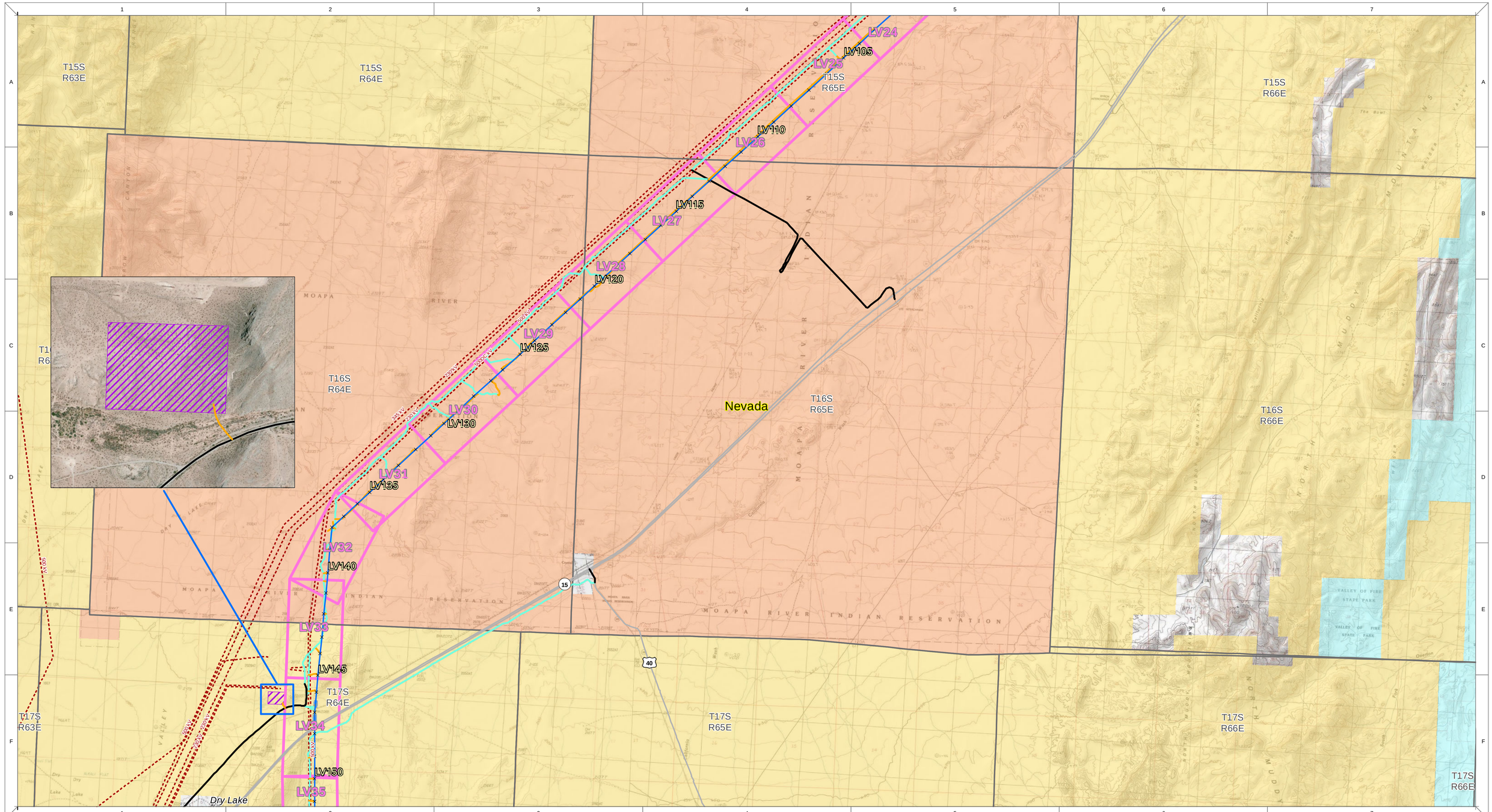

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1:72,000 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- Proposed Tower Location (every 5th structure is labeled)
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road
- Wire-Pulling, Tensioning, Splicing Site on Public Land
- Material Yard on Public Land

Jurisdiction

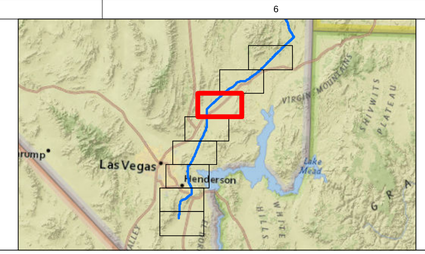
- Tribal
- BLM
- State

Boundaries

- Township
- Detailed Map Index

Existing Utilities

- Existing Transmission (115 kV or Higher)



Las Vegas FO Overview

Date: 3/18/2015

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LAS VEGAS FIELD OFFICE**

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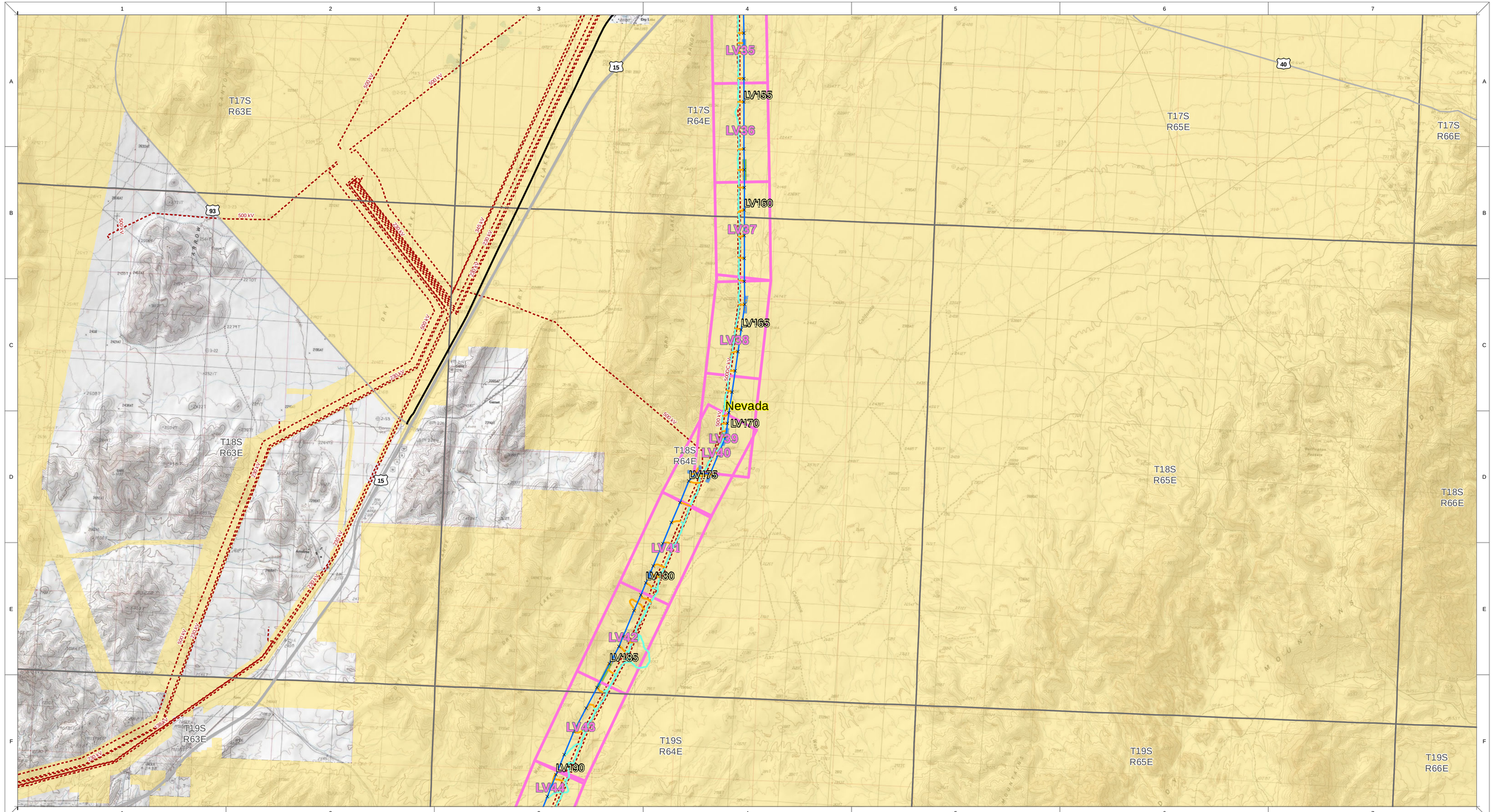

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1:72,000 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

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- × Proposed Tower Location (every 5th structure is labeled)
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road
- Fly Yard/Staging Area on Public Land
- Wire-Pulling, Tensioning, Splicing Site on Public Land

Jurisdiction

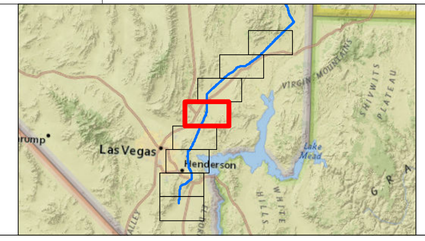
- BLM

Boundaries

- Township
- Detailed Map Index

Existing Utilities

- Existing Transmission (115 kV or Higher)



Las Vegas FO Overview

Date: 3/18/2015

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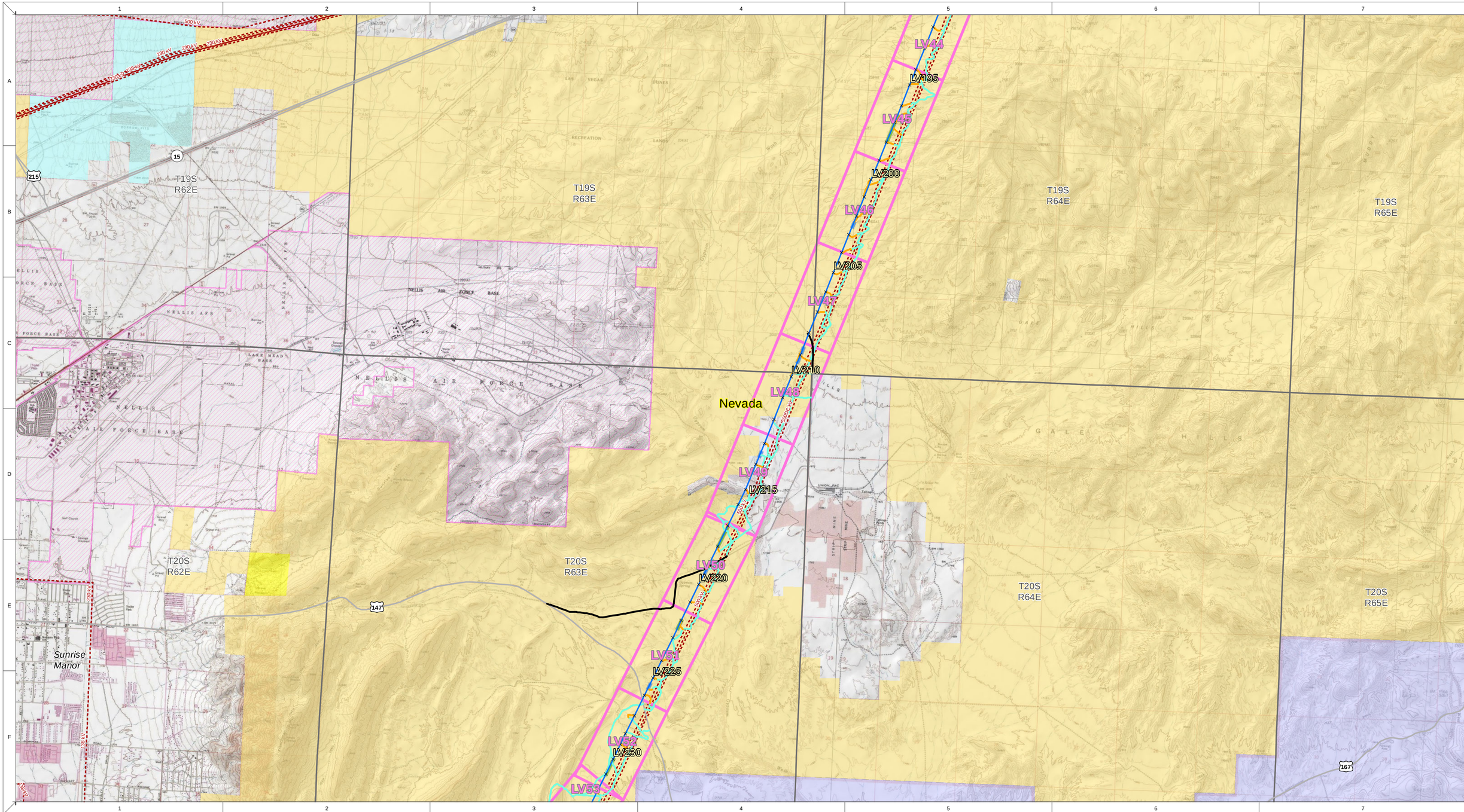

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1:72,000 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

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- × Proposed Tower Location (every 5th structure is labeled)
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road
- Fly Yard/Staging Area on Public Land
- Wire-Pulling, Tensioning, Splicing Site on Public Land

Jurisdiction

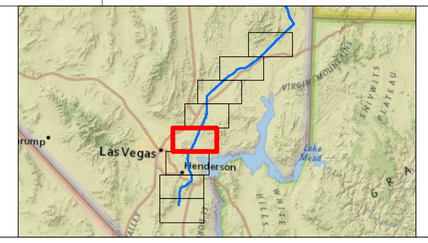
- BLM
- County/Local
- DOD
- NPS
- State

Boundaries

- Township
- Detailed Map Index

Existing Utilities

- Existing Transmission (115 kV or Higher)



Las Vegas FO Overview

Date: 3/18/2015

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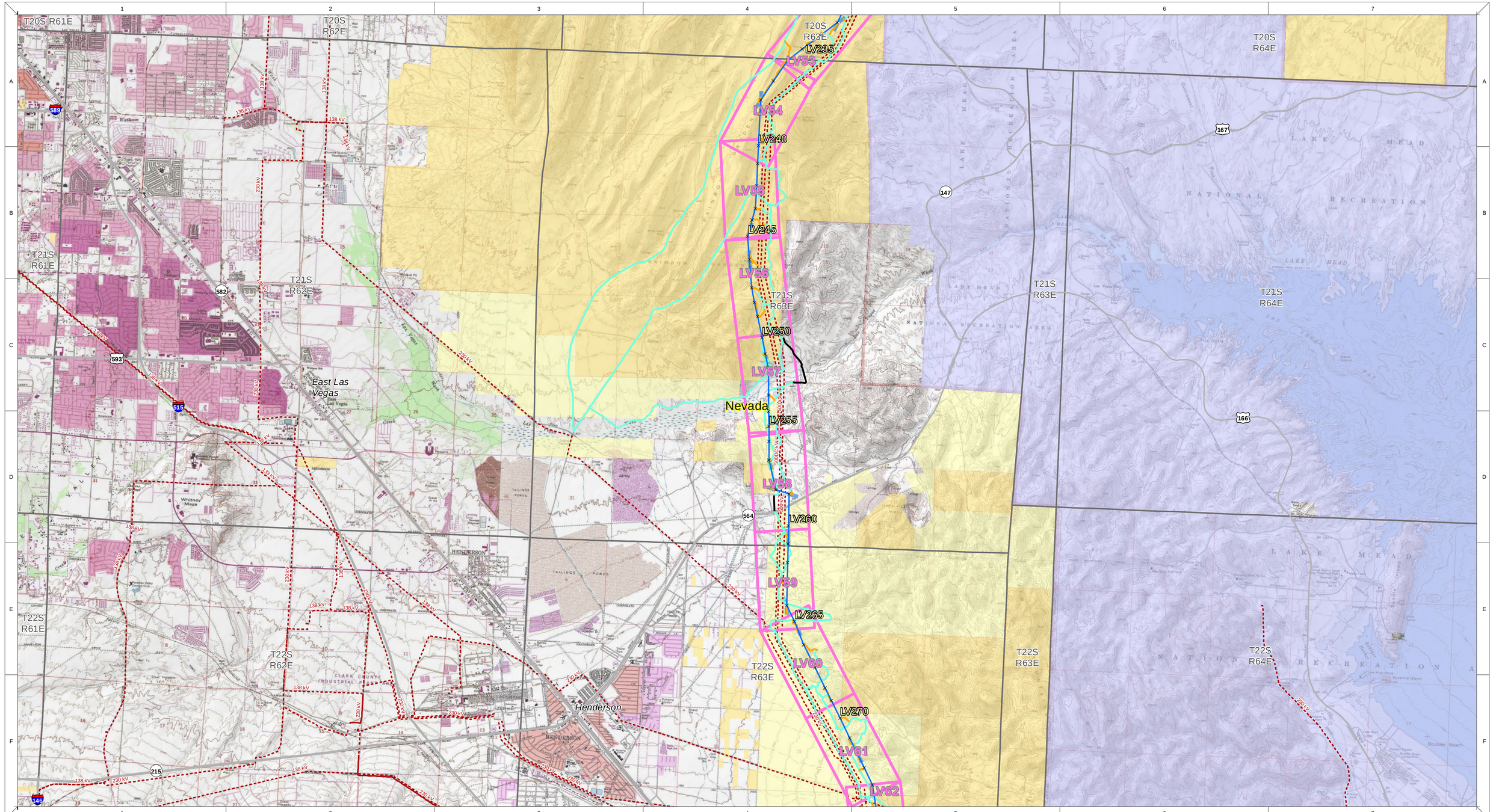


0 1,500 3,000 6,000 Feet

1:36,000 when printed on 34x22 inch sheet
1:72,000 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- × Proposed Tower Location (every 5th structure is labeled)
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road
- Fly Yard/Staging Area on Public Land
- Wire-Pulling, Tensioning, Splicing Site on Public Land

Jurisdiction

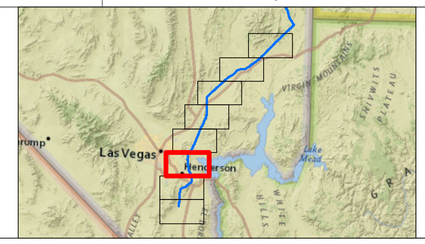
- BLM
- BOR
- NPS

Boundaries

- Township
- Detailed Map Index

Existing Utilities

- Existing Transmission (115 kV or Higher)



Las Vegas FO Overview

Date: 3/18/2015

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TRANSWEST EXPRESS TRANSMISSION PROJECT: LAS VEGAS FIELD OFFICE

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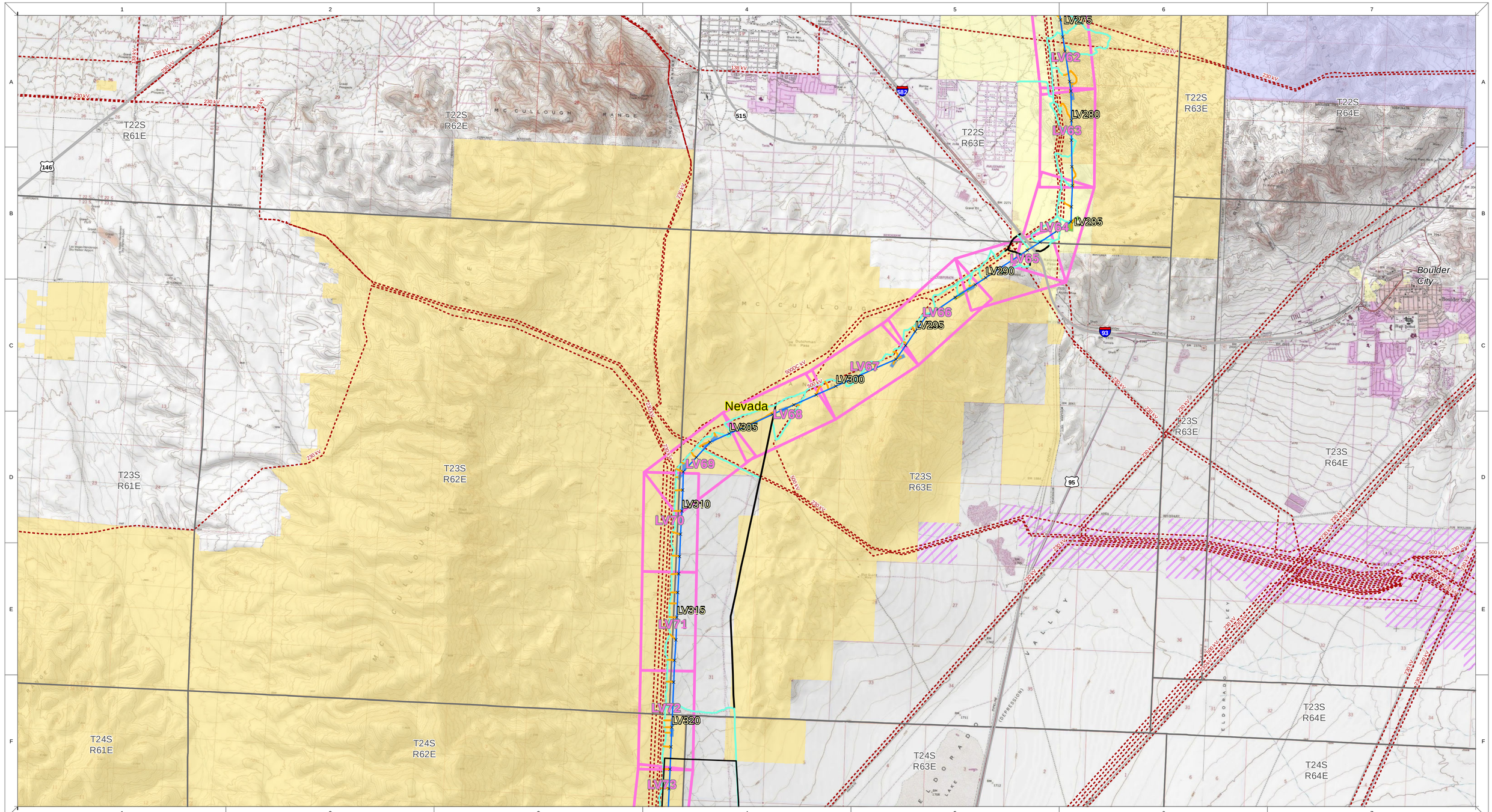

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1:36,000 when printed on 34x22 inch sheet
1:72,000 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- × Proposed Tower Location (every 5th structure is labeled)
- Southern Terminal Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road
- Fly Yard/Staging Area on Public Land
- Wire-Pulling, Tensioning, Splicing Site on Public Land

Jurisdiction

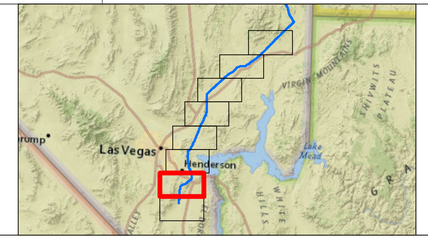
- BLM
- BOR
- DOE
- NPS

Boundaries

- Township
- Detailed Map Index

Existing Utilities

- Existing Transmission (115 kV or Higher)



Las Vegas FO Overview

Date: 3/18/2015

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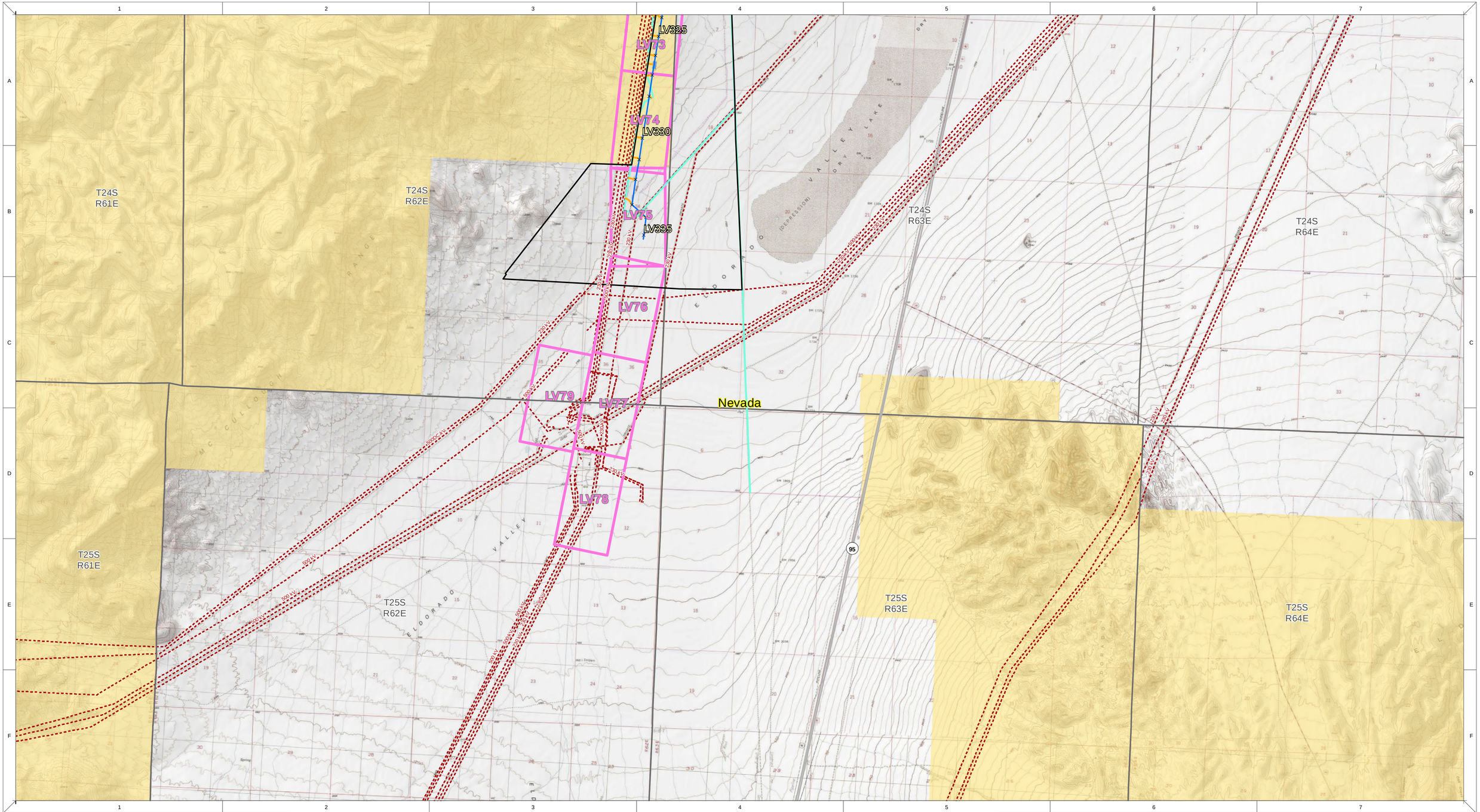

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1:36,000 when printed on 34x22 inch sheet
1:72,000 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- × Proposed Tower Location (every 5th structure is labeled)
- Southern Terminal Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road
- Wire-Pulling, Tensioning, Splicing Site on Public Land

Jurisdiction

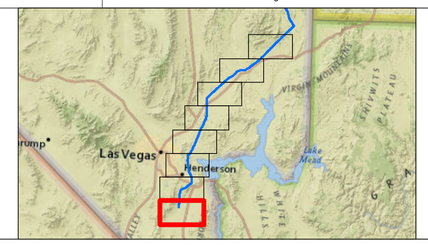
- BLM

Boundaries

- Township
- Detailed Map Index

Existing Utilities

- Existing Transmission (115 kV or Higher)



Las Vegas FO Overview

Date: 3/18/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT: LAS VEGAS FIELD OFFICE

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T13S R68E S36

T12S R68E S36

T13S R68E S1

500 kV

345 kV

500DC kV

LV2

LV1

T12S R69E S31

T13S R69E S16

T12S R69E S31

T13S R69E S31

T12S R69E S16

T13S R69E S16

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

Note 2: Section and jurisdiction misalignments are due to different data sets and will be reconciled once land surveying is completed.

Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT: LAS VEGAS FIELD OFFICE

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T13S R68E S2

T13S R68E S11

T13S R68E S12

T13S R68E S1

500 kV

345 kV

500DC kV

LV7

LV6

LV5

LV4

LV3

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T13S R68E S10

T13S R68E S15

T13S R68E S14

T13S R68E S11

T13S R68E S12

345 kV

500 kV

500DC kV

LV11

LV10

LV9

LV8

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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LAS VEGAS FIELD OFFICE**

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T13S R68E S16

T13S R68E S10

345 kV

500 kV

T13S R68E S15

500DC kV

LV16

LV15

LV14

LV13

LV12

T13S R68E S22

T13S R68E S14

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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TRANSWEST EXPRESS TRANSMISSION PROJECT: LAS VEGAS FIELD OFFICE

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T13S R68E S16

T13S R68E S15

345 kV

500 kV

T13S R68E S21

500DC kV

LV20

LV19

LV18

LV17

T13S R68E S22

T13S R68E S28

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources

- Desert Tortoise Potential Habitat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities

- Existing Transmission (115 kV or Higher)

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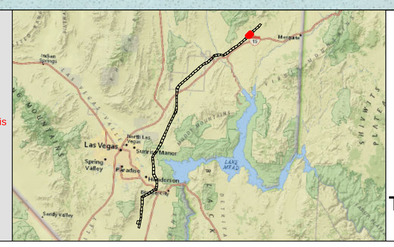

Las Vegas FO - Constraints, Access Roads, and Work Area Details

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T13S R68E S20

T13S R68E S21

345 kV

T13S R68E S29

500 kV

500DC kV

LV24

LV23

LV22

LV21

T13S R68E S28

T13S R68E S32

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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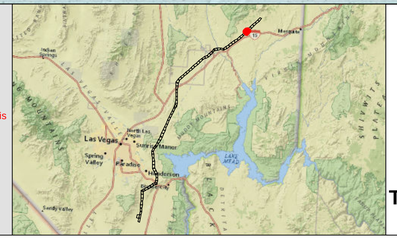

Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

**PRELIMINARY DRAFT:
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**TRANSWEST EXPRESS TRANSMISSION PROJECT:
LAS VEGAS FIELD OFFICE**

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T13S R68E S30

T13S R68E S31

T13S R68E S29

345 kV

500 kV

500DC kV

T13S R68E S32

LV28

LV27

LV26

LV25

Image Source: ESRI World Imagery Basemap
accessed on: 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
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- Preliminary Tower Location
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- Structure Work Area
- Existing Improved Road
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- New Road

Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

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T13S R67E S36

T14S R67E S1

T13S R68E S31

345 kV

500 kV

T14S R68E S6

500DC kV

LV33

LV32

LV31

LV30

LV29

Image Source: ESRI World Imagery Basemap
accessed on: 3/19/2015

0 200 400 800 Feet

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

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- New Road

Environmental Resources

- Desert Tortoise Potential Habitat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

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T14S R67E S2

T14S R67E S11

345 kV

T14S R67E S1

500 kV

500DC kV

LV37

LV36

LV35

LV34

T14S R67E S12

T14S R68E S6

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
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- Section
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Las Vegas FO - Constraints, Access Roads, and Work Area Details

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T14S R67E S10

T14S R67E S15

T14S R67E S14

T14S R67E S11

T14S R67E S12

345 kV

500 kV

500DC kV

LV41

LV40

LV39

LV38

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Level III Vegetation Management (AECOM 2014)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
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Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T14S R67E S16

T14S R67E S10

345 kV

500 kV

500DC kV

T14S R67E S15

LV45

LV44

LV43

LV42

T14S R67E S22

T14S R67E S14

Image Source: ESRI World Imagery Basemap
accessed on: 3/19/2015

0 200 400 800 Feet

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Level III Vegetation Management (AECOM 2014)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
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Las Vegas FO - Constraints, Access Roads, and Work Area Details

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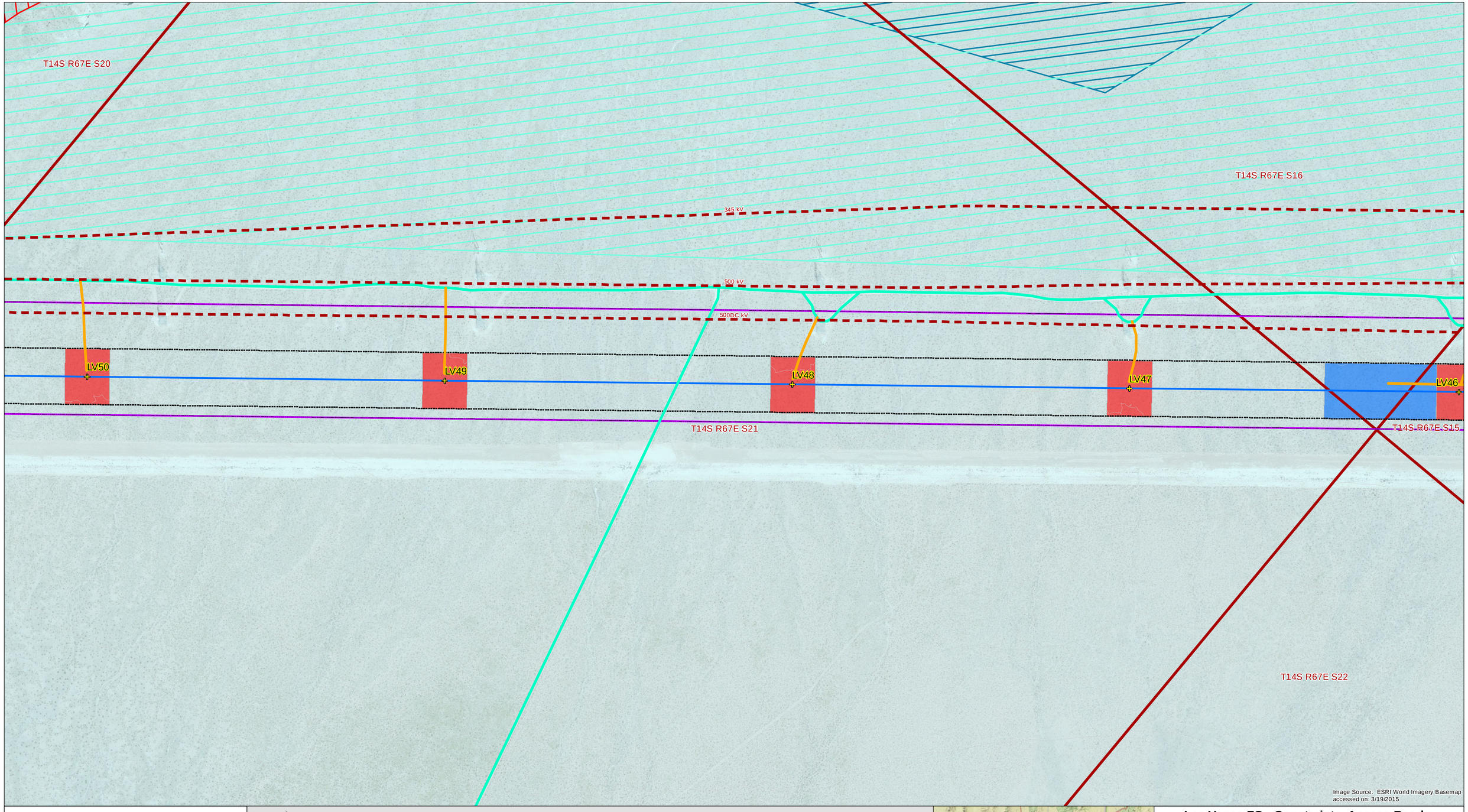

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Bighorn Sheep (NDOW 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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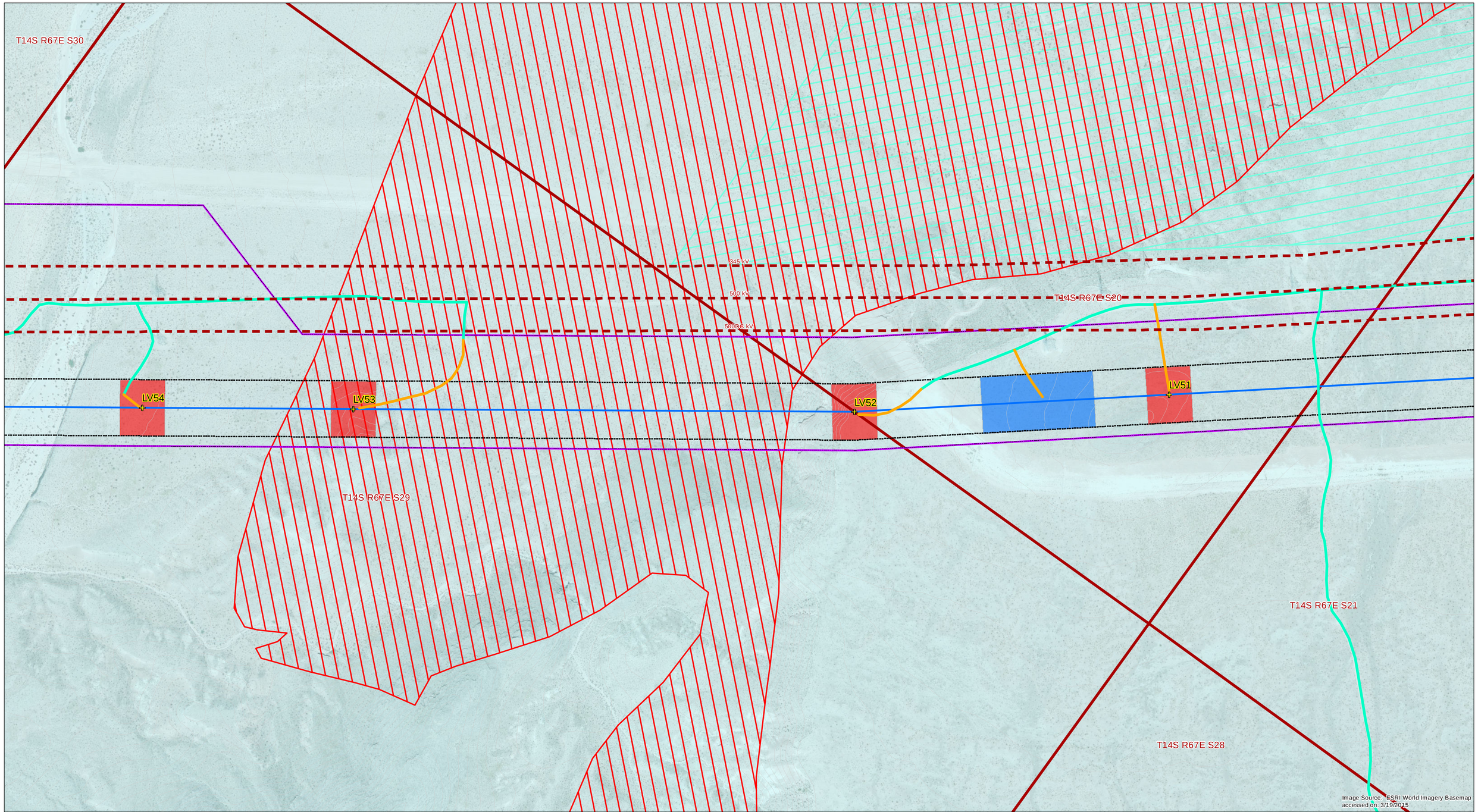

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

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- Structure Work Area
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- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
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T14S R66E S25

345 kV

500 kV

500DC kV

LV59

LV58

LV57

LV56

LV55

T14S R67E S30

T14S R67E S31

T14S R67E S29

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

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T14S R66E S25

T14S R67E S30

T14S R67E S31

T14S R66E S36

LV59

LV60

LV61

LV62

LV63

LV64

345 kV

500 kV

500DC kV

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

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- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Bird Habitat Concentration Area (AECOM 2014)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
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T14S R66E S27

T14S R66E S26

T14S R66E S25

T14S R66E S35

T14S R66E S36

LV68

LV67

LV66

LV65

LV64

345 kV

500 kV

500DC kV

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

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- New Road

Environmental Resources
- Level III Vegetation Management (AECOM 2014)
- Western Yellow-billed Cuckoo Model Habitat (AECOM 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Southwestern Willow Flycatcher Model Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Bird Habitat Concentration Area (AECOM 2014)
- Recreation Mitigation (AECOM 2014)
- Permanent Water Source (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- PRIVATE
- Section

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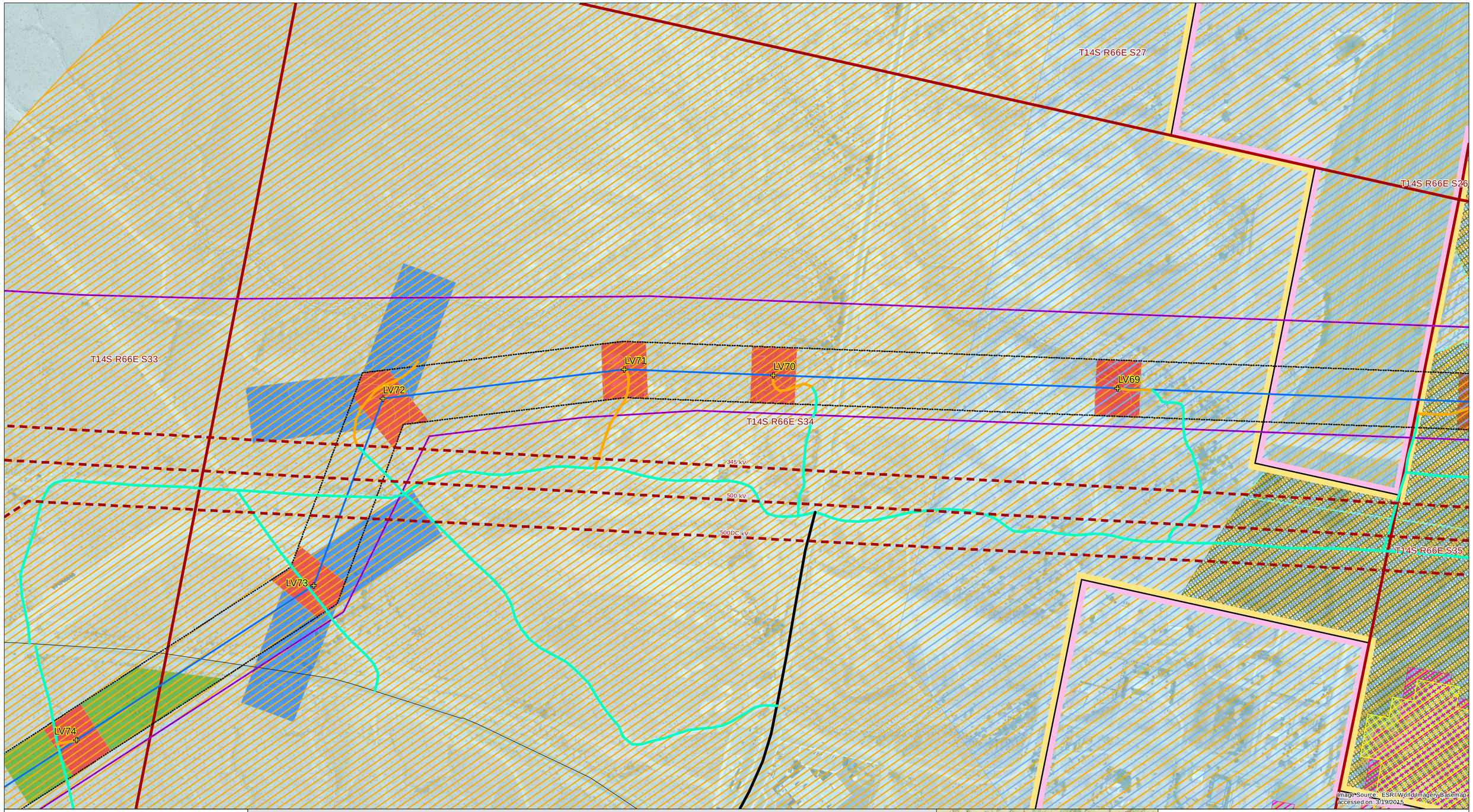

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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LV77
LV76
LV75
LV74
LV73
LV72
T15S R66E S4
T14S R66E S33
T14S R66E S34
T15S R66E S3
345 kV
500 kV
500DC kV

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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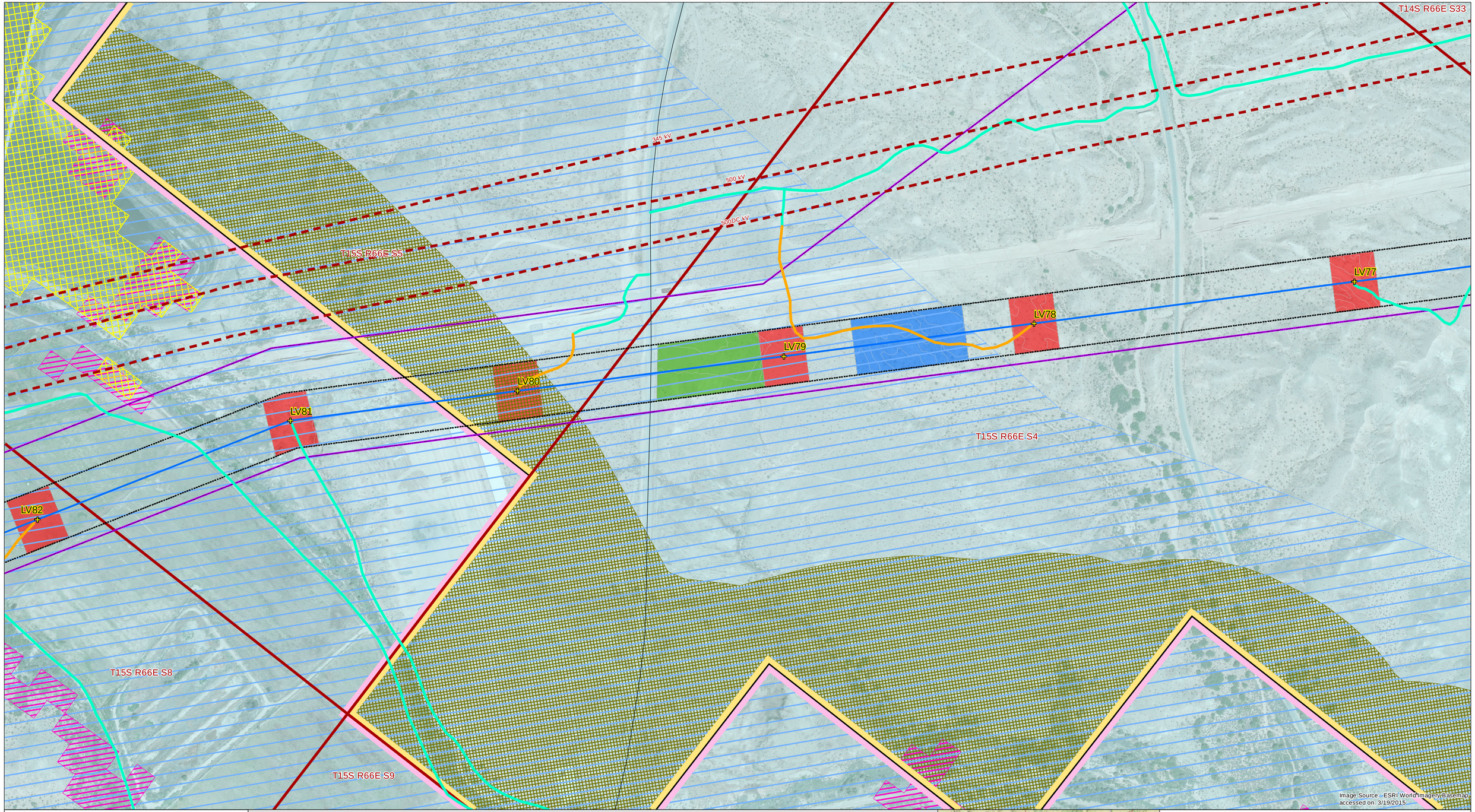

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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T15S R66E S7

T15S R66E S5

T15S R66E S8

T15S R66E S17

LV86

LV85

LV84

LV83

LV82

345 kV

500 kV

500DC kV

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Level III Vegetation Management (AECOM 2014)
- Western Yellow-billed Cuckoo Model Habitat (AECOM 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Southwestern Willow Flycatcher Model Habitat (AECOM 2013)
- Bird Habitat Concentration Area (AECOM 2014)
- Permanent Water Source (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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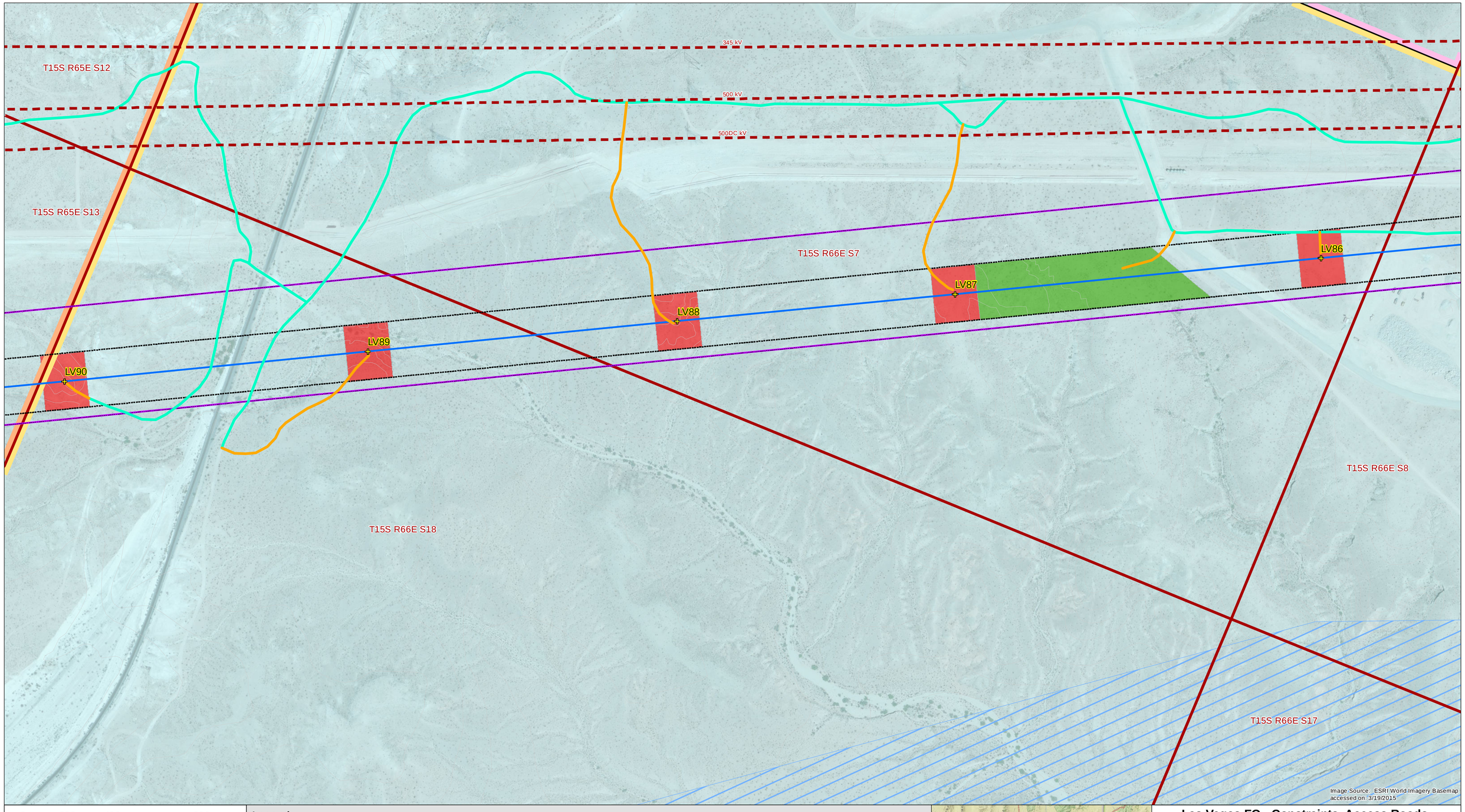

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

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Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)
- Bird Habitat Concentration Area (AECOM 2014)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- Tribal
- BLM
- PRIVATE

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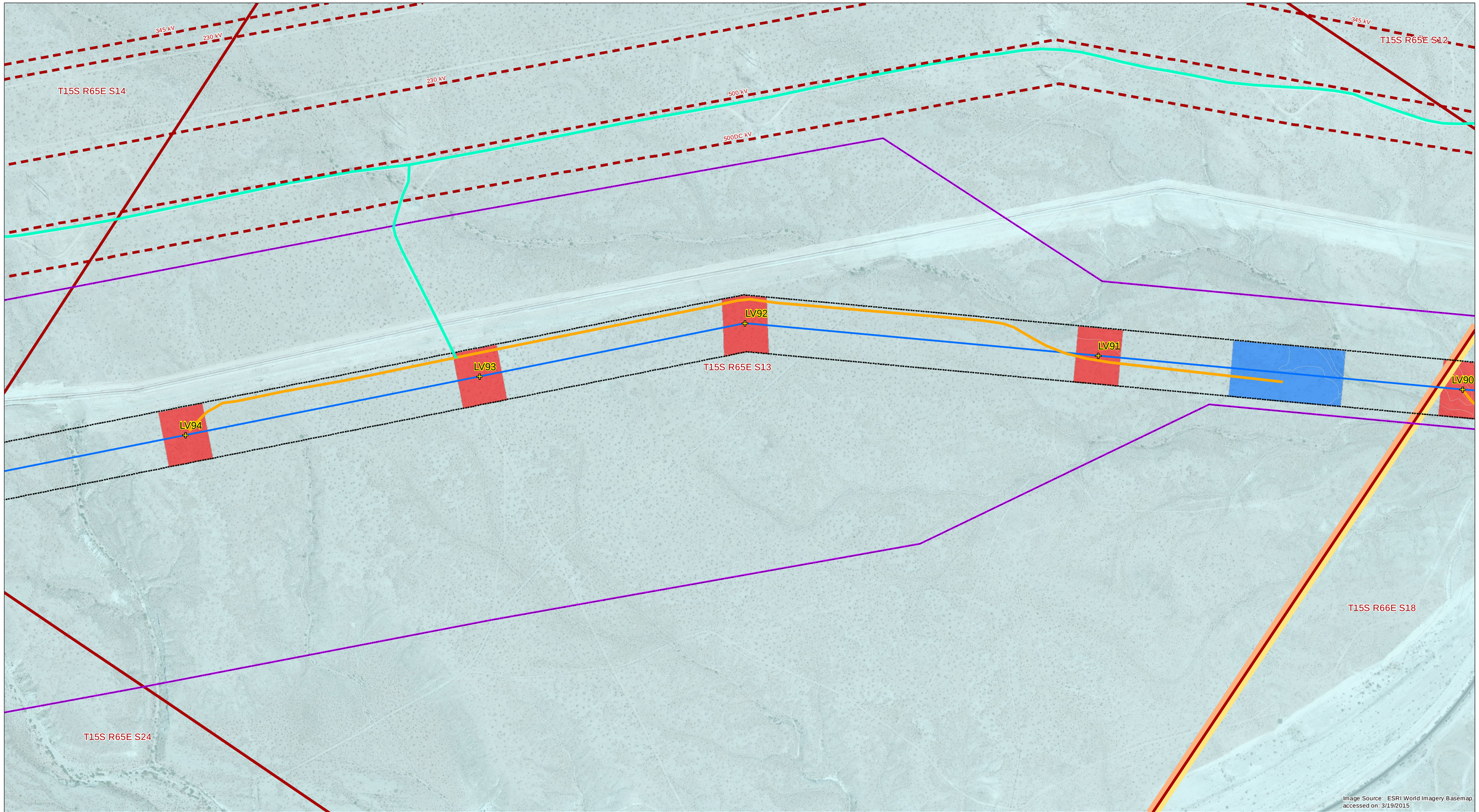

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)

Existing Transportation
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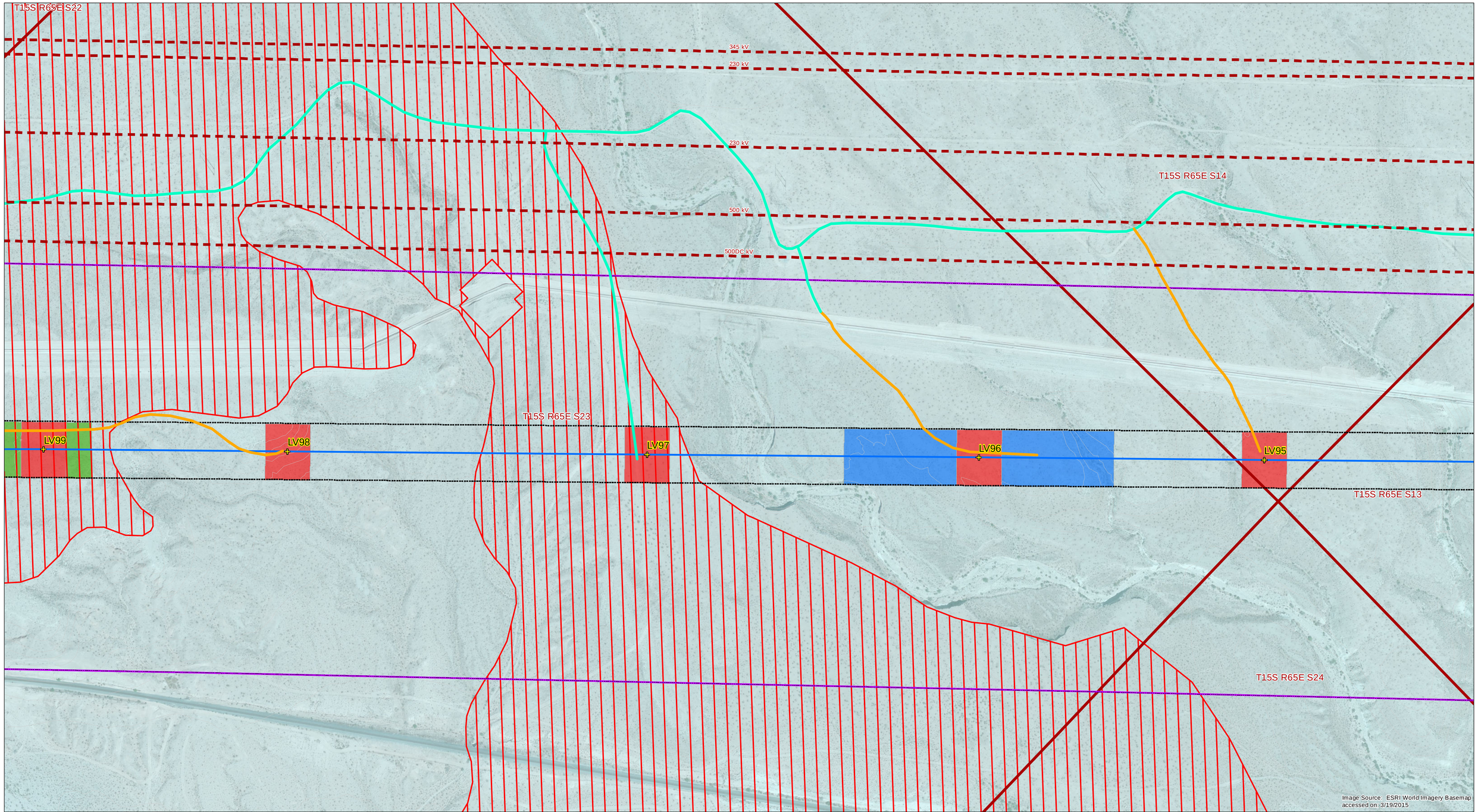

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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Environmental Resources
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- Las Vegas Buckwheat (AECOM 2013)

Existing Transportation
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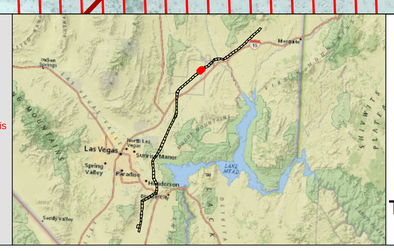

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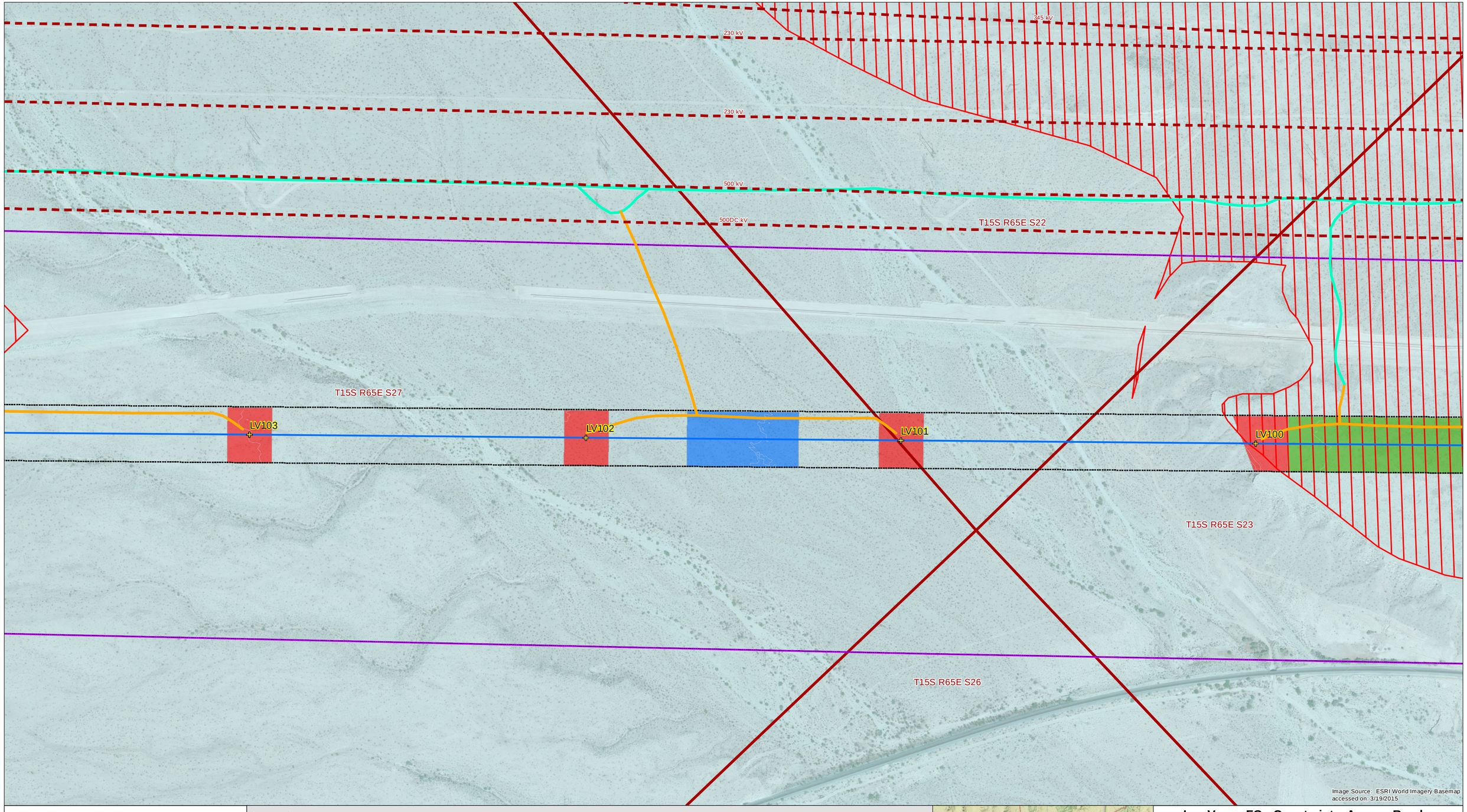

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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Environmental Resources
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- Las Vegas Buckwheat (AECOM 2013)

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- State Highway

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

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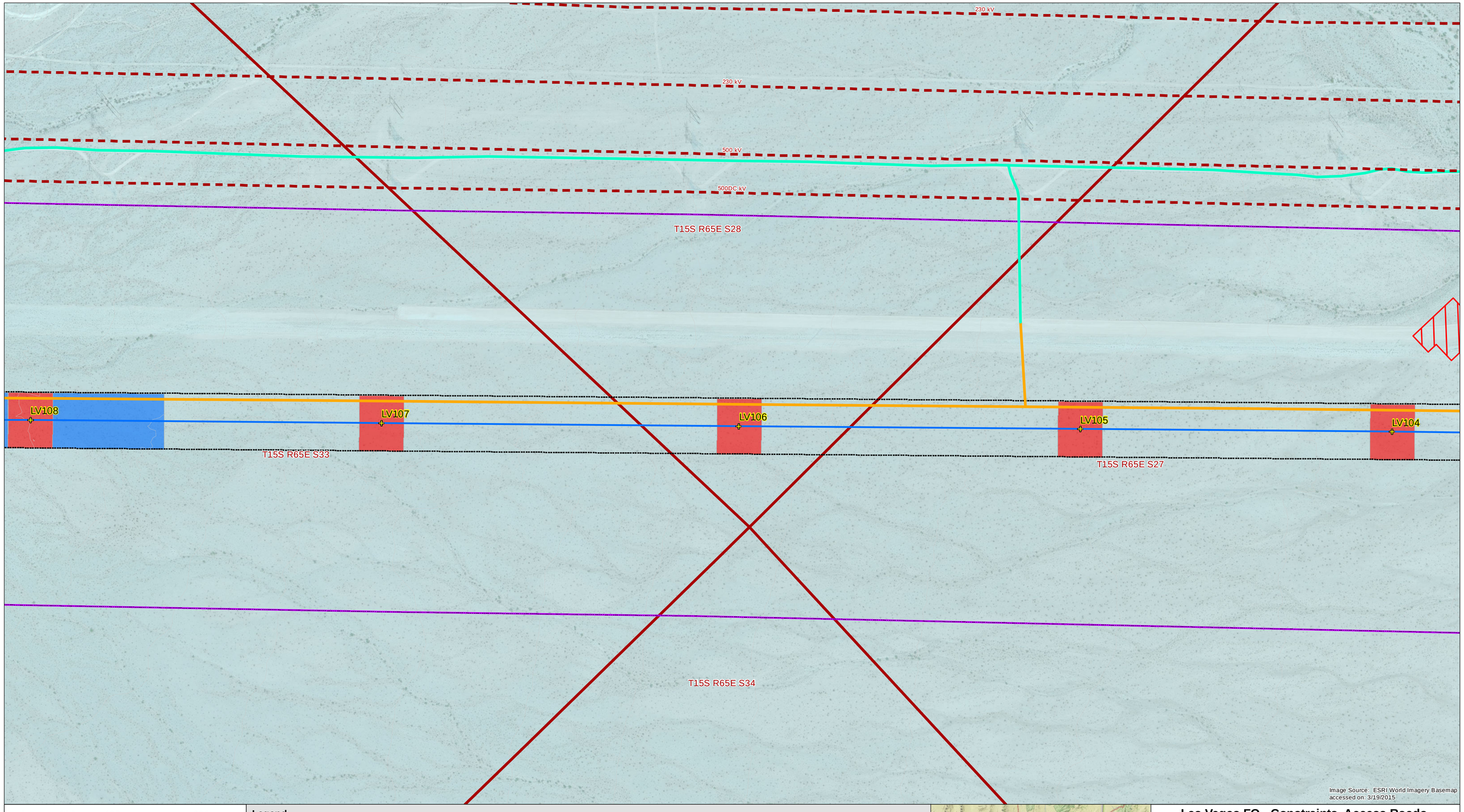

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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230 kV

500 kV

500DC kV

T15S R65E S32

LV112

LV111

LV110

LV109

T15S R65E S33

T16S R65E S5

T16S R65E S4

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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Environmental Resources

- Desert Tortoise Potential Habitat (AECOM 2013)

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Jurisdiction

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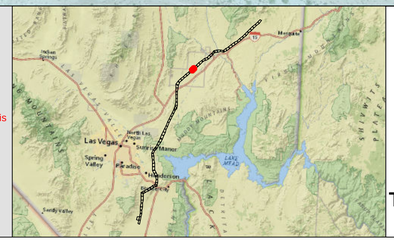

Las Vegas FO - Constraints, Access Roads, and Work Area Details

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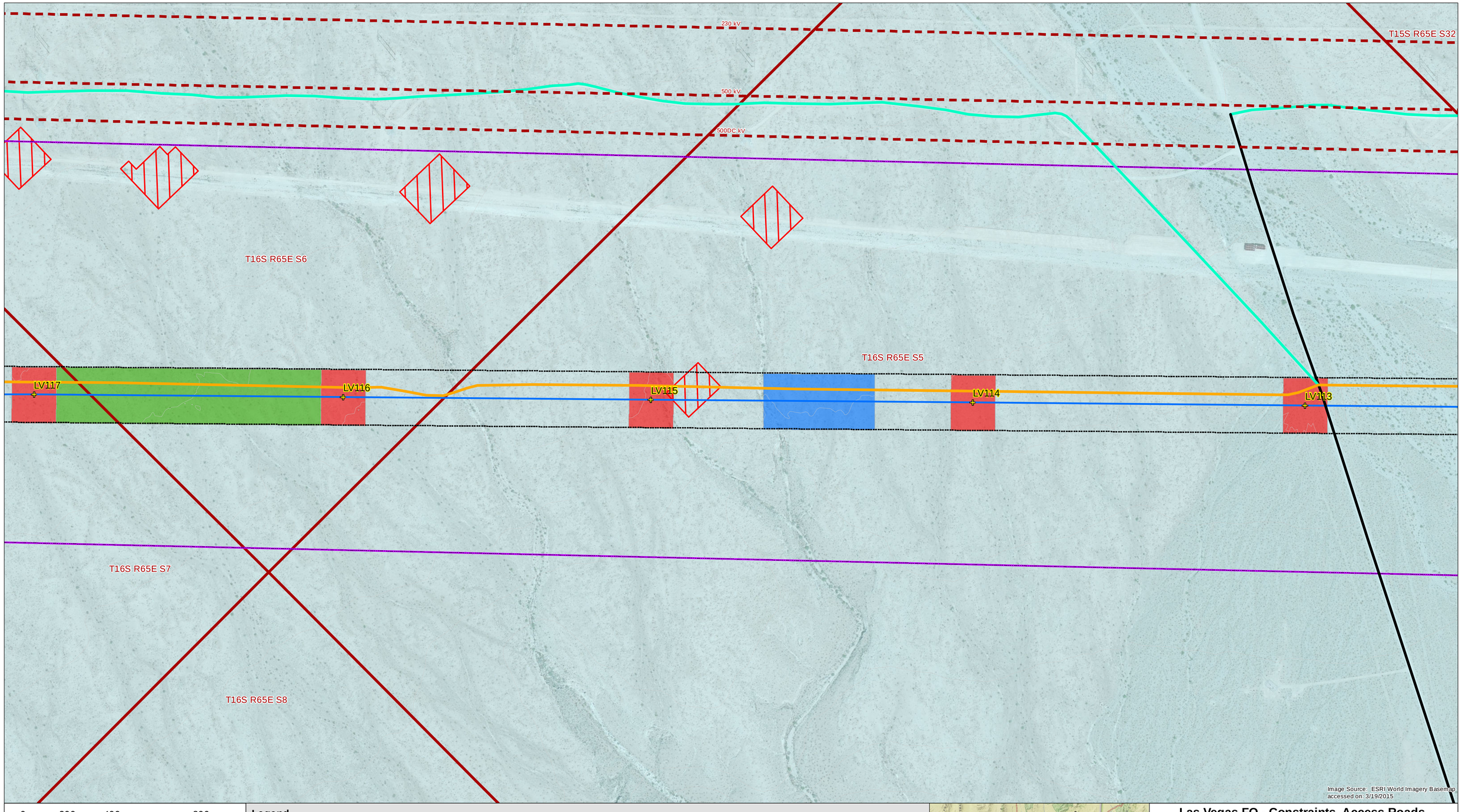

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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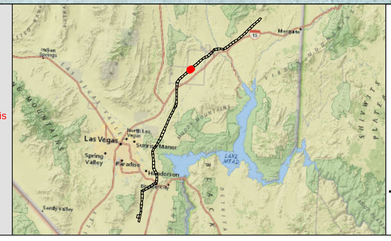

Las Vegas FO - Constraints, Access Roads, and Work Area Details

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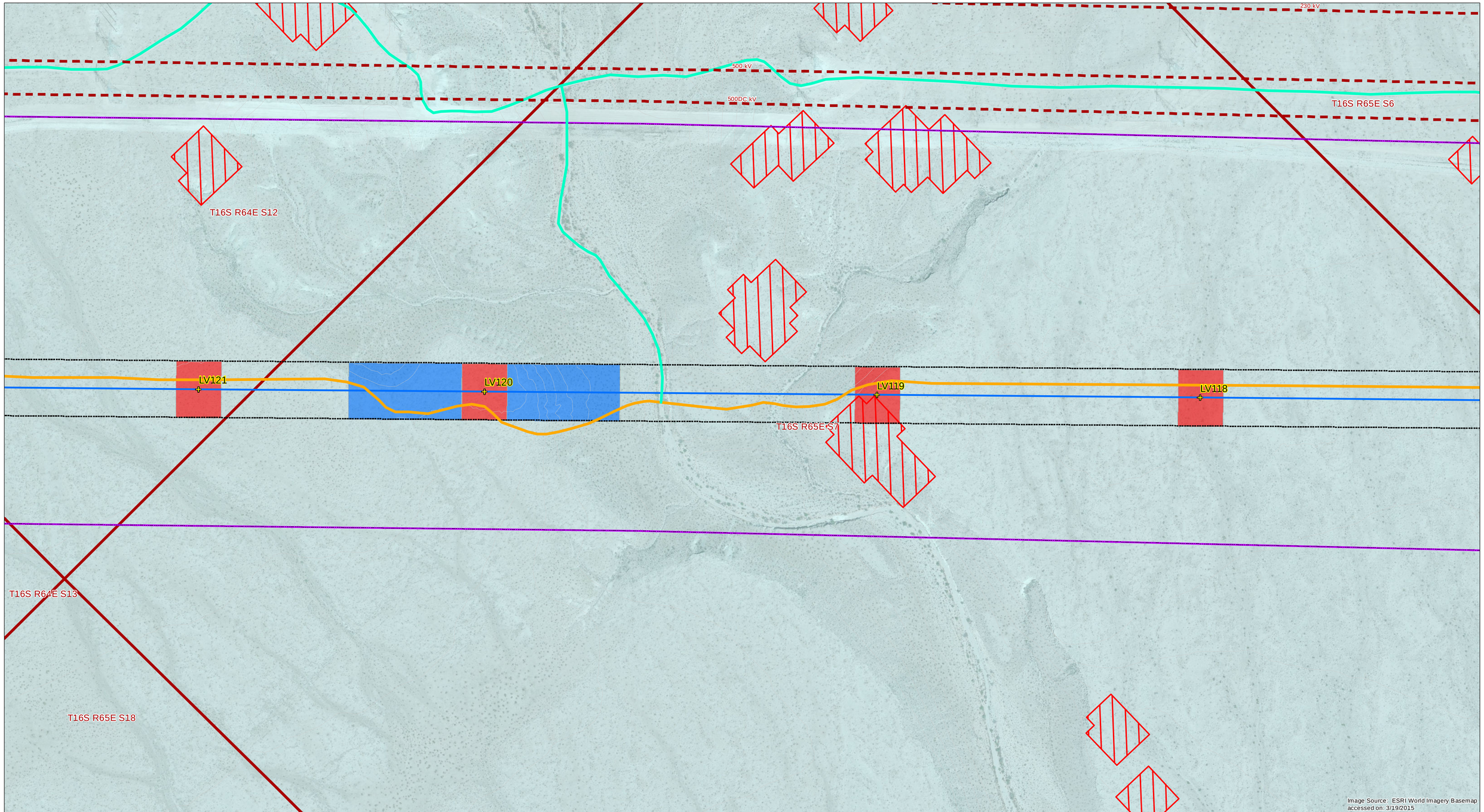

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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Environmental Resources
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500 kV

500DC kV

T16S R64E S14

T16S R64E S12

LV126

LV125

LV124

LV123

LV122

T16S R64E S13

T16S R65E S18

T16S R64E S24

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

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T16S R64E S22

500 kV

500DC kV

T16S R64E S14

LV131

LV130

LV129

LV128

LV127

T16S R64E S23

T16S R64E S13

T16S R64E S24

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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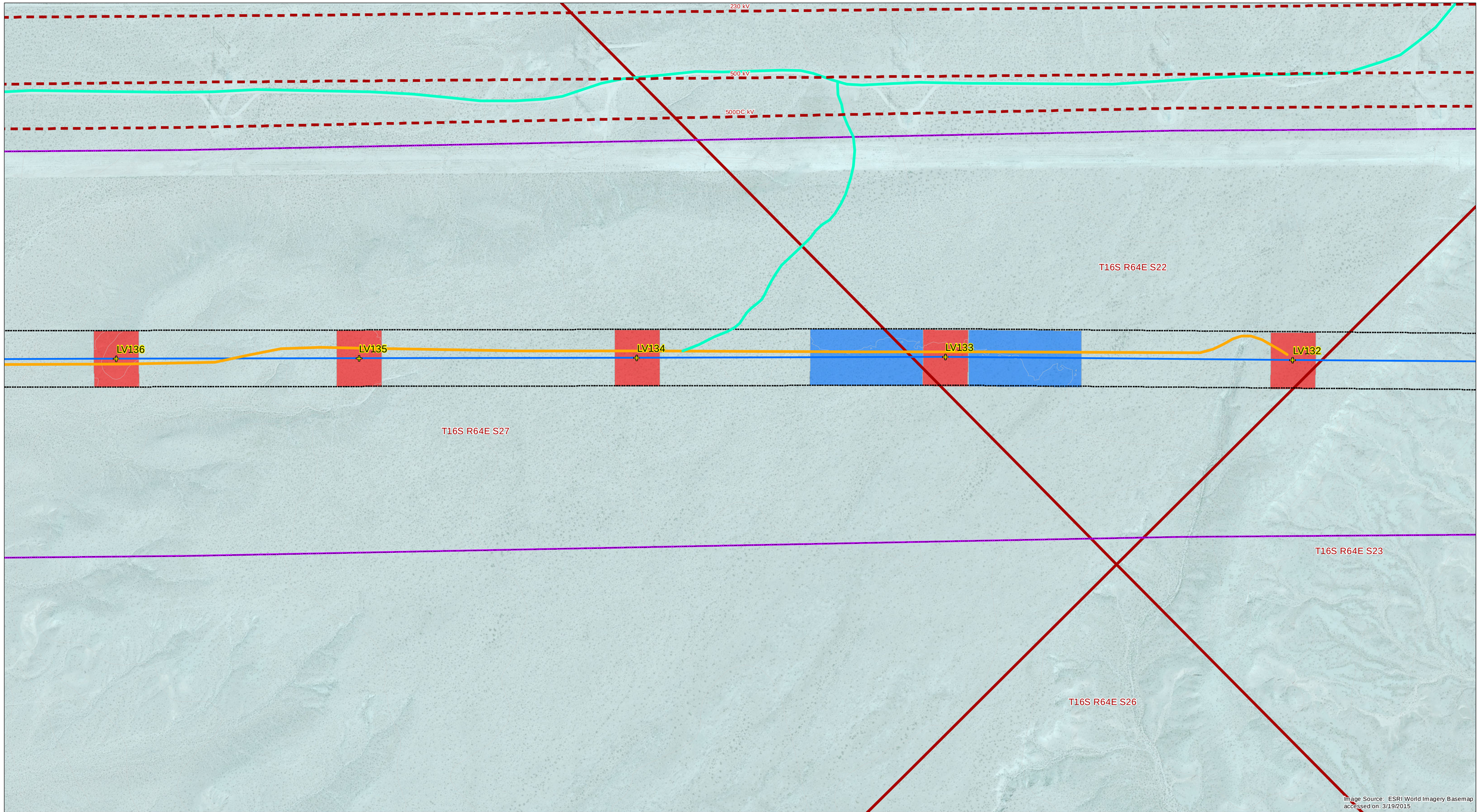

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TRANSWEST EXPRESS LLC

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T16S R64E S28

T16S R64E S33

T16S R64E S34

T16S R64E S27

LV136

LV137

LV138

LV139

LV140

LV141

500 kV

500DC kV

230 kV

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

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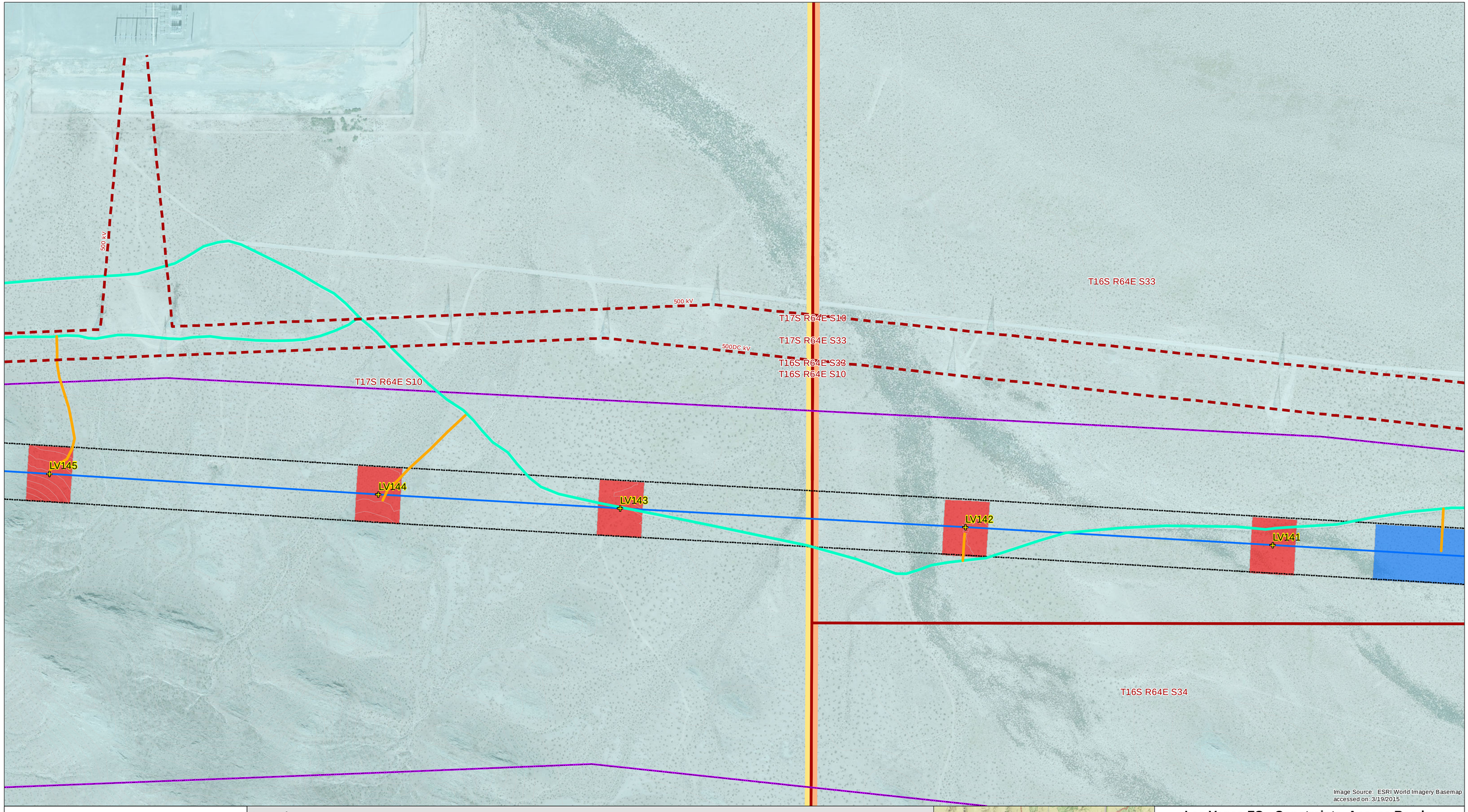

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- New Road

Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- Tribal
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT: LAS VEGAS FIELD OFFICE

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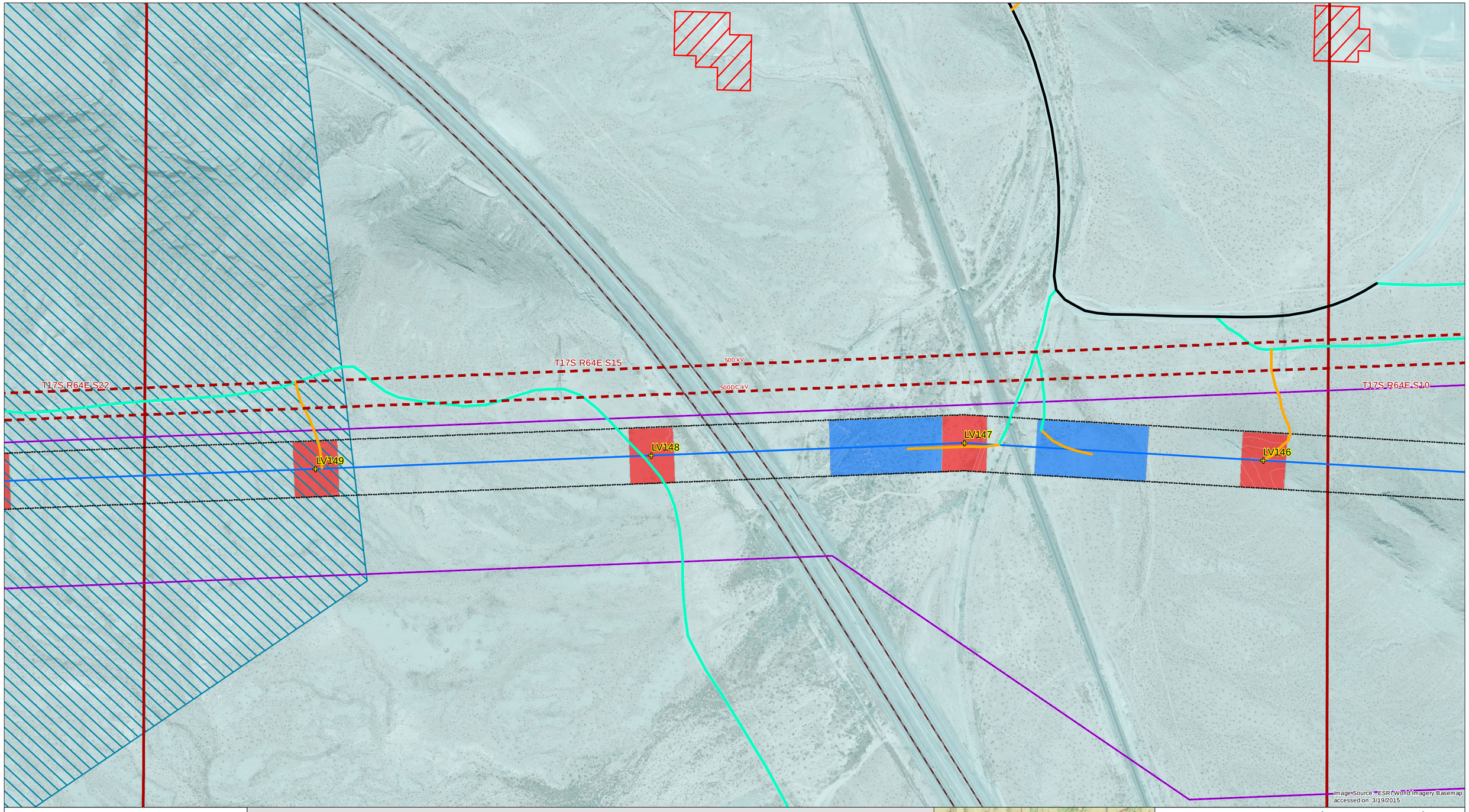

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1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Bighorn Sheep (NDOW 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

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T17S R64E S27

T17S R64E S22

500 kV

500DC kV

LV154

LV153

LV152

LV151

LV150

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Level III Vegetation Management (AECOM 2014)
- Bighorn Sheep (NDOW 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

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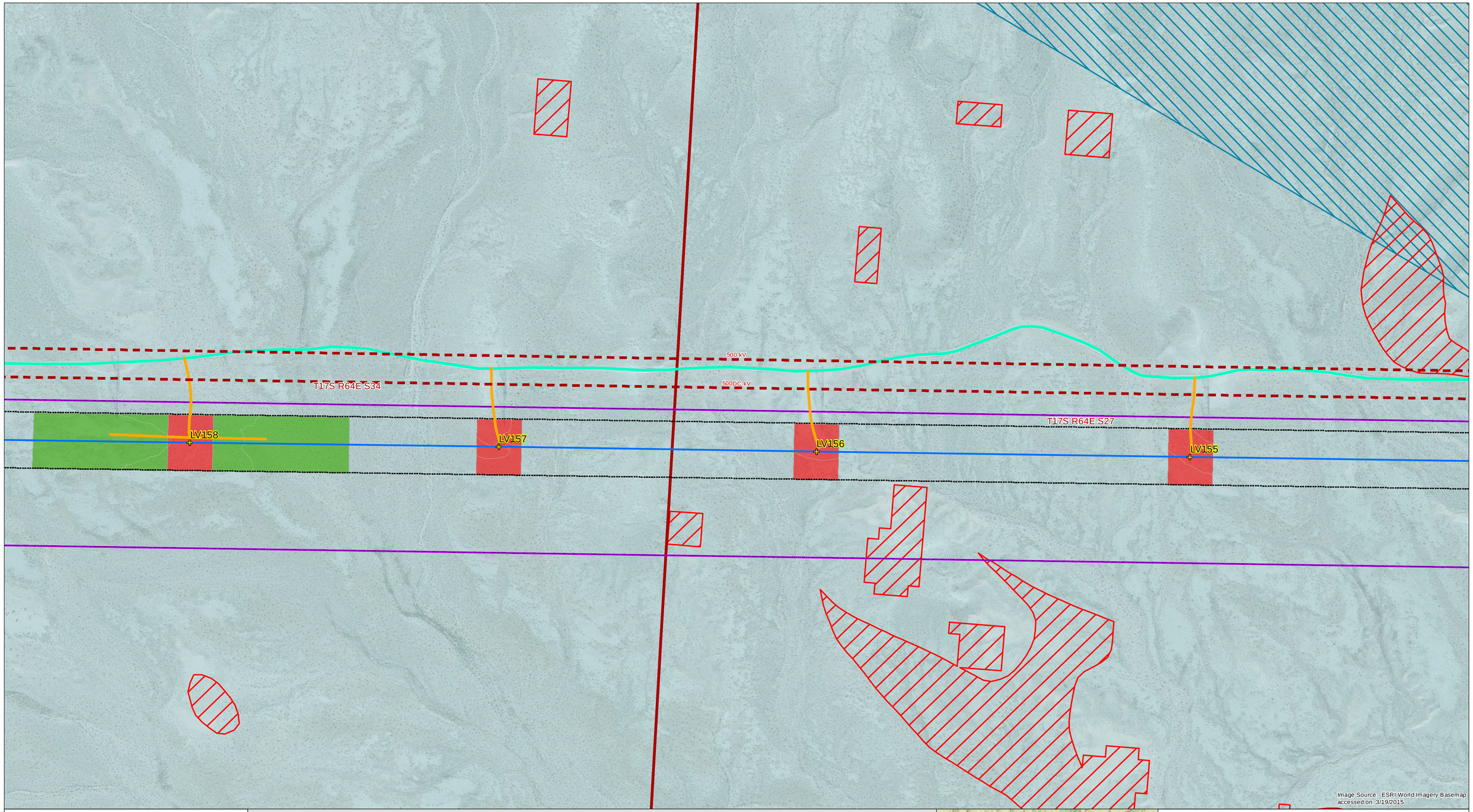

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Bighorn Sheep (NDOW 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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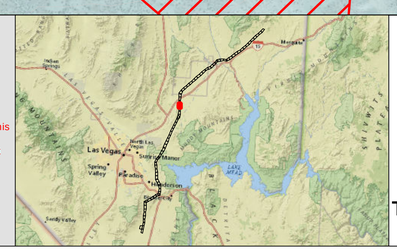

Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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500 kV

500DC kV

T17S R64E S34

T18S R64E S3

LV162

LV161

LV160

LV159

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources

- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities

- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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LAS VEGAS FIELD OFFICE**

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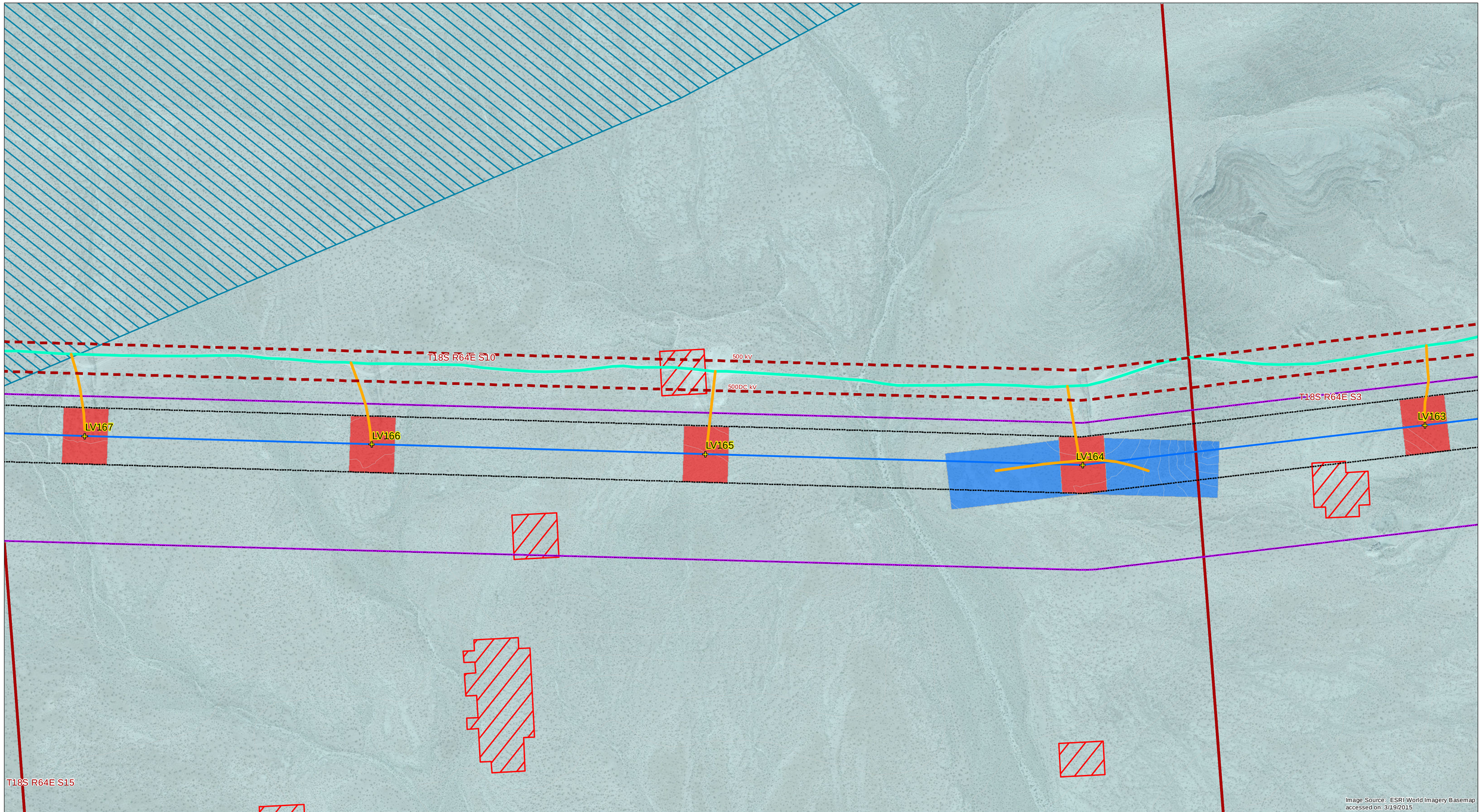

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- TWE Project Transmission Line Corridor
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- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Bighorn Sheep (NDOW 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
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Las Vegas FO - Constraints, Access Roads, and Work Area Details

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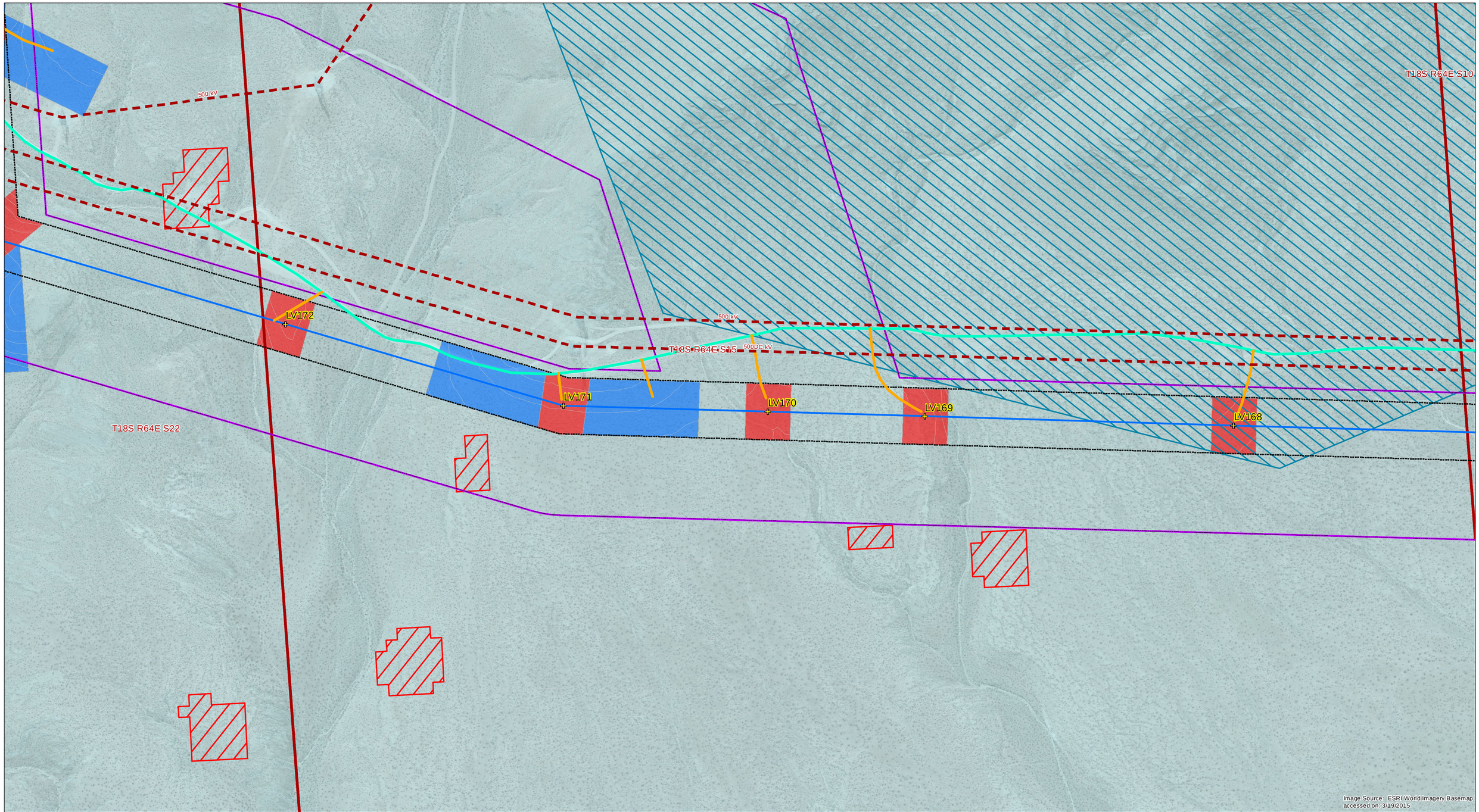

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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- New Road

Environmental Resources
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- Interstate
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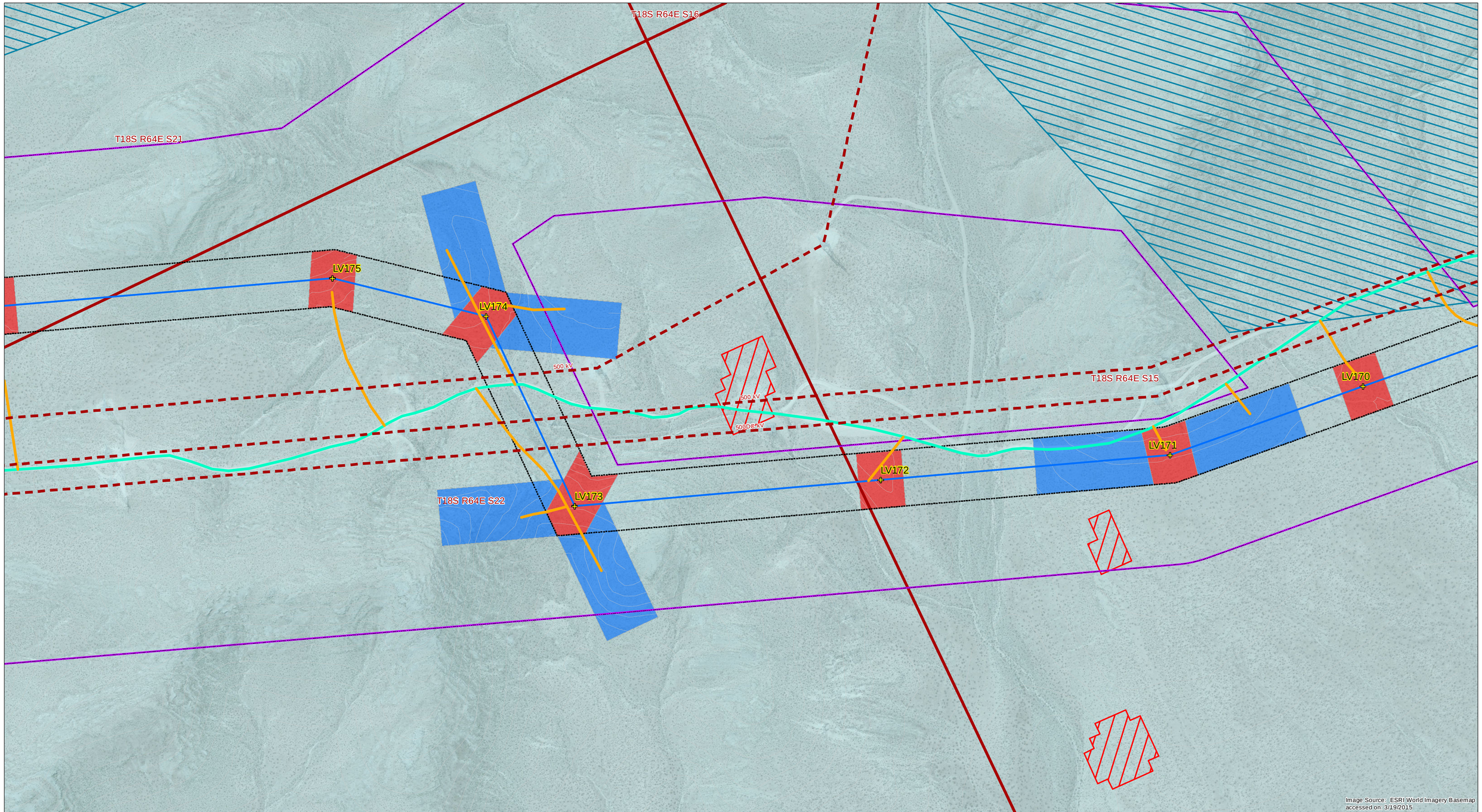

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

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Environmental Resources
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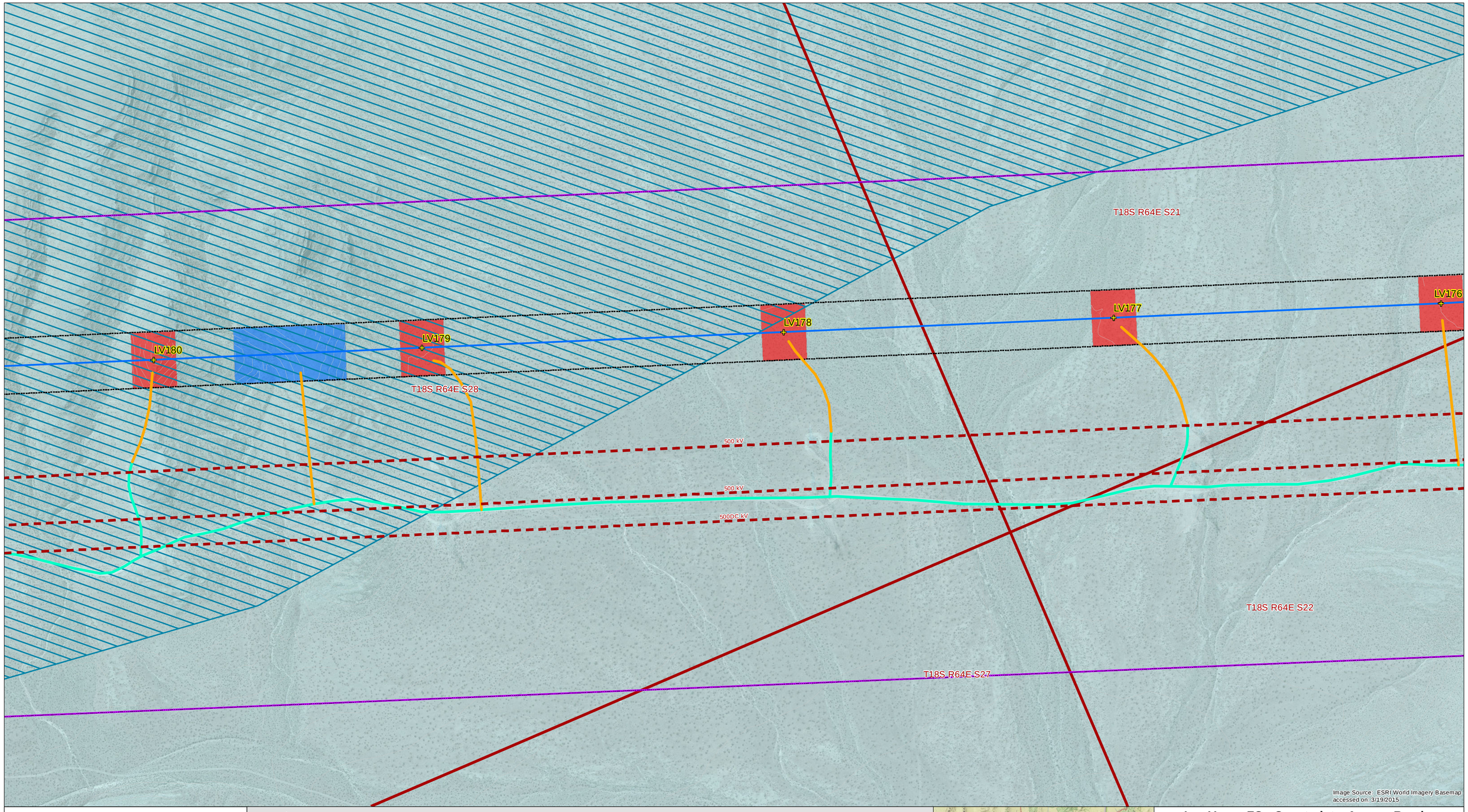

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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Environmental Resources
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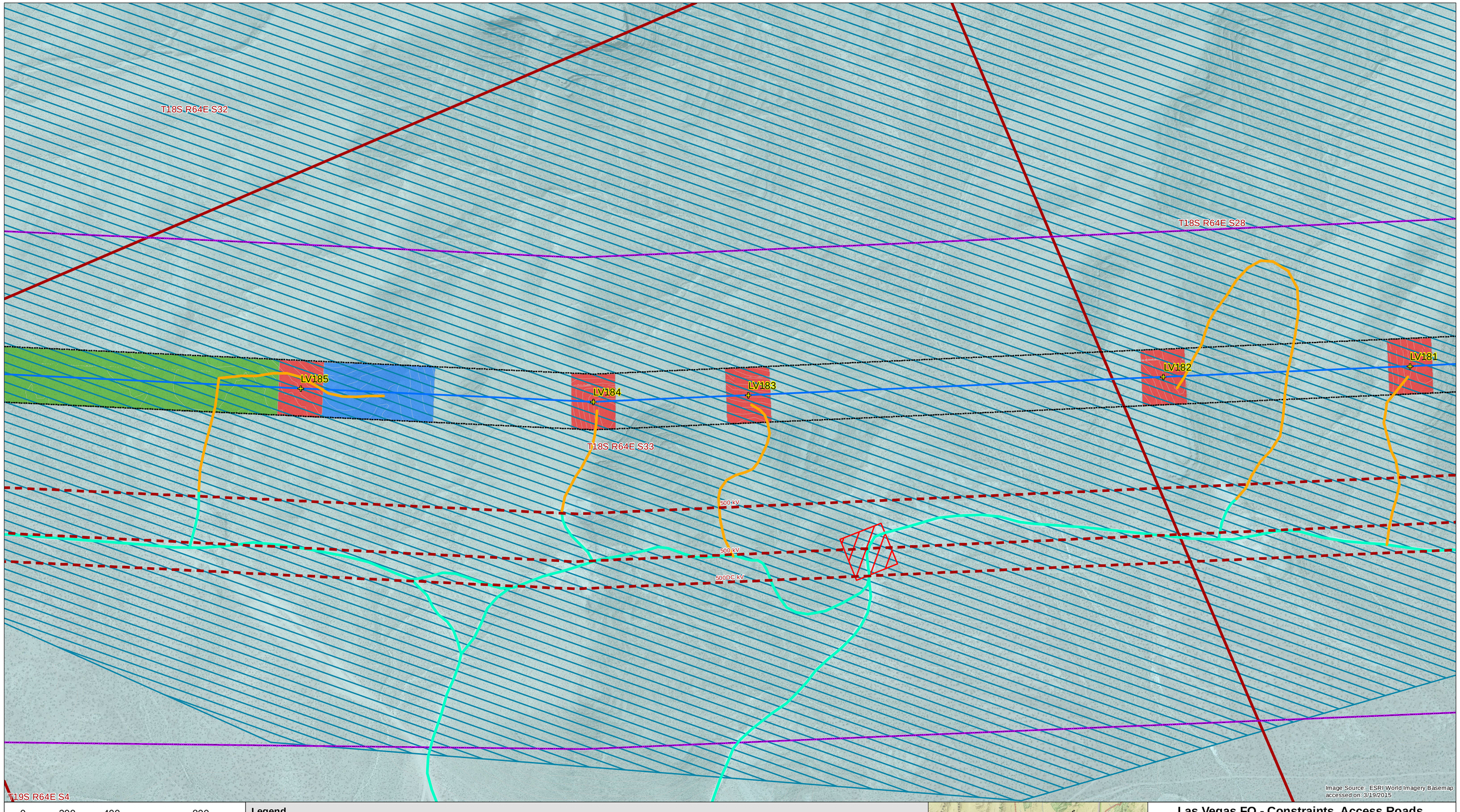

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
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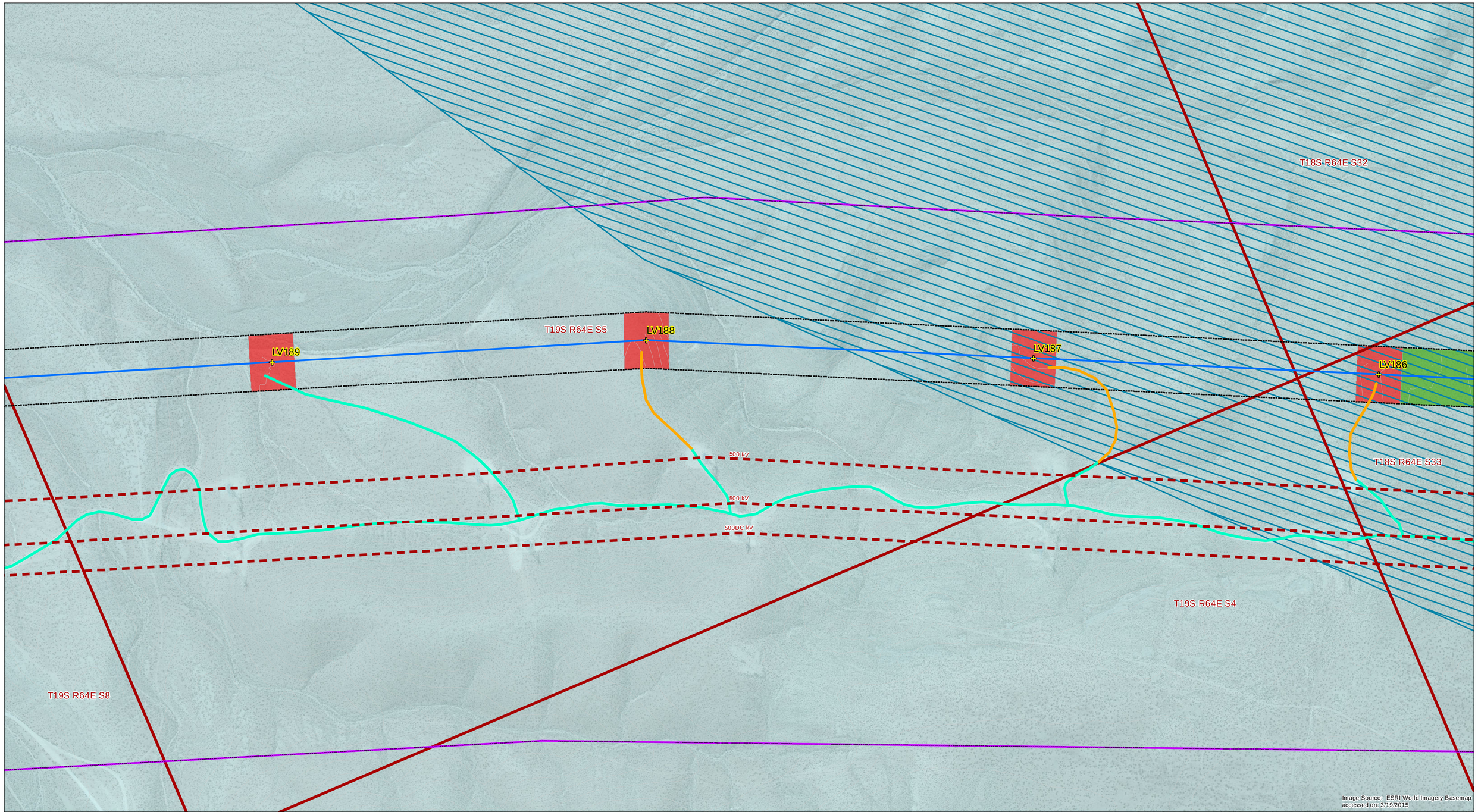

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

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T19S R64E S7

T19S R64E S18

T19S R64E S5

T19S R64E S8

T19S R64E S17

LV194

LV193

LV192

LV191

LV190

500 kV

500 kV

500DC kV

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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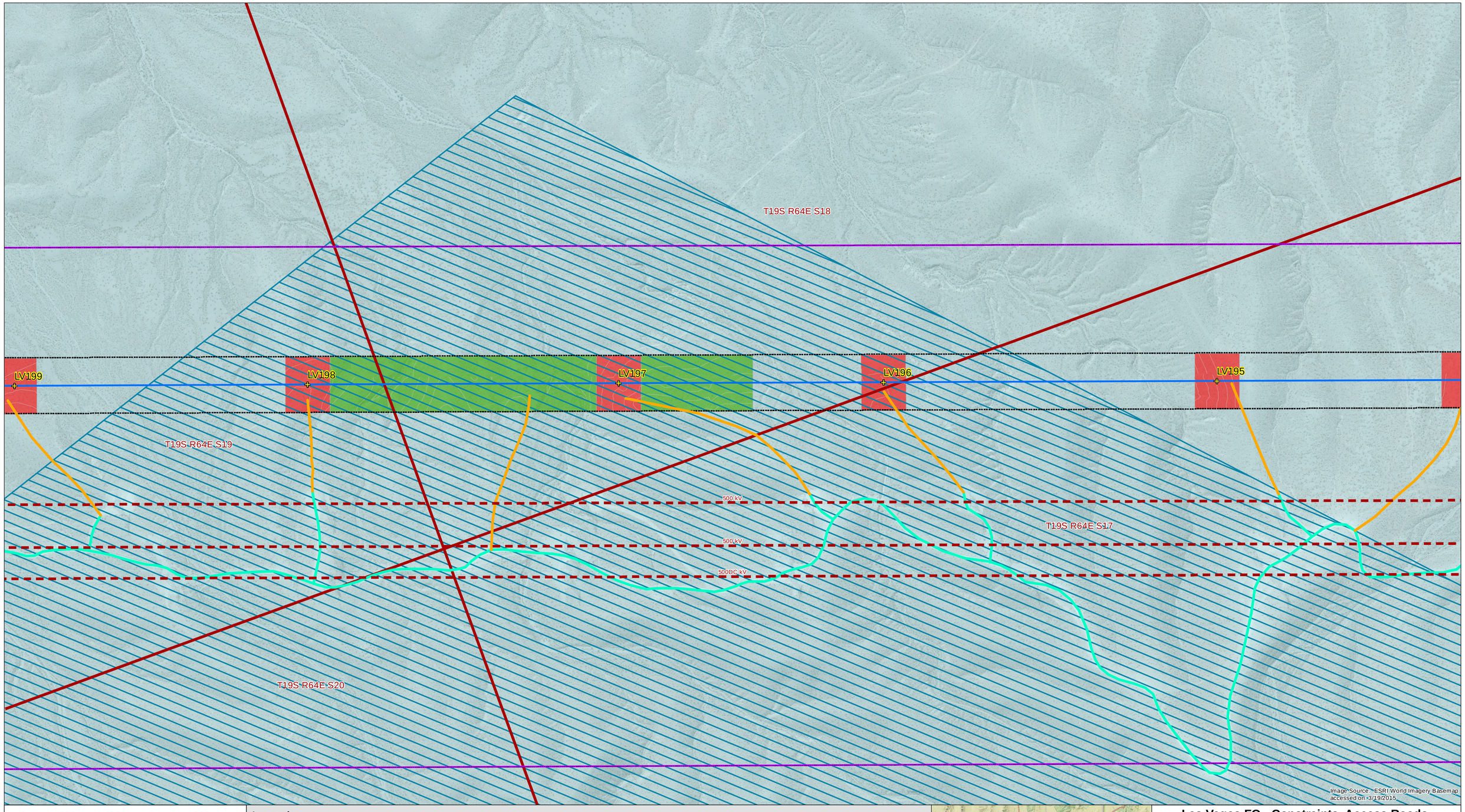

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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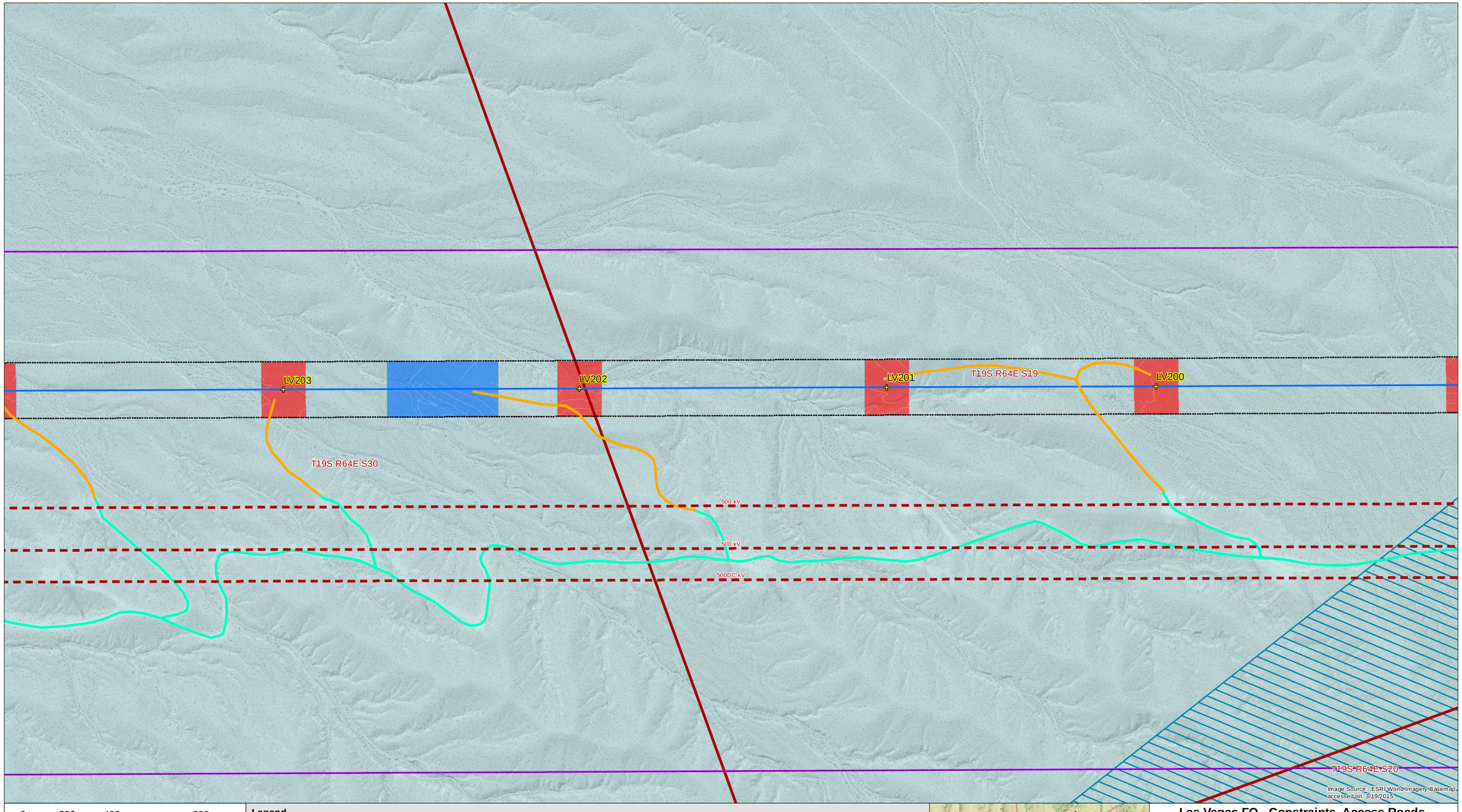

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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T19S R63E S25

T19S R63E S36

LV208

LV207

LV206

LV205

LV204

T19S R64E S30

500 kV

500 kV

T19S R64E S31

500DC kV

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

Note 1: All design features shown on this drawing are based on best available preliminary engineering and are subject to change after field verification and during final detailed design.

Note 2: Section and jurisdiction misalignments are due to different data sets and will be reconciled once land surveying is completed.

Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT: LAS VEGAS FIELD OFFICE

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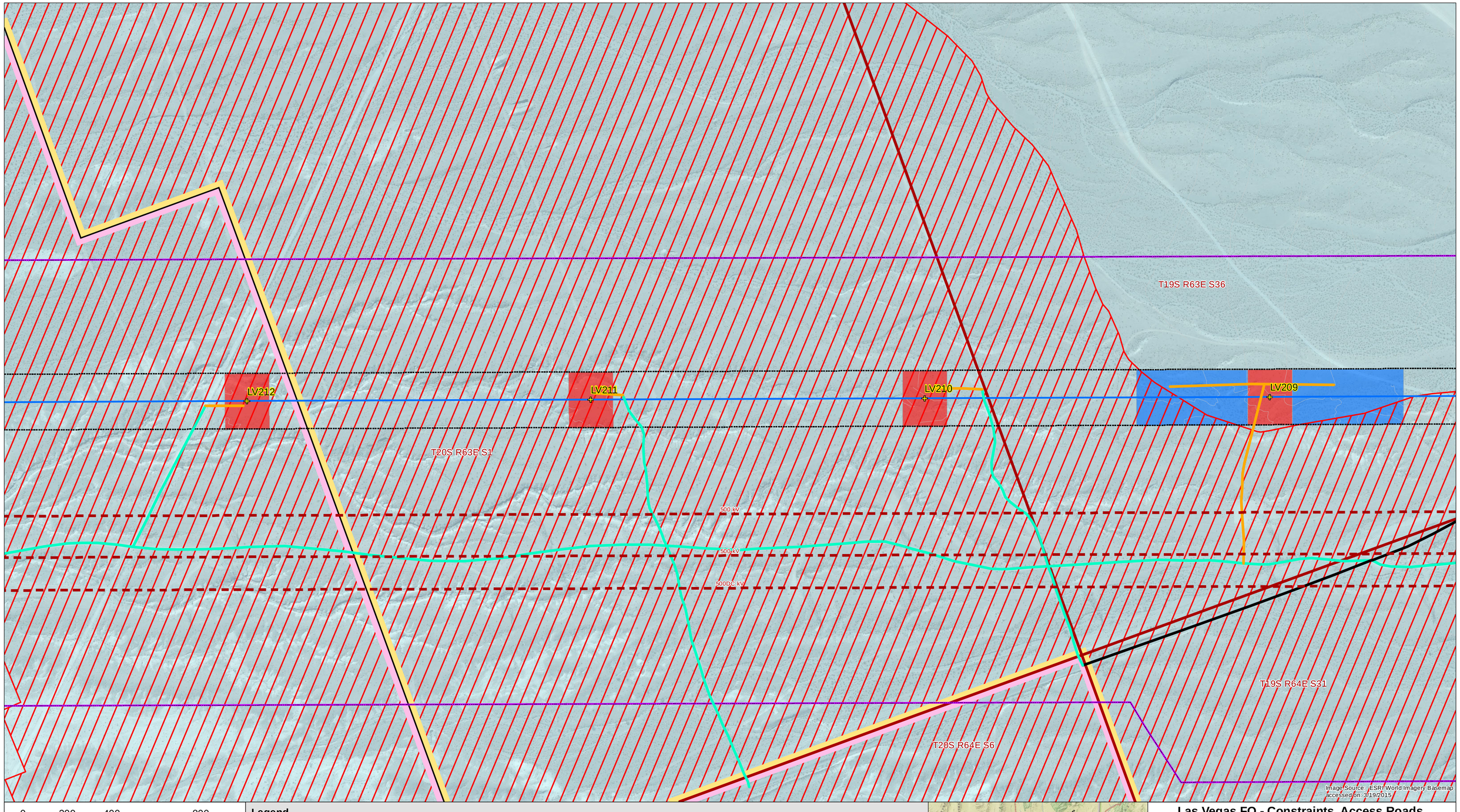

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1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T20S R63E S11

T20S R63E S1

T20S R63E S12

T20S R63E S13

LV216

LV215

LV214

LV213

500 kV

500 kV

500 kV

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- PRIVATE
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T20S R63E S11

T20S R63E S14

T20S R63E S12

T20S R63E S13

T20S R63E S23

LV221

LV220

LV219

LV218

LV217

500 kV

500 kV

500DC kV

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Bighorn Sheep (NDOW 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Permanent Water Source (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- PRIVATE
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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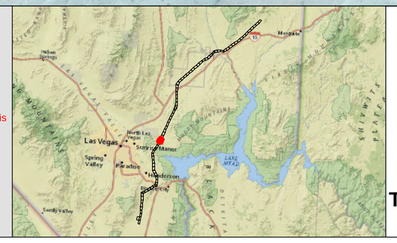

Las Vegas FO - Constraints, Access Roads, and Work Area Details

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T20S R63E S22

T20S R63E S14

T20S R63E S27

T20S R63E S23

T20S R63E S26

LV226

LV225

LV224

LV223

LV222

500 kV

500 kV

500DC kV

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Bighorn Sheep (NDOW 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Bighorn Sheep (NDOW 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- NPS
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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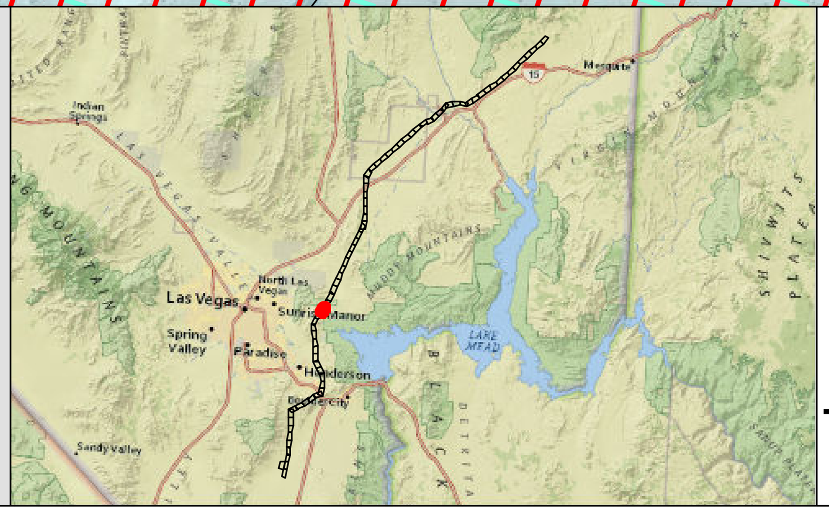

Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T20S R63E S27
T20S R63E S33
T21S R63E S4
LV236
LV235
LV234
T20S R63E S34
LV232
LV233
T20S R63E S24
T20S R63E S34
T20S R63E S3
T21S R63E S3
T21S R63E S3
T21S R63E S34
500 kV
500 kV
500 kV

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Bighorn Sheep (NDOW 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

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T20S R63E S33

LV238

LV237

LV239

T21S R63E S4

500 kV

500 kV

500 kV

T21S R63E S9

LV240

T21S R63E S3

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Bighorn Sheep (NDOW 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

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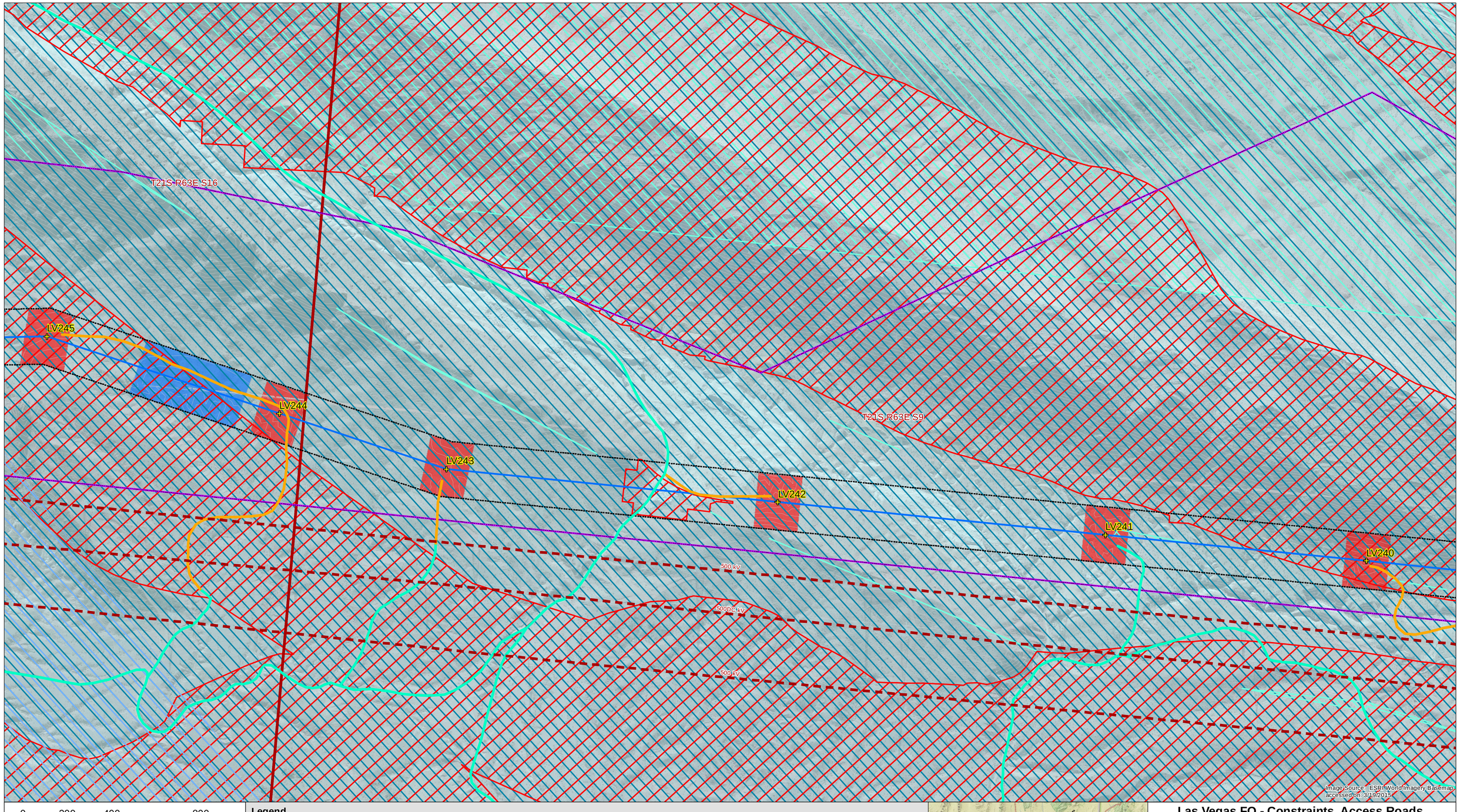

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1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Bighorn Sheep (NDOW 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Bird Habitat Concentration Area (AECOM 2014)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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T21S R63E S21

T21S R63E S22

T21S R63E S15

T21S R63E S16

LV247

LV248

LV249

LV246

500 kV

500DC kV

500 kV

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Bighorn Sheep (NDOW 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Bird Habitat Concentration Area (AECOM 2014)
- Recreation Mitigation (AECOM 2014)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- PRIVATE
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

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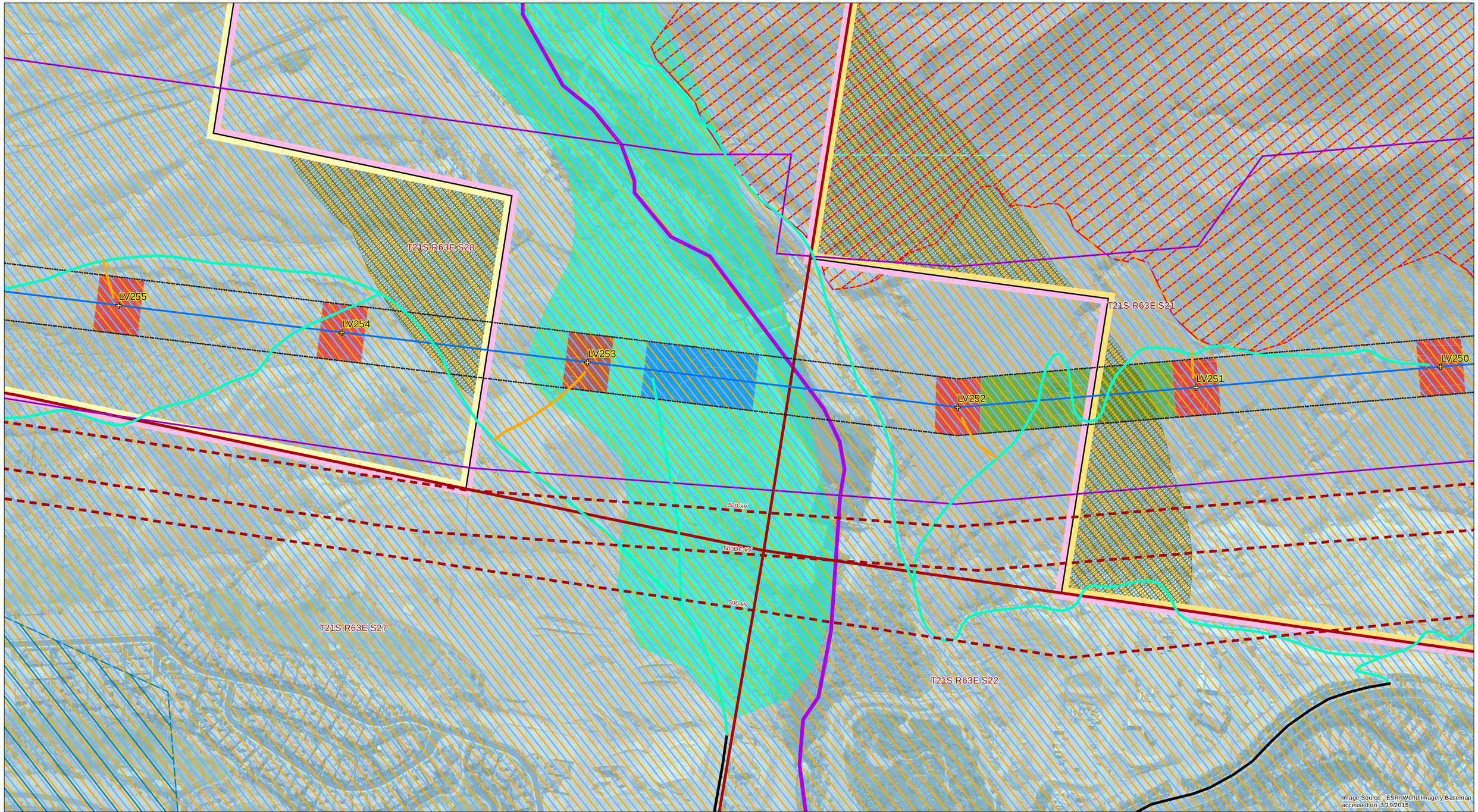

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1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Bighorn Sheep (NDOW 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- 303D Impaired Waters (AECOM 2012)
- Las Vegas Buckwheat (AECOM 2013)
- Bird Habitat Concentration Area (AECOM 2014)
- Recreation Mitigation (AECOM 2014)
- Permanent Water Source (AECOM 2013)
- Special Management Area (AECOM 2013)
- NWI Wetland (USGS 2012)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- BOR
- PRIVATE
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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T21S R63E S33

T21S R63E S28

T21S R63E S34

T21S R63E S27

LV257

LV256

LV258

LV259

LV260

500DC kV

500 kV

500 kV

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Bighorn Sheep (NDOW 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Bird Habitat Concentration Area (AECOM 2014)
- Recreation Mitigation (AECOM 2014)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- BOR
- PRIVATE
- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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T22S R63E S9

T22S R63E S10

T22S R63E S4

T21S R63E S33

T22S R63E S3

T21S R63E S34

230 kV

500DC kV

500 kV

500 kV

LV264

LV263

LV262

LV261

LV265

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

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- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Fly Yard/Staging Area
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources

- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Bird Habitat Concentration Area (AECOM 2014)
- Recreation Mitigation (AECOM 2014)
- Special Management Area (AECOM 2013)

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- BLM
- BOR
- PRIVATE

- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities

- Existing Transmission (115 kV or Higher)

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Las Vegas FO - Constraints, Access Roads, and Work Area Details

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T22S R63E S15

T22S R63E S9

T22S R63E S4

T22S R63E S10

T22S R63E S3

T22S R63E S11

230 kV

500DC kV

500 kV

500 kV

LV269

LV268

LV267

LV266

LV265

Image Source - ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features (Agency Preferred Alternative)

- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources

- Bighorn Sheep (NDOW 2013)
- Desert Tortoise Potential Habitat (AECOM 2013)
- Las Vegas Buckwheat (AECOM 2013)
- Recreation Mitigation (AECOM 2014)
- Special Management Area (AECOM 2013)

Existing Transportation

- Interstate
- US Highway
- State Highway

Jurisdiction

- BLM
- BOR
- PRIVATE
- Section

- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

Existing Utilities

- Existing Transmission (115 kV or Higher)

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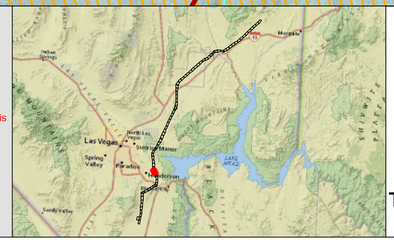

Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

PRELIMINARY DRAFT: NOT FOR CONSTRUCTION

TRANSWEST EXPRESS TRANSMISSION PROJECT: LAS VEGAS FIELD OFFICE

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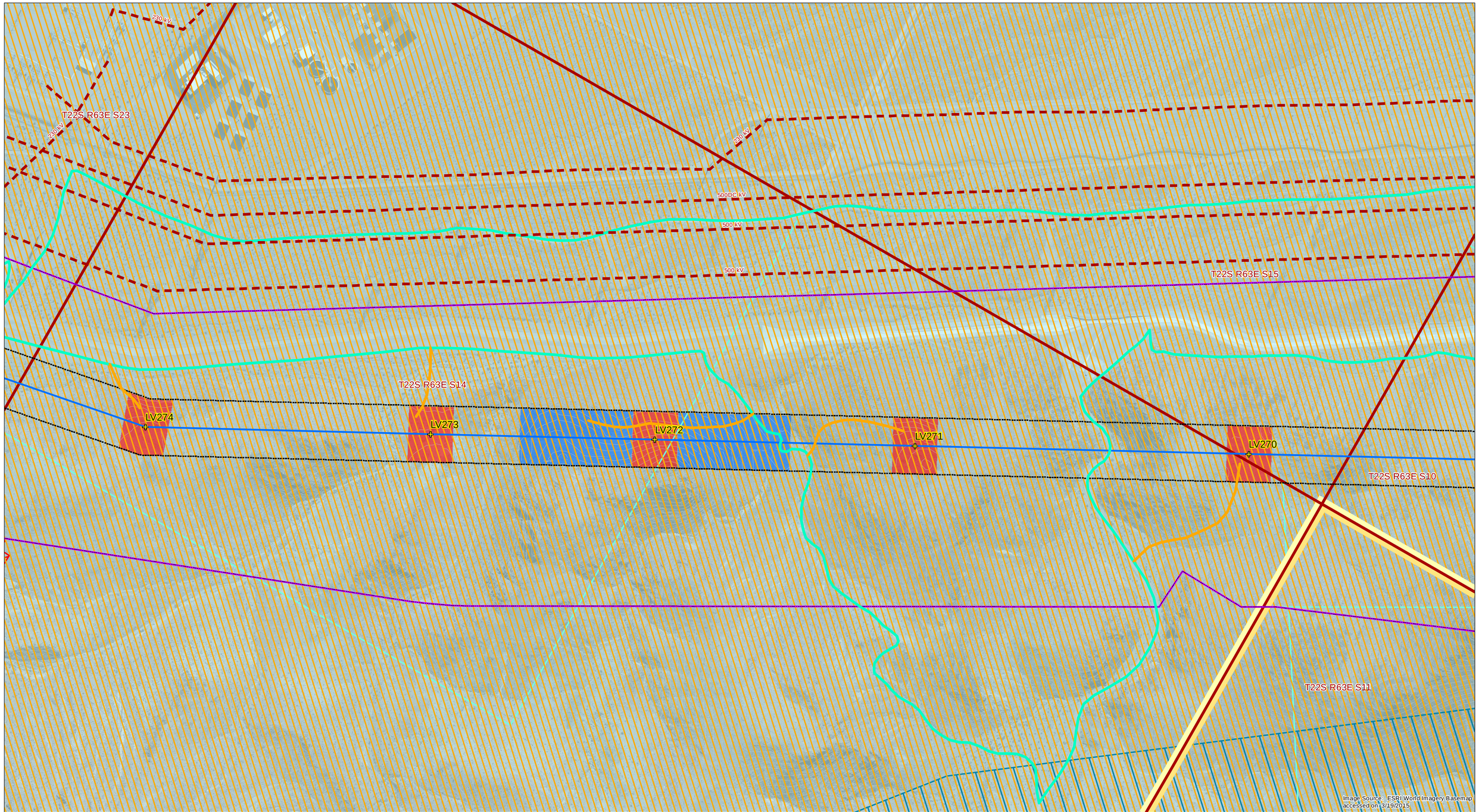

0 200 400 800 Feet

1:2,400 when printed on 34x22 inch sheet
1:4,800 when printed on 11x17 inch sheet

POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

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- TWE Project Transmission Line ROW Edge
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- New Road

Environmental Resources
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Existing Transportation
- Interstate
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Jurisdiction
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- BOR
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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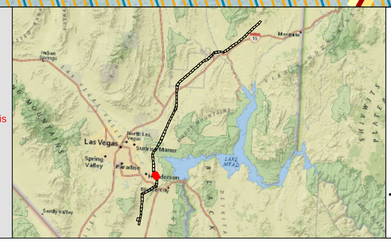

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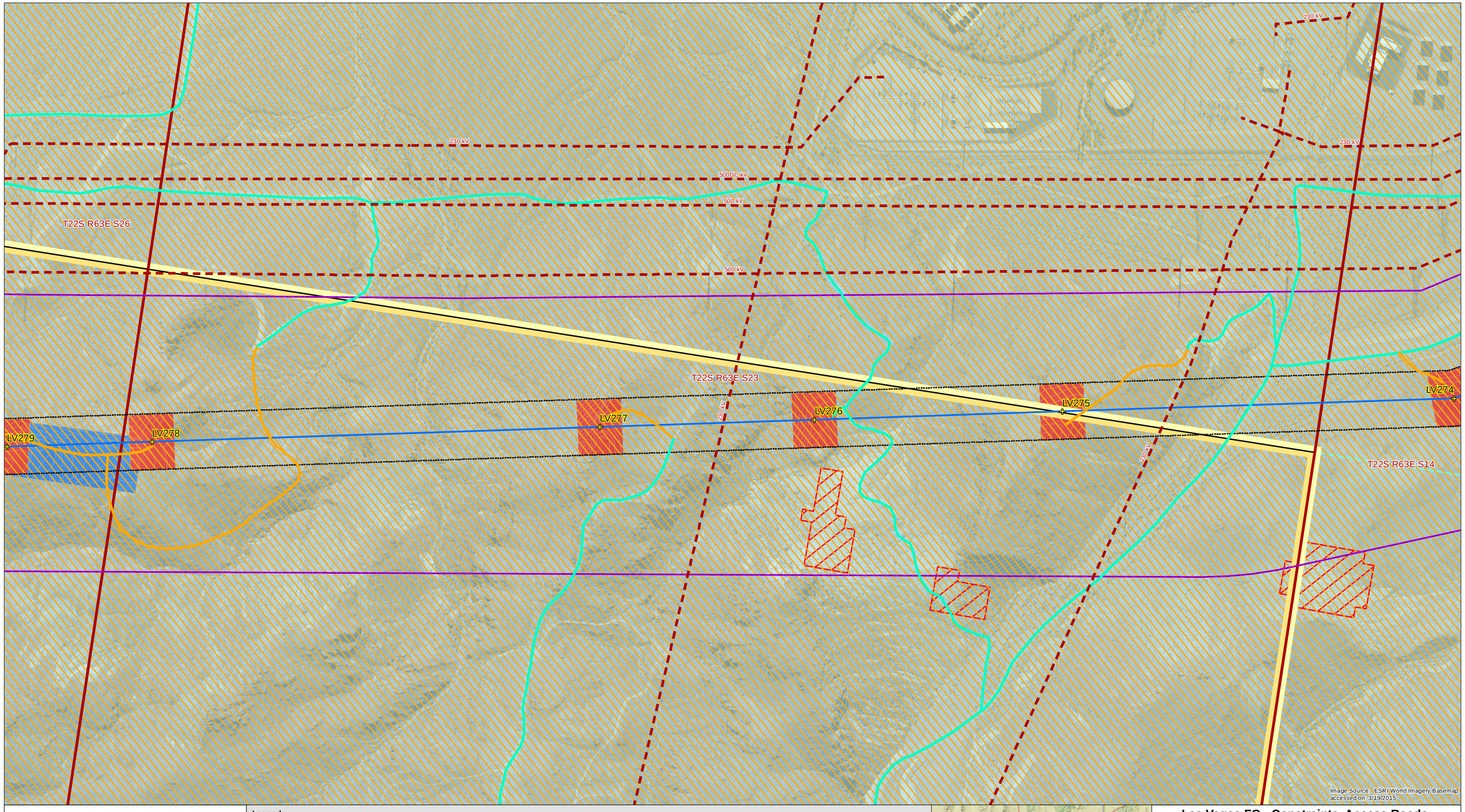

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TRANSWEST EXPRESS LLC

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T22S R63E S35

T22S R63E S26

T22S R63E S36

500DC kV

500 kV

230 kV

500 kV

LV283

LV282

LV281

LV280

LV279

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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LV288
LV287
LV286
LV285
LV284
LV283
230 kV
500 kV
T23S R63E S2
T22S R63E S35
T22S R63E S36
Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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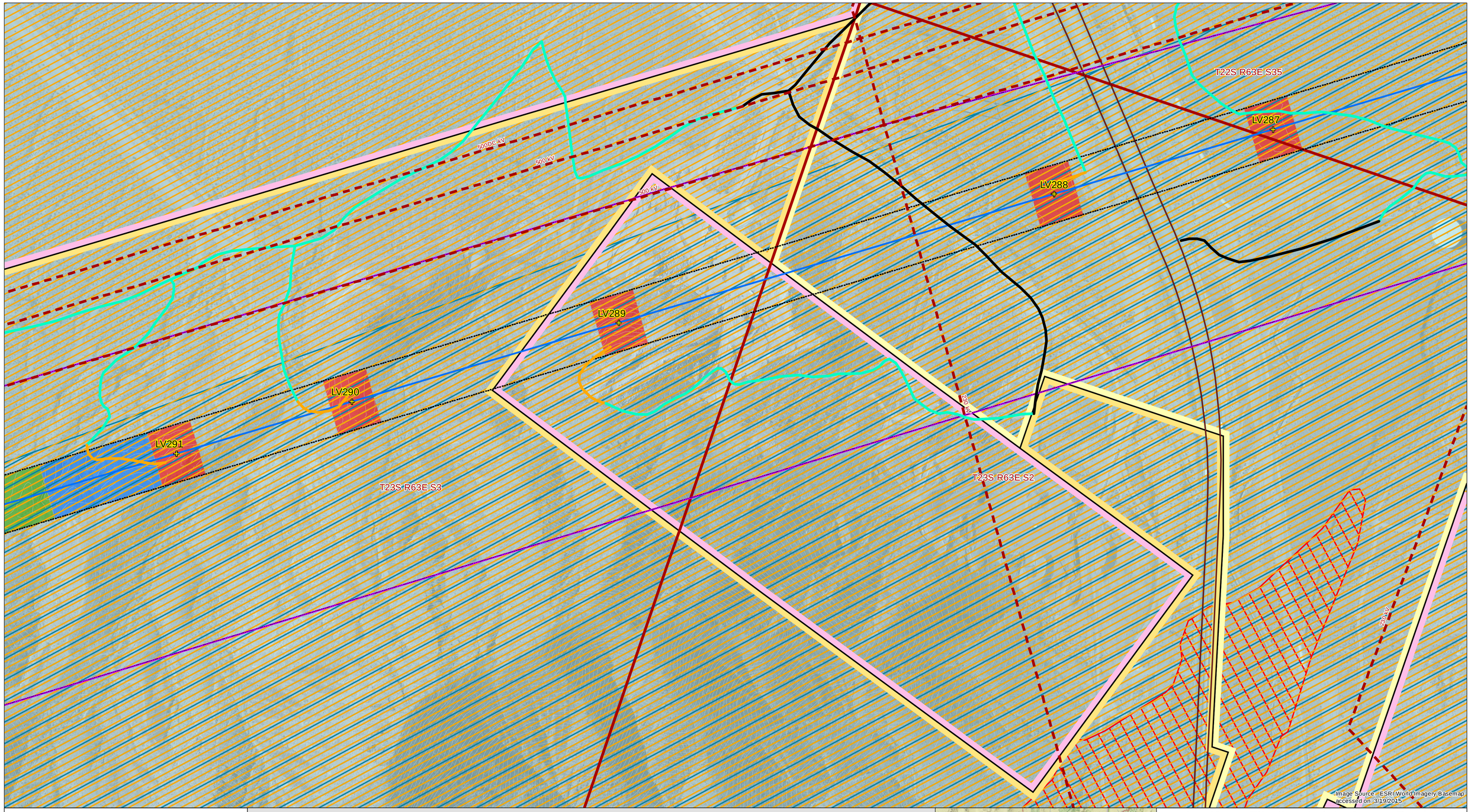

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TRANSWEST EXPRESS LLC

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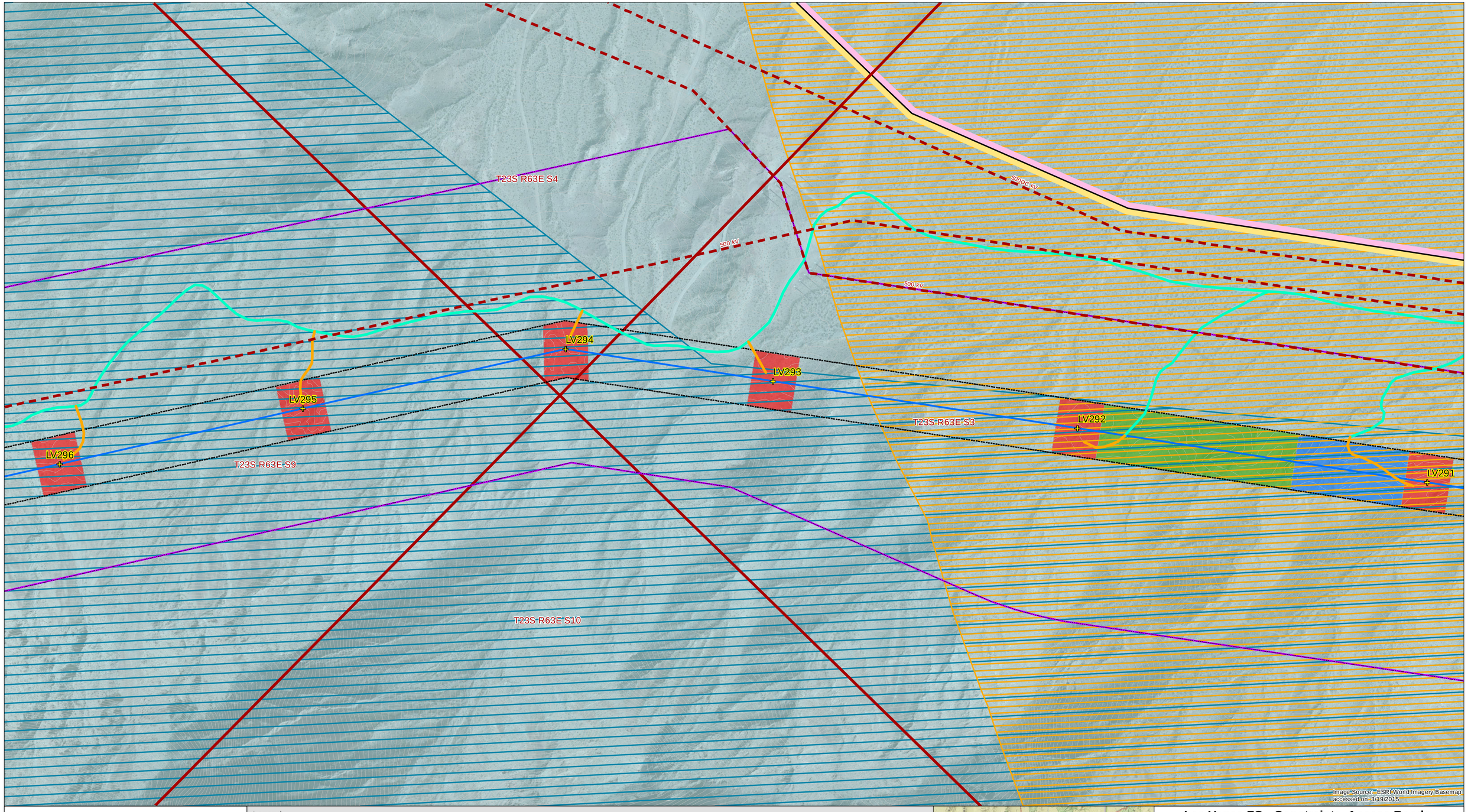

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TRANSWEST EXPRESS LLC

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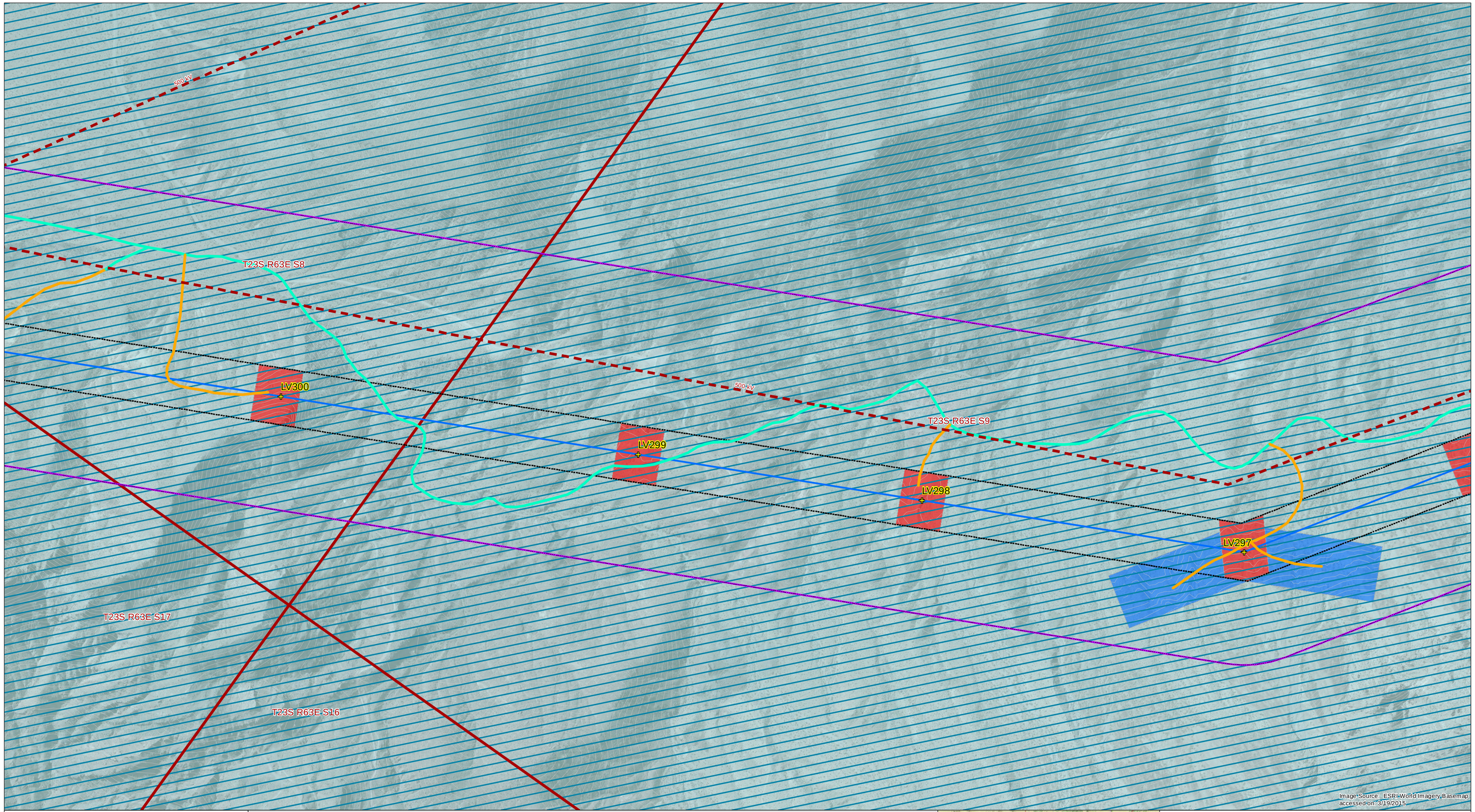

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T23S R63E S7

T23S R63E S8

T23S R63E S17

T23S R63E S18

500DC kV

500 kV

500 kV

LV304

LV303

LV302

LV301

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

0 200 400 800 Feet

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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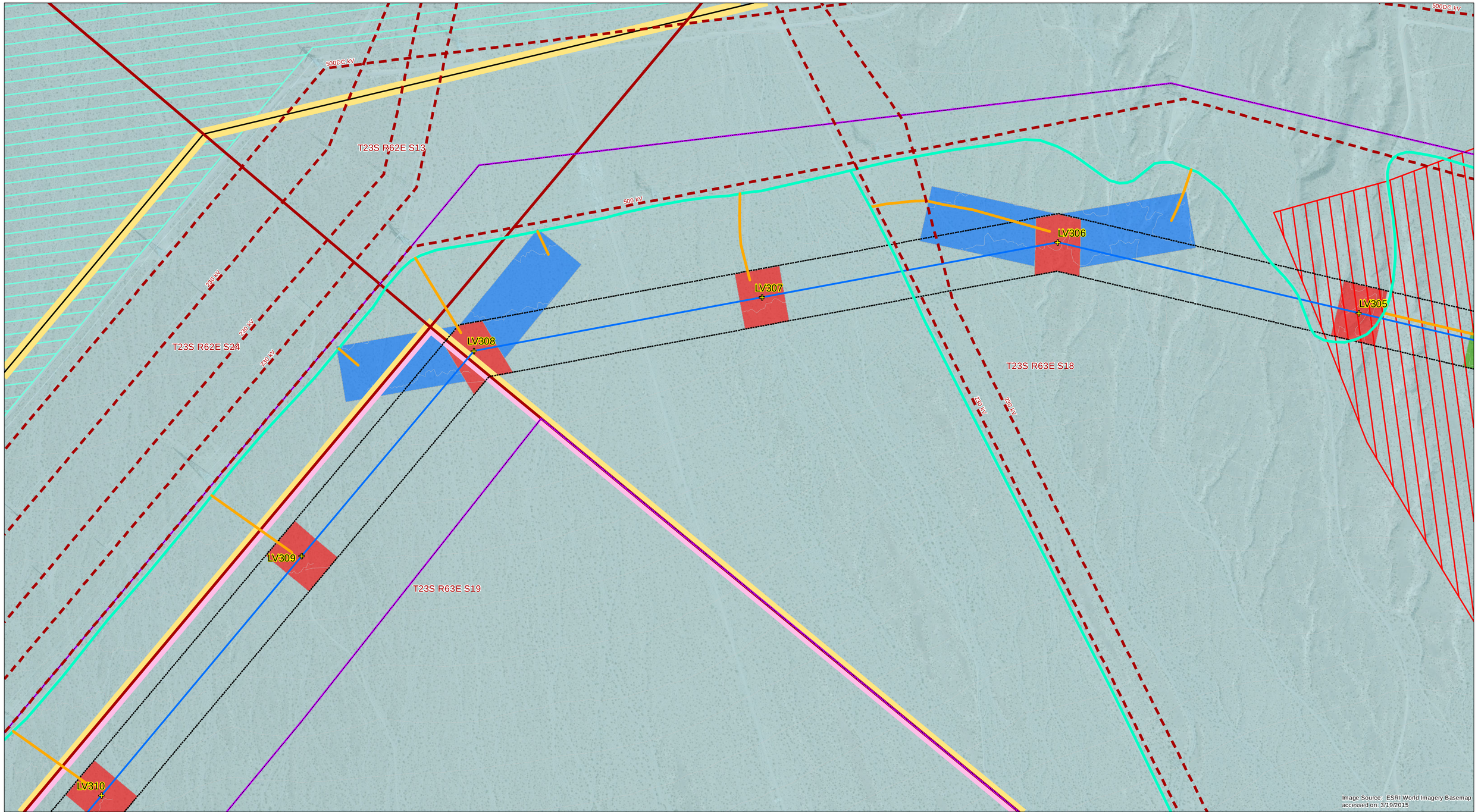

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

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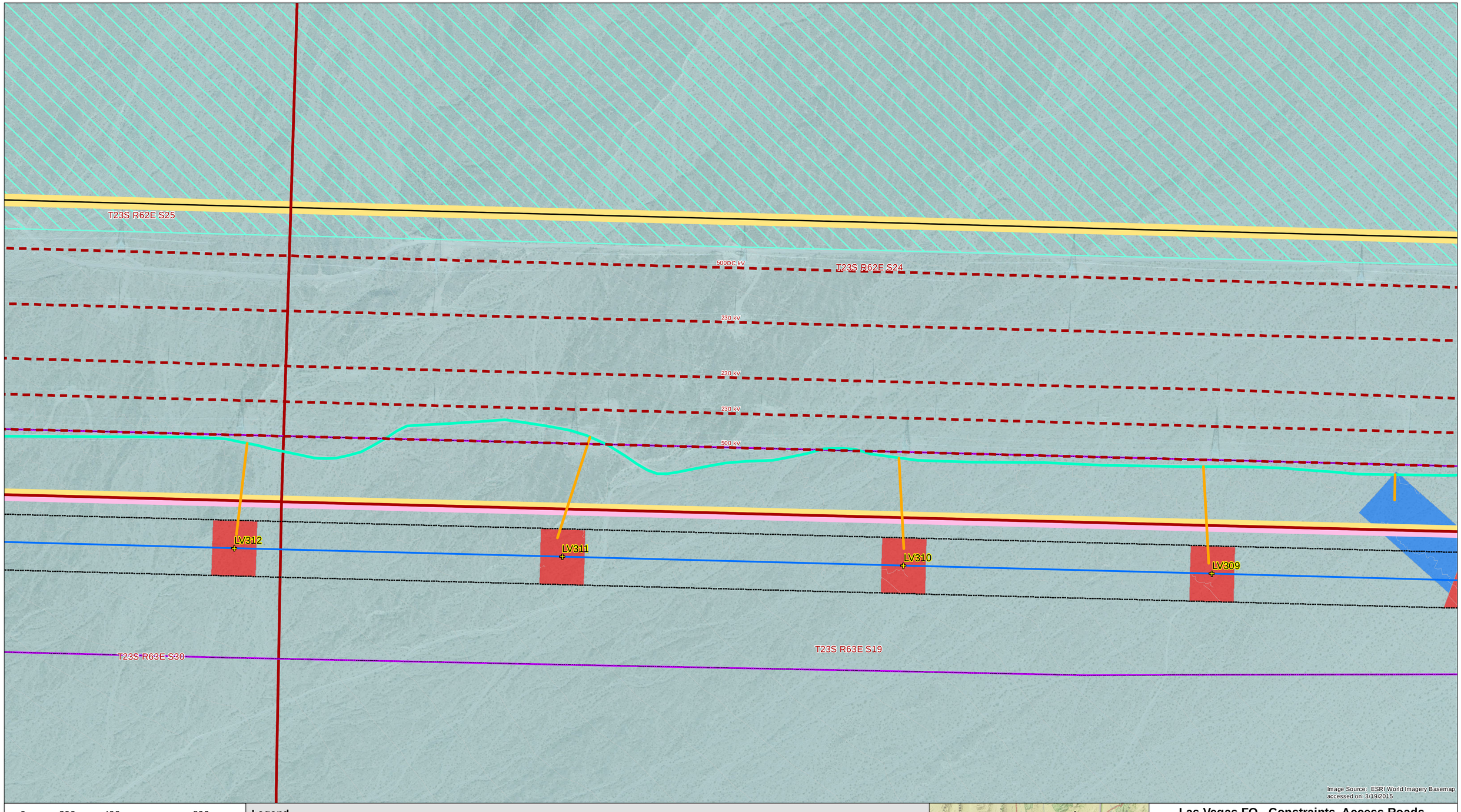

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T23S R62E S36

T23S R62E S25

500DC kV

230 kV

230 kV

230 kV

500 kV

LV317

LV316

LV315

LV314

LV313

T23S R63E S31

T23S R63E S30

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

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T24S R62E S1

500DC kV

T24S R62E S36

T23S R62E S36

230 kV

T23S R62E S36

T23S R62E S1

230 kV

230 kV

T24S R62E S1

500 kV

LV322

LV321

LV320

LV319

LV318

T23S R63E S31

T24S R63E S6

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

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500DC kV

230 kV

230 kV

230 kV

500 kV

T24S R62E S12

T24S R62E S1

LV326

LV325

LV324

LV323

LV322

T24S R63E S7

T24S R63E S6

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500DC kV

230 kV

230 kV

230 kV

500 kV

T24S R62E S13

T24S R62E S12

T24S R62E S24

T24S R63E S18

LV331

LV330

LV329

LV328

LV327

Image Source: ESRI World Imagery Basemap accessed on 3/19/2015

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Legend

Project Features (Agency Preferred Alternative)
- TWE Project Transmission Centerline
- TWE Project Transmission Interconnection Centerline
- TWE Project Transmission Line ROW Edge
- Preliminary Tower Location
- TWE Project Transmission Line Corridor
- Structure Work Area
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)
- Special Management Area (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
- BLM
- PRIVATE
- Section
- Contours - 10 ft interval (USGS 10 meter DEM & LIDAR)

Existing Utilities
- Existing Transmission (115 kV or Higher)

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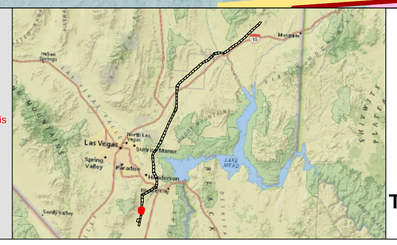

Las Vegas FO - Constraints, Access Roads, and Work Area Details

Date: 3/19/2015

**PRELIMINARY DRAFT:
NOT FOR CONSTRUCTION**

**TRANSWEST EXPRESS TRANSMISSION PROJECT:
LAS VEGAS FIELD OFFICE**

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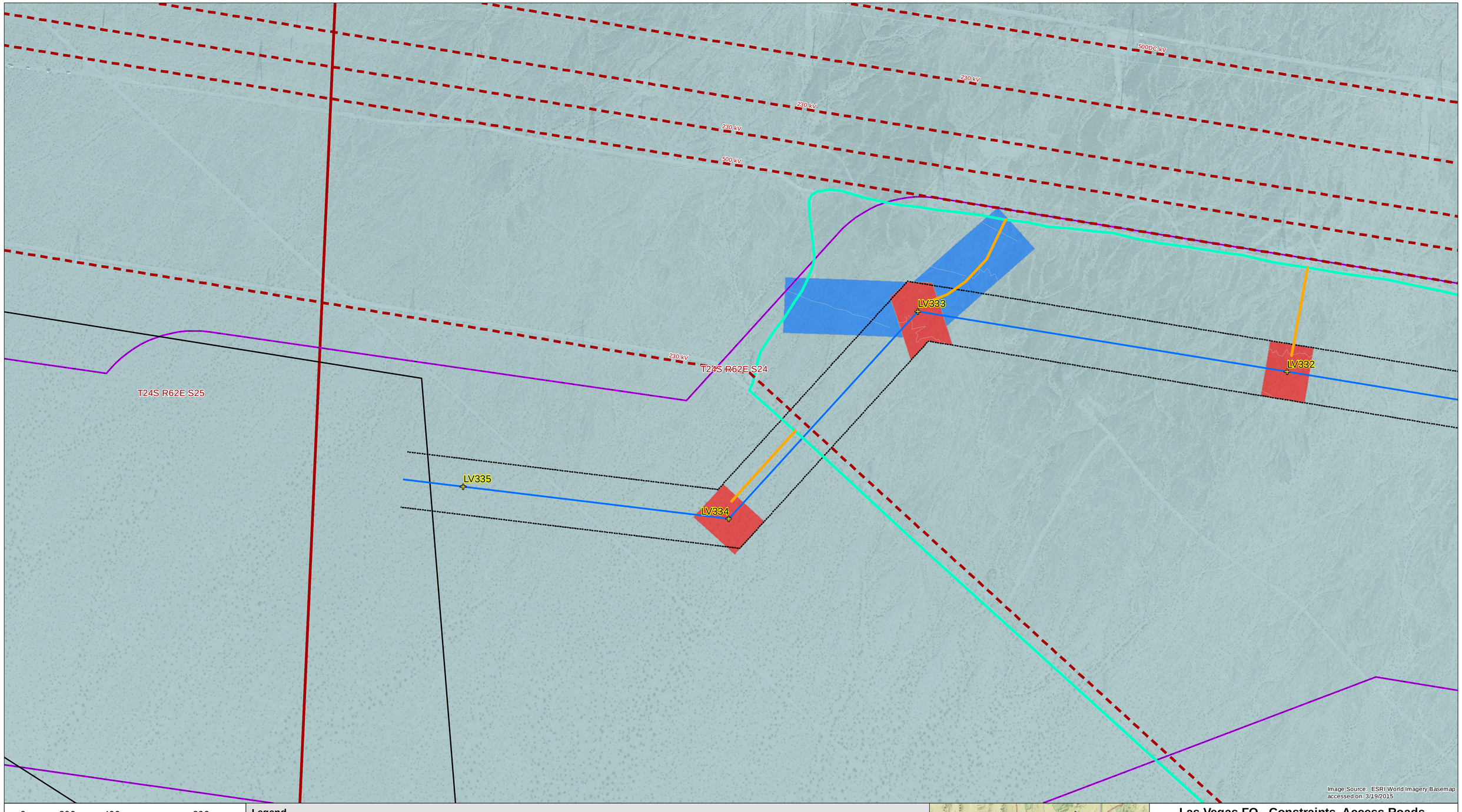

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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

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- Wire-Pulling, Tensioning, Splicing Site
- Structure Work Area
- Southern Terminal Site
- Existing Improved Road
- Existing Road Requiring Improvement
- New Road

Environmental Resources
- Desert Tortoise Potential Habitat (AECOM 2013)

Existing Transportation
- Interstate
- US Highway
- State Highway

Jurisdiction
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- Section

Contours - 10 ft interval (USGS 10 meter DEM & LiDAR)

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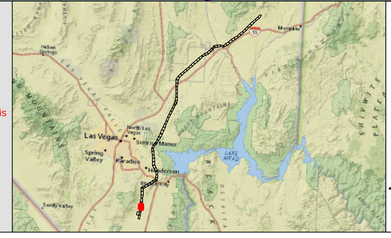

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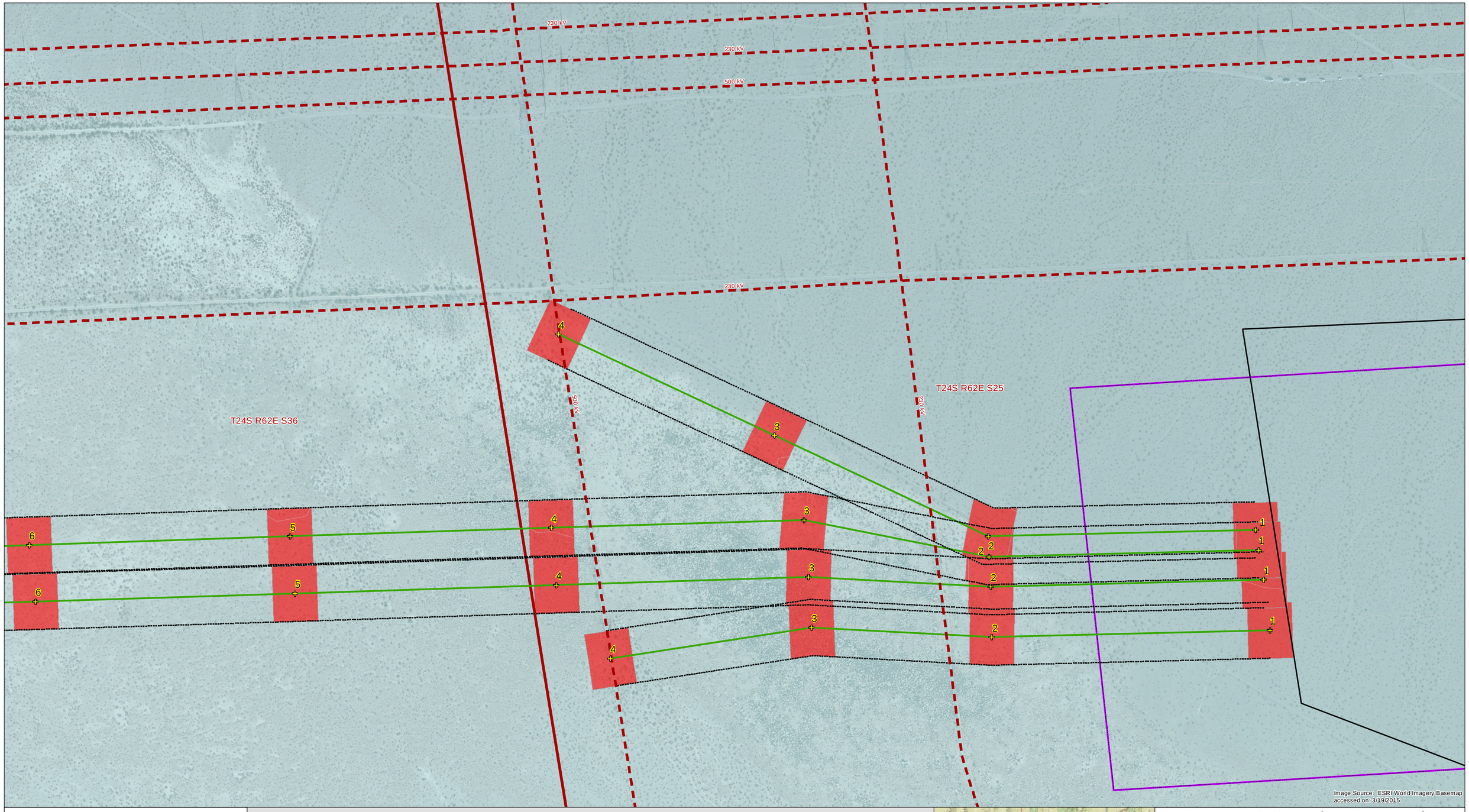

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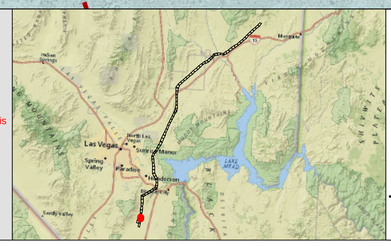

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T25S R62E S2

T25S R62E S1

T24S R62E S36

500 kV

230 kV

12

11

10

9

8

7

10

9

8

7

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

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T25S R62E S11

T25S R62E S2

T25S R62E S1

T25S R62E S12

500 kV

230 kV

15

14

13

Image Source: ESRI World Imagery Basemap accessed on: 3/19/2015

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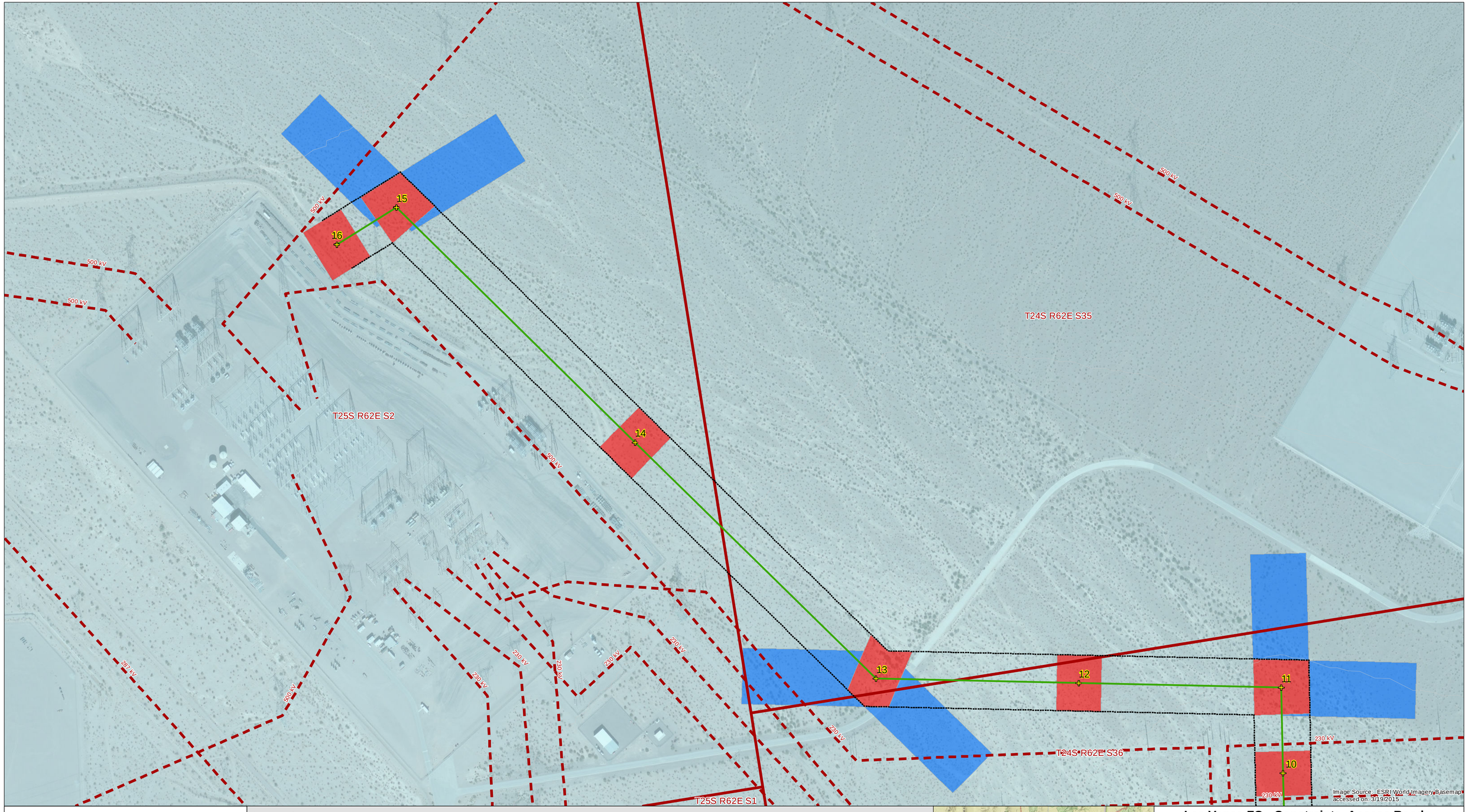

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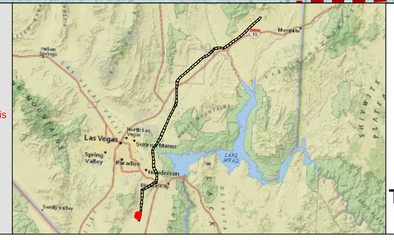

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Appendix C

Programmatic Agreement

PROGRAMMATIC AGREEMENT
AMONG
THE BUREAU OF LAND MANAGEMENT,
THE WESTERN AREA POWER ADMINISTRATION,
THE USDA FOREST SERVICE,
THE NATIONAL PARK SERVICE, INTERMOUNTAIN REGION,
THE BUREAU OF RECLAMATION, UPPER AND LOWER COLORADO REGIONS,
THE BUREAU OF INDIAN AFFAIRS,
THE U.S. FISH AND WILDLIFE SERVICE,
THE U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION,
THE UTE TRIBE OF THE UINTAH AND OURAY RESERVATION,
THE MOAPA BAND OF PAIUTE INDIANS,
THE WYOMING STATE HISTORIC PRESERVATION OFFICER,
THE COLORADO STATE HISTORIC PRESERVATION OFFICER,
THE UTAH STATE HISTORIC PRESERVATION OFFICER,
THE NEVADA STATE HISTORIC PRESERVATION OFFICER,
AND
TRANSWEST EXPRESS LLC,

REGARDING COMPLIANCE WITH
THE NATIONAL HISTORIC PRESERVATION ACT
FOR THE
TRANSWEST EXPRESS TRANSMISSION PROJECT

WHEREAS, TransWest Express LLC (Applicant) has applied for and the Bureau of Land Management (BLM) is considering the issuance of a federal right-of-way (ROW) grant and associated permits for the TransWest Express Transmission Project (the Undertaking) and the BLM is preparing this Programmatic Agreement (PA) under the requirements of Title 54 U.S.C. § 306108, commonly known as Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA)(hereinafter referred to as Section 106), as a Signatory; and

WHEREAS, Western Area Power Administration (Western), as authorized under the 2009 amendments to the Hoover Power Plant Act of 1984, is considering providing Federal funding for the Undertaking; and if they do provide Federal funding, Western may obtain temporary or permanent access rights to non-Federal lands in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, where rights across each non-Federal land parcel are appraised pursuant to Federal Standards, and is a Signatory to this PA; and

WHEREAS, the USDA Forest Service (USFS) is considering issuing a special use permit to construct, operate, maintain and eventually decommission the proposed Undertaking and is a Signatory to this PA; and

WHEREAS, the National Park Service (NPS), Intermountain Region, is considering issuing a federal authorization to construct, operate, maintain and eventually decommission the proposed Undertaking and is a Signatory to this PA; and

WHEREAS, the Upper and Lower Colorado Region of the Bureau of Reclamation (BOR) are considering issuing a license to the Applicant to construct, operate, maintain and eventually decommission the proposed transmission line across any BOR lands crossed by the Undertaking and is a Signatory to this PA; and

WHEREAS, the Sacramento District of the U.S. Army Corps of Engineers (USACE), administers a permit program under the authority of the Rivers and Harbors Act of 1899, Section 10 (33 U.S.C. §403), and the Clean Water Act of 1972, Section 404 (33 U.S.C.§1344) and may issue permits authorizing the discharge of dredged or fill material through Section 404 (the Undertakings) associated with the Undertaking, and is a Signatory to this PA; and

WHEREAS, the Undertaking is an approximately 730-mile transmission line extending from southern Wyoming through Colorado and Utah and into southern Nevada; across multiple federal, state, and local jurisdictions; private lands; and tribal lands (Appendix A – Map of Proposed Route and Alternatives); and

WHEREAS, the Applicant intends to construct, operate, maintain and eventually decommission the Undertaking according to general parameters contained in the approved project Plan of Development (POD) for the Undertaking which shall be appended to and made a part of the Records of Decision (ROD) authorizing the ROW grant; and

WHEREAS, the BLM has determined that issuance of the ROW grant and related authorizations is an undertaking as defined at 36 CFR 800.16(y) that triggers the requirements of Section 106 on affected federal and non-federal lands during the planning, construction, operation, maintenance and eventual decommissioning of the Undertaking; and

WHEREAS, for purposes of the Undertaking, the BLM Wyoming State Office is lead federal agency for compliance with Section 106 on behalf of the BLM, Western, USFS, NPS, BOR, Bureau of Indian Affairs (BIA), FWS, and USACE (federal agencies) (36 CFR 800.2(a)(2)), in accordance with the Interagency Transmission Memorandum of Understanding (October 23, 2009) and by BLM Washington Office Instruction Memorandum 2010-169, Implementation Guidance for the Interagency Transmission Memorandum of Understanding, and by the Memorandum of Understanding between BLM and Western and by the signing of this PA by any responsible federal agency official, and is the primary contact for all Consulting Parties to this PA including Indian tribes; and

WHEREAS, the effects on historic properties are multi-state in scope and cannot be fully determined prior to approval of the Undertaking, and thus the BLM, in consultation with the Consulting Parties, has determined to use a phased process to identify historic properties (36 CFR 800.4(b)(2)) and assess the effects on those properties (36 CFR 800.5(a)(3)), such that completion of the identification and evaluation of historic properties, determinations of effect on historic properties, and consultation concerning measures to avoid, minimize, or mitigate any

adverse effects will be carried out in phases as part of planning for and prior to any Notice to Proceed (NTP) and Undertaking implementation; and

WHEREAS, BLM has determined that this PA documenting the terms and conditions for compliance with Section 106 has been negotiated among Consulting Parties according to 36 CFR 800.14(b)(1)(ii); and

WHEREAS, the BLM has determined that the Undertaking may have direct, indirect, and cumulative effects on cultural resources included in or eligible for inclusion in the National Register of Historic Places (NRHP), hereinafter called historic properties, and has consulted with the Wyoming, Colorado, Utah, and Nevada State Historic Preservation Officers (SHPO) who are Signatories to this PA; and

WHEREAS, the BLM has notified the Advisory Council on Historic Preservation (ACHP), pursuant to Section 106 and its implementing regulations [36 CFR 800.6(a)(1)], and the ACHP has elected to participate in consultation and is a Signatory to this PA; and

WHEREAS, an alternative route may cross Indian trust lands on the Uintah and Ouray Indian Reservation and, whether Tribal and/or individual Indian-owned lands, upon obtaining consent from the Indian landowner(s), the BIA may issue encroachment permits and grants of easement for the Undertaking, and as a federal agency, is a Signatory to this PA; and

WHEREAS, an alternative route may cross the external boundaries of the Uintah and Ouray Indian Reservation, Ute Tribe of the Uintah and Ouray Indian Reservation (hereinafter called Ute Indian Tribe) is a Signatory to this PA; and

WHEREAS, an alternative route may cross the Moapa River Indian Reservation of the Moapa Band of Paiute Indians, and whereas Public Law 96-491 reserves to the United States a right-of-way across the Moapa River Indian Reservation for the purpose of uses consistent with section 501(a) of the Federal Land Policy and Management Act of 1976, or under section 28 of the Act of February 25, 1920, commonly referred to as the Mineral Leasing Act, and whereas administration of any rights-of-way over, upon, under or through this corridor is the responsibility of the Department of the Interior, through the BLM, the Moapa Band of Paiute Indians is a Signatory to this PA; and

WHEREAS, the Undertaking includes lands administered by the State of Utah, School and Institutional Trust Lands Administration (SITLA), an agency in the State of Utah that has a responsibility to comply with Utah Code Annotated (UCA) § 9-8-404 on lands owned or controlled by SITLA within the Areas of Potential Effects (APEs). SITLA intends to employ this PA to address applicable requirements for actions resulting from this PA involving land administered by SITLA. SITLA, however, does not waive its independent state statutory jurisdiction to make final decisions concerning its lands, and is not bound in its leasing or other approval authority by actions taken, or determination made, concerning Federal lands, and has therefore been consulted and invited to become an Invited Signatory to this PA; and

WHEREAS, the Undertaking includes lands administered by the Utah Department of Transportation (UDOT), an agency in the State of Utah, that has a responsibility to comply with UCA § 9-8-404 on lands owned or controlled by UDOT within the APEs. UDOT intends to employ this PA to address applicable requirements for actions resulting from this PA involving land administered by UDOT. UDOT, however, does not waive its independent state statutory jurisdiction to make final decisions concerning its lands, and is not bound in its leasing or other approval authority by actions taken, or determination made, concerning Federal lands, and has therefore been consulted and invited to become an Invited Signatory to this PA; and

WHEREAS, the Utah Reclamation Mitigation & Conservation Commission (URMCC) is considering issuing a license to the Applicant to construct, operate, and maintain a 500kv line across any URMCC lands crossed by the Undertaking and has therefore been consulted and invited to become an Invited Signatory to this PA; and

WHEREAS, the Applicant, as a potential grantee of the right-of-way, has participated in consultation pursuant to 36 CFR 800.2(c)(4), and is an Invited Signatory to this PA; and

WHEREAS, the BLM recognizes its government-to-government obligation to consult with federally-recognized Indian tribes that may attach religious and cultural significance to historic properties that may be affected by the Undertaking and will continue to consult with affected Indian tribes regarding their concerns under Section 106; and

WHEREAS, the BLM, as lead federal agency for tribal consultation and coordination, has initiated consultation with the Chemehuevi Indian Tribe, Confederated Tribes of the Goshute Reservation, Duckwater Shoshone Tribe of the Duckwater Reservation, Eastern Shoshone Tribe of the Wind River Reservation, Ely Shoshone Tribe of Nevada, Fort McDermitt Paiute-Shoshone Tribe of the Fort McDermitt Reservation, Fort Mojave Indian Tribe, Hopi Tribe, Jicarilla Apache Tribe, Kaibab Paiute Tribe, Kewa Pueblo (formerly Pueblo of Santo Domingo), Las Vegas Tribe of Paiute Indians of the Las Vegas Indian Colony, Lovelock Paiute Tribe of the Lovelock Indian Colony, Navajo Nation, Northern Arapaho Tribe of the Wind River Reservation, Northwestern Band of Shoshone Nation, Ohkay Owingeh (formerly Pueblo of San Juan), Paiute Indian Tribe of Utah, Paiute-Shoshone Tribe of the Fallon Reservation and Colony, Pueblo of Acoma, Pueblo of Cochiti, Pueblo of Isleta, Pueblo of Jemez, Pueblo of Laguna, Pueblo of Nambe, Pueblo of Picuris, Pueblo of Pojoaque, Pueblo of Sandia, Pueblo of San Felipe, Pueblo of San Ildefonso, Pueblo of Santa Ana, Pueblo of Santa Clara, Pueblo of Taos, Pueblo of Tesuque, Pueblo of Zia, Pueblo of Zuni, Pyramid Lake Paiute Tribe of the Pyramid Lake Reservation, Reno-Sparks Indian Colony, San Juan Southern Paiute Tribe, Shoshone-Bannock Tribes of the Fort Hall Reservation, Shoshone-Paiute Tribes of the Duck Valley Reservation, Skull Valley Band of Goshute Indians of Utah, Southern Ute Indian Tribe of the Southern Ute Reservation, Summit Lake Paiute Tribe of Nevada, Te-Moak Tribe of Western Shoshone Indians of Nevada, Ute Mountain Ute Tribe of the Ute Mountain Reservation, Walker River Paiute Tribe of the Walker River Reservation, Washoe Tribe of Nevada and California, Winnemucca Indian Colony of Nevada, Yerington Paiute Tribe of the Yerington Colony and Campbell Ranch, and Yomba Shoshone Tribe of the Yomba Reservation, and has invited all of these tribes who opted to consult on the Undertaking to be Concurring Parties to this PA; and

WHEREAS, the BLM continues to consult with the Alliance for Historic Wyoming, Archaeo-Nevada Society, Catherine Baker, The Church of Jesus Christ of Latter-day Saints, Huntington Eccles Scenic Byway, Mesa County (CO), Milford Archaeological Research Institute, Moffat County (CO), Mountain Meadows Association, Mountain Meadows Massacre Descendants, Mountain Meadows Monument Foundation, Nevada Archaeological Association, Nevada Rock Art Foundation, Old Spanish Trail Association, Oregon-California Trail Association, Utah Governor's Public Lands Policy Coordination Office, Utah Old Spanish Trail Association, Utah Professional Archaeological Council, Utah Rock Art Research Association, and Utah Statewide Archaeological Society and has invited them to be Concurring Parties to this PA; and

WHEREAS, the proposed or alternative routes may affect segments of the Old Spanish National Historic Trail (NHT), which is co-administered by the BLM and National Park Service (NPS); and

WHEREAS, the proposed or alternative routes may affect the Mountain Meadows Massacre Site National Historic Landmark (NHL) and the BLM has invited the NPS to participate in this consultation in order to identify the planning and actions that may be necessary to minimize harm to the Mountain Meadows Massacre Site NHL, as required by 36 CFR 800.10; and

WHEREAS, NPS has jurisdiction over Dinosaur National Monument, and an alternative may cross the Deerlodge Road leading into the park; and

WHEREAS, the BLM has provided the public opportunities to comment on the Undertaking and participate in the National Environmental Policy Act (NEPA) process through a Notice of Intent to Prepare an Environmental Impact Statement (EIS) published in the Federal Register on January 4, 2011 for the development of the EIS; held 12 public scoping meetings in January, February and March 2011; published the Draft EIS in July 2013 and held 13 public meetings in August and September 2013. Public meeting materials included information about the NHPA and the Section 106 process and BLM considered comments received through the NEPA and NHPA processes concerning cultural resources in the development of this Agreement; and

WHEREAS, reference to "parties to this agreement" and "Consulting Parties" shall be taken to include Signatories, Invited Signatories, and Concurring Parties. Concurring Parties have only agreed to participate in the consultation process as outlined in the PA; it is understood that their participation does not necessarily imply an endorsement of the project in part or as a whole. Indian tribes and other parties consulting under Section 106 may decline to sign this document; however, the decision not to sign shall not preclude their continued or future participation as Consulting Parties to this Undertaking; and

WHEREAS**,** the BLM will require that the Undertaking be executed in accordance with the conditions of the ROW grant and other authorizations that may be granted by the federal land managing agencies (the "Authorizations"), and in accordance with the stipulations of this PA, which shall be appended to and made a part of the Records of Decision (ROD); and

WHEREAS, the BLM may issue a ROW grant for the construction, operation and maintenance, and eventual decommissioning of the Undertaking, and the ROW grant will incorporate this PA by reference; and

WHEREAS, this PA, and the Historic Properties Treatment Plans (HPTPs) that will be developed pursuant to this PA, will be incorporated into the approved project POD;

NOW, THEREFORE, the Signatories and Invited Signatories to this PA agree that the proposed Undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the Undertaking on historic properties and to comply with Section 106 of the NHPA for the Undertaking.

DEFINITIONS

Terms used in this PA are defined in Appendix B. All other terms not defined have the same meaning as set forth in ACHP's regulations at 36 CFR 800.16.

STIPULATIONS

The BLM, as lead federal agency, and in cooperation with the other federal and state agencies, shall ensure that the following stipulations are met and carried out:

I. Area of Potential Effects (APE)

A. Defining the APE

The BLM, in consultation with the SHPOs and other Consulting Parties, has defined and documented the APE based upon direct, indirect, and cumulative effects. The APE will apply to federal, state, tribal, and private lands that may be affected by the transmission line corridor, staging areas, access roads, borrow areas, transmission substations, and other related transmission infrastructure for this Undertaking. The BLM may modify the APE in accordance with Stipulation I.B of this PA. The APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking (36 CFR 800.16(d)).

1. Direct Effects

The APE for direct effects is the area within which historic properties may sustain physical alteration or destruction as a result of the Undertaking. The APE for direct effects is influenced by the area of potential ground disturbance by activities related to the Undertaking, and will be determined as follows:

a. For above ground transmission lines, the APE is 500 feet (250 feet on either side of the ROW centerline).

b. The APE for access roads, except for existing crowned and ditched or paved roads, is 100 feet on either side of the centerline for a total width of 200 feet. Existing crowned and ditched or paved roads are not part of the APE unless project-related changes to the current footprints of these roads are planned or if unanticipated effects occur in adjacent areas, at which time BLM will re-define the APE as appropriate pursuant to the terms of this PA.

c. The APE for staging areas, borrow areas, substations, and other transmission infrastructure includes the footprint of the facility and a buffer of 200 feet around the footprint of the proposed activity.

d. The APE for pulling/tensioning areas that fall outside the ROW is the footprint of the area plus a buffer of 200 feet around the footprint of the proposed activity.

e. The APE for geotechnical drill sites is the boring location footprint plus a buffer of 200 feet around the footprint of the boring location. In most cases, the APE for the geotechnical drill site locations will fall within the direct APE of the transmission line and other project components.

2. Indirect Effects

The APE for indirect effects on historic properties considers visual, audible, and atmospheric elements that could diminish the integrity of historic properties for which setting, feeling, and/or association are aspects of such integrity.

a. The indirect APE for the Undertaking extends to the visual horizon, not to exceed three miles on either side of the transmission line centerline, unless an exception is raised as indicated in Stipulation III.D below. A Geographic Information System (GIS) viewshed analysis will be used to identify areas in the indirect APE from which the Undertaking may be visible, as identified in Appendix C.

b. Where the indirect APE includes traditional cultural properties (TCPs), rural historic landscapes (RHLs), properties of traditional religious and cultural significance, NHLs, NHTs, and other classes of historic properties for which setting, feeling, and/or association contribute to eligibility, additional analyses may be required and the indirect APE may be modified accordingly following procedures at Stipulation I.B below. These areas will require analysis on a case-by-case basis.

3. Cumulative Effects

Cumulative Effects are the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future

actions regardless of what agency (federal or non-federal) or person undertakes other actions. For the purposes of this PA, the APE for cumulative effects is the same as that for direct and indirect effects.

B. Modifying the APE

1. The APE, as currently defined, encompasses an area sufficient to accommodate all of the Undertaking components under consideration as of the date of the execution of this PA. The APE may be modified when tribal consultation, additional field research or literature review, consultation with Consulting Parties, or other factors indicate that the qualities and values of historic properties that lie outside the boundaries of the currently defined APE may be affected directly, indirectly, or cumulatively.

    a. If the BLM determines that the Undertaking or changes to the Undertaking may cause direct, indirect, or cumulative effects on historic properties that were not foreseeable at the time the PA was executed beyond the extent of the established APE, then the BLM may use the process set forth in Stipulation I.B.1.b to determine whether to modify the APE.

    b. Any Consulting Party to this PA may propose that the APE be modified by providing written justification and illustration of the proposed APE modification. The BLM shall send the modification proposal to all Consulting Parties and consult with them for no more than 30 days in an effort to reach consensus on the proposal. If the Signatories and Invited Signatories that sign the PA agree to modify the APE, the BLM will notify the Consulting Parties of the decision. If all Signatories and Invited Signatories cannot agree to a proposal for the modification of the APE, then the BLM will consider their concerns and will render a final decision.

2. Agreement to modify the APE will not require an amendment to the PA.

3. Amendment of the ROW grant during construction is covered under this PA in accordance with Stipulation XI; amendment of the ROW grant for operations, maintenance and decommissioning of the facilities will be considered a separate Undertaking under Section 106.

II. Protection of Confidential Information

To the extent consistent with NHPA Section 304 (54 U.S.C. § 300310), and the Archaeological Resources Protection Act (ARPA) Section 9(a), cultural resource data from this Undertaking will be treated as confidential by all Consulting Parties and is not to be released to any person, organization or agency not a Party to this PA. Confidentiality concerns for properties that have traditional religious and cultural significance to the Indian tribes will be respected and will remain confidential to the fullest extent permitted by law. BLM may require data sharing agreements with any Consulting Party to this PA who is

interested in obtaining specific confidential information. Alternatively, BLM may require an authorization from the applicable State Director if the requested data is from a single state.

III. Identification, Evaluation, and Determination of Effects

A. The BLM will ensure that all work undertaken to satisfy the terms of this PA meets the Secretary of the Interior's Standards for Archeology and Historic Preservation (48 FR 44716) (*Federal Register*, September 29, 1983), hereinafter referred to as Secretary's Standards, and is consistent with the ACHP's guidance on archaeology and all applicable NPS guidance for evaluating National Register properties (*e.g. Guidelines for Evaluating and Documenting Traditional Cultural Properties, Guidelines for Evaluating and Documenting Rural Historic Landscapes*). The BLM has defined conventions or standards for inventory corridors and survey intensity to adequately identify historic properties that may be affected by this Undertaking. Except for lands managed by USFS, all inventory activity will meet BLM Manual 8110 guidance and be consistent with that of the SHPOs, including guidance and standards found in respective BLM and SHPO State Protocol Agreements. Identification on lands managed by USFS will follow Forest Service Manual 2360.

B. The BLM will ensure that all identification and inventory on public and on all other lands is carried out by or under the direct supervision of a person or persons meeting, at a minimum, the applicable professional qualifications standards set forth in the Secretary's Standards and the permitting requirements of appropriate state and federal agencies and Indian tribes.

C. Identification and evaluation activities will be conducted only after qualified cultural resource professionals have obtained the appropriate federal, state and tribal permits for such fieldwork. The BLM or other appropriate federal or state land managing agencies shall authorize fieldwork to conduct inventories on land they manage, respectively, following review of a complete application from the Applicant's qualified cultural resource consultant.

D. Within 60 days of the signing of the BLM ROD, the Consulting Parties will identify to the BLM areas of concern within the direct and indirect APE. In addition, Consulting Parties may identify specific resources outside the 6-mile indirect APE, with justification for why that resource should be considered for evaluation. BLM, in consultation with the applicable land managing agency, will decide whether those resources should be included in the targeted reconnaissance of the indirect APE along the preferred route. Each Consulting Party will also convey to BLM how they would like to be kept informed of discoveries in their area(s) of concern.

E. Inventory

The BLM will ensure that a cultural resource inventory will be completed in the following phases:

1. Phase 1 – Literature Review

   A literature review of federal and state agency files has been completed for a two- mile-wide corridor along all alternatives of the proposed Undertaking. The literature review resulted in 4 reports, one for each state, which have been reviewed and commented on by BLM. The literature review will inform all subsequent phases, and will be used as reference documents to support all of the Class III surveys conducted for this Undertaking. The BLM will ensure that additional file searches are conducted as needed to address changes in the APE and to be current in advance of any Class III inventories.

2. Phase 2 – Pre-construction Inventory

   a. After the federal agencies issue RODs on the Undertaking, the Applicant will complete Class III inventories under BLM guidance for the direct APE, as indicated in Stipulation I.A.1, and where not covered by previous acceptable Class III inventories. BLM and the Applicant will follow the procedure described in Appendix D for documenting landowner permission or denial to conduct cultural resources investigations on private lands. Inventory and recordation methods for each applicable state will be used. Where there is insufficient information for making site eligibility determinations, and after consultation with the applicable federal and/or state agency, the BLM and SHPOs may determine that additional archaeological testing or other investigations (*e.g.*, analysis of existing aerial imagery, archival/documentary/map research, and other means) are necessary to complete NRHP evaluations for cultural resources that may be affected. The Applicant will complete fieldwork and BLM will complete consultation for this phase prior to initiation of construction.

   b. Determination of archaeological site boundaries is required. Field recording of identified resources exceeding the APE that are either linear (e.g., roads, trails, fences, etc.) or extremely large will be inventoried to the same level as resources within the APE, to a maximum of 1,200 feet beyond the APE.

   c. Documentation may entail recordation of cultural resources over multiple land jurisdictions, including private land. The Applicant will obtain private landowner consent by written documentation to allow inventory beyond the APE if the boundaries of cultural resources extend beyond the APE. If landowner consent cannot be obtained to access the portion of the site outside the APE, BLM will make a determination of eligibility based upon all known information regarding the site and similar resources in the area.

   d. The Applicant will use existing resources to the extent available to identify historic properties eligible under Criteria A, B and/or C, that fall within the indirect APE and that may be affected by the Undertaking, as described in Appendix C. The Applicant will ensure that ethnographic and other information provided by the Consulting Parties or other knowledgeable sources will be addressed.

e. At the conclusion of the fieldwork, the Applicant will submit for review copies of the draft reports and site forms, including identification and evaluation of historic properties within the indirect effects APE, to each BLM State Office. Each BLM State Office will distribute reports to the appropriate BLM field offices and applicable federal agencies, state agencies, and Indian tribes who have signed this PA or a data sharing agreement. Each report will be consistent with the appropriate state guidelines and formats including recommendations of eligibility and effect. Reports shall also include appropriate state site inventory forms, other documentation for results of identification of properties of religious and cultural significance to Indian tribes, and recommendations on the historic significance, integrity, and NRHP eligibility of identified cultural resources [(36 CFR 800.4(c)].

f. The BLM field offices and other appropriate federal agencies, state agencies, and Indian tribes will have 30 days from receipt of each report to review and provide comments, determinations and findings on the initial draft to the lead BLM Office. These responses will address adequacy of inventory and reports submitted under Section III.E.2.e above, the consultant-recommended eligibility of properties identified [36 CFR 800.4(c)], and the consultant-recommended effects of the Undertaking on any cultural resources considered to be historic properties [36 CFR 800.4(d) and 36 CFR 800.5]. Based upon the responses received, the BLM may require the Applicant to revise the reports. Any revised reports will be submitted to the BLM for a 15-day review.

g. The applicable Consulting Party from 2.f above will notify the lead BLM Office main point of contact by e-mail requesting a review extension and providing the justification for the delay, if time frames above cannot be met. The lead BLM Office will determine whether to grant an extension, not to exceed 30 days.

F. Determinations of Eligibility and Assessment of Effect

1. For each cultural resource within the direct APE of a land-managing agency's jurisdiction, the agency will provide recommendations regarding determinations of eligibility and findings of effect to the BLM. BLM will then consult with any Indian tribe that attaches religious and cultural significance to any identified resource, and other Consulting Parties to determine NRHP eligibility pursuant to 36 CFR 800.4(c)(1) following NRHP guidance in "*How to Apply the National Register Criteria for Evaluation.*" If the parties cannot reach concurrence on a determination of NRHP eligibility, the documentation will be forwarded to the Keeper of the National Register (Keeper) for a formal determination. If the parties cannot reach concurrence on other determinations or findings, the question will be referred to the ACHP.

2. Within the indirect APE, following a Geographic Information Systems (GIS) viewshed analysis, any of the following cultural resources from which the Undertaking can be seen will be evaluated for National Register eligibility: any previously identified cultural resource eligible under criterion A, B, or C; cultural resources identified as areas of concern by Consulting Parties pursuant to Stipulation III.D; and portions of National

Historic Trails. The methodology detailed in Appendix C will be utilized across the Undertaking and may include additional state-specific requirements.

3. The BLM will utilize a setting assessment methodology, described in Appendix C, to determine the effects to those historic properties identified in Stipulation III.F.2 for which setting, feeling and/or association contribute to eligibility. Tribal consultation will be carried out regarding sites previously identified by tribes as significant. This methodology will be utilized across the project and may include state-specific requirements. Appendix C may be revised through review by the BLM and Consulting Parties, without amendment of the PA.

4. For each eligible property identified in Stipulation III.F.1-2, the BLM, in consultation with appropriate federal agencies, state agencies, SHPOs, and any Indian tribe that attaches religious or cultural importance to any identified historic property, will assess effects in order to identify all reasonably foreseeable and potentially adverse effects that may occur as a result of the Undertaking. BLM will take the comments of all Consulting Parties, including the recommendations for determinations of eligibility and findings of effect, into account prior to submitting the Class III report to the appropriate SHPO.

    a. Consultation with federal and state land-managing agencies

        BLM will provide the applicable Class III inventory report to federal and state land managing agencies. These agencies will have 30 days from receipt to review the Class III reports and provide comments on eligibility and effect to BLM.

    b. Consultation with Indian Tribes

        After agency reviews are completed, BLM will provide the applicable Class III inventory reports to Indian tribes who sign this PA or a data-sharing agreement consistent with BLM Handbook H-8120-1, Part IV.E Indian tribes will have 30 days to review the Class III report and provide comments on eligibility and effect to BLM.

    c. Consultation with Other Consulting Parties

        The Applicant will provide to BLM a summary document containing brief descriptions, recommendations for determination of eligibility and finding of effect for each site. At the same time the BLM provides the Class III inventory reports to Indian tribes, as described above, BLM will distribute the summary document to Consulting Parties (other than Indian tribes and SHPOs) for review and consultation regarding eligibility and effect, following 36 CFR 800.4(c), 36 CFR 800.5(a)(1) and (a)(2)(i)-(vii). The document will be consistent with confidentiality provisions of 36 CFR 800.11(c). Consulting Parties will have 30 days to review the summary document and provide comments to BLM.

d. Consultation with SHPO

BLM will provide each Class III inventory report to the appropriate SHPO for a 30-day review and will request concurrence regarding determination of eligibility and effect for all cultural resources whether on federal, state, tribal, or private lands. These determinations of effect will serve as the basis for the development of HPTPs.

1. If the BLM and SHPO agree that the cultural resource is not eligible for listing in the NRHP, no further review or consideration under this PA will be required for such cultural resources.

2. If the BLM and SHPO agree that the cultural resource is eligible, then effect determinations will be in accordance with Stipulation III. F.

3. If the BLM and SHPO do not agree on eligibility, and agreement cannot be reached within 30 days, then the BLM will request a determination of eligibility from the Keeper, pursuant to 36 CFR 800.4(c)(2) and 36 CFR Part 63. The Keeper's determination will be final.

e. The applicable Consulting Party will notify the lead BLM Office main point of contact by e-mail requesting a review extension and providing the justification for the delay, if time frames above cannot be met. The lead BLM Office will determine whether to grant an extension, not to exceed 30 days.

5. Findings of effect may be subject to change due to alterations in the Undertaking and APEs. BLM will consult with all appropriate Consulting Parties if any changes in the Undertaking or APE require changes in the agency's findings of effect.

IV. Tribal Consultation

Through government-to-government consultation with Indian tribes, pursuant to 36 CFR 800.2(c)(2), the BLM and other federal land-managing agencies, as appropriate, will make a good faith effort to identify properties that have traditional religious and cultural significance to one or more Indian tribes and to determine whether they are historic properties. Discussion of these properties will be integrated, as applicable, as a separate chapter or appendix, or submitted as a separate report. Ethnographic studies are not required, but may be requested by Indian tribes and any that are completed will become an addendum to the inventory. All parties to the PA will respect any sites of traditional religious and cultural importance [NHPA 101(d)(6)(A)] and confidentiality concerns expressed by Indian tribes to the extent allowed by law (see Stipulation II).

V. Resolution of Adverse Effects

A. If the BLM determines that the Undertaking will have adverse effects on historic properties, the BLM shall consult with the appropriate SHPOs, Consulting Parties and Indian tribes to

develop and evaluate alternatives or modifications to the Undertaking that could avoid, minimize, or mitigate adverse effects to those properties.

B. The BLM, to the maximum extent possible, will undertake planning and actions that may be necessary to minimize harm to NHLs that may be directly and adversely affected by the Undertaking (36 CFR 800.10). The BLM will notify the ACHP and the NPS regarding whether the Undertaking will have an adverse effect on an NHL and will ask the ACHP and NPS to participate in consultation to resolve any adverse effects to NHLs prior to issuance of an NTP.

C. Historic Properties Treatment Plans (HPTPs)
BLM will resolve adverse effects on historic properties by ensuring that a state-specific HPTP is prepared and implemented as described below. The HPTPs will provide specific avoidance, minimization, or mitigation measures, commensurate with the adverse effects of the Undertaking, and to lessen any potential for cumulative effects.

1. The Applicant will prepare a draft HPTP outline in coordination with the BLM for each state affected by the Undertaking for a 30 day review. Each HPTP will be prepared in consultation with the appropriate SHPO, Consulting Parties and Indian tribes, and will be consistent with the Secretary's Standards; the Advisory Council on Historic Preservation's *Section 106 Archaeology Guidance* (2009); the Historic American Buildings Survey (HABS), Historic American Engineering Record (HAER), and Historic American Landscapes Surveys (HALS) guidance (http://www.nps.gov/hdp/); and appropriate state guidelines. The BLM will hold a consultation meeting with all Consulting Parties to produce the HPTP.

2. Creation, Review and Approval of HPTPs

    a. BLM will use a draft HPTP outline and consult with Indian tribes and all Consulting Parties to determine HPTP content.

    b. Once each HPTP is completed and accepted by the BLM, the Applicant will provide the appropriate plan to each BLM Deputy Preservation Officer (DPO) who will distribute the plan to the applicable federal and state agencies, Consulting Parties and Indian tribes within their state for a final 30-day review.

    c. All comments will be submitted to the appropriate BLM DPO.

    d. BLM will take all comments into account and direct the Applicant to revise the plans, as appropriate. The Applicant will revise and provide new plans to the BLM within 10 days. BLM will ensure that the appropriate changes have been made and will submit the final HPTP to each SHPO for a 15-day review and concurrence.

3. Each HPTP will list all identified historic properties within the APE by state; by land ownership; by township, range, and section number; and by milepost of the Undertaking in which it occurs. The plans will identify the specific avoidance, minimization and/or

mitigation strategies proposed to address the direct, indirect, and cumulative effects of the Undertaking for both individual historic properties and specific groups of historic properties (e.g., archaeological sites, trails, etc.).

a. Each plan will identify whether the actions required to implement avoidance, minimization and/or mitigation for each historic property must be implemented prior to the authorization of any ground-disturbing activities in a segment (e.g., archaeological data recovery, landscape photography), or will be implemented following authorization of ground-disturbing activities (e.g., historical research, installation of an interpretive kiosk, public education materials, etc.).

b. Each plan will provide a table listing each historic property, including:

(1) A distinctive name or number;
(2) A brief description of the historic property;
(3) Its sequential location in terms of distance and direction from a project-defined milepost(s) or similar established markers;
(4) The type of disturbance that will affect the historic property;
(5) The nature or kind of each required treatment measure (avoidance, minimization, mitigation) pertaining to each historic property (e.g., landscape photography, archaeological data recovery, etc.);
(6) The identification of treatment measures, if any, which must be completed prior to authorization of ground-disturbing activities and/or those measures which may be completed after authorization of ground-disturbance; and
(7) The documentation and reporting procedures for each proposed treatment measure.

4. Each HPTP will incorporate research designs as needed to guide data recovery and other treatment efforts. BLM and SHPOs may utilize existing research designs included within acceptable historic context documents when the Consulting Parties agree that they are appropriate to a specific historic property or group of properties.

5. Other examples of treatment measures for adverse effects may include, but are not limited to:
   a. Completion of NRHP nomination forms
   b. Conservation easements
   c. HABS, HAER, and HALS documentation to be submitted to the Library of Congress
   d. Documentation of local or regional resources to be submitted to the appropriate SHPO or State Archives
   e. Purchase of land containing NHT segments or other historic properties for transfer to protective management/ownership with willing consent of landowner
   f. Partnerships and funding for public archaeology projects
   g. Print publication (brochure/book)
   h. Digital media publication (website/podcast/video).

6. HPTPs will include provisions for the discovery and treatment of previously unidentified cultural resources and the discovery of human remains (see Stipulations VII and VIII) that occur after issuance of any NTP.

7. Monitoring Plan
   Each HPTP will include a monitoring plan for implementation during construction, operation and maintenance. BLM and SHPOs may utilize existing monitoring plans when the Consulting Parties agree that they are appropriate to a specific historic property or group of properties.

   a. This plan will address monitoring for compliance with stipulations of the HPTP, as well as a potential strategy to avoid, minimize, or mitigate direct, indirect or cumulative adverse effects on historic properties at any time during the Undertaking, and include provisions for inadvertent discoveries of cultural resources including human remains and archaeological sites.

   b. All monitoring plans shall identify monitoring objectives and the methods necessary to attain these objectives, and in particular address those areas determined under the inventory to show a high probability for buried cultural deposits.

   c. Monitoring shall, as appropriate, include archaeological inspection of construction activities by personnel under the direct supervision of a person meeting the Secretary of the Interior's Professional Qualifications standards.

   d. Should tribal consultation indicate the need for tribal monitors along the construction route near historic properties or site types previously identified as significant to tribes or at testing or excavation locations, provisions for such monitors will be included in the plan.

   e. Any cultural resource, human remains or funerary objects discovered during pre-construction, construction, construction monitoring, or operation and maintenance activities will be treated in accordance with the inadvertent discovery protocols in the HPTP, described in Stipulation V.C.6.

8. Operations and Maintenance
   The HPTP shall address all operations and maintenance activities related to the functioning of the Undertaking after construction and reclamation are completed and prior to decommissioning. These permitted activities are defined in the POD. All terms, conditions, and stipulations concerning historic properties which are included in the POD and the ROW grant must be followed during any operations and maintenance activities.

   a. The HPTP will identify those stipulations necessary to ensure the consideration of historic properties throughout the life of the ROW grant.

   b. The BLM will be responsible for ensuring that the stipulations in the BLM ROW grant are enforced on BLM land for the life of the grant. Federal or state agencies

issuing a permit for the Undertaking will be responsible for permit enforcement under their jurisdiction.

c. The HPTP will identify a variance review process for operations and maintenance, to address any changes in procedures that could have an adverse effect on historic properties in the ROW. The applicant will submit a request for variance review to the BLM for any proposed changes in use of equipment or other changes that may result in ground disturbance outside of the previously surveyed APE. The BLM will consult with applicable land-managing agencies regarding such proposed changes.

d. The BLM, in consultation with the appropriate SHPO and land managing agency, will develop a list of operation and maintenance activities that will NOT be subject to additional Section 106 review, and will identify the types of activities that will require additional Section 106 review. The HPTP will incorporate these lists.

e. BLM administration of the ROW grant shall include appropriate BLM cultural resource specialists to participate in ROW grant review and to review compliance with stipulations or changes in procedures that may affect historic properties in the ROW. Coordination with applicable land-managing agencies will occur during the review process.

9. Decommissioning
   a. Prior to decommissioning the transmission line, the BLM, in consultation with the Consulting Parties, will assess the direct, indirect and cumulative effects on all historic properties that may be affected by decommissioning this transmission line and associated facilities in accordance with Stipulation III.F.

   b. The BLM will consult with the Consulting Parties in accordance with Stipulation III. F.5 on findings of effects on all historic properties that may be affected by decommissioning and seek ways to avoid, minimize, or mitigate adverse effects on these historic properties under the HPTP Stipulation V.A-C.

   c. Review of findings of effect will proceed according to the measures and time frames established in Stipulation III.E-F. Disagreement regarding findings of effect will be handled according to the procedures established in Stipulation XIV.

10. Implementation of HPTPs and Issuance of NTP

    BLM may issue an NTP for a portion of the Undertaking if the authorized activities will not preclude the BLM's or Applicant's ability to re-site or re-locate other facilities in adjacent portions of the Undertaking to avoid adverse effects on historic properties, or to resolve those adverse effects in accordance with terms of this PA.

D. Upon final acceptance by the BLM and SHPO, each HPTP will be appended to this PA as Appendix E.

VI. Personnel Training

Prior to conducting environmental training, the Applicant will provide their cultural resource training materials to BLM for a 30-day review. During that review period, BLM may request a 15-day review from the Consulting Parties.

Before any company is authorized to work within the APE, the Applicant shall train all personnel (including contractors, inspectors and monitors) involved in construction, operation, maintenance, and/or decommissioning of the Undertaking on site avoidance and protection measures and statutes protecting all cultural resources. Training will include sensitivity training regarding properties of traditional religious and cultural significance to Indian tribes and tribal issues in general. At a minimum, all personnel shall receive in-person training that discusses the importance of cultural resources, including linear resources such as historic trails; laws and regulations protecting them; and penalties for violation. This training program will also apply to personnel hired after the project has started. The Applicant shall maintain records demonstrating that the above described personnel training has been carried out and that all on-site workers have received the training.

If construction occurs outside of the approved ROW, BLM will utilize the compliance and monitoring plan to determine whether to issue a stop-work order and conduct damage assessment under ARPA, if appropriate, while the Applicant provides additional training for personnel in the area.

VII. Discovery of Previously Unidentified Cultural Resources

If potential historic properties are discovered after construction has begun or unanticipated effects occur to known historic properties, the BLM will implement a Discovery Plan, which will be developed in consultation with Consulting Parties prior to issuance of any NTP and be included in the HPTP pursuant to Stipulation V.C.6.

VIII. Discovery of Human Remains

If human remains are discovered, the BLM will follow the provisions of applicable state and local laws and NAGPRA (25 U.S.C. § 3001), pursuant to a Plan of Action that will be included in the HPTP. All work within 200 feet of the discovery will cease, and the Applicant will protect the discovery, as directed by the Plan of Action. Procedures for the discovery of human remains will be developed in consultation with Consulting Parties and prior to issuance of any NTP. The procedures will also address curation and repatriation.

IX. Curation

A. Collection of archaeological materials will follow the applicable state inventory policy. All materials found on federal lands will remain federal property when curated, unless otherwise repatriated in accordance with federal law.

B. Archaeological materials collected from non-federal lands (including private, state and/or tribal) pursuant to the implementation of this PA shall be maintained in accordance with 36 CFR Part 79 until all analysis is complete. If such non-federal landowners do not wish to allow analysis offsite, all analysis will occur in the field. If such non-federal landowners wish to donate collections from their lands to a museum, university, historical society, or other repository, the BLM will ensure the transfer occurs and the Applicant covers the transfer and curation costs. Otherwise, BLM will ensure that collections from such non-federal lands are returned to the landowners within 60 days of acceptance of the applicable report by the appropriate SHPO. The Applicant will provide documentation of the disposition of non-federal collections to the BLM and the appropriate SHPO.

C. The BLM shall ensure that curation of the material remains and all associated records resulting from identification and data recovery efforts on federal lands is completed in accordance with 36 CFR Part 79. The Applicant shall provide documentation of the curation of these materials to the BLM, other applicable land managing agencies, and the appropriate SHPO within 60 days of acceptance of the relevant report.

X. Initiation of Construction Activities

Land managing agencies may issue an NTP for segments of the Undertaking only after issuance of any applicable Authorizations for the Undertaking.

A. NTPs for segments may be authorized if the land managing agency, in consultation with the appropriate SHPO pursuant to Stipulation III, determines that:

1. No historic properties are present within the APE for that segment; or

2. Historic properties are present within the APE for that segment but will not be adversely affected, and all stipulations in the HPTP are in place to ensure no adverse effect. Such measures include a buffer for avoidance clearly marked in the field and provision for any monitoring, if required.

B. If the land managing agency, in consultation with the appropriate SHPO, determines that historic properties are present within the APE for a segment and that such historic properties may be adversely affected by the Undertaking, then the land managing agency may issue an NTP for that segment only if:

1. Implementation of the pre-construction portions of the HPTP for historic properties within the segment is complete and the BLM has received and accepted a preliminary or letter report documenting compliance with the applicable provisions of the HPTP; or

2. The HPTP for historic properties within the segment is implemented to a level acceptable to the BLM, in consultation with the Consulting Parties, and mitigation measures, which may include compensatory mitigation, are agreed upon and completed to an acceptable level pursuant to Stipulation V.C.2.a.

C. Land managing agencies may only authorize activities under A or B above if such authorization will not preclude the ability to re-site or re-locate other facilities in adjacent segments to avoid adverse effects on historic properties, or to resolve those adverse effects in accordance with the terms of this PA.

XI. Changes in Construction Activities

A. BLM will require that a Class III inventory be conducted for any variances or amendments to the ROW grant or any other changes to the Undertaking that are outside the currently inventoried APE (including changes in construction ROW and ancillary areas). Where BLM determines that additional inventory is needed, no ground disturbance will be authorized in the area of the variance or amendment to the ROW grant or any other changes to the Undertaking until the inventory, the effects determinations, and any required on-site mitigation measures are completed. BLM will issue a NTP after the Section 106 process is completed. BLM will determine where construction may continue while the additional work is being completed.

1. BLM will notify Consulting Parties within 5 days of proposed changes in construction that fall outside the originally defined APE. Consulting Parties may respond to BLM within 5 days with comments or concerns. BLM will consider any comments or concerns when the proposed construction change is processed.

2. The Applicant will assemble all variance reports into a second inventory volume and append it to the original Class III inventory report for the Undertaking.

B. The BLM and SHPOs will make every effort to expedite review of any changes to construction plans after initiation of construction. If the Applicant proposes changes in the construction ROW or any ancillary areas outside of the APE surveyed for the Undertaking, the Applicant will conduct identification and evaluation of historic properties in accordance with Stipulation III. Results of the inventory report will be handled as follows:

1. If the inventory results in no cultural resources identified, the Applicant will submit copies of the draft inventory report to the lead BLM Office for distribution to the appropriate federal and state agencies for review. The agencies will have 5 days to provide comments on the report to the lead BLM Office. If the BLM accepts the findings, the BLM may issue the NTP without SHPO review. If the BLM does not accept the findings, the Applicant will revise the report as necessary and resubmit it to the applicable BLM State Office within 5 days. The report data will also be included in any final report for the Undertaking.

2. If the inventory results in no historic properties identified, the Applicant will submit copies of the draft inventory report to the lead BLM Office for distribution to the appropriate Consulting Parties to this PA. Reviewers will provide any comments to the lead BLM Office within 10 days of receipt of the document. Any necessary changes to the report will be made by the Applicant and resubmitted to the appropriate Consulting

Parties within 5 days. The BLM will then send the documentation to the SHPO who will have 15 days to review and comment. The BLM will have 5 days to respond to any SHPO comments. If the SHPO does not respond within the stated timeframe, the BLM will assume SHPO has no objection to the report and concurs with the agency determination of eligibility. The BLM may issue the NTP or other applicable authorization to proceed at this point pursuant to Stipulation X.

3. If the inventory results in historic properties identified, the Applicant will submit copies of the draft inventory report to the lead BLM Office to distribute the report, including the potential effects to any historic properties, to the appropriate Consulting Parties to this PA. Reviewers will provide any comments to the lead BLM Office within 30 days. Any changes to the report will be performed by the Applicant and resubmitted to the appropriate Consulting Parties within 10 days. The BLM will then send the documentation to the SHPO who will have 30 days to review and comment. The BLM will have 10 days to respond to any SHPO comments. If the SHPO does not respond within the stated timeframe, the BLM will assume SHPO has no objection to the report and concurs with the agency determination of eligibility and finding of effect.

    a. No Adverse Effect determination: The BLM may issue the NTP or other applicable authorization to proceed pursuant to Stipulation X.A.2.

    b. Adverse Effect determination: The BLM may issue the NTP or other application for authorization to proceed pursuant to Stipulation X.B.

XII. Applicant's Responsibilities

A. The Applicant will post a financial security (such as a surety bond, letter of credit, etc.) with the BLM in an amount sufficient to cover all post-fieldwork costs associated with implementing the HPTP, or other treatment activities, as negotiated by the Applicant where they contract for services in support of this PA. Such costs may include, but are not limited to treatment; post-field analyses; research and report preparation; interim and summary reports preparation; the curation of Project documentation and artifact collections in a BLM-approved curation facility; and the repatriation and reburial of any human remains, sacred objects, or objects of cultural patrimony. The Applicant will post a financial security prior to BLM issuing an NTP for the segment where historic property treatment is required.

B. The security posted is subject to forfeiture if the Applicant does not complete tasks within the time period established by the treatment selected; provided, however, that the BLM and Applicant may agree to extend any such time periods. The BLM will notify Applicant that the security is subject to forfeiture and will allow the Applicant 15 days to respond before action is taken to forfeit the security.

C. The BLM will release the financial security, in whole or in part, as specific tasks are completed and accepted by the BLM.

D. The BLM shall monitor activities pursuant to this PA. Terms and conditions of monitoring activities are described in the HPTP. Should the Applicant or its cultural resources contractor fail to comply with any provision of this PA, the BLM may, at its discretion, counsel the Applicant and/or its cultural resources contractor regarding performance requirements, or suspend the permits under which this PA is executed. Such suspension could, at BLM's discretion, result in the issuance of a "stop work" order for the entire Project if BLM determines that the severity of the failure to comply warrants it.

XIII. PA Annual Report and Review

The lead BLM office shall prepare an annual letter report of cultural resources activities pertaining to this Undertaking for all Consulting Parties by January 31 of each year for the duration of this PA. The annual letter report will include an update on project schedule, status, tasks completed, and any ongoing cultural resources monitoring or mitigation activities, discovery situations, or outstanding tasks to be completed under this PA or the HPTP. Consulting Parties shall evaluate the implementation and operation of this PA on an annual basis. This evaluation, to be conducted after the receipt of the BLM letter report, may include in-person meetings or conference calls among these parties, and suggestions for possible modifications or amendments to this PA.

XIV. Dispute Resolution

A. Other than the NRHP dispute resolution process identified in Stipulation III.F.1 and 4.d.3, should any party to this PA object to the manner in which the measures stipulated in this PA are implemented, they shall provide written notice to the BLM of the reason for, and a justification of, the objection. The objecting party also shall provide a proposed resolution to the objection. Upon acceptance of such notice, the BLM shall consult for up to 30 days with the Consulting Parties to resolve the objection. If the BLM determines that the objection cannot be resolved, the BLM shall forward all documentation relevant to the dispute to the ACHP. Within 30 days after receipt of all pertinent documentation, the ACHP shall either provide the BLM with recommendations, which the BLM shall take into account in reaching a final decision regarding the dispute; or notify the BLM that it will comment within an additional 30 days. The BLM will take into account any ACHP comment provided in response to such a request in accordance with 36 CFR 800.7(c)(4) with reference to the subject of the dispute.

B. The BLM's responsibility to carry out all other actions subject to the terms of this PA that are not the subject of the dispute will remain unchanged.

XV. Amendment

Any Signatory or Invited Signatory may request that the PA be amended by informing BLM in writing of the reason for the request and the proposed amendment language. The BLM shall notify all Consulting Parties of the proposed amendment and consult to reach agreement within 30 days, unless the Signatories and Invited Signatories agree to a longer period of consultation or the party proposing the amendment retracts its proposal. The amendment will be effective on the

date a copy signed by all the Signatories and Invited Signatories is filed by the BLM with the ACHP.

XVI. Termination

A. Any of the Signatories and Invited Signatories who have signed this PA may terminate it.

B. The termination process starts when a Signatory or Invited Signatory who has signed the PA provides written notice to the other Signatories and Invited Signatories of its intent to terminate. Termination shall take effect no less than 30 days after this notification, during which time the Signatories, Invited Signatories, and Concurring Parties shall consult to seek agreement on amendments or any other actions that would address the issues and avoid termination. The notice must explain in detail the reasons for the proposed termination. The PA will be terminated at the end of the 30 day period unless the Signatories and Invited Signatories agree to a longer period of consultation or the party proposing termination retracts its proposal.

C. In the event that this PA is terminated, the BLM shall comply with 36 CFR 800.6 (c)(8) and will take reasonable steps to avoid adverse effects on historic properties until another PA has been executed or will request, take into account, and respond to ACHP comments, in accordance with 36 CFR 800.7. BLM will notify all parties to this agreement as to the course of action it will pursue.

D. An individual SHPO may withdraw from the PA upon written notice to all Signatories and Invited Signatories after having consulted with them for at least 30 days to attempt to find a way to avoid the withdrawal. Upon withdrawal, the BLM and the withdrawing SHPO will comply with Section 106 in accordance with 36 CFR 800.3 through 800.7 or the execution of an agreement in accordance with 36 CFR 800.14(b). Such Section 106 compliance will be limited to consideration of effects of the Undertaking solely within the jurisdiction of the withdrawing SHPO. This PA will still remain in effect with regard to the portions of the Undertaking located in the jurisdiction of the SHPOs who have not withdrawn from the PA. If all SHPOs withdraw from the PA, the PA will be considered to be terminated.

XVII. Duration of this PA

A. This PA will expire if the Undertaking has not been initiated and the BLM ROW grant expires or is withdrawn, or the stipulations of this PA have not been initiated within 10 years from the date of the execution of the BLM ROD. At such time, and prior to work continuing on the Undertaking, the BLM must either execute a memorandum of agreement pursuant to 36 CFR 800.6; execute a PA pursuant to 36 CFR 800.14(b); or request, take into account, and respond to the comments of the ACHP under 36 CFR 800.7. Prior to expiration of the PA, the BLM may consult with the Consulting Parties to reconsider the terms of the PA and amend it in accordance with Stipulation XV.

B. Unless the PA is terminated pursuant to Stipulation XVI above, or another agreement executed for the Undertaking supersedes it, or the Undertaking has been canceled or is not

approved, this PA will remain in full force and effect until BLM, in consultation with the other Signatories and Invited Signatories, determines that construction of all aspects of the Undertaking has been completed and that all terms of this PA have been fulfilled in a satisfactory manner, not to exceed 15 years, unless each of the Signatories and Invited Signatories agrees to extend the term hereof through an amendment pursuant to Stipulation XV. Upon a determination by BLM that all terms of this PA have been fulfilled in a satisfactory manner, BLM will notify the Consulting Parties in writing of the agency's determination. This PA will terminate on the day that BLM so notifies the Consulting Parties.

C. The BLM will retain responsibility for administering the terms and conditions of the ROW grant pertaining to historic properties for the life of the grant.

XVIII. General Provisions

A. Entirety of Agreement. This PA, consisting of twenty-eight (28) pages with Appendix A consisting of six (6) pages, Appendix B consisting of five (5) pages, Appendix C consisting of fifteen (15) pages, and Appendix D consisting of two (2) pages, represents the entire and integrated agreement between the parties and supersedes all prior negotiations, representations and agreements, whether written or oral, regarding compliance with Section 106 of the NHPA for the Undertaking.

B. Prior Approval. This PA shall not be binding upon any party unless this PA has been reduced to writing before performance begins, as described under the terms of this PA, and unless the PA is approved as to form by the Attorney General or his or her representative.

C. Severability. Should any portion of this PA be judicially determined to be illegal or unenforceable, the remainder of the PA shall continue in full force and effect, and any party may renegotiate the terms affected by the severance.

D. Sovereign Immunity. No State, SHPO, or Tribal government waives their sovereign or governmental immunity by entering into this PA and each fully retains all immunities and defenses provided by law with respect to any action based on or occurring as a result of the PA.

E. Indemnification. Each Signatory to this PA shall assume the risk of any liability arising from its own conduct. Each Signatory agrees they are not obligated to insure, defend, or indemnify the other Signatories to this PA.

F. Counterparts: This Agreement may be executed in two or more counterparts, each of which shall be deemed an original but all of which together shall constitute one and the same instrument. The BLM will distribute copies of all signed pages to the Consulting Parties once the PA is executed in full.

G. All notices, requests, and other communications required or permitted hereunder between the Consulting Parties shall be in writing. All such notices, requests, and other communications

shall be given: (i) by delivery in person, (ii) by a next day courier service, (iii) by first class, registered or certified mail, postage prepaid, or (iv) by electronic mail to the address of the Consulting Party as such party may specify in writing. All such notices, requests, and other communications shall be deemed to have occurred and be effective upon: (i) receipt by the party to which notice is given, or (ii) the fifth (5th) day after having been sent, whichever occurs first.

EXECUTION of this PA by the Signatories and Invited Signatories and implementation of its terms evidence that the BLM and the other federal agencies have taken into account the effects of this Undertaking on historic properties and afforded the ACHP an opportunity to comment on it in compliance with Section 106.

SIGNATORIES

SIGNATORIES

Bureau of Land Management, Wyoming State Office

By: _____ Title: Acting State Director
Signature

JAN 15 2016

Mary Jo Rugwell Date: _____
Printed

SIGNATORIES

Wyoming State Historic Preservation Officer

By: Mary Hopkins
Signature

Title: State Historic Preservation Officer

Mary Hopkins
Printed

Date: 2/8/16

Attorney General's Office: Approval as to Form:

By: [signature] #44939
Signature

Title: Assistant Attorney General

for Samantha Caselli
Printed

Date: 02-04-16

SIGNATORIES

Colorado State Historic Preservation Officer

By: _____ Title: State Historic Preservation Officer
Signature

for Steve Turner Date: 1/20/16
Printed

SIGNATORIES

Utah State Historic Preservation Officer

By: _____ Title: State Historic Preservation Officer
Signature

P. Brad Westwood _____ Date: January 20, 2016
Printed

SIGNATORIES

Nevada State Historic Preservation Officer

By: _____
Signature

Title: State Historic Preservation Officer

Rebecca L. Palmer
Printed

Date: 01/19/16

SIGNATORIES

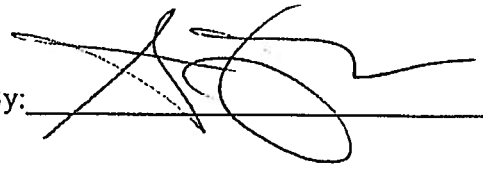
Moapa Band of Paiute Indians

By: _____ Title: Chairman, Tribal Business Council
Signature

Robert Tom _____ Date: 4-25-16
Printed

SIGNATORIES

Ute Indian Tribe of the Uintah and Ouray Reservation

By:  Title: Chairman, Business Committee

Shaun Chapoose
Printed

Date: 8-24-16

By: Betsy L. C. Date: 9/07/2016

Betsy Chapoose
Title: Director, Ute Indian Tribe Cultural Rights and Protection Department

SIGNATORIES

Advisory Council on Historic Preservation

By: _____ Title: Executive Director
Signature

John M. Fowler _____ Date: 10/18/16
Printed

INVITED SIGNATORIES

INVITED SIGNATORIES

Western Area Power Administration

By: _____
Signature

Title: Administrator

Mark A. Gabriel
Printed

Date: Oct 6, 2016

INVITED SIGNATORIES

U.S. Forest Service

By: _____ Title: Forest Supervisor
Signature

John R. Erickson Date: 03/28/2016
Printed

INVITED SIGNATORIES

National Park Service, Intermountain Region

By: _____ Title: Regional Director
Signature

for Sue E. Masica Date: 2/12/16
Printed

INVITED SIGNATORIES

Bureau of Reclamation, Upper Colorado Region

By: _____ Title: Provo Area Office Manager
Signature

Wayne Pullan _____ Date: 18 Feb. 2016
Printed

INVITED SIGNATORIES

Bureau of Reclamation, Lower Colorado Region

ACTING FOR

By: _____
Signature

Title: Regional Director, Lower Colorado Region

Terrance J. Fulp, Ph.D.
Printed

Date: Oct 11, 2016

INVITED SIGNATORIES

Bureau of Indian Affairs

By: _____ Title: Regional Director, Western Region
Signature

Bryan Bowker Date: 2/3/16
Printed

INVITED SIGNATORIES

U.S. Fish and Wildlife Service, Wyoming Field Office

By: _____ Title: Field Office Supervisor
Signature

R. Mark Sattelberg Date: 1-28-16
Printed

INVITED SIGNATORIES

U.S. Army Corps of Engineers, Sacramento District

By: _____ Title: Chief, Regulatory Division
Signature

Michael S. Jewell Date: 27 Jan 2016
Printed

INVITED SIGNATORIES

State of Utah, School and Institutional Trust Lands Administration

By: David Ure
Signature

Title: Director

David Ure
Printed

Date: 2/11/16

Approved as to Form
Sean D. Reyes
ATTORNEY GENERAL
By: _____

INVITED SIGNATORIES

Utah Department of Transportation

By: _____ Title: Deputy Director
Signature

Shane Marshall Date: 11/27/16
Printed

INVITED SIGNATORIES

Utah Reclamation Mitigation & Conservation Commission

By: ACTING FOR _____ Title: Executive Director
Signature

Mark Holden _____ Date: 2/4/16
Printed

INVITED SIGNATORIES

TransWest Express LLC

By: _____ Title: Vice President
Signature Land and Environmental Affairs

Garry L. Miller Date: January 15, 2016
Printed

CONCURRING PARTIES

Tribal Governments

CONCURRING PARTIES

Fort McDermitt Paiute-Shoshone Tribe

By: Bradley Crutcher
Signature

Title: Chairperson

Bradley Crutcher
Printed

Date: 7-17-2014

CONCURRING PARTIES

Pueblo of Laguna

By: Virgil Siow
Signature

Title: Governor

Virgil A. Siow
Printed

Date: 1/27/16

CONCURRING PARTIES

Other Concurring Parties

CONCURRING PARTIES

Alliance for Historic Wyoming

By: Carly Ann Marie Andersen
Signature

Title: Executive Director

Carly-Ann Anderson
Printed

Date: January 27, 2016

CONCURRING PARTIES

Catherine Baker

By: Catherine A. Baker Title: Individual
Signature

Catherine Baker Date: 1-31-2016
Printed

I am signing w/ the understanding that if the decision is made to come through Mountain Meadow, I cannot file an appeal unless I have signed this P.A.
CAB 1/31/2016

CONCURRING PARTIES

The Church of Jesus Christ of Latter-day Saints

By: Richard E. Turley Jr.
Signature

Title: Assistant Church Historian and Recorder

Richard E. Turley, Jr.
Printed

Date: 9 Feb. 2016

CONCURRING PARTIES

Huntington Eccles Scenic Byway

By: Rosann Fillmore
Signature

Rosann Fillmore
Printed

Title: Scenic Byway Coordinator

Date: Jan. 27, 2016

2016 FEB -3 AM 10:00
RECEIVED
BOEM

CONCURRING PARTIES

Mountain Meadows Association

By: Terry N. Fancher
Signature

Title: President

Terry Fancher
Printed

Date: 1/25/2016

CONCURRING PARTIES

Mountain Meadows Descendants

By: Patricia Norris
Signature

Title: President

Patricia Norris
Printed

Date: January 27, 2016

2016 FEB -3 AM 8:00
RECEIVED
BUREAU OF
CHEYENNE, WYOMING

CONCURRING PARTIES

Mountain Meadows Monument Foundation

By: Phil Bolinger
Signature

Title: President

Phil Bolinger
Printed

Date: 3-1-2016

CONCURRING PARTIES

Nevada Archaeological Association

By: _____ Title: President
Signature

Jeffrey Wedding _____ Date: 2/8/2016
Printed

CONCURRING PARTIES

Nevada Rock Art Foundation

By: _____ Title: ~~President~~ EXECUTIVE DIRECTOR
Signature

Angus R. Quinlan, PhD, RPA Date: 2/3/16
Printed

CONCURRING PARTIES

Old Spanish Trail Association, Utah

By: _____ Title: Utah Director
Signature

Alva Matheson Date: 21 January 2016
Printed

CONCURRING PARTIES

Utah Public Lands Policy Coordination Office

By: _____
Signature

Title: Director

Kathleen Clarke
Printed

Date: 2/1/2016

CONCURRING PARTIES

Utah Professional Archaeological Council

By: _____
Signature

Jody J. Patterson
Printed

Title: Vice President of Government Affairs and Research

Date: 04 Feb 2016

CONCURRING PARTIES

Utah Statewide Archaeology Society

By: Heidi Essex
Signature

Title: President

Heidi Essex
Printed

Date: Feb. 12, 2016

LIST OF APPENDICES

Appendix A – Map of Proposed Route and Alternatives

Appendix B – Definitions

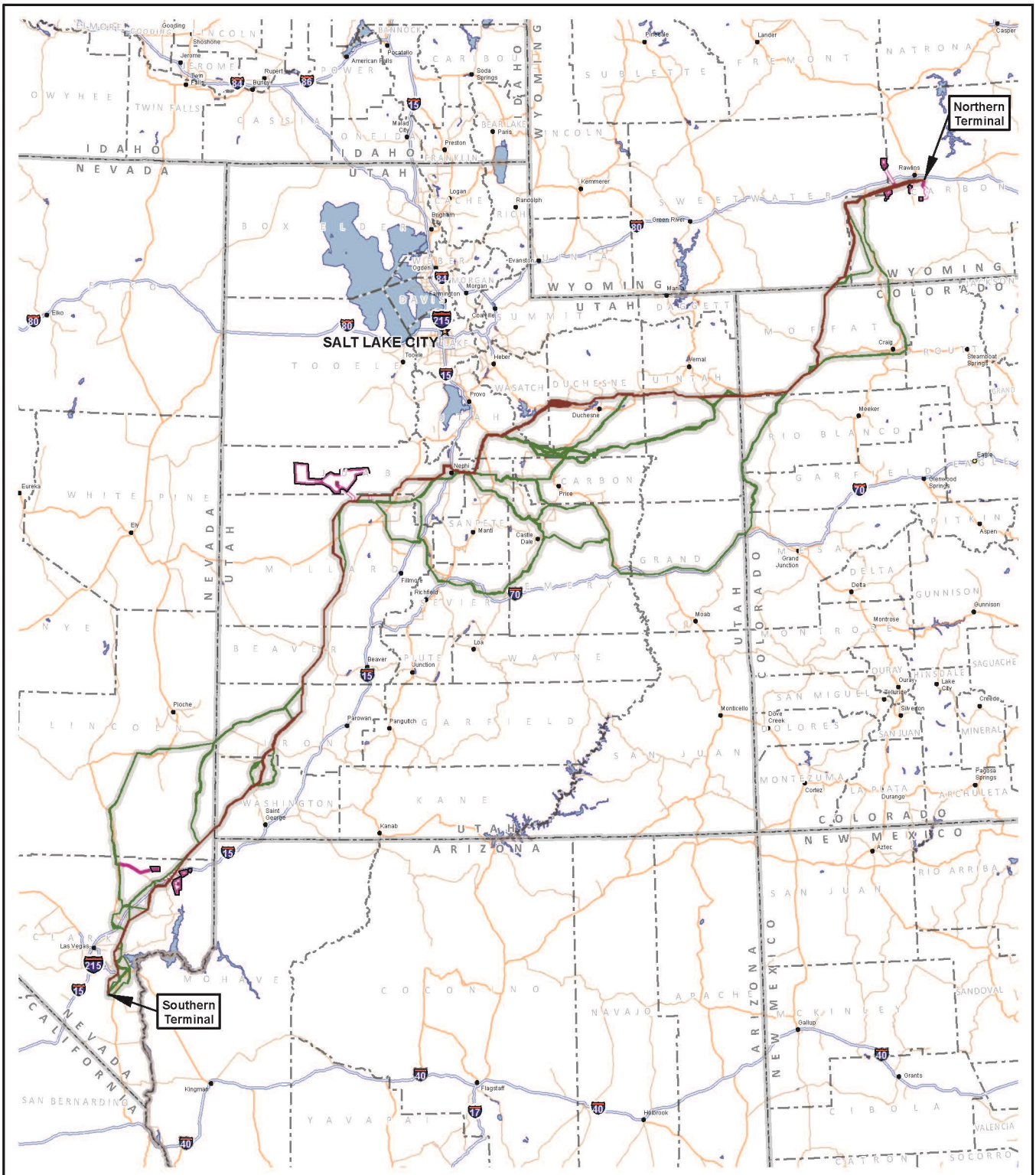
Appendix C – Procedures for Determining Effects on Historic Properties for which Setting, Feeling and Association are Aspects of Integrity

Appendix D – Procedures for Documenting Access for Cultural Resources Investigations on Private Land

Appendix E – Historic Properties Treatment Plan (RESERVED – to be developed after the Class III Inventories)

APPENDIX A

MAPS OF PROPOSED ROUTE AND ALTERNATIVES



Project Corridors

- Applicant Proposed
- Alternative

- Potential Ground Electrode Siting Area
- Potential Ground Electrode Site
- Potential Ground Electrode Overhead Electrical Line

TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure A-1
Project Location

0 20 40 80 Miles
0 20 40 80 km
1:4,750,000

Western AREA POWER ADMINISTRATION

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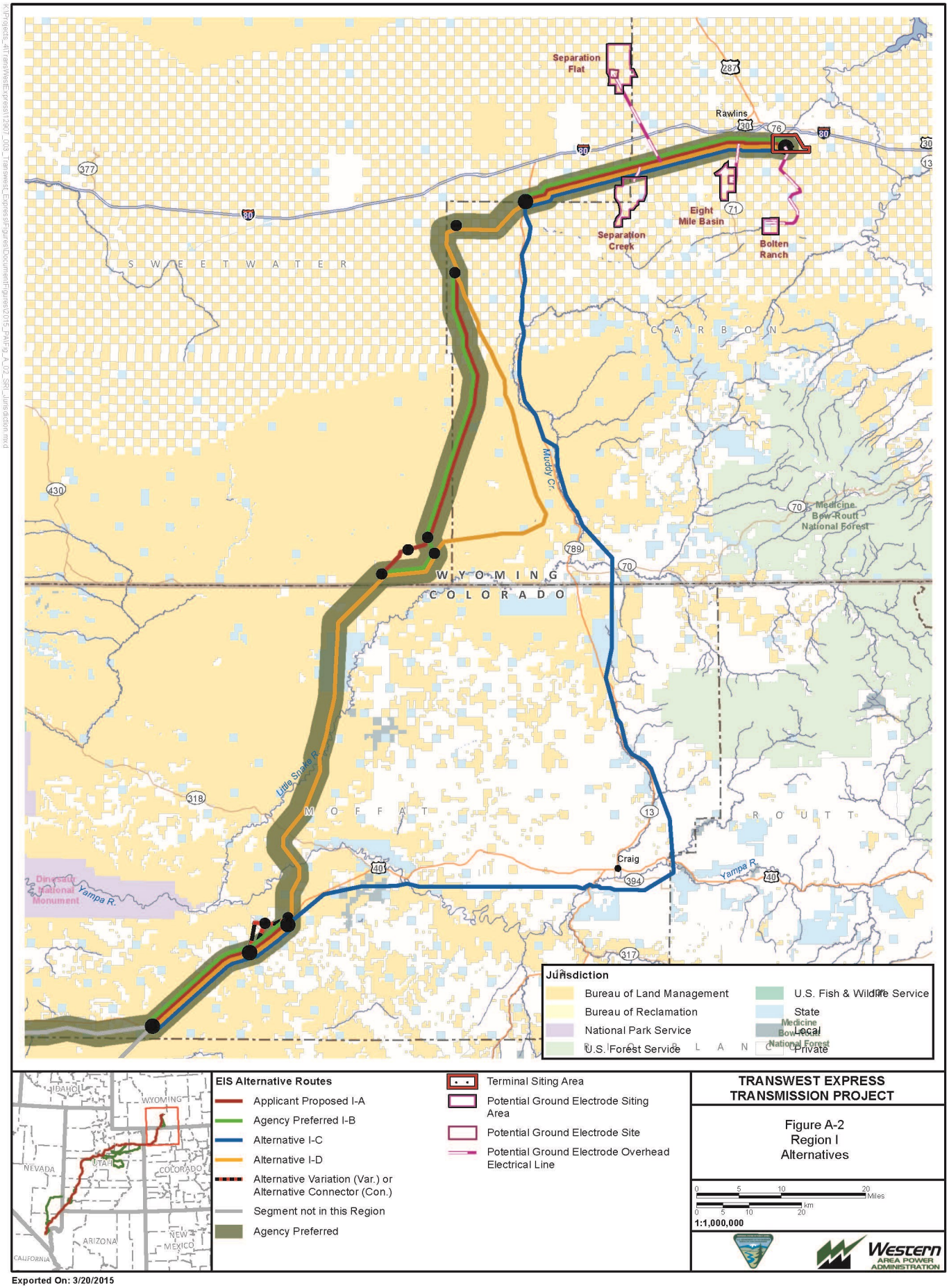

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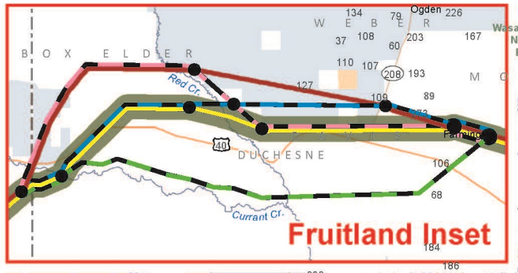

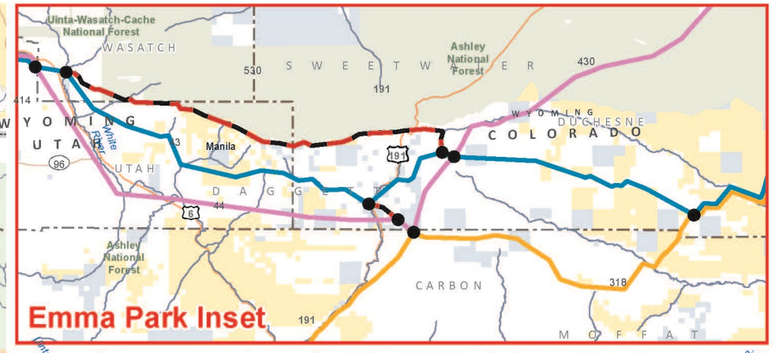

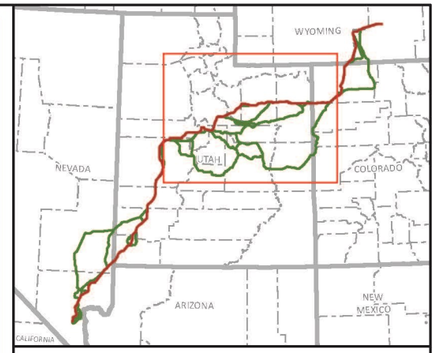

EIS Alternative Routes

- Applicant Proposed II-A
- Alternative II-B
- Alternative II-C
- Alternative II-D
- Alternative II-E
- Alternative II-F
- Agency Preferred II-G
- Alternative Variation (Var.) or Alternative Connector (Con.)
- Segment not in this Region
- Agency Preferred Alternative
- Node

Ground Electrode Components

- Potential Siting Area
- Potential Overhead Electrical Line

Jurisdiction

- BIA/Tribal
- Bureau of Land Management
- Bureau of Reclamation
- DOD/USACE
- National Park Service
- U.S. Forest Service
- U.S. Fish & Wildlife Service
- Other Federal
- State
- Local
- Private

TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure A-3
Region II
Alternatives

0 10 20 40 Miles
0 10 20 40 Kilometers
1:1,200,000

N

Western AREA POWER ADMINISTRATION

Exported On: 3/20/2015

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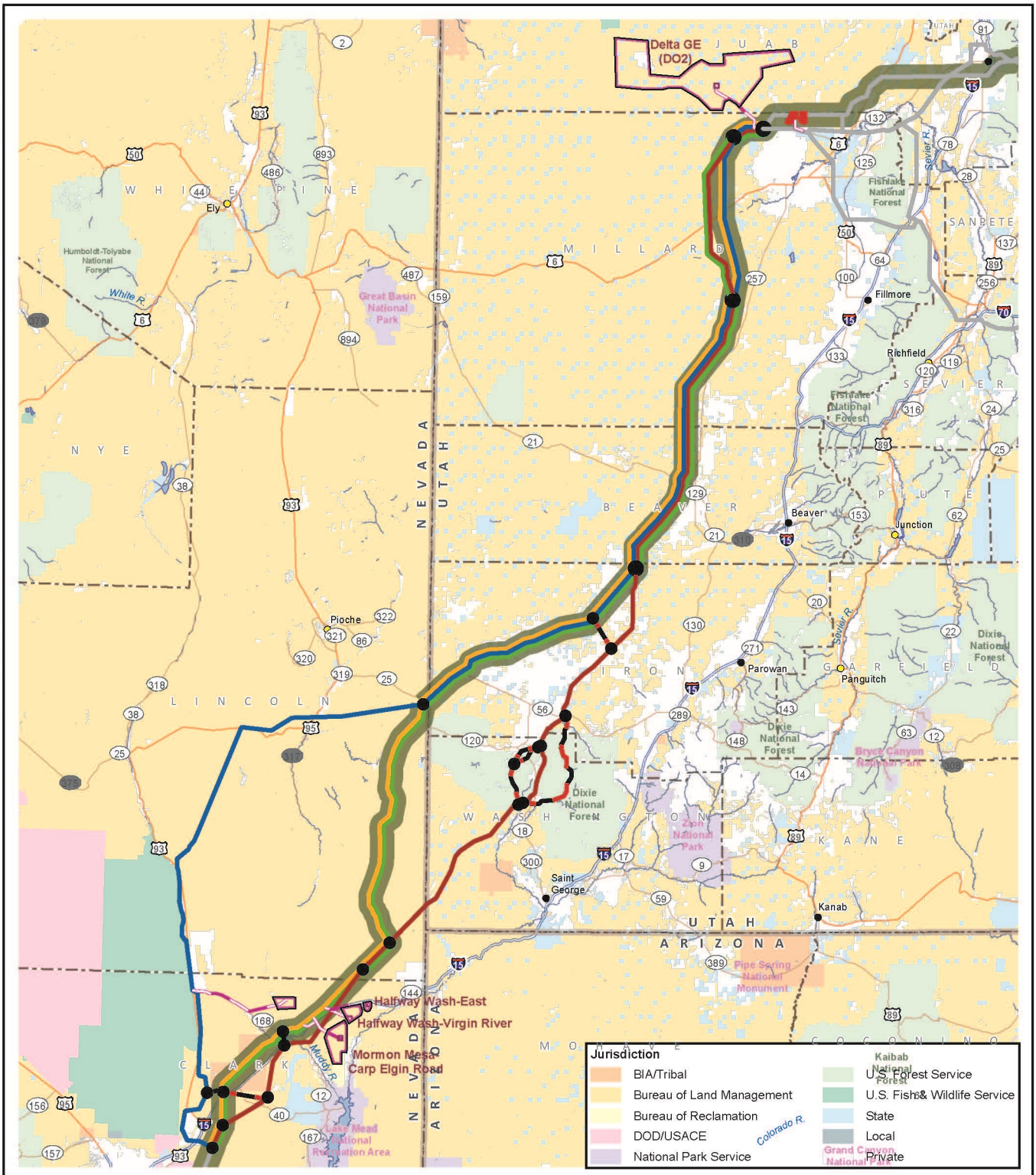

EIS Alternative

- Applicant Proposed III-A
- Alternative III-B
- Alternative III-C
- Agency Preferred III-D
- Alternative Variation (Var.) or Alternative Connector (Con.)
- Segment not in this Region
- Agency Preferred

- Terminal Siting
- Potential Ground Electrode Siting Area
- Potential Ground Electrode Site
- Potential Ground Electrode Overhead Electrical Line

TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure A-4
Region III
Alternatives

0 10 20 40 Miles
0 10 20 40 km
1:2,000,000

Western AREA POWER ADMINISTRATION

Exported On: 3/20/2015

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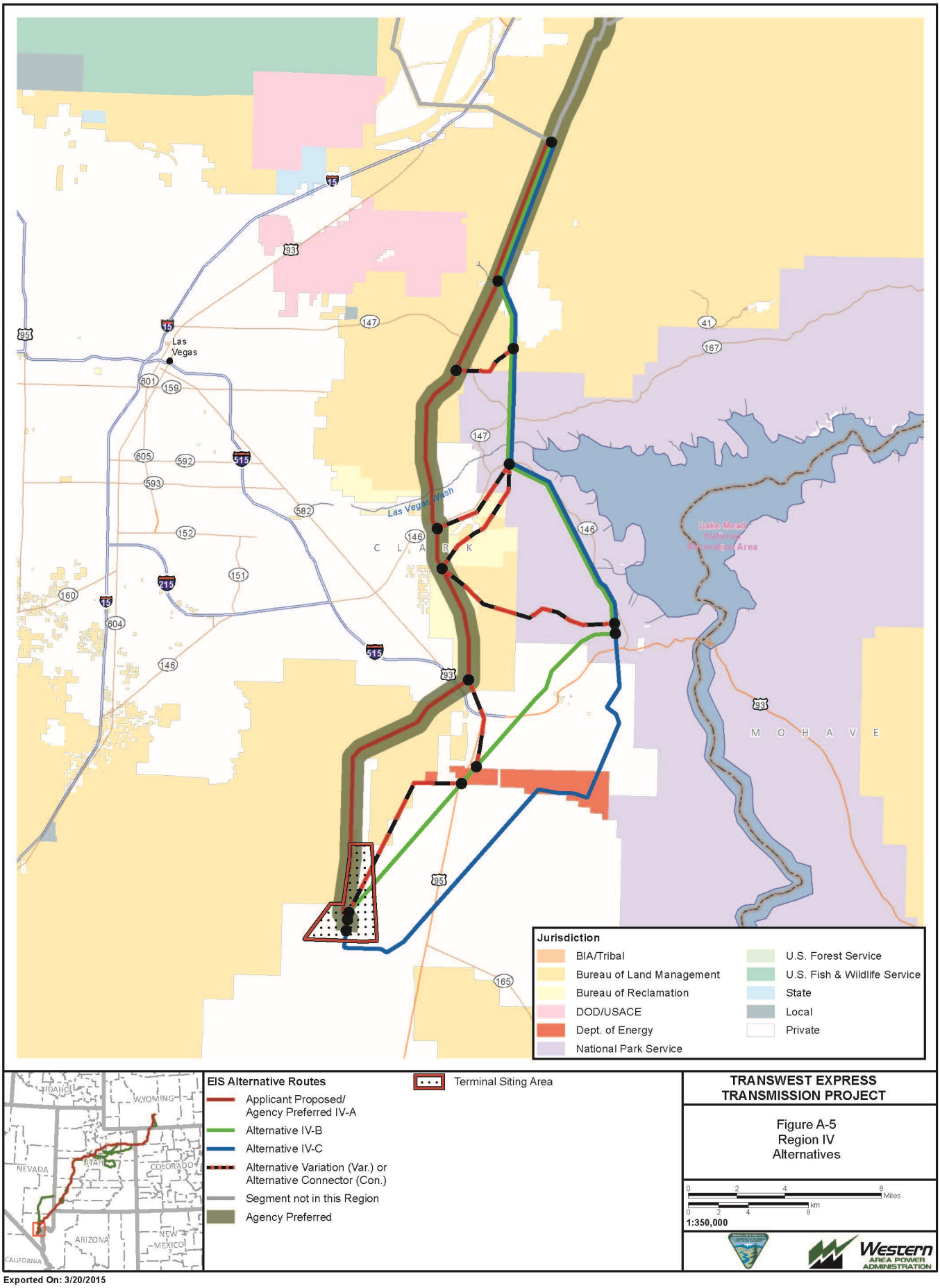
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Las Vegas
Las Vegas Wash
Lake Mead National Recreation Area
C L A R K
M O H A V E
Jurisdiction
BIA/Tribal
Bureau of Land Management
Bureau of Reclamation
DOD/USACE
Dept. of Energy
National Park Service
U.S. Forest Service
U.S. Fish & Wildlife Service
State
Local
Private
EIS Alternative Routes
Applicant Proposed/ Agency Preferred IV-A
Alternative IV-B
Alternative IV-C
Alternative Variation (Var.) or Alternative Connector (Con.)
Segment not in this Region
Agency Preferred
Terminal Siting Area
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
CALIFORNIA
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure A-5
Region IV
Alternatives
Miles
km
1:350,000
Western AREA POWER ADMINISTRATION
Exported On: 3/20/2015

APPENDIX B

DEFINITIONS

1. *Adverse effect.* When an Undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration will be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for listing in the National Register. Adverse effects may include reasonably foreseeable effects caused by the Undertaking that may occur later in time, be farther removed in distance or be cumulative (36 CFR 800.5(a)(1). Adverse effects on historic properties include, but are not limited to:

   - Physical destruction of or damage to all or part of the property;
   - Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, which is not consistent with the Secretary of the Interior's Professional Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines;
   - Removal of the property from its historic location;
   - Change in the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
   - Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;
   - Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
   - Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

2. *Area of Potential Effect (APE).* The geographic area or areas within which an Undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist (36 CFR 800.16(d)).

3. *Class III Inventory.* A Class III inventory is an intensive, 100% pedestrian field survey to determine the distribution, number, location, and condition of historic properties in an area in order to determine effects and potential mitigation methods. A Class III inventory is used when it is necessary to know precisely what historic properties exist in a given area or when information sufficient for later evaluation and treatment decisions is needed on individual historic properties (BLM Manual 8110).

4. *Compensatory mitigation/offsite mitigation.* Offsite mitigation consists of compensating for resource impacts by replacing or providing substitute resources at a different location than the project area.

5. *Concurring Parties.* Concurring Parties are Consulting Parties who have participated in the consultations and may be invited to concur in the agreement. Concurring parties who refuse to concur in the agreement do not invalidate the agreement (36 CFR 800.6(c)(3)).

6. *Construction.* The construction phase begins when BLM has issued a ROW grant to the proponent for the Undertaking. It includes all activities related to construction of the undertaking, including activities required to be completed in advance of construction, as well as all activities completed in order to reclaim lands disturbed during construction for two years after construction is completed or until cost recovery agreements related to construction expire.

7. *Consulting Parties*. All required Signatories, Invited Signatories, and Concurring Parties.

8. *Cultural resource.* A definite location of human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence. The term includes archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and may include definite locations (sites or places) of traditional cultural or religious significance to specified social and/or cultural groups (traditional cultural property). Cultural resources are concrete, material places and things that are located, classified, ranked, and managed through the system of identifying, protecting, and utilizing for public benefit described in the BLM 8100 Manual. They may be but are not necessarily eligible for listing in the National Register.

9. *Cumulative effects*. Cumulative effects are the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR 1508.7). For the purposes of the PA and paraphrasing 40 CFR 1508.7, cumulative effects on historic properties are the effects that result from the incremental impact of the Undertaking when added to other past, present and reasonably foreseeable future undertakings regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

10. *Day(s).* For the calculation of time periods under this PA, "days" means calendar days. Any time period specified in this PA that ends on a weekend or a state or federal holiday is extended until the close of the following business day.

11. *Decommissioning.* The action in which the transmission line(s) and/or related facilities such as substations are taken out of commission (cease to operate) and are physically dismantled.

12. *Deputy Preservation Officer (DPO).* The BLM Deputy Preservation Officer is a senior cultural resource specialist in each State Office and is responsible for advising the State Director, district and field managers on professional and technical matters relating to cultural resource management.

13. *Effect.* An alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register [36 CFR 800.16(i)].

14. *Historic property.* Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural significance to an Indian tribe and that meet the National Register criteria (36 CFR 800.15(1)). The phrase 'eligible for inclusion in the National Register' is used to refer to both properties formally determined as such by the Secretary of the Interior and all other properties that meet National Register listing criteria as defined in 36 CFR 800.16(l)(2).

15. *Historic Property(ies) Treatment Plan.* (HPTP) A document that details the procedures and techniques for resolving adverse effects on historic properties within the APE through avoidance, minimization, and/or mitigation.

16. *Literature review.* A "literature review," "existing data review," "file search," or "records check" is generally the brief first step before initiating a field survey. Ideally, completing an existing data review means consulting the SHPO's automated database, as well as BLM or USFS office records. The literature review provides information regarding whether any survey has been conducted and any cultural properties have been recorded within or near the project location.

17. *Milepost.* Sign posts indicating distances along the transmission line corridor from end to end. Mileposts will be used to designate discrete segments along the construction corridor.

18. *Monitoring.* Actions performed to ensure compliance with the terms, conditions, and stipulations of a grant. Actions include inspection, construction, operation, maintenance, and termination of permanent or temporary facilities and protection and rehabilitation activities until the holder completes rehabilitation of the ROW and the BLM approves it. Monitoring for cultural resources may have different objectives depending on the phase of the project.

19. *National Historic Landmark (NHL).* A district, site, building, structure or object, in public or private ownership, judged by the Secretary of the Interior to possess national significance in American history, archeology, architecture, engineering and culture, and so designated by him [36 CFR 65.3(h)].

20. *National Historic Trail (NHT).* A trail or route designated by Congress as a National Historic Trail under the National Trails System Act of 1968 as amended. To qualify for designation as a National Historic Trail, a trail or route must be established by historic use and be historically significant as a result of that use; be of national significance; and have significant potential for public recreational use or historical interest based on historic interpretation and appreciation. Generally, they are extended trails of one hundred or more miles in length which follow as closely as possible and practicable the original trails or routes of travel of

national historical significance. National historic trails have as their purpose the identification and protection of the historic route and its historic remnants and artifacts for public use and enjoyment.

21. *Notice to Proceed (NTP).* A written authorization by the Administrative Officer (AO) that allows the holder to initiate actions under the ROW grant. The AO can issue separate notices to proceed if the project involves distinct work phases and/or locations. Each notice to proceed will specify the nature of work, location, and dates to be authorized.

22. *Operations and Maintenance.* Activities associated with operation and maintenance of the approved right-of-way grant over the life of the right-of-way grant. This includes all activities related to the functioning of the Undertaking after construction and reclamation are completed and prior to any activities related to decommissioning of the Undertaking, pursuant to Stipulation XI. Activities during this this time are generally infrequent, predictable, and routine. Any actions not specifically approved in the right-of-way grant, such as changes in equipment used or actions outside the right-of-way require approval of the BLM.

23. *Plan of Action.* A document included in the HPTP that establishes procedures for ensuring the proper treatment of human remains and related grave goods encountered during the Undertaking.

24. *Plan of Development*. A plan of development includes the detailed construction, operation, rehabilitation, and environmental protection plan of the project. The project Applicant completes the POD, which is reviewed by the land-managing agencies.

25. *Property of traditional religious and cultural importance.* A property that is eligible for the National Register because of traditional religious and cultural importance to an Indian tribe. A 1992 amendment to the National Historic Preservation Act (P.L. 102-575)(now P.L. 113-287) directs that properties of traditional religious and cultural importance to an Indian tribe may be determined to be eligible for inclusion on the National Register, and that in carrying out its responsibilities under Section 106 of the Act, a Federal agency shall consult with any Indian tribe that attaches religious and cultural importance to such properties. This term may also appear as “properties of religious and cultural significance”; “properties of traditional religious and cultural significance”; “properties of cultural or religious importance”; or “properties of religious or cultural importance.”

26. *Reclamation.* The process of restoring lands disturbed during construction to their pre-construction condition, generally involving restoration of vegetation, soils and topography. Reclamation processes and practices are described in the Plan of Development and generally are to be completed no later than two years after construction is completed.

27. *Record of Decision (ROD).* The public record made by the agency at the time of its decision which states what the decision was, identifies all alternatives considered by the agency in reaching its decision, specifies the alternative which was considered to be environmentally

preferable, and states whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not. A monitoring and enforcement program shall be adopted and summarized where applicable for any mitigation (40 CFR Part 1505.2). Until an agency issues a record of decision, no action concerning the proposal shall be taken which would (1) have an adverse environmental impact; or (2) limit the choice of reasonable alternatives (40 CFR Part 1506.1).

28. *Right-of-Way grant holder*. The entity that currently has the BLM right-of-way authorization for the project. Right of way grants may be assigned to others, pursuant to 43 CFR 2805.14.

29. *Rural Historic Landscape (RHL)*. A geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features.

30. *Segment*. Any of the parts into which something (i.e. transmission line) is separated; section.

31. *Setting assessment*. A methodology devised to determine the effects of an undertaking to those historic properties for which setting, feeling and/or association contribute to eligibility.

32. *Signatories*. Required Signatories execute, may amend, and may terminate this agreement. *Invited Signatories* have the same rights to amend and terminate the agreement once they sign it pursuant to 36 CFR 800.6(c)(2).

33. *Summary Report*. A document that summarizes results of treatment activities undertaken on an individual historic property for the purposes of informing the agency and Consulting Parties in order to gain approval for the Project to go forward prior to the acceptance of the final report required by the HPTP.

34. *Targeted field reconnaissance*. Reconnaissance survey is a focused or special-purpose information tool that is less systematic, less intensive, less complete, or otherwise does not meet Class III inventory standards. Reconnaissance surveys may be used, among other purposes, for locating particular types of cultural resources, such as those for which setting, feeling, and association are important to their integrity. Fieldwork may be targeted to specific areas or types of locations in which such properties may exist, or to examine known cultural resources to determine whether they are significant and whether setting, feeling and/or association may be important to their significance.

35. *Traditional cultural property (TCP)*. A property that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community (National Register Bulletin 38).

36. *Variance*. A written authorization from the responsible agency permitting construction in a manner that departs from the specific requirements of the Plan of Development.

APPENDIX C
PROCEDURES FOR DETERMINING EFFECTS TO HISTORIC PROPERTIES FOR WHICH SETTING, FEELING OR ASSOCIATION ARE ASPECTS OF INTEGRITY

1.0 INTRODUCTION

This methodology defines the procedures for identifying and evaluating effects from the TransWest Express Transmission Project (Undertaking) to historic properties within the Area of Potential Effect for Indirect Effects (indirect effects APE) for which the qualities of setting, feeling, or association are aspects of integrity and thereby characteristics that qualify these properties for NRHP eligibility. The BLM, in consultation with the Advisory Council on Historic Preservation; the Wyoming, Colorado, Utah and Nevada State Historic Preservation Officers (SHPOs); and Consulting Parties to the PA, has compiled these procedures, pursuant to Stipulations I.A.2 and II.E.6 of the PA.

The Applicant will produce separate reports that identify effects to setting, feeling or association for historic properties in Wyoming, Colorado, Utah and Nevada. The goal will be to include these reports as stand-alone addenda to the Class III inventory reports for each state. Each report will meet the reporting requirements of the BLM and the SHPO from each respective state. SHPOs from each state may stipulate additional reporting requirements for this assessment.

The methodology involves four components. Within the indirect effects APE defined in Stipulation I.A.2 of the PA, (1) identify historic properties from which the Undertaking can be seen and for which setting, feeling or association is an aspect of integrity; (2) complete field evaluations of the integrity of these historic properties; (3) assess effects to setting, feeling or association of these historic properties; 4) resolve adverse effects. Complete Components 1, 2 and 3 and include results in the Class III inventory report for the Undertaking; complete Component 4 and include in the Historic Properties Treatment Plan (HPTP). We address each component of this methodology below. In addition to the following detailed description of each component, Exhibit 1 to this Appendix is a field implementation guide intended to assist field personnel in implementing these procedures.

1.1 Definitions and Eligibility Criteria

For the purposes of this methodology, we define cultural resources as archaeological, historical, or architectural sites, districts, buildings, structures, places, and objects which have been documented on the official site forms used by the SHPOs in the states of Wyoming, Colorado, Utah, and Nevada; or listed on the National Register of Historic Places or state registers of historic places; and additionally those properties identified by Consulting Parties in Stipulation II.D of the PA. Cultural resources include sites known to be important to tribes; for example, some rock art, rock cairns, alignments and stone circles. Cultural resources encompass definite locations (sites or places) of traditional cultural or religious significance to specified social and/or cultural groups (including traditional cultural properties), as in the definition in Appendix

B of the PA, and are most readily identified by Consulting Parties from these groups bringing them forward, per Stipulation II.D of the PA.

Cultural resources eligible for listing on the National Register of Historic Places (NRHP) are referred to as "historic properties." Historic properties must demonstrate importance in American history, architecture, archaeology, engineering, or culture. A historic property is considered significant in these categories if it possesses integrity of location, design, setting, materials, workmanship, feeling, and association and meets one or more of the following criteria:

> (a) is associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (b) is associated with the lives of persons significant in our past; or
>
> (c) embodies the distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or that possesses high artistic values, or that represents a significant and distinguishable entity whose components may lack individual distinction; or
>
> (d) has yielded, or may be likely to yield, information important in prehistory or history. (36 CFR 60.4)

1.2 Integrity

Integrity is defined as "the ability of a property to convey its own significance" (National Park Service [NPS] 1995:44). According to NRHP guidelines, the evaluation of integrity must always be grounded "in an understanding of a property's physical features and how they relate to its significance" (NPS 1995:44). Setting, feeling and association (also defined in NPS 1995:44-45) are particularly sensitive to visual, audible, and atmospheric effects and convey the property's historic character.

- **Setting** is the physical environment of a historic property. Setting encompasses the physical features of each historic property, in which the property played its historic role. It includes natural features such as topography and vegetation, and manmade features that are part of the property and the surrounding landscape.
- **Feeling** is a property's expression of the aesthetic or historic sense of a particular period of time. Do the physical features taken together convey the property's historic character? Does the property "feel" like it did during its historic period? Are the sights and sounds the same? Can you imagine the property during its period of significance? Examine the potential modern intrusions which may distract from the historic features and character of the property.
- **Association** "is the direct link between an important historic event or person and a historic property" (NPS 1995:45). Is there a direct link between the historic person or event and the historic property? Examine whether the place at which the event or activity occurred is sufficiently intact to convey the historic link or relationship to an observer.

All other terms not defined within this document are as defined in the PA.

1.3 Area of Potential Effect for Indirect Effects (Indirect Effects APE)

As described in Stipulation I.A.2 of the PA, the indirect effects APE extends to the visual horizon or for three miles on either side of the transmission line centerline, whichever is closer. Where the indirect effects APE includes traditional cultural properties, properties of traditional religious and cultural importance, National Historic Landmarks (NHLs), National Historic Trails (NHTs), and other classes of historic properties for which setting, feeling or association contributes to eligibility, additional analyses may be required and the indirect APE may be modified accordingly, following procedures described in I.B of the PA. Consulting Parties may identify cultural resources to consider for inclusion in this analysis beyond the 3 mile indirect effects APE.

2.0 INVENTORY HISTORIC PROPERTIES FOR WHICH SETTING, FEELING OR ASSOCIATION IS IMPORTANT TO INTEGRITY

Identifying historic properties within the indirect effects APE for which setting, feeling or association may be important to their integrity involves a two-step approach: (1) conducting a GIS viewshed analysis to identify areas in the indirect effects APE from which the Undertaking may be visible, and (2) compiling a list of historic properties within the potentially visible portion of the indirect effects APE for which setting, feeling or association is anticipated to be an important quality of integrity. This two-step viewshed analysis screening approach effectively screens out historic properties that are located within the indirect effects APE but have no view of the Undertaking or for which setting, feeling or association is not an important quality of integrity. The NRHP eligibility screening eliminates cultural resources that do not meet the criteria for eligibility as set forth in the NRHP. The details of each step are discussed below.

2.1 Viewshed Analysis Screening

The BLM will require the Applicant to conduct a GIS viewshed (seen-unseen) analysis to generate a viewshed that represents the area of the Undertaking (especially transmission line towers) potentially visible within the indirect effects APE. The Undertaking may be visible because of (1) anticipated landform modifications that are necessary to prepare a right-of-way for construction, (2) the removal of vegetation to construct and maintain a facility, and (3) the introduction of new above-ground elements into the landscape. Conduct the GIS viewshed analysis screening using the best and most current information available about these visibility factors at the time work begins on this report. Eliminate from further consideration all portions of the indirect effects APE from which the Undertaking is not visible.

2.2 NRHP Eligibility Screening

Within the visible portion of the indirect effects APE defined in 2.1, identify historic properties for which setting, feeling or association contributes to integrity, based upon NRHP evaluations. Use existing cultural records databases at SHPO and federal land management agencies to identify the pool of historic properties eligible under Criteria A, B and/or C, that fall within the

indirect APE and that may be affected by the Undertaking. If eligibility criteria are not available or are incomplete in electronic databases, site types may be used to search within electronic databases for sites that are likely to be eligible under A, B and/or C. For example, "historic structure" may be a starting place to search for historic properties eligible under A, B and/or C without having to go through every paper site form to find these sites.

Include in this pool certain types of historic properties eligible under Criterion D and known to be important to tribes or other Consulting Parties, such as rock art, rock cairns, alignments or stone circles. The Consulting Parties are encouraged to define these kinds of sites, and also any specific sites that should be included, within 60 days after the ROD is signed, per Stipulation II.D of the PA. The BLM, in consultation with other involved land managing agencies and the applicable SHPO, may include historic properties eligible under Criterion D at its discretion. Along with those sites brought forward by Consulting Parties, which may need to be evaluated for National Register eligibility, the pool of historic properties will include those that are traditional cultural properties, properties of traditional religious and cultural importance, NHLs, NHTs, and sites identified as sacred or respected places during tribal consultation. Tribally sensitive information will not be shared with other Consulting Parties.

The focus of this identification effort is on properties likely to be determined eligible, not on properties that are unlikely to be determined eligible because of lack of significance under A, B or C. Place a high priority on areas of importance identified by Consulting Parties. Conversely, Consulting Parties should take care to identify places of importance to them in the indirect effects APE, per Stipulation III.D of the PA. Examples of properties likely to be determined eligible may include named roads or other named features. Examples of properties unlikely to be determined eligible may include unnamed roads and trails or other unnamed features; historic linear utilities (e.g., transmission or telegraph lines) recorded as historic sites; and industrial sites where setting is unlikely to contribute to integrity.

Screening for site type: As a screening measure, the BLM, in consultation with the Consulting Parties, may define site types for which setting, feeling or association are important to integrity, and may likewise define site types for which setting, feeling or association are not important to integrity. In conjunction, site types for which audible or atmospheric effects are not important may be defined. The Applicant may propose definitions of such site types to the BLM at the beginning of the assessment. Describe these definitions in the report, and remove historic properties screened out through this process from the list of historic properties to visit in the field.

Screening for overall integrity: In some instances, historic properties have been entirely destroyed or compromised to the extent that the site no longer meets the criteria set forth for eligibility on the NRHP. If lack of integrity can be ascertained during the inventory process, remove historic properties lacking integrity, and thus no longer eligible, from the list of historic properties to visit in the field.

Screening for setting, feeling or association: If the identification of the historic property's integrity of setting, feeling or association has not been included in available documentation,

BLM in consultation with SHPOs, the Consulting Party who brought forward the historic property, and any other applicable land managing agency will determine the importance of these aspects of integrity to the historic property. This determination will also apply to places brought forward by Consulting Parties through Stipulation II.D of the PA, which may not be present in SHPO or Agency site files. When possible, this determination will be made prior to completion of the field inventory. The BLM will share any such determinations with all Consulting Parties as part of the documentation for the Undertaking.

Consideration of Land Status: The Applicant will demonstrate a good faith effort to acquire access to visit historic properties on private land beyond the direct effects APE. Historic properties on private land where access cannot be obtained for fieldwork will be assessed remotely.

Consideration of Audible and Atmospheric Effects: Identify places at which construction activities will be longer in duration or more extensive in scope, or where they may have more than typical audible and atmospheric effects. These "intensive construction locales" may include construction staging areas, areas prone to excessive noise or dust, or helicopter overflight areas near historic properties of concern for these indirect effects. In addition to the use of reference towers to measure visual effects, include the locations of such places as reference places for assessing audible and atmospheric effects.

Geodatabase: Compile a geodatabase of all historic properties identified at the end of the inventory process in 2.1 and 2.2 above (including historic properties identified during Class III inventories conducted for this Undertaking). This database will include the following information in tabular format: site location, Smithsonian site number (if available), source of the information, land ownership, site description, NRHP evaluation and nominating criteria, and additional reasons for inclusion (e.g., NHTs, sacred sites, sites brought forward by Consulting Parties). Tribally sensitive information and site location information for sensitive sites will not be shared with other Consulting Parties.

GIS Screening in the Office: To verify that the Undertaking has an effect on the historic properties in the geodatabase prior to fieldwork, employ GIS methods in the office for visualizing features of the Undertaking, such as using simulation analysis as available through Google Earth "street view." Using GIS in the office, assign a Cultural Key Observation Point (CKOP) to the center of each historic property in the geodatabase, and then do a GIS analysis of the Undertaking's visibility using those CKOPs, as measured to the nearest reference tower(s) or intensive construction locale. The analysis should result in a simulated view of the landscape from each CKOP with the Undertaking in it. The agency archaeologist(s) and the Applicant will review these simulated views before going to the field so that they can identify historic properties where the effects of the Undertaking are clearly so minor that a field visit is not necessary. In the report and in the geodatabase, list historic properties dropped from further analysis because of no or very minor (no adverse) effects as identified through this process.

Simulation of Undertaking: Based on the GIS screening in the office, produce simulated images that show the anticipated Undertaking from each CKOP. Where field inventory is necessary, take these images to the field for reference, to help field crews visualize where the Undertaking will be located in relation to each historic property that will be visited.

2.3 List of Historic Properties for Field Inventory and Evaluation

Historic properties that remain in the pool after the Viewshed Analysis Screening and NRHP Eligibility Screening described in 2.1 and 2.2 above are those for which setting, feeling or association has been identified as important to their integrity. Schedule the tasks involved in inventorying and evaluating these properties with the goal of including the completed report as an addendum to the Class III inventory report. Next, assess potential visual, audible or atmospheric effects from the Undertaking on these historic properties in the field.

3.0 FIELD EVALUATIONS

Complete the following analysis on historic properties identified for field inventory as a result of the screening done during the inventory stage (Beck et al 2012; Bureau of Land Management [BLM] 2006, 2013a and b, 2014; Delaware State Historic Preservation Office 2003). Consult the National Register Bulletin's *How to Apply the National Register Criteria for Evaluation* (NPS 1995) as the primary reference to assess setting, feeling or association as they apply to eligibility and integrity. First, collect photographic data from each potentially affected historic property to document effect recommendations; and secondly, assess the effects on setting, feeling or association using the attributes described below.

3.1 Overall Integrity Prior to the Undertaking

In the field, record and evaluate the National Register eligibility of cultural resources identified by Consulting Parties through Stipulation II.D of the PA if they have not been previously recorded in SHPO site files and if the BLM's review of the screening process under Section 2 above indicates that they need to be recorded. Include in eligibility recommendations an assessment of site integrity with emphasis on setting, feeling and association. Document the rationale for eligibility recommendations in the report and on state site forms for these newly recorded sites, and include the site forms with the report.

If the field visit shows that a historic property has been destroyed or compromised to the extent that the historic property no longer meets the criteria for eligibility, document the site's present condition with a site form addendum or a site update form as required by the applicable SHPO; prepare and submit this documentation with the report. Evaluate whether historic properties that have been compromised but not destroyed since their last recording retain NRHP eligibility, with an emphasis on integrity of setting, feeling and association. If not, eliminate these sites from further consideration, and document the "not eligible" recommendation in the report. No further assessment is required.

3.2 Photographic Data Collection

3.2.1 Establish Cultural Key Observation Points and Photograph Undertaking

At each historic property identified in 3.1 that is visited in the field and that retains integrity, establish at least one CKOP with a representative view of the Undertaking. Take sufficient photographs from the CKOP(s) at each historic property to document the view of the Undertaking from the CKOP. If a historic property is linear or large, or if there are several important features at the property, more than one CKOP may be needed. Position the camera at each CKOP to capture the viewshed from the historic property facing the proposed transmission tower(s) or intensive construction locale. In addition, take photographs in the four opposite or perpendicular directions from each CKOP that best demonstrate the existing setting in relation to the Undertaking. Record the camera height and aspect and the GPS location for each CKOP. Use an appropriate lens and the same model of camera and camera lens, or cameras and lenses with the same resolution and image quality at all CKOPs. Note in the report the camera and lens model used.

3.2.2 Visualization Modeling and Simulation

After fieldwork, superimpose all visible and proposed components of the Undertaking onto a representative image or images from each historic property. If visual simulations are not effective or obtainable, GIS modelling may be used. Simulations will be to scale in proper geographic locations and with appropriate component elevations and heights. The result of these simulations or models will be a graphical illustration of the potential visual impacts of the Undertaking on each potentially affected historic property.

The visual simulations or models document the visibility of the Undertaking from the historic property; include them in the report. Complete the assessment described in 3.3 below in the field, at the historic property and also consider effects from atmospheric or audible elements at historic properties near intensive construction locales in the field.

3.3 Analyzing Effects to Setting, Feeling or Association

Systematically identify and analyze effects to the integrity of setting, feeling and association at each historic property, as assessed in the field and documented with photographs, visual simulations and/or models. Employ the following criteria to describe the effects of the Undertaking on each historic property, and document the results for each historic property. If possible, an agency archaeologist should be in the field with the Applicant's consultant so that effect recommendations can be made jointly.

Integrity of Setting, Feeling or Association

For the assessment of integrity, the setting, feeling and association of the historic property are the main concerns. Assess the historic property's integrity of setting, feeling and association considering the simulations of the Undertaking, i.e. assuming the Undertaking is in place, as follows:

High – The historic property retains integrity. The introduction of the Undertaking leaves the setting, feeling and association intact and relatively untouched.

Low – The historic property retains few aspects of integrity. The introduction of the Undertaking leaves the setting, feeling and association severely compromised or lacking in the historic property's ability to convey its significance.

Distance

Distance is the actual distance between the historic property and the Undertaking. Because areas that are closer potentially have a greater effect on the observer, they can draw greater attention than areas farther away. Using GIS measurements, record the distance from each CKOP to the closest visible reference tower or intensive construction locale of the Undertaking. In the field, record the number of towers visible from each CKOP.

Contrast

Measure contrast by comparing the Undertaking features with the major elements in the existing setting, including topography, vegetation, and man-made features. Use the basic elements of form, line, color, and texture to make this comparison and to describe the visual contrast anticipated to be created by the Undertaking. Follow the guidelines in the BLM's Visual Resource Contrast Rating Handbook H-8431-1 for making the visual contrast rating, and use the Visual Contrast Rating Worksheet in the current Wyoming protocol Appendix C (BLM 2014a); record the date and time of day of the rating. If possible, complete the Visual Contrast Rating at the time of day and year and under light and vegetation conditions that are representative of when most people are likely to see the Undertaking from the historic property. Append the Visual Contrast Rating Worksheets for each historic property to the site form.

No Contrast – The undertaking cannot be seen at all.

Weak Visual Contrast – The elements of the Undertaking, or portions of the elements, can be seen but will not dominate the setting or attract the attention of the casual observer.

Moderate Contrast – The elements of the Undertaking tend to stand out in the setting.

Strong Contrast – The elements of the Undertaking clearly dominate the setting.

Cumulative Effects

For the purposes of this document and paraphrasing the National Environmental Policy Act definition (40 CFR 1508.7), cumulative effects on historic properties are the effects that result from the incremental impact of the Undertaking when added to other past, present and reasonably foreseeable future undertakings regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. Assess cumulative effects as follows in relation to past, present and reasonably foreseeable future undertakings:

Project Compatible - Multiple or large industrial features or developments have appeared in the surrounding landscape. These features dominate the setting, feeling and association; the Undertaking does not create a striking contrast.

Project Moderately Compatible - Single or small industrial features or developments have appeared in the surrounding landscape. These other features are visible on the landscape but the Undertaking dominates the setting, feeling and association.

Project Incompatible - No other industrial or developmental features appear in the surrounding landscape. The Undertaking creates a striking contrast that is incompatible with the setting, feeling and association.

Results of Analysis

Support recommendations regarding effects on the setting, feeling and association of each historic property in the report with photographs from CKOPs, showing visual simulations of the Undertaking and analysis of the above attributes using forms or other means of record keeping. Submit these records, along with site form updates as required, as an appendix to the report; they will eventually be integrated into SHPO cultural resources site files.

4.0 ASSESSMENT OF EFFECTS TO SETTING, FEELING OR ASSOCIATION

Adverse effects on historic properties may occur from a "change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance (36 CFR 800.5(a)2)(iv)," including "visual, atmospheric, or audible intrusions" (Advisory Council on Historic Preservation 2014). The primary question to be addressed is "can the setting, feeling or association of the property continue to effectively convey its historic significance despite the effect of the Undertaking?"

Planning the Undertaking provides the opportunity to avoid and minimize effects on historic properties. Avoidance is the preferred strategy for eliminating effects on historic properties. Avoidance methods may include but are not limited to "screening" the transmission line by moving it behind a hill, moving tower locations, and realigning proposed access routes. Minimizing adverse effects may include camouflaging or reducing the reflective qualities of materials used in construction; feathering, tapering or selective planting of native vegetation along cleared areas; and using existing roads as access roads, as outlined in the Draft Environmental Impact Statement for the Undertaking (BLM 2013b: Appendix C, Table C-2).

4.1 Recommendation of Adverse Effect

Under 36 CFR 800.5(a)(1) an adverse effect is found when an undertaking alters "directly or indirectly, any of the characteristics of a historic property that qualify it for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association."

4.2 Recommendation of No Adverse Effect

An effect to setting, feeling or association, whether direct or indirect or a combination of the two, does not automatically call for an "Adverse Effect" recommendation. Under 36 CFR 800.5(b)(3) if an effect caused by the Undertaking does not meet the criteria for adverse effect in 36 CFR 800.5(a)(1) or the undertaking is modified or conditions are imposed, so the adverse effect criteria are not met, then a recommendation of "no adverse effect" is warranted. In other words, the effect may not compromise the integrity of the historic property to such an extent that it diminishes said integrity or causes an adverse effect.

4.3 Recommendation of No Effect

A recommendation of No Effect means that the undertaking cannot be seen or heard from the historic property or its effects to the integrity of the historic property are so minor as to be negligible.

5.0 RESOLUTION OF ADVERSE EFFECTS

As outlined in the PA at Stipulation V.C, a Historic Properties Treatment Plan (HPTP) will be prepared after the ROD is signed, the Undertaking's footprint is finalized, and the Class III inventory report is completed. All historic properties that will be adversely affected by the Undertaking will be reviewed and addressed individually within the HPTP. Include recommendations for minimizing adverse effects to setting, feeling and association in the report and in the HPTP.

The avoidance and minimization measures described in 4.0 may not be viable options in all cases of adverse effects to setting, feeling and association. Where on-site mitigation of visual effects cannot be achieved, develop alternative mitigation measures following the process spelled out in the PA, Stipulation V.C and include them in the HPTP.

6.0 POST-CONSTRUCTION RE-EVALUATION

After construction is complete, revisit each historic property evaluated in the field prior to construction, re-photograph it, and re-evaluate its integrity and the effects of the Undertaking. Describe whether construction impacts are likely to be temporary or permanent. Report pre- and post-construction integrity and effect evaluations as a stand-alone report required by the HPTP.

7.0 REVISIONS TO PROCEDURES

Revisions to the above procedures may be proposed and accepted through review by the BLM and the Consulting Parties without amendment of the PA.

8.0 REFERENCES

36 CFR Part 800 – Protection of Historic Properties
2004 Available at http://www.achp.gov/regs-rev04.pdf

Advisory Council on Historic Preservation
2014 Section 106 Regulations, Flow Chart, Explanatory Material. Available at http://www.achp.gov/flowexplain.html

Beck, R. Kelly, Nicci Barger, Lindsey Kester and Tanya Johnson
2012 Assessing the Visual Effects of Wind Generation Facilities on Historic Properties for National Historic Preservation Act Consultation. SWCA, Inc., Salt Lake City, Utah. Poster presented at the American Wind Energy Association's WINDPOWER conference, Atlanta.

Bureau of Land Management
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EXHIBIT 1. FIELD IMPLEMENTATION GUIDE
PROCEDURES FOR DETERMINING EFFECTS
TO HISTORIC PROPERTIES FOR WHICH SETTING, FEELING OR ASSOCIATION ARE ASPECTS OF INTEGRITY

Purpose: To summarize the procedures for identifying and evaluating effects from the TransWest Express Transmission Project (Undertaking) on historic properties within the Area of Potential Effect for Indirect Effects (indirect effects APE) for which the qualities of setting, feeling, or association are aspects of integrity, as defined in Appendix C of the Programmatic Agreement (PA). This field guide is intended as a quick reference for carrying out the procedures described in Appendix C.

Step 1: Define Indirect Effects APE and Conduct Viewshed Analysis
The Undertaking's indirect effects APE extends to the visual horizon or a maximum of 3 miles on either side of the transmission line centerline, whichever is closer. Use a Geographic Information System (GIS) viewshed analysis to model the viewshed surrounding the Undertaking and refine the APE to include only areas where the Undertaking can be seen.

Step 2: Conduct a File Review: Screen for NRHP Eligibility
Examine existing records for all sites in the refined APE to identify known sites that may be sensitive to visual effects. Sites that are eligible for the National Register of Historic Places (NRHP) under Criterion A, B, or C are considered potentially sensitive. Sites that are eligible only for their data potential (i.e., Criterion D) may be considered for analysis by the BLM in consultation with other applicable land managing agencies and the State Historic Preservation Officer (SHPO). Place a high priority on areas identified by Consulting Parties, even if outside the indirect effects APE. They have 60 days after the Record of Decision (ROD) is signed to provide this information. Site types may be used to search for sites that are likely to be eligible under A, B and/or C. Screen site types for those for which setting, feeling or association are important.

Step 3: Verify Site Integrity
A site must retain integrity of setting, feeling or association to be sensitive to visual effects caused by the Undertaking. Screen out sites that no longer possess integrity, i.e., have been destroyed or damaged to the extent that their integrity is compromised. If integrity of setting, feeling or association has not been included in site documentation, determine the importance of these aspects to the historic property.

Outcomes: Steps 1 through 3 should result in a geodatabase of historic properties sensitive to integrity of setting, feeling, and/or association and visible from the Undertaking. Begin to compile this geodatabase as soon as the ROD is signed and a Right of Way (ROW) for the Undertaking is approved.

Step 4: Check Visual Simulations in the Office Prior to Fieldwork
Employ GIS (for example, Google Earth "street view") to visualize the Undertaking from the historic properties. In the office, assign proxy Cultural Key Observation Points (CKOPs) at the center of historic properties in the geodatabase, then do a GIS analysis of the Undertaking's visibility using those CKOPs. Identify intensive construction locales that may be important for assessing audible and atmospheric effects. View the simulated Undertaking's nearest reference tower or intensive construction locale from the historic properties to screen out those historic properties where the effects of the Undertaking are clearly so minor that a field visit is not necessary. Compile a list of the historic properties eliminated by this process.

Produce computer-generated simulations that show the Undertaking from each CKOP. Take these images to the field for reference to help visualize where the Undertaking will be located in relation to each historic property that will be visited.

Outcome: Step 4 should result in a list of historic properties to evaluate in the field for effects from the Undertaking.

Step 5: Fieldwork - Visit Historic Properties to Verify Eligibility
Use the NRHP Bulletin's *How to Apply the National Register Criteria for Evaluation* (NPS 1995) as the primary reference to assess setting, feeling or association as they apply to eligibility and integrity.

Record and recommend the National Register eligibility of cultural resources identified by Consulting Parties if they have not been previously recorded. Include an assessment of site integrity (setting, feeling and association) with eligibility recommendations.

If a historic property has been destroyed or compromised to the extent that it is no longer eligible, document the site's present condition with a site update and re-evaluate the historic property's eligibility.

Outcome: Step 5 should result in a final list of historic properties to be field-evaluated for effects to setting, feeling and association.

Step 6: Fieldwork: Take photographs before construction
At each historic property visited, establish at least one field CKOP representing a typical view of the Undertaking. If a historic property is large or linear, or if there are several important features at the property, more than one CKOP may be needed. Photograph the proposed Undertaking location from the CKOP. Take photos in the four opposite or perpendicular directions from each CKOP. Record camera height and aspect and GPS location for each CKOP. Use an appropriate lens; use the same camera and the same lens (or model of camera and lens) for all sites; include camera and lens information in report.

After fieldwork, superimpose all components of the Undertaking onto the photographic images to scale in proper geographic locations and with appropriate component elevations.

Step 7: Fieldwork – Analyze Effects to Setting, Feeling or Association
While referring to the simulations created in Step 4, evaluate the effect of the Undertaking using a visual assessment worksheet. Include at a minimum assessments of the following attributes: site integrity (setting, feeling or association), distance, contrast, and cumulative effects.

Follow the guidelines in the BLM's Visual Resource Contrast Rating Handbook H-8431-1 for making the visual contrast rating, and use the Visual Contrast Rating Worksheet in the current Wyoming protocol Appendix C (BLM 2014), including recording the date and time of day of the rating. Recommend how contrast can be minimized.

Outcome: Steps 6 and 7 should result in recommendations regarding effects on the setting, feeling and association of each historic property documented with photographs from CKOPs showing visual simulations of the Undertaking, and written analysis of the above attributes. Submit these records, along with site form updates, with the report.

Step 8: Assess effects to setting, feeling or association
Address the primary question "can the setting, feeling or association of the property continue to effectively convey its historic significance despite the effect of the Undertaking?"

Recommend No Effect, No Adverse Effect, or Adverse Effect: An effect to setting, feeling or association does not automatically call for an "Adverse Effect" recommendation. If an effect caused by the Undertaking does not meet the criteria for adverse effect in 36 CFR 800.5(a)(1) or the undertaking is modified or conditions are imposed so the adverse effect criteria are not met, then recommend "no adverse effect." In other words, the effect may not compromise the integrity of the historic property to such an extent that it diminishes the integrity or causes an adverse effect.

Outcome: Step 8 should result in recommendations of effect for each historic property visited.

Step 9: Recommend ways to resolve adverse effects
Avoidance is the preferred strategy for eliminating effects on historic properties. Avoidance methods include "screening" the transmission line by moving it behind a hill, moving tower locations, and realigning proposed access routes. Minimizing adverse effects includes camouflaging or reducing the reflective qualities of construction materials; tapering or selective planting of native vegetation in cleared areas; and using existing access roads. Where on-site mitigation of visual effects cannot be achieved, alternative mitigation measures will be developed.

Address each historic property with adverse visual, auditory or atmospheric effects from the Undertaking in the Historic Properties Treatment Plan (HPTP), which will be prepared after the ROD is signed, the Undertaking's footprint is finalized, and the Class III inventory report is completed. Recognize that it may not be possible to resolve adverse effects on site and alternative mitigation may be required.

Outcome: Step 9 should result in a recommendation for resolving adverse effects for each historic property that will be adversely affected.

Step 10: **After construction is completed**, revisit each historic property visited in Step 7. Re-photograph and re-evaluate integrity and effects. Report pre- and post -construction integrity and effect evaluations with photos as a stand-alone report required by the HPTP.

Outcome: Step 10 should result in a post-construction check on the pre-construction integrity evaluations. This will help to determine whether the process outlined above is working adequately.

APPENDIX D.
PROCEDURE FOR DOCUMENTING ACCESS FOR
CULTURAL RESOURCES INVESTIGATIONS ON PRIVATE LAND

BLM's responsibility to assess and minimize the potential impacts of its actions on historic properties in the Area of Potential Effect (APE) of a project extends to private lands. Because a landowner's denial of access does not relieve BLM of its Section 106 responsibilities, BLM's policy is to work cooperatively with private landowners and project applicants to reach agreements on access. The process described below would apply for the TransWest Express Project.

In the case of the TransWest Express Project, a direct effects APE wider than the final right-of-way is required in order to allow latitude in avoiding or minimizing impacts to cultural resources in the final project design, thereby allowing greater flexibility in reaching a "no effect" or "no adverse effect" determination. The wider APE also is designed to reduce timeframes and costs during final design and implementation as well as to minimize the number of variances requested by the Applicant during construction, thereby reducing the construction workload for BLM, the Applicant, the Applicant's contractors, and the Consulting Parties in the Section 106 process.

The process outlined below does not address mitigation of adverse effects to cultural resources that cannot be identified where access has been denied. Rather, this process best assures federal compliance with Section 106 of the National Historic Preservation Act under 36 CFR 800 to ensure a reasonable and good faith effort to identify and consider effects to historic properties in the APE on private lands.

Before BLM issues a Notice to Proceed for the TransWest Express Project, the Applicant and BLM will take the following steps to ensure that landowners receive consistent information regarding proposed cultural resource inventory and investigation activities:

The Applicant will:

- Provide BLM with a list of landowners for private lands within the 500' direct effects APE, by state and by Field Office, along with mailing address and other means of contact (email address or phone number).

Each BLM Field Office will:

- Determine whether an adequate inventory has already been conducted on private lands.
- Contact each landowner on the list within its Field Office area, and, if necessary, request access to the land within the APE for the purpose of cultural resources inventory and investigations (potentially including test excavations and data recovery excavations).
- Document each landowner's decision whether to grant access, using a form that includes the signature of the landowner or landowner's authorized representative.
- The BLM Field Office may choose to hold a landowner meeting to describe the cultural inventory that will be required for this project and to answer any questions that

landowners may have. Private landowners will be requested to complete and sign the landowner access document after the meeting.

- BLM will attach the formal documentation to the cultural resource report submitted to SHPO for consultation. Formal documentation will include whether previous adequate inventory has been conducted or if the area is previously disturbed and therefore unlikely to contain cultural resources with integrity.
- BLM will utilize the TransWest cost recovery account for the above project related activities.

If landowner permission is granted, BLM will direct the Applicant to complete a Class III inventory on the 500' APE direct effects corridor on that private land.

If landowner permission is denied, BLM will transmit documentation of the landowner's denial of access to the Applicant. Before issuing the NTP, BLM will require the Applicant to ensure that the Class III inventories of the 250' ROW and ancillary areas, and any necessary subsequent cultural resources investigations for those areas, have been completed for all private lands for which access is secured through agreement or other measures.

Appendix D

Endangered Species Act-Section 7 Consultation Package

From: Martin, Spencer
Sent: Wednesday, April 08, 2015 4:53 PM
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Subject: TransWest Express Biological Assessment

Tyler *et al.*

Please click on the link below to download the TransWest Express Transmission Project Biological Assessment (BA) for your formal review. We appreciate the input you provided during your courtesy review of the Preliminary Draft BA and we have endeavored to address all of your questions and comments in the current version of the document. We are in the process of producing a hardcopy of the BA, which will be sent to the USFWS Cheyenne Office for your files.

Let us know if you have any questions or require additional information as you begin your review. Also, please acknowledge receipt of this e-mail so that we can plan accordingly with respect to the Service's 135-day review period.

Thanks all, -Spencer

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TransWest Express Transmission Project Biological Assessment

Prepared on Behalf of:

U.S. Department of the Interior, Bureau of Land Management
Wyoming State Office

Prepared by:

AECOM
Fort Collins, Colorado

April 8, 2015

Executive Summary

The TransWest Express Transmission Project (Project) is a proposed 600-kilovolt, direct current transmission system that would extend approximately 728 miles across public (federal and state) and private lands in Wyoming, Colorado, Utah, and Nevada. The Project would provide the transmission infrastructure and capacity necessary to deliver approximately 3,000 megawatts of electric power from renewable and/or non-renewable energy resources in south-central Wyoming to southern Nevada. The northern terminal would be located near Sinclair, Wyoming, and the southern terminal would be located at the Marketplace Hub in the Eldorado Valley near Boulder City, Nevada. Other project facilities would include two ground electrode systems, 12 to 15 fiber optic communication and regeneration facilities, and access roads.

Table ES-1 summarizes the species analyzed in this Biological Assessment, the states in which they occur in the Project action area or in which water withdrawals could occur that would affect downstream species, species' listing status, and the determinations of effect to the species and critical habitat, if designated.

Table ES-1 Species and Critical Habitat Determinations

Species	State[1]	Federal Status	Species Determination	Critical Habitat Determination
Federally Listed Threatened and Endangered Species				
Canada Lynx	Wyoming, Colorado, Utah	Threatened	May affect, not likely to adversely affect	Not applicable
Gray Wolf	Utah, Colorado	Endangered, EXP/NE	May affect, not likely to adversely affect	Not applicable
Utah Prairie Dog	Utah	Threatened	May affect, not likely to adversely affect	Not applicable
California Condor	Utah, Nevada	Endangered, EXP/NE	May affect, not likely to adversely affect	No effect: Critical habitat is well outside action area
Southwestern Willow Flycatcher	Nevada	Endangered	May affect, not likely to adversely affect	No effect: Critical habitat is well outside action area
Yuma Clapper Rail	Nevada	Endangered	May affect, not likely to adversely affect	Not applicable
Western Yellow-billed Cuckoo	Wyoming, Colorado, Utah, Nevada	Threatened	May affect, not likely to adversely affect	May affect, not likely to adversely modify proposed critical habitat
Mojave Desert Tortoise	Utah, Nevada	Threatened	May affect, likely to adversely affect	May affect, likely to adversely affect
Bonytail[3]	Colorado, Utah	Endangered	May affect, likely to adversely affect	May affect, likely to adversely affect
Colorado Pikeminnow	Wyoming, Colorado, Utah	Endangered	May affect, likely to adversely affect	May affect, likely to adversely affect
Humpback Chub[3]	Colorado, Utah	Endangered	May affect, likely to adversely affect	May affect, likely to adversely affect
June Sucker	Utah	Endangered	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Razorback Sucker	Wyoming, Colorado, Utah, Nevada	Endangered	May affect, likely to adversely affect	May affect, likely to adversely affect

Table ES-1 Species and Critical Habitat Determinations

Species	State[1]	Federal Status	Species Determination	Critical Habitat Determination
Virgin River Chub	Nevada	Endangered (Virgin River)	May affect, not likely to adversely affect[2]	No effect: critical habitat is well outside action area
Barneby Ridgecress	Utah	Endangered	May affect, not likely to adversely affect	Not applicable
Clay Phacelia	Utah	Endangered	May affect, not likely to adversely affect	Not applicable
Deseret Milkvetch	Utah	Threatened	May affect, not likely to adversely affect	Not applicable
Ute Ladies'-tresses Orchid	Wyoming, Colorado, Utah	Threatened	May affect, not likely to adversely affect	Not applicable
Species Proposed for Federal Listing and EXP/NE Populations of Listed Species				
Black-Footed Ferret	Wyoming, Colorado, Utah	Endangered - EXP/NE	Not likely to jeopardize; BLM is conferencing on this species	Not applicable
Candidates for Federal Listing				
Greater Sage-Grouse	Wyoming, Colorado, Utah	Candidate	Not Applicable	Not Applicable
Platte River Species[3]				
Interior Least Tern	Wyoming	Endangered	May affect, likely to adversely affect	Not applicable
Piping Plover	Wyoming	Threatened	May affect, likely to adversely affect	Not applicable
Whooping Crane	Wyoming	Endangered	May affect, likely to adversely affect	May affect, likely to adversely affect
Pallid Sturgeon	Wyoming	Endangered	May affect, likely to adversely affect	Not applicable
Western Prairie Fringed Orchid	Wyoming	Threatened	May affect, likely to adversely affect	Not applicable

[1] State in which species occurs in Project action area or state in which water depletions could occur that would affect species downstream of the withdrawal site.

[2] Determination is made for Muddy River population, which is not part of the listed population.

[3] Affected by water depletions only.

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Acronyms and Abbreviations

°F	degrees Fahrenheit
AASHTO	American Association of State Highway and Transportation Officials
AC	Alternating current
AGFD	Arizona Game and Fish Department
amsl	Above mean sea level
ANSI	American National Standards Institute, Inc.
AOU	American Ornithologists' Union
APA	Agency Preferred Alternative
APLIC	Avian Power Line Interaction Committee
APP	Avian Protection Plan
ATV	All-terrain vehicle
AWBP	Aransas-Wood Buffalo National Park
BA	Biological Assessment
BE	Biological Evaluation
BHCA	Bird Habitat Conservation Area
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	Biological Opinion
BRTG	Biological Resources Task Group
CDOW	Colorado Division of Wildlife
CFR	Code of Federal Regulations
CGSSC	Colorado Greater Sage-grouse Steering Committee
cm	centimeters
CNHP	Colorado Natural Heritage Program
COM Plan	Construction, Operation, and Maintenance Plan
COT	Conservation Objectives Team
CPW	Colorado Parks and Wildlife
CWA	Clean Water Act
CWS	Canadian Wildlife Service
dBA	Decibels on the A weighted scale
DC	Direct current
DEQ	Department of Environmental Quality
DOE	U.S. Department of Energy
DPS	U.S. Distinct Population Segment
ECOS	Ecological Conservation Online System
EIS	Environmental Impact Statement
EMF	electric and magnetic field
EO	Executive Order
ESA	Endangered Species Act
EXP/NE	experimental, non-essential
EXPA	Experimental Population Area
FAA	Federal Aviation Administration
FCR	Field Contact Representative

FO	Field office
FR	Federal Register
GIS	Geographic information system
GPS	Global Positioning System
HEA	Habitat Equivalency Analysis
HUC	Hydrographic Unit Code
I-80	Interstate 80
IBA	Important Bird Area
IM	Instruction Memoranda
IPaC	Information, Planning, and Conservation System
IPP	Intermountain Power Project
IRA	Inventoried roadless area
IVM	Integrative vegetation management
km	Kilometer
kV	Kilovolt
LADWP	Los Angeles Department of Water and Power
LAU	Lynx Analysis Unit
LCAS	Lynx Conservation Assessment Strategy
LRMP	Land Resource Management Plan
LRP	Limited revegetation potential
mm	millimeters
MOA	Military Operation Area
MOU	Memorandum of Understanding
mph	Miles per hour
MW	Megawatt
MZ	Management Zone
NAGPRA	Native American Grave Protection and Repatriation Act of 1990
NDOW	Nevada Department of Wildlife
NEP	non-essential population
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NFS	National Forest System
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NNHP	Nevada Natural Heritage Program
NPDES	National Pollutant Discharge Elimination System
NTT	National Technical Team
NWR	National Wildlife Refuge
NWReGAP	Northwest Regional Gap Analysis Project
ODFW	Oregon Department of Fish and Wildlife
OHV	Off-highway vehicle
PAC	Protected Activity Center
PBO	Programmatic biological opinion
PDEIS	Preliminary Draft Environmental Impact Statement
PDTR	Project Description Technical Report
PGH	Preliminary General Habitat
POD	Plan of Development

PPH	Preliminary Priority Habitat
ppm	Parts per million
Project	TransWest Express Transmission Project
PRRIP	Platte River Recovery Implementation Program
psi	Pounds per square inch
PUP	Pesticide Use Proposal
RMP	Resource Management Plan
ROD	Record of Decision
ROW	Right-of-way
RU	Recovery Unit
SAIC	Science Applications International Corporation
SCCA	South Central Wyoming Conservation Area
SH	State Highway
STS	Southern Transmission System
SWPPP	Stormwater Pollution Prevention Plan
SWReGAP	Southwest Regional Gap Analysis Project
TL	Timing Limitations
UDWR	Utah Division of Wildlife Resources
UHF	ultra-high frequency
UNHP	Utah Natural Heritage Program
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VHF	very high frequency
WDFW	Washington Department of Fish and Wildlife
Western	Western Area Power Administration
WGFD	Wyoming Game and Fish Department
WUS	Waters of the U.S.
WWEC	West-wide Energy Corridor
WYNDD	Wyoming Natural Diversity Database
YOY	Young-of-year

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1.0 Introduction

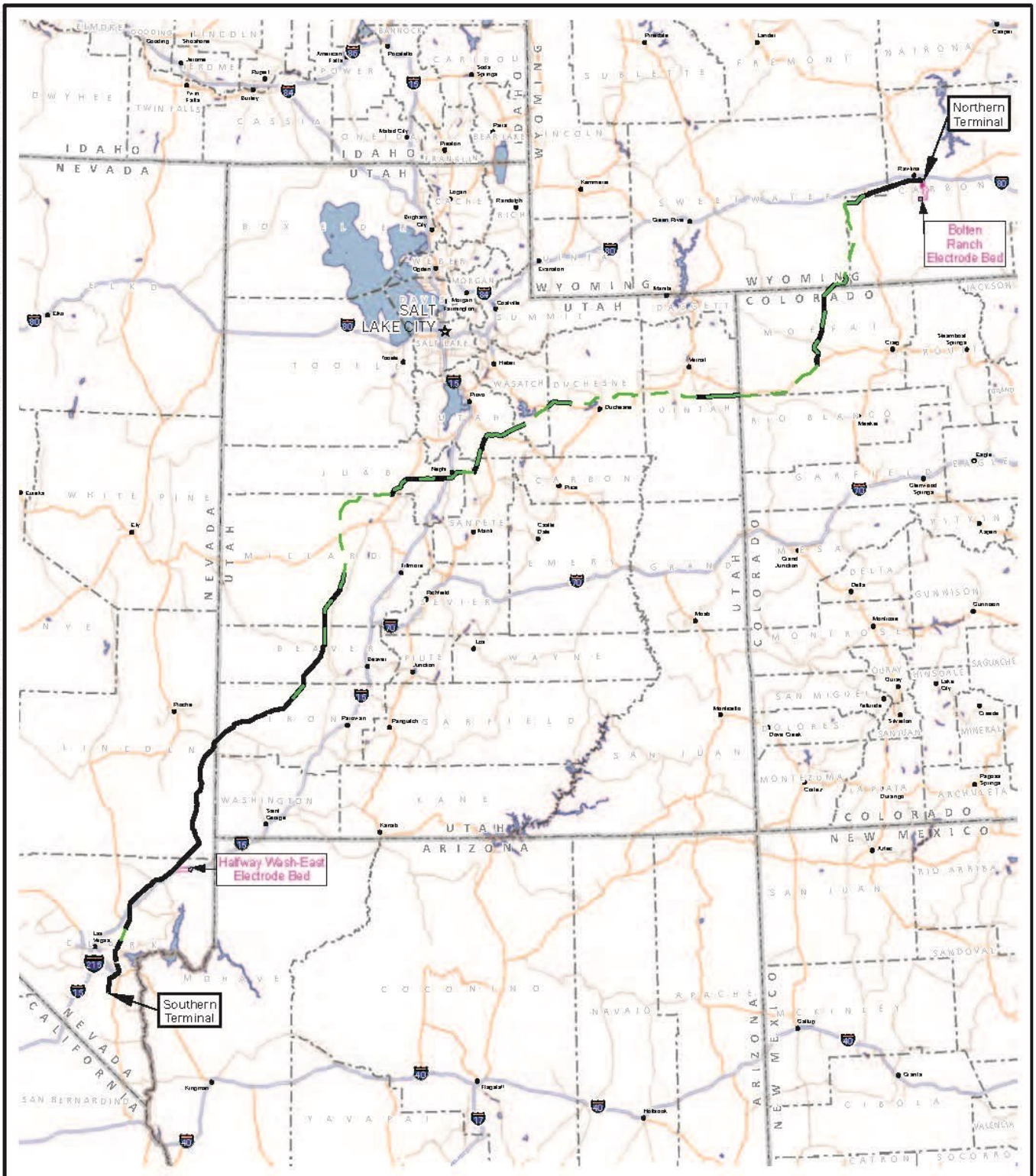
1.1 Purpose of Document

This biological assessment (BA) presents the potential effects of the TransWest Express Transmission Project (TWE or Project), a proposed ultra-high voltage direct current (DC) transmission line extending from south-central Wyoming to southern Nevada, on federally listed threatened and endangered species and species that have been proposed or are candidates for listing under the Endangered Species Act of 1973, as amended (ESA) (16 United States Code [USC] Section 1531 et seq.). Under the direction of the lead federal agencies, the Bureau of Land Management (BLM) and Western Area Power Administration (Western), a draft environmental impact statement (EIS) for the proposed Project was released in July of 2013. It is currently anticipated that a Final EIS for the Project will be available in April of 2015. A Record of Decision (ROD) for the Project is expected to be issued early September of 2015.

This BA has been prepared for the purpose of consultation (per Section 7 of the ESA) between the action agencies (i.e., BLM, Western, and the U.S. Forest Service [USFS]); and the U.S. Fish and Wildlife Service (USFWS) on the expected effects of the TWE agency preferred alternative (hereafter referred to as the Proposed Action) on threatened and endangered species with potential to occur in the action area (**Figure 1-1**). This BA also analyzes Project effects to species that are part of experimental, non-essential (EXP/NE) populations. These EXP/NE species are treated as species proposed for federal listing for the purpose of conferencing under Section 7 of the ESA. A single candidate species, the greater sage-grouse, has been included in the BA for informational purposes only and no determination of effect has been provided for this species. AECOM is the third-party contractor for the EIS and serves as the designated non-federal representative responsible for preparing this BA on behalf of the BLM, Western, and the USFS.

Under provisions of the ESA, federal agencies are directed to conserve threatened and endangered species and the habitats in which these species are found. Federal agencies also are required to ensure actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of endangered and threatened species or their critical habitat. To this end, the action agencies are currently engaged in a number of conservation programs for listed species. For instance, per Section 7(a)(1) of ESA and BLM's Special Status Species Manual 6840, BLM is responsible for implementing conservation strategies as contained in approved recovery plans, cooperative agreements, and other instruments of which the BLM has cooperatively participated in developing. Examples include participation in and implementation of recovery actions as identified in recovery plans for the black-footed ferret, whooping crane, Mojave population of the desert tortoise, and the Utah prairie dog; and conservation agreements for the Bonneville cutthroat trout and Colorado River cutthroat trout.

Western's mission is to market and deliver clean, renewable, reliable, cost-based federal hydroelectric power and related services. Western is one of four power marketing administrations within the U.S. Department of Energy (DOE) whose role is to market and transmit wholesale electricity from multi-use water projects. Western’s service area encompasses a 15-state region of the central and western U.S. where Western’s more than 17,000 circuit mile transmission system carries electricity from 56 hydropower plants. Western sells its power to preference customers such as federal and state agencies, cities and towns, rural electric cooperatives, public utility districts, irrigation districts and Native American tribes. These entities, in turn, provide retail electric service to millions of consumers in the West.



Proposed Action
Ground Electrode Siting Area
Ground Electrode Overhead Electrical Line

TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure 1-1
Project Location

0 20 40 80 Miles
0 20 40 80 km
1:4,760,000

Western AREA POWER ADMINISTRATION

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As Western's mission is primary based on the hydroelectric generation in the west, most of Western's actions under the Section 7(a)(1) of the ESA are focused on implementing conservation strategies as contained in the approved recovery plans and cooperative agreements of the major rivers that provide the renewable energy of Western's mission. The primary programs Western participates in, and extensively funds, include the:

- Missouri River Recovery Program. Western is a member of the Missouri River Recovery Implementation Committee which serves as a basin-wide collaborative forum to come together and develop a shared vision and comprehensive plan for Missouri River recovery, including the recovery of ESA listed species.
- Upper Colorado River Endangered Fish Recovery Program. This program is focused on recovering four species of endangered fish in the Colorado River and its tributaries in Colorado, Utah, and Wyoming. The program works for these species while still ensuring that water use and development continues to meet human needs in compliance with interstate compacts and applicable federal and state laws. Substantial funding for the program is provided by Western.
- Glen Canyon Dam Adaptive Management Program. This program is focused on mitigating the impacts of Glen Canyon dam on downstream resources, in particular ESA listed species affected by dam operations and other native species. This is an ongoing program primarily within Grand Canyon and Glen Canyon National Parks. Funding for the majority of the program is provided by Western.
- Lower Colorado River Multi-Species Conservation Program. This is a 50-year and $626 million dollar multi-stakeholder Federal and non-Federal partnership responding to the need to balance the use of lower Colorado River water resources and the conservation of native species and their habitats in compliance with the ESA.
- The Central Valley Project Improvement Act. This act mandates changes in management of the Central Valley Project, located in California, particularly for the protection, restoration, and enhancement of fish and wildlife. Since 1992, power customers have contributed more than $300 million for projects that include water temperature control devices at dams to regulate downstream water temperature and improve fish populations; installation of fish screens at intakes to improve fish passage; firm water supplies for Central Valley wildlife refuges, as well as other actions.

Western also works with the USFWS, as well as state wildlife agencies, through various recovery plans and agreements to ensure that the overhead wires that transmit the electricity generated from these hydroelectric facilities are not an additional risk to ESA listed species.

The USFS pursues conservation actions focused on addressing identified threats to species with status under the ESA. Conservation emphasis includes species relevant to the Project action area including Canada lynx, wolverine, Mexican spotted owl, yellow-billed cuckoo, greater sage-grouse (sage-grouse), Colorado pikeminnow, humpback chub, Colorado cutthroat trout, and other fishes of the upper Green River. Many of the programs associated with these species have been in place for several years, are fairly well recognized, and include Section 7 conference and consultation with the USFWS on relevant proposed management actions. Of recent and more specific note, the USFS is focusing on sage-grouse. The following areas are currently receiving considerable effort:

- The USFS is a partner to the BLM lead agency Greater Sage-grouse Management Plan effort. This document, when approved, will provide guidance to land managers regarding resource management within occupied sage-grouse habitat and range. The document will attempt to address the threats to sage-grouse identified in the USFWS 2010 decision.
- The USFS also is participating with state wildlife agencies in baseline studies to identify and refine sage-grouse habitats and use. USFS involvement has included cooperative funding and field support of local telemetry monitoring projects.

- On-the-ground land management efforts are focused upon reducing immediate threats to sage-grouse habitat. These include local and landscape scale efforts to maintain and enhance sagebrush community expanse and condition quality. Examples of projects include invasive pinyon and juniper removal from sagebrush communities and identifying, removing, or visually marking fences near sage-grouse leks to reduce bird-fence collisions.
- The USFS also works with State wildlife agencies to monitor lek attendance trends and other relevant sage-grouse observations.

The ESA requires action agencies to consult or confer with the USFWS and/or National Marine Fisheries Service (NMFS) when there is discretionary federal involvement or control over the action. Formal consultation becomes necessary when the action agency determines that the proposed action is likely to adversely affect listed species or critical habitat, or when the USFWS or NMFS do not concur with the action agency's finding (USFWS and NMFS 1998). Preparation of a BA is required under Section 7(c) of the ESA if listed species or their critical habitat may be present in the area affected by any major construction activities.

This BA provides documentation for the Proposed Action to meet federal requirements and agreements set forth among the federal agencies listed above. It addresses federally listed threatened, endangered, candidate, and proposed species and has been prepared pursuant to Section 7 regulations, in accordance with the 1998 procedures set forth by USFWS and NMFS, and in accordance with the 1994 Memorandum of Understanding (MOU) and 2000 Memorandum of Agreement (MOA). As part of this BA, the BLM, Western, and USFS request formal Section 7 consultation with the USFWS for the Project. The action agencies also request USFWS concurrence with the determinations made in this BA.

It should be noted that, during the Section 7 consultation process the applicant, TransWest Express LLC (TransWest), is prohibited from making any irreversible or irretrievable commitments of resources that would preclude the development of reasonable and prudent alternatives designed to avoid or minimize adverse effects on listed species. Prohibited actions include those that would directly or indirectly affect listed or proposed species and their habitats. TransWest is not prohibited from making other types of resource commitments that do not affect listed species or their habitats such as securing land leases and rights-of-way (ROWs) across private fee lands or purchasing equipment that would be used for the Project. However, prior to issuance of the ROD, such commitments would be considered at-risk.

ESA Section 7 consultation for the Project would need to be re-initiated under the following conditions: 1) if new information obtained through species-specific surveys or detailed siting/engineering reveals that the Proposed Action would affect listed or proposed species or designated or proposed critical habitat in a manner or to an extent not analyzed in the BA; 2) if the action is subsequently modified in a manner that causes an effect to a listed or proposed species or designated or proposed critical habitat that was not considered in the BA; 3) if a new species is listed or critical habitat is designated that may be affected by the Project; and/or 4) if the authorizing officer approves any other Final EIS alternative (or portion thereof) that differs from the Proposed Action analyzed in this BA.

1.2 Project Overview

In April 2010, TransWest Express LLC (TransWest/Applicant) and Western entered into a MOU in which Western agreed to act as joint lead agency with the BLM in preparation of an EIS for the proposed Project. In its route between its northern terminus near Sinclair, Wyoming, to its southern terminus in the Eldorado Valley south of Boulder City, Nevada, the proposed transmission line corridor would pass through BLM lands under the jurisdiction of multiple field offices (FOs) in Wyoming, Colorado, Utah, and Nevada. Based on the results of the EIS, the BLM will decide whether or not to grant a ROW for the Project across BLM-administered lands and Western will decide whether or not to use its federal borrowing authority to contribute financing and hold partial ownership in the transmission facilities and capacity. The USFS is a cooperating agency on the Project and is considered an action agency for the purposes of Section 7 consultation because portions of the Proposed Action would pass through or

immediately adjacent to three national forests in Utah: the Ashley, Uinta-Wasatch-Cache, and Manti-La National Forests. The USFS will decide whether or not to grant a special use permit for those crossings of National Forest System (NFS) lands. For more details on the lead and cooperating agencies' pending decisions along with their statements of purpose and needs for the Project, please refer to Section 1.1 of the EIS.

TWE is proposed as a 600-kilovolt (kV), DC transmission system extending from south-central Wyoming to southern Nevada (**Figure 1-1**). The Project would provide the transmission infrastructure and capacity necessary to deliver approximately 3,000 megawatts (MW) of electric power from renewable and/or non-renewable energy sources in south-central Wyoming to southern Nevada.

The Proposed Action would consist of the following facilities:

- Transmission Line – The 600-kV DC transmission line would extend approximately 728 miles across public (federal and state) and private lands in Wyoming, Colorado, Utah, and Nevada. The transmission line corridor would range in width from approximately 500 to 3,600 feet. The transmission line ROW would be approximately 250 feet wide.
- Terminals – Terminal stations would be located on private or public lands at the two ends of the transmission line. The northern terminal would be located near Sinclair, Wyoming, and the southern terminal would be located at the Marketplace Hub in the Eldorado Valley near Boulder City, Nevada. Terminal facilities would include converter stations and related substation facilities necessary for interconnections to existing and planned regional alternating current (AC) transmission systems.
  - Facilities within the Northern Terminal Station would be situated on approximately 235 acres and include an AC/DC converter station to convert alternating electrical current to direct current, thereby allowing power from the AC system to be transmitted on the Project transmission system.
  - Facilities within the Southern Terminal Station would be situated on approximately 205 acres and include an AC/DC converter station to convert direct current to alternating current, allowing power transmitted on the Project transmission system to enter the regional grid serving California, Nevada, and Arizona. The Project also would be capable of transmitting power in a south-to-north direction, although the primary purpose of the transmission line would be for north-to-south power transfers.
- Access Roads – Access roads would include new overland access, new unpaved roads, and improvements on existing roads to access construction areas and Project facilities during operation and maintenance phases.
- Ancillary Facilities, Communication Systems – A network of 12 to 15 fiber optic communication and regeneration sites would be located within the 250-foot-wide transmission line ROW. Microwave facilities also would be located at each of the terminals.
- Ancillary Facilities, Ground Electrodes – Ground electrode facilities are required to provide an electrical circuit through the ground to maintain system operations following emergency events when there is an unexpected loss of one of the two poles (or circuits) of the Project terminal or converter station equipment. There would be two ground electrode facilities, each sited on approximately 160 acres of private land within 100 miles of the northern and southern terminals in Wyoming and Nevada. Each of the facilities would result in a total of 65 acres of ground disturbance during construction, the majority of which would be reclaimed following construction. Long-term surface disturbance associated with ground electrode facilities during the operation phase of the Project would total approximately 6 acres. A low voltage 34.5-kV electrical line would connect the ground electrode facilities to the transmission line.

The description of the Proposed Action presented in this BA was summarized from information contained in Chapter 2.0 of the Final EIS and the Project Plan of Development (POD), which is presented in Appendix D of the Final EIS. Refer to these documents for a more detailed description of the proposed Project.

1.3 Species Considered in the Analysis

Based on a letter from the USFWS dated August 25, 2010, a list of federally threatened, endangered, candidate, and proposed species for which 12-month findings were pending was provided to the BLM for the proposed Project area. In total, 39 listed species, 7 candidate species, and 1 species proposed for listing were identified. This total included four federally listed species known to occur in or along the Platte River that could be affected by Project-related water withdrawals from the North Platte River Basin in Wyoming.

After this initial list of species was identified, a detailed review of species occurrence information was completed for the Proposed Action. Data sources included Natural Heritage Program databases for the states of Wyoming, Colorado, Utah, and Nevada; published literature on species distributions; and feedback from federal and state agency biologists who participated in the Project's Biological Resources Task Group (BRTG). The BRTG participants coordinated with other agency biologists having knowledge of listed species occurrence for the Project action area. Following identification of the agency-preferred alternative, AECOM refined the list of species to be carried forward in the BA based on a review of species-specific occurrence data and habitat characteristics along the alignment of this alternative. Through this process, each of the species identified in the USFWS' 2010 letter was either carried forward for or eliminated from detailed analysis in the BA. A species screening matrix was developed and used to document this process. This screening matrix was presented to the USFWS in a meeting on January 21, 2014. On February 21, 2014, the USFWS issued a letter confirming the list of species to be analyzed in the TransWest BA. Following a change in the agency-preferred alternative in September of 2014, the species with potential to be affected by the Proposed Action analyzed in this BA changed. A revised species list was submitted to the USFWS on October 27, 2014 and the USFWS concurred with the changes and provided additional changes on October 31, 2014. Federally listed, candidate, and EXP/NE species (treated as proposed species for conferencing purposes) carried forward for detailed analysis in this BA are presented in **Table 1-1**. Several listed, one EXP/NE, and one candidate species occur in the counties traversed by the Proposed Action. Not all of these species would be affected by Project implementation. Species not affected by the Project are not discussed further in this document.

In total, 25 species are analyzed in this BA. Seven of these species would only have potential to be affected by Project-related water depletions in the Platte and Colorado River Basins. These species include the pallid sturgeon, whooping crane, interior least tern, piping plover, and western prairie fringed orchid in the Platte River Basin and the bonytail and humpback chub in the Colorado River Basin. For species with potential to be directly or indirectly affected by Project construction, operation, and management, species-specific information, including the environmental baseline, assessment of Project effects, and determinations of effect, are provided in Chapter 6.0 of this BA. The Platte River species, which only have potential to be indirectly affected by the Project through water depletions in the North Platte River system, are discussed in Section 6.4 of this BA.

Table 1-1 List of Endangered, Threatened, Proposed, and Candidate Species Carried Forward in the Biological Assessment

Common Name	Scientific Name	Federal Status	Proposed or Designated Critical Habitat (Y/N)	Recovery Plan (Y/N)
Mammals				
Black-footed ferret	*Mustela nigripes*	EXP/NE	N	Y
Canada lynx	*Lynx canadensis*	Threatened	Y	Outline
Gray wolf	*Canis lupus*	EXP/NE in Wyoming; Endangered in Colorado and Utah	N	N
Utah prairie dog	*Cynomys parvidens*	Threatened	N	Y
Birds				
California condor	*Gymnogyps californianus*	Endangered; EXP/NE-Utah	Y	Y
Greater sage-grouse	*Centrocercus urophasianus*	Candidate	N	N
Yuma clapper rail	*Rallus longirostris yumanensis*	Endangered	N	Draft
Whooping crane[1]	*Grus americana*	Endangered	Y	Y
Piping plover[1]	*Charadrius melodus*	Threatened	Y	Y
Interior least tern[1]	*Sternula antillarum*	Endangered	N	Y
Yellow-billed cuckoo (western)	*Coccyzus americanus*	Threatened	Y	N
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Y	Y
Reptiles and Amphibians				
Desert tortoise	*Gopherus agassizii*	Threatened	Y	Y
Fish				
Bonytail[2]	*Gila elegans*	Endangered	Y	Y
Colorado pikeminnow	*Ptychocheilus lucius*	Endangered	Y	Y
Humpback chub[2]	*Gila cypha*	Endangered	Y	Y
June sucker	*Chasmistes liorus*	Endangered	Y	Y
Pallid sturgeon[1]	*Scaphirhynchus antillarum*	Endangered	N[3]	Y
Razorback sucker	*Xyrauchen texanus*	Endangered	Y	Y
Virgin River chub	*Gila robusta seminuda*	Endangered	N[3]	N[4]

Table 1-1 List of Endangered, Threatened, Proposed, and Candidate Species Carried Forward in the Biological Assessment

Common Name	Scientific Name	Federal Status	Proposed or Designated Critical Habitat (Y/N)	Recovery Plan (Y/N)
Plants				
Barneby ridgecress	*Lepidium barnebyanum*	Endangered	N	Y
Deseret milkvetch	*Astragalus desereticus*	Threatened	N	N
Clay phacelia	*Phacelia argillacea*	Endangered	N	Y
Western prairie fringed orchid[1]	*Platanthera praeclara*	Threatened	N	Y
Ute ladies'-tresses orchid	*Spiranthes diluvialis*	Threatened	N	Draft

[1] Species with potential to be affected only by water depletions in the Platte River System.

[2] Species with potential to be affected only by water depletions in the Colorado River System.

[3] No critical habitat within the action area.

[4] Recovery plan is not applicable to the Muddy River population.

1

2

2.0 Project Description

2.1 Project Location

As summarized in Section 1.2 of this BA and described in detail in Sections 2.4.2 and 2.5.1 of the EIS, the Proposed Action (identified as the Agency Preferred Alternative in the EIS) would extend from a northern terminus near Sinclair, Wyoming, to a southern terminus in the Eldorado Valley, approximately 12 miles southwest of Boulder City, Nevada. For each region, the Proposed Action has been chosen based on multiple criteria including, but not limited to, staying within or adjacent to existing utility corridors, avoiding or minimizing impacts to sensitive natural and cultural resources, and accommodating input from local governments and agency representatives. Please refer to the EIS for detailed narrative descriptions of the Project components.

To facilitate the analysis of alternatives in the EIS, the Project area was broken into four geographic regions. Region I encompasses the Wyoming and Colorado portions of the line, Region II extends from the Colorado-Utah border to Delta, Utah. Region III is located between Delta and a point approximately 20 miles northeast of Las Vegas, Nevada; and Region IV extends from that point to the southern terminus of the proposed line. As a whole, the Proposed Action is made up of four regional alternatives (denoted alphanumerically by the region number in Roman numerals followed by the alpha code of the alternative in that region) comprising the agency preferred alternative from the EIS. These regional alternatives and other Project components are listed in **Table 2-1** and shown in **Figures 2-1** through **2-4**. Following Table 2-1, the regional alternatives comprising the Proposed Action are not referred to by their alphanumeric codes but are simply identified by Project region as this BA only evaluates a single Proposed Action and does not assess alternatives to that action.

Tables 2-2 through **2-6** summarize the lengths and areas of disturbance for each of the Project components during construction and operation of the facilities. Construction impacts take into account short-term surface disturbance associated with clearing and grading around facility sites and temporary use areas such as structure work areas, concrete batch plants, material storage yards, and wire pulling and tensioning sites. Following construction, the majority of these areas would be reclaimed and revegetated and only the facility footprints would remain as disturbed ground. Thus, long-term operation-related impacts are substantially lower than construction-related impacts as a result of interim reclamation efforts. Refer to **Figure 2-5** for a schematic representation of a typical transmission line ROW with temporary work areas and access roads.

Table 2-1 Proposed Action

Project Components	Component Description
Transmission line analysis corridors[1]	Regional transmission line alternatives: I-B, II-G, III-D, and IV-A
Ground electrode facilities	Bolten Ranch and Halfway Wash East ground electrode sites
Terminals	Northern and Southern Terminals

[1] Roman numeral designates the geographical region and the letter denotes the alternative that comprises the Proposed Action in that region.

Table 2-2 Project Properties and Transmission Line Facility Areas

Electrical Properties					
Nominal Voltage	±600-kV DC				
Nominal Capacity	3,000 MW (as measured at the Southern Terminal)				
Circuit Configuration	DC Bi-Pole Bundled				
Conductor Size	Approximately 1.5-inch-diameter aluminum conductor steel reinforced (ACSR) bundled with three or four subconductors per pole				
Conductor Ground Clearance	37 feet minimum at a conductor temperature of 176 degrees Fahrenheit				
Facility Properties					
Line Length	728 miles				
ROW Width	250 feet; Increased ROW may be required in site-specific locations to accommodate rough terrain or unusually long spans				
Access Roads	Paved Roads	Typically highways and state routes; used for travel to existing and new dirt roads for ROW access			
	Dirt/Gravel Roads (no improvement)	No improvement to dirt/gravel roads required			
	Dirt Road (with improvements)	Improvement of existing dirt roads 16 to 24 feet wide depending on terrain			
	New Access Road (bladed)	Typically, 14-foot-wide bladed surface with 2- to 3-foot-wide berms or ditches on either side, but can be wider in steep and mountainous terrain because of cut and fill requirements according to ground slope			
	Overland Access	Non-graded overland access (“drive and crush”) where terrain and soil conditions are suitable			
Structure Designs[1]	**Type**	**Application**	**Interval (Span)**	**Height**	**Foundation**
	Guyed steel lattice (tangent)	Flat to rolling terrain, open areas	3 to 4 structures per mi (900-1,500 feet)	120-180 feet	One 3- to 6-foot dia, 4 to 6 feet deep precast concrete support pedestal; four anchors for guy cables designed for soil/rock conditions
	Self-supporting steel lattice (tangent)	Steep terrain with side hills, agriculture, and urban areas	3 to 4 structures per mi (900-1,500 feet)	120-180 feet	Four 3- to 4-foot dia, 12 to 25 feet deep reinforced cast-in-place concrete
	Tubular steel poles (tangent)	Urban and other highly constrained areas	5 to 6 structures per mi (700-1,200 feet)	100-150 feet	One 6- to 10-foot dia, 20 to 60 feet deep reinforced cast-in-place concrete
	Self-supporting steel lattice (angle)	Angles 2° or less	site-specific	120-140 feet	Four 5- to 8-foot dia, 20 to 50 feet deep reinforced cast-in-place concrete drilled pier
	Self-supporting steel lattice (dead-end)	Angles from 3°-90° or every 4-6 mi on straight runs	site-specific	120-140 feet	Four 5- to 8-foot dia, 20 to 50 feet deep reinforced cast-in-place concrete drilled pier

Table 2-2 Project Properties and Transmission Line Facility Areas

Land Disturbance			
Construction Areas	**Type**	**Footprint[2]**	**Interval**
Structure Work Areas	All Tower Structures	ROW width x 200 feet (50,000 sq feet)	each structure location
Wire-Pulling and Tensioning Sites	Mid-span conductor and shield wire	ROW width x 500 feet (125,000 sq feet)	9,000 feet (approx.)
	Dead-end structures	ROW width x 500 feet (125,000 sq feet)	two sites at all dead-end structures
	Communication fiber optic cable	100 x 500 feet (50,000 sq feet)	18,000 feet (approx.)
Staging Areas/Fly Yards		7 ac (approx.) outside ROW	5 mi (approx.)
Material Storage Yards		20 ac (approx.) outside ROW	30 mi (approx.)
Batch Plant Sites		5 ac (approx. stand-alone) outside ROW	15 mi (approx.)
Guard Structures		100 x 100 feet (10,000 sq feet)	each road and existing electrical line crossings
Operation Areas	**Type**	**Footprint[2]**	**Interval**
Structure Bases[1]	Guyed steel lattice (tangent)	10- x 10-foot mast foundation; four 10- x 10-foot anchors (500 sq feet total)	3 to 4 areas per mi
	Self-supporting steel lattice (tangent)	30 x 30 feet (900 sq feet)	3 to 4 areas per mi
	Tubular steel poles (tangent)	7-foot-dia (40 sq feet)	5 to 6 areas per mi
	Self-supporting steel lattice (angle)	35 x 35 feet (1,225 sq feet)	Angles 2° or less
	Self-supporting steel lattice (dead-end)	40 x 40 feet (1,600 sq feet)	Angles from 3°-90° or every 4 to 6 mi on long straight runs
Communication Regeneration Sites		100 x 100 (10,000 sq feet)	50 mi (approx.)

[1] Structure types to be used in site-specific settings will be determined during engineering and design of the agency preferred alternative.

[2] Footprint areas within ROW unless specified otherwise.

Table 2-3 Length of Proposed Transmission Line Route and Associated Access Roads

Facilities	Length (miles)				
	Region I	Region II	Region III	Region IV	TOTAL
Transmission Line	158	252	281	37	**728**
Access Roads	204	395	303	49	**951**

Table 2-4 Proposed Action Areas of Disturbance

Facilities	Construction Disturbance (acres)				Operation Disturbance (acres)			
	Region I	Region II	Region III	Region IV	Region I	Region II	Region III	Region IV
Access Roads	456	990	638	120	456	990	638	120
Structures and Communication Sites	746	1,181	1,303	177	15	24	27	4
Stringing and Tensioning Sites	520	927	884	161	–	–	–	–
Temporary Work Areas[1]	379	604	675	89	–	–	–	–
Facilities Total	**2,101**	**3,703**	**3,500**	**547**	**471**	**1,014**	**665**	**124**
Additional ROW-vegetation clearing[2]	3,310	5,250	6,089	771	–	–	–	–

[1] Temporary work areas include staging areas, concrete batch plants, storage yards, and helicopter fly yards.

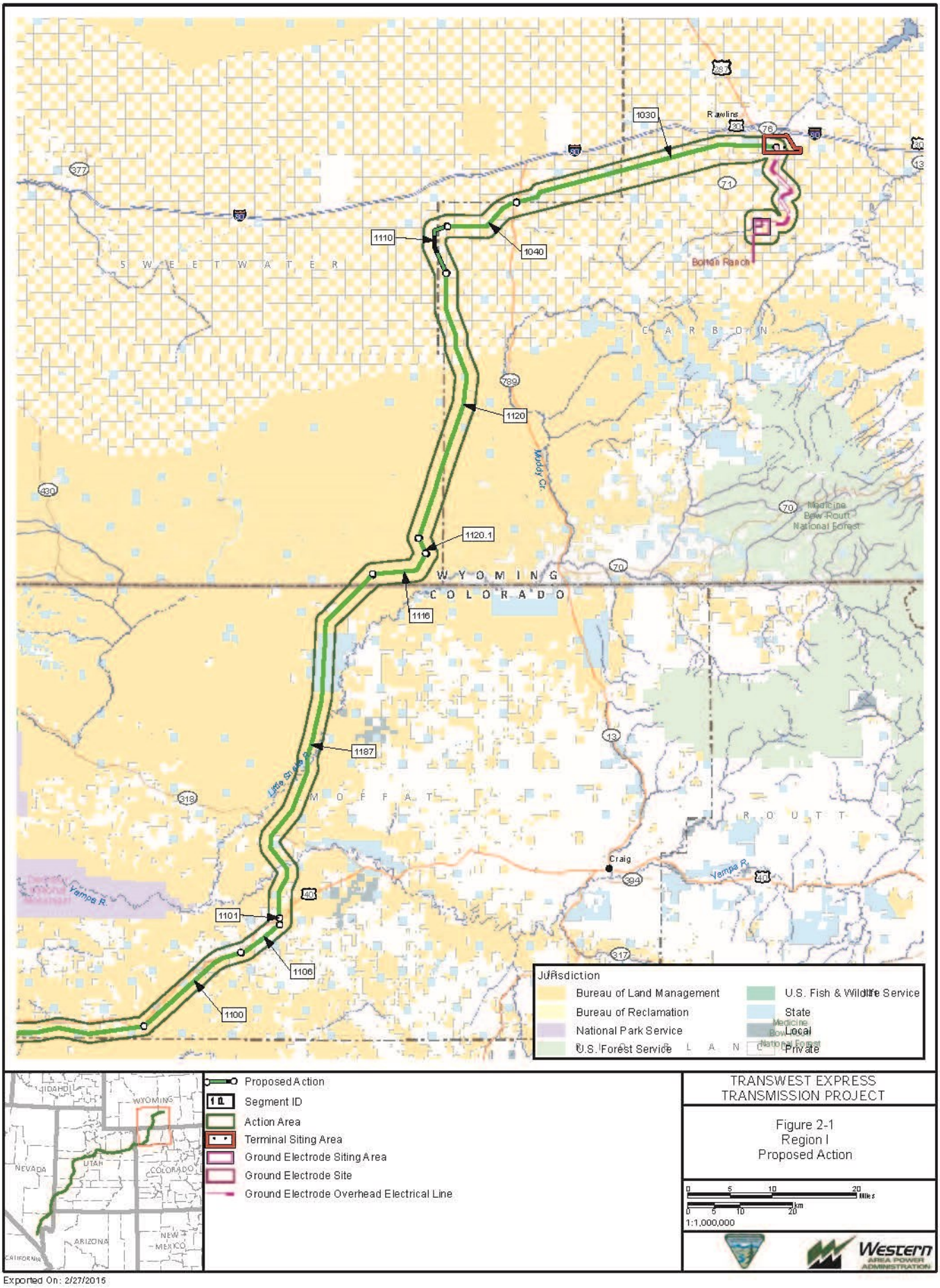
[2] Additional ROW-vegetation clearing is the remainder of the area within the ROW that is not included in construction or operation facilities disturbance that may experience some degree of vegetation clearing (e.g., mowing, woody vegetation clearing, and overland travel) during construction.

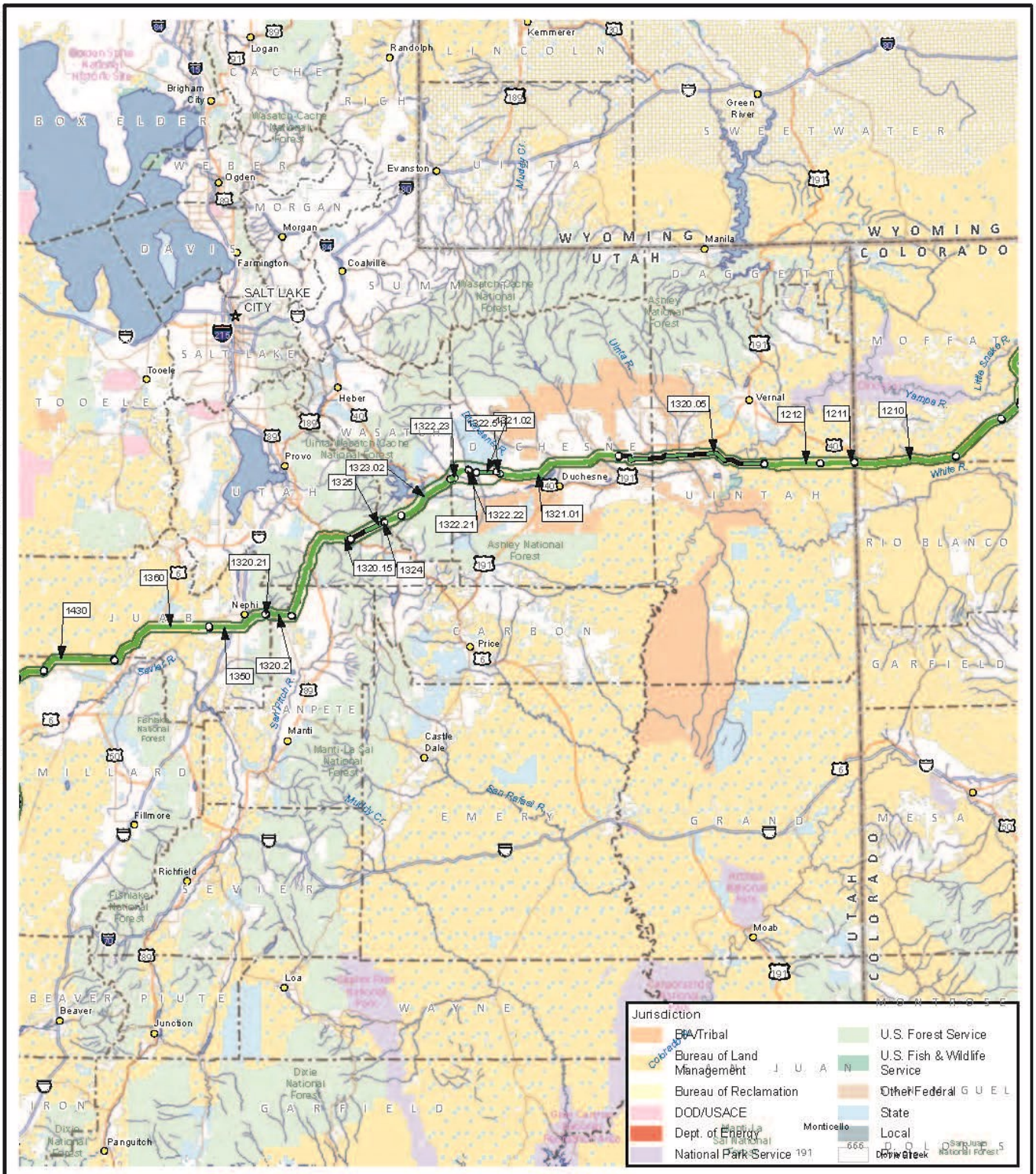
Table 2-5 Proposed Action Ground Electrode System Lengths and Areas of Disturbance

Ground Electrode System Sites	Length (miles)		Construction Disturbance (acres)				Operation Disturbance (acres)			
	34.5-kV AC Overhead Line	Access Road	Ground Electrode Sites	Over-head Lines	Access Roads	Total	Ground Electrode Sites	Over-head Lines	Access Roads	Total
Bolten Ranch	15	21	65	40	46	151	6	<1	46	52
Halfway Wash East	4	5	65	18	18	**101**	6	<1	18	**24**

Table 2-6 Terminal Facility Lengths and Areas of Disturbance

Terminal	Length (miles)		Construction Disturbance (acres)				Operation Disturbance (acres)			
	Inter-connection T-Lines	Access Roads	Converter, Substation, Switchyard	Inter-connection T-Lines	Access Roads	Total	Converter, Substation, Switchyard	Inter-connection T-Lines	Access Roads	Total
Northern	13	17	213	263	43	519	205	1	43	249
Southern	10	34	148	328	81	557	140	5	81	226
Southern Alternative	19	47	148	496	111	755	140	9	111	260


1030
Rawlins
1110
1040
Bolton Ranch
SWEETWATER
CARBON
1120
Muddy Cr.
1120.1
Medicine Bow-Routt National Forest
WYOMING
COLORADO
1116
1187
Little Snake R.
MOFFAT
ROUTT
Craig
Yampa R.
1101
1106
1100
Jurisdiction
Bureau of Land Management
Bureau of Reclamation
National Park Service
U.S. Forest Service
U.S. Fish & Wildlife Service
State
Local
Private
Proposed Action
Segment ID
Action Area
Terminal Siting Area
Ground Electrode Siting Area
Ground Electrode Site
Ground Electrode Overhead Electrical Line
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
CALIFORNIA
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 2-1
Region I
Proposed Action
0 5 10 20 Miles
0 5 10 20 km
1:1,000,000
Western AREA POWER ADMINISTRATION
Exported On: 2/27/2015



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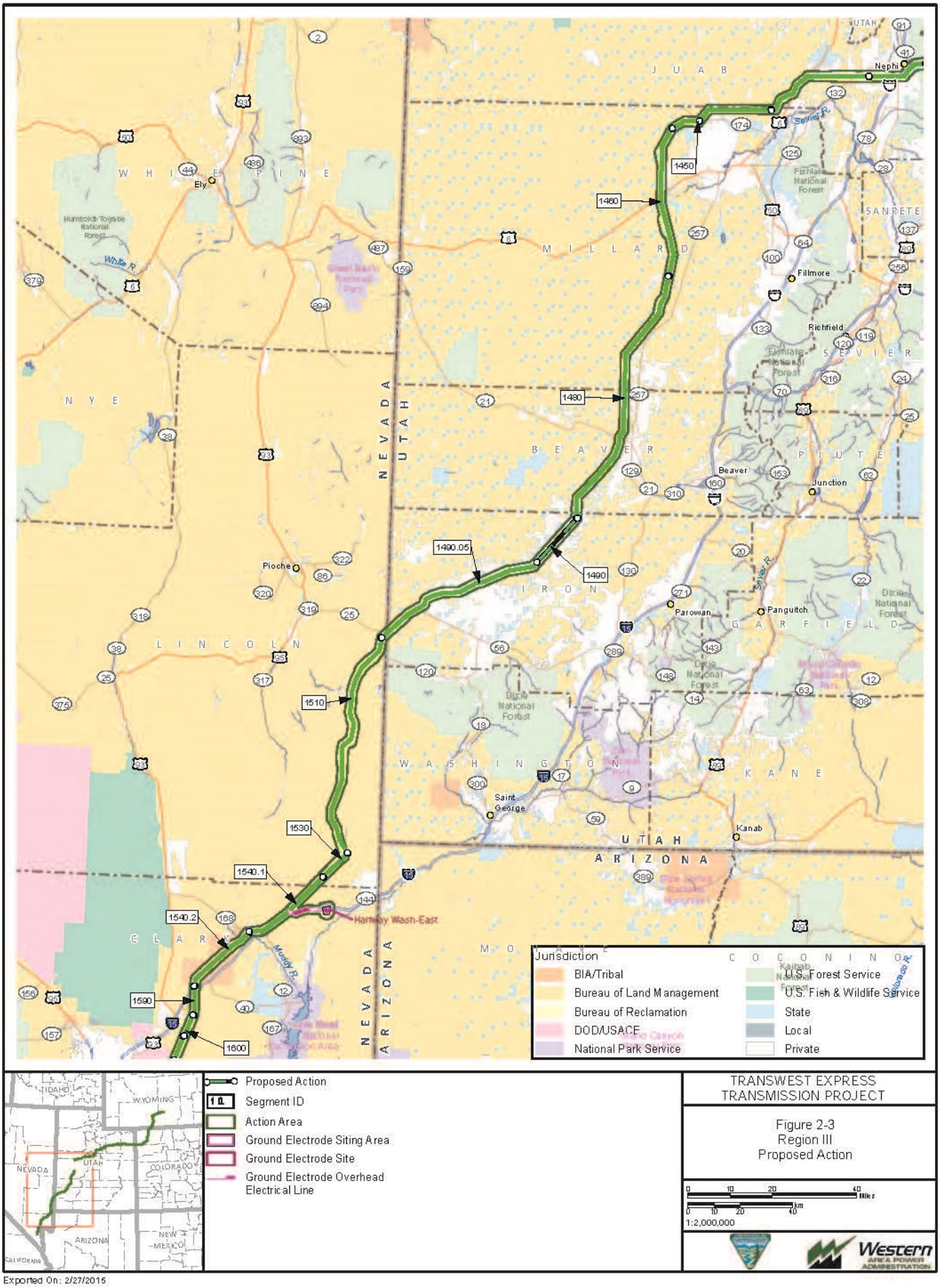
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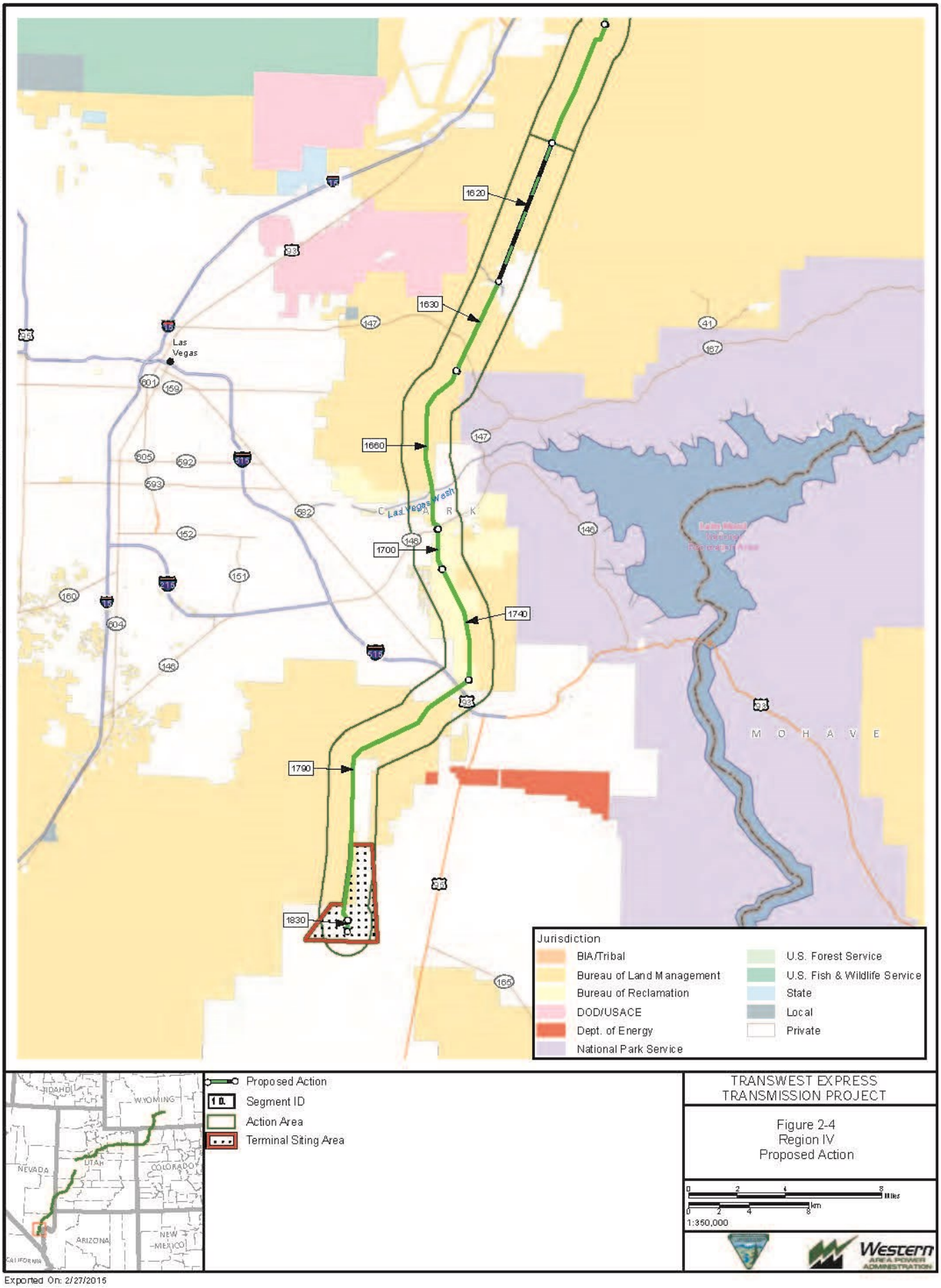
UTAH
Nephi
Sevier R.
Fishlake National Forest
SANPETE
Fillmore
Richfield
SEVIER
Beaver
Junction
BEAVER
PIUTE
MILLARD
JUAB
WHITE PINE
Ely
Humboldt-Toiyabe National Forest
White R.
NYE
NEVADA
UTAH
LINCOLN
Pioche
IRON
Parowan
Panguitch
GARFIELD
Dixie National Forest
WASHINGTON
Saint George
KANE
Kanab
UTAH
ARIZONA
CLARK
Muddy R.
Hamboy Wash-East
NEVADA
ARIZONA
MOHAVE
COCONINO
Kaibab National Forest
Colorado R.
1450
1460
1480
1490.05
1490
1510
1530
1540.1
1540.2
1590
1600
Jurisdiction
BIA/Tribal
Bureau of Land Management
Bureau of Reclamation
DOD/USACE
National Park Service
U.S. Forest Service
U.S. Fish & Wildlife Service
State
Local
Private
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
CALIFORNIA
Proposed Action
Segment ID
Action Area
Ground Electrode Siting Area
Ground Electrode Site
Ground Electrode Overhead Electrical Line
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 2-3
Region III
Proposed Action
0 10 20 40 Miles
0 10 20 40 km
1:2,000,000
Western AREA POWER ADMINISTRATION
Exported On: 2/27/2015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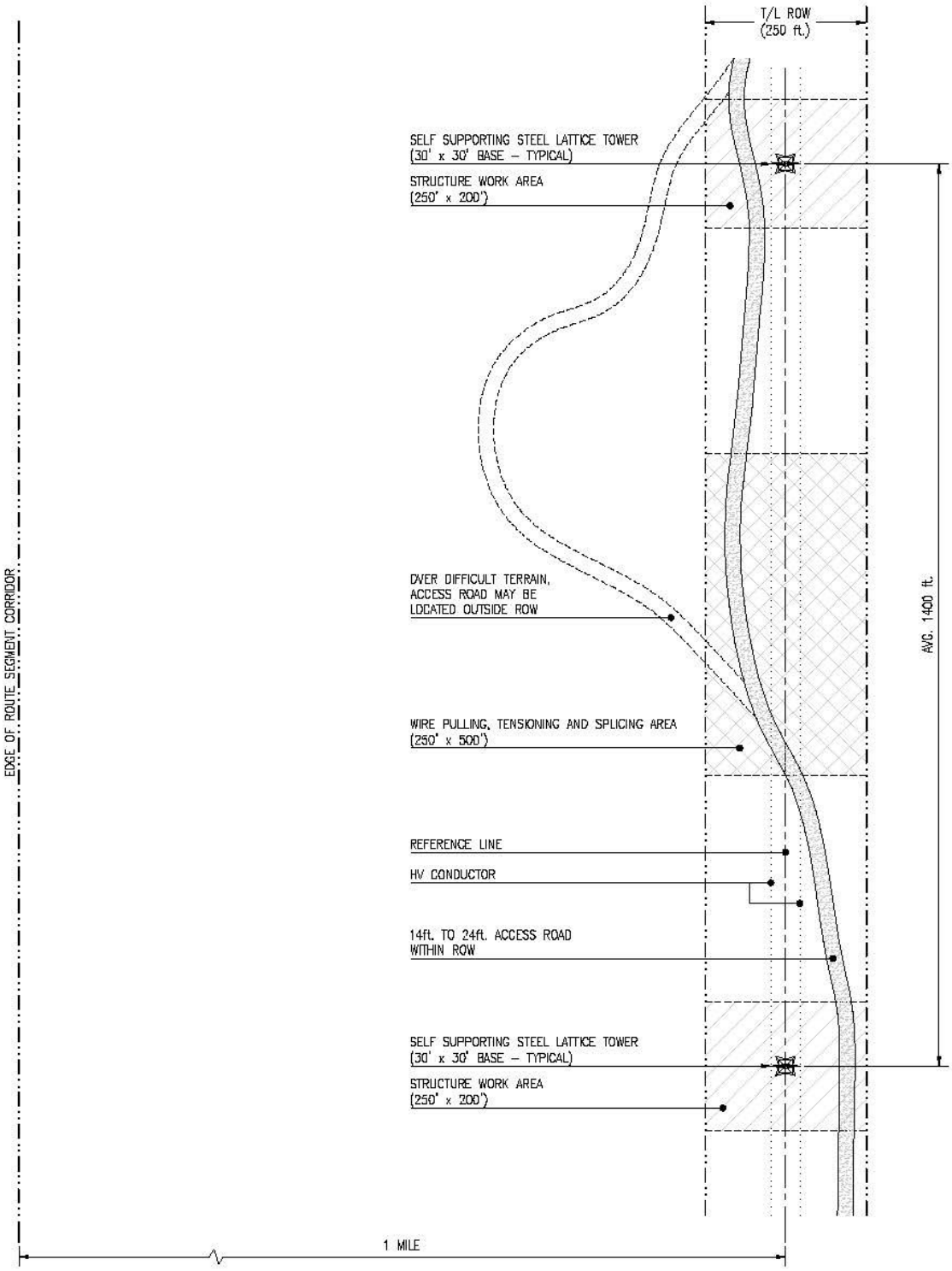
1620
1630
1660
1700
1740
1790
1830
Las Vegas
Lake Mead National Recreation Area
M O H A V E
Jurisdiction
BIA/Tribal
Bureau of Land Management
Bureau of Reclamation
DOD/USACE
Dept. of Energy
National Park Service
U.S. Forest Service
U.S. Fish & Wildlife Service
State
Local
Private
Proposed Action
Segment ID
Action Area
Terminal Siting Area
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
CALIFORNIA
TRANSWEST EXPRESS
TRANSMISSION PROJECT
Figure 2-4
Region IV
Proposed Action
Miles
km
1:350,000
Western
AREA POWER ADMINISTRATION
Exported On: 2/27/2015



TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure 2-5
Typical Transmission ROW
and
Temporary Work Areas

Source: TWE 2011

06/04/14

Note that there are two Design Options that could be applied to the Proposed Action depending on future permitting decisions for other regional systems and/or future energy and transmission market conditions. Under Design Option 2 the Project would deliver energy to a new Southern Terminal located near the Intermountain Power Project (IPP) just north of Delta, Utah, via a 600-kV, DC transmission line. Delivery of energy to markets in the Desert Southwest region would be completed through a new 500-kV AC line (constructed along the same alignment as the Proposed Action) as well as through the existing Southern Transmission System (STS) line between Delta, Utah, and Adelanto, California. Under Design Option 2, the Southern Terminal and ground electrode system located in Clark County, Nevada, would be replaced by similar facilities located near the IPP. The new 500-kV AC line from IPP to southern Nevada would deliver its energy to one of the existing substations in the Eldorado Valley and would include a series compensation station about midway between IPP and Eldorado Valley. Design Option 2 would be expected to reduce Project impacts to federally listed species due to the reduced footprint of Project facilities (i.e., elimination of the Southern Terminal and the Halfway Wash East ground electrode site) in desert tortoise habitat.

Under Design Option 3, the Project would be constructed using a two-phase approach. The first phase would entail constructing a 1,500-MW, 500-kV, three-phase AC transmission line from the proposed Northern Terminal near Sinclair, Wyoming, to the IPP substation near Delta, Utah. This phase also would include a series compensation station located about midway between Sinclair and IPP. Phase two would occur in the future if and when market demands warrant conversion of the line from 1,500-MW to 3,000-MW. At this point, the southern portion of the line would be constructed as a 600-kV DC line from the IPP to Marketplace Hub and the northern portion of the line would be converted from a 500-kV AC line to a 600-kV DC line with one of the three conductor bundle sets de-energized and left in place. If future market demands warrant construction of the southern portion of the transmission line, Design Option 3 would have essentially identical impacts on federally listed species as the Proposed Action but they would be initiated over a longer time period. If there is not sufficient demand for the southern portion of the transmission line, this design option would have fewer impacts to federally listed and candidate species due to the lack of new facilities in southwestern Utah and southern Nevada. Please refer to Section 2.1.2 of the EIS for more detailed information on these design options.

Design Options 2 and 3 currently do not meet the interests and objectives of the Project because capacity currently is not available on the STS. Therefore, implementation of the design options only would be considered if sufficient capacity (approximately 1,500-MW) became commercially available to transmit energy delivered by the Project to California, and if commercial interconnection agreements with the utility owning and operating the IPP transmission line (currently Los Angeles Department of Water and Power [LADWP]) could be established. Consequently, these design options will not be discussed further in this BA. Should the Project be approved and one of the design options selected by the Applicant, it may be necessary to revisit the Section 7 consultation for this project in order to address minor differences in Project effects on listed, proposed, and/or candidate species.

2.2 Action Area

As defined in the ESA Handbook (USFWS and NMFS 1998), a project “action area” refers to all areas that would be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 Code of Federal Regulations [CFR] 402.02). The portion of action area for the proposed Project that would be directly affected by construction and operation of the Project includes the footprints for the Northern and Southern Terminals, the Bolten Ranch and Halfway Wash East ground electrode systems, and two areas associated with the transmission line route:

- The proposed 250-foot-wide transmission line ROW in which the preliminary engineered alignment is located; and
- The refined transmission corridor, which varies from 500 feet wide to 3,500 feet wide depending on local resource issues and siting constraints.

The indirect effects portion of the action area varies somewhat depending on the species and the type of project activity. In general, it consists of a 2-mile-wide corridor centered on the proposed ROW. For portions of the project that are not sited adjacent to existing utility lines, there could be some direct impacts in this area resulting from new access roads linking the ROW with the existing road network and from temporary work areas such as staging areas, concrete batch plants, storage yards, and helicopter fly yards. The exact locations of facilities within this "potential disturbance area" have not been determined at this time but have been accounted for in quantifying Project effects and would be very small relative to the total area within the 2-mile-wide corridor. Consequently, the potential disturbance area is used to account for indirect impacts to species carried forward in the BA. This area is buffered by varying amounts for different species (e.g., 300 feet for most listed plants, 4 miles for greater sage-grouse) to account for additional species-specific indirect impacts that would result from human activity and construction noise that could extend beyond this corridor. The action area for each species analyzed in this BA is defined in Chapter 6.0 under the species-specific Area of Analysis sections.

2.3 Proposed Action

The above tables summarize relevant aspects of the Proposed Action and are referred to, where appropriate in the subsections that follow. Refer to Chapter 2.0 and/or Appendix D (Preliminary POD) of the TWE Final EIS for additional details on the Proposed Action. **Table 2-2** provides the specifications of project components, including the widths of new access roads, dimensions of temporary work spaces, sizes and intervals of various types of transmission tower bases, and other information upon which the lengths and acreages of disturbance shown in **Tables 2-3** through **2-6** are based.

2.3.1 Pre-construction Activities

Prior to construction, TransWest would obtain all applicable federal, state, and local permits; acquire easements and ROW grants for the Project facilities; conduct pre-construction environmental and engineering surveys; and conduct geotechnical surveys and testing. Studies would be conducted to select structure sites based on engineering design criteria, terrain, geologic investigations, and property owner input regarding land use and how to minimize potential impacts to properties.

2.3.1.1 Environmental Surveys

As required by permitting agencies, pre-construction environmental surveys would be conducted for the identification, flagging, and avoidance of sensitive resources. Various environmental pre-construction surveys are identified in the Final EIS and are expected to be mandated by the agencies' decisions. Environmental surveys may include, but would not be limited to: special status plant and wildlife surveys, noxious weed surveys, wetlands delineations per Clean Water Act (CWA) Section 404 permit requirements, and cultural resource surveys. The results of all survey efforts pertaining to federally listed, EXP/NE, proposed, or candidate species would be provided to the USFWS and applicable land and wildlife management agencies, as appropriate, after such data are collected and compiled.

2.3.1.2 Engineering Surveys

Pre-construction engineering surveys would be conducted to identify the transmission line ROW centerline and width, structure sites, vegetation clearance boundaries, property boundaries, ground profiles, access routes, temporary work areas, and stream crossings.

2.3.1.3 Geotechnical Investigations

Geologic and geotechnical surveys would be completed at proposed and alternate structure locations to evaluate potential geologic and geotechnical hazards and to determine specific requirements (ground conditions, soil types, depth to rock, depth to water, soil strength properties, etc.) for foundation design and construction. The work would be completed in time to develop final engineering specifications necessary for construction. The primary purpose of the geologic evaluation is to identify potential hazards with sufficient lead time to evaluate options for avoiding or mitigating potential hazards. To

determine proper structure foundation requirements, geotechnical investigations would be performed in the field to evaluate the strength and bearing capacity of site soils. Both engineering and environmental surveys would be conducted to identify the ROW centerline and width, structure sites, vegetation clearance and property boundaries, access routes, temporary work areas, and sensitive resources. Surveys would be performed within the structure construction work areas and ROW after the ROW grant. Geotechnical investigations will not be initiated until after the Section 7 consultation process is complete.

2.3.2 Construction Activities

It is currently anticipated that the total construction timeframe for the Project would be approximately 3 years with construction of the terminals and ground electrode systems taking place concurrently with construction of the transmission line. The overall construction schedule for the transmission line has been separated into three construction spreads with a staggered start time to allow time for setups, material and equipment logistics, and coordination between spreads. The construction spreads are planned to be: 1) Northern Terminal to northeastern Utah; 2) northeastern Utah to west-central Utah; 3) west-central Utah to the Southern Terminal. Line construction would progress simultaneously in the three spreads. The duration of transmission line construction activities on any given parcel of land may extend up to 1 year, although the total amount of time of actual construction activity would be much shorter, likely on the order of a few months. Along any given section of the route, construction would be characterized by short periods (ranging from 1 day up to 2 weeks) of relatively intense activity interspersed with periods of no activity. Construction of the terminals would start approximately 3 to 6 months after the start of construction on the transmission line and would run concurrently for approximately 2 years. Construction activities for the main project components are described in the subsections below. Refer to Section 5.8.1 of the Project Plan of Development (POD) (Final EIS, Appendix D) for detailed information on the relative timing and duration of construction activities.

The total estimated number of construction personnel for construction of the entire transmission line is 630 people. For construction of the two terminals and two ground electrode systems, it is estimated that an additional 360 people would be needed. Construction would generally occur between 7 a.m. and 7 p.m., Monday through Saturday. However, additional hours may be necessary to make up for schedule delays or complete critical activities. Temporary work camps are not expected to be necessary for construction of the Project. Refer to POD Section 5.8.2 for detailed information on the size of the various construction crews and the type and quantity of equipment that would be used in constructing the transmission line and ancillary facilities.

2.3.2.1 Transmission Line

As shown in **Table 2-2** and **Table 2-3**, the total length of the Proposed Action would be approximately 728 miles. The general sequence of transmission line construction includes: construction of access roads; clearing of the ROW and temporary work areas; installation of tower foundations; assembly and erection of structures; installation of shield wires and conductors; construction of ancillary facilities; and site cleanup and reclamation of temporary use sites. The following information provides a general description of the construction activities for the major transmission line components. More detailed descriptions of these activities may be found in Section 2.4.2 of the Final EIS and Section 3.5.2 of the Project Description Technical Report located in Appendix D of the Draft EIS.

Access Roads

The estimated lengths of the access roads associated with the Proposed Action in the four geographical regions would be approximately 204 miles in Region I, 395 miles in Region II, 303 miles in Region III, and 49 miles in Region IV. The total length of the transmission line access roads would be approximately 951 miles (**Table 2-3**). The estimated area of disturbance for these roads is 2,447 acres (**Table 2-4**). The location of the access roads has not been defined at this time. However, all new roads would be located within 1 mile of the preliminary engineered alignment (i.e., within a 2-mile-wide corridor centered on the

transmission line). The following information provides a description of the design and construction of the TWE access roads.

The Project would require some form of surface access to all structures and work areas during construction and operation to allow equipment to access each transmission structure. The construction of new access roads would occur only as necessary to access structure sites lacking direct access from existing roads, or where topographic conditions (e.g., steep terrain, rocky outcrops, and drainages) prohibit safe overland access to the site. Where terrain and soil conditions are suitable, non-graded overland access ("drive and crush") would be employed. New access roads would be located within the Project ROW whenever practical and would be sited to minimize environmental impacts. The number of new access roads would be held to a minimum, consistent with their intended use (e.g., structure construction or conductor stringing and tensioning).

Where new roads are required, access roads would be designed in accordance with standards and guidelines set by the American Association of State Highway and Transportation Officials (AASHTO). On public lands, BLM and USFS road design standards would be followed, including standards set forth in "The Gold Book – Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development" (AASHTO 2006).

Existing, maintained roads would comprise the backbone road network. These roads were identified and analyzed in the EIS. As indicated above, new or improved access road locations would not be determined until after the ROD is issued, an action alternative is approved, and the final engineering design is completed prior to any notice to proceed with construction being issued. For assessment in the TWE EIS, a programmatic methodology was developed to estimate miles of new access roads, differentiating between required access roads both inside and outside the refined transmission corridor. Four terrain types (flat, rolling, steep, and mountainous) were considered in determining different road improvement needs along the routes. The methodology used the results obtained from 18 example segments and the slope of the 250-foot-wide transmission line ROW within these segments to estimate miles of new access roads required for every transmission line segment. The segment totals were then aggregated to create the total number of access road miles needed for each alternative in each Region. Access road miles along with other metrics were used to make comparisons between the alternatives. This programmatic methodology and the results were reviewed and approved by the lead agencies for use in the EIS analysis and are carried forward for use in this BA.

ROW and Temporary Work Areas

Table 2-4 provides calculated areas of impact for temporary work areas. **Figure 2-5** depicts a typical transmission line construction ROW and temporary work areas. Vegetation within the ROW would be cleared and maintained in accordance with a Vegetation Management Program developed specifically for this Project. The proposed approach is to clear the ROW of any vegetation greater than 6 feet in height while leaving low-growing vegetation, stumps, and roots to provide cover and soil stabilization.

Temporary work areas would include work areas at each structure site; pulling, tensioning and spicing sites; staging areas; material storage yards; batch plant sites; fly yards; and guard structures. Temporary work areas would be cleared of vegetation or flagged, as needed, prior to construction.

Individual sites would be cleared to install the transmission line structures and facilitate access for future transmission line and structure maintenance. The area cleared would provide the space for construction laydown, structure assembly, and erecting towers at each structure site within the ROW. To the extent necessary, the work area would be cleared of vegetation and bladed to create a safe working area for placing equipment, vehicles, and materials. Wire pulling, tensioning and splicing sites would be cleared and bladed only to the extent necessary to perform safe wire installation construction activities. During planning for wire installation activities, wire pulling and tensioning and splicing sites would be selected to minimize clearing and blading to the extent practical such that actual disturbance areas would be minimized.

The staging areas would be located in previously disturbed sites or in areas of minimal vegetation cover where possible. The staging areas would serve as FOs; reporting locations for workers; parking space for vehicles and equipment; and sites for material storage, fabrication assembly, concrete batch plants, and stations for equipment maintenance. Staging area locations would be finalized following discussion with the land management agency or negotiations with landowners. In some areas, the staging area may need to be scraped by a bulldozer and a temporary layer of rock laid to provide an all-weather surface. Unless otherwise directed by the landowner, the rock would be removed from the staging area upon completion. Additionally, fly yards for helicopter operations would be located where helicopter construction is planned.

Transmission Structures

Structure Foundations

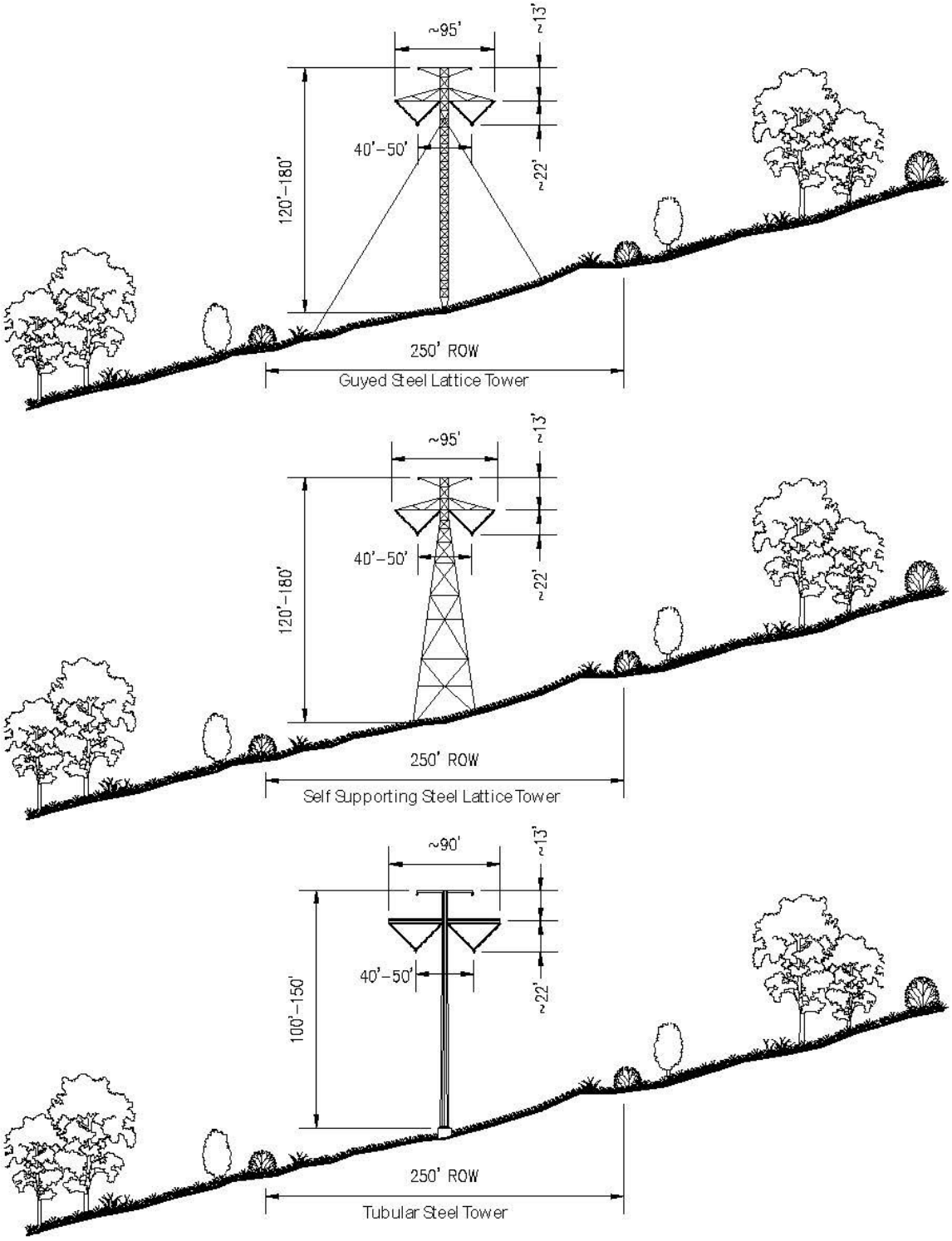
Table 2-2 identifies the three main types of transmission line tower structures being considered for the Project **Table 2-4** summarizes the total area of impact associated with these structures and Project-associated communication sites. **Figure 2-6** provides an illustration of the three structure types. Foundations for guyed steel lattice towers typically would be small precast or cast-in-place concrete pedestals. The precast pedestals would be transported to the tower site on a flatbed truck and set in a small excavation dug by a backhoe or digger.

Guyed lattice structures require the installation of anchors and guy wires to support the structure. Depending upon the soil type and engineering strength requirements, anchors would be drilled and secured either with epoxy or grouted anchors or with excavated plate anchors. Drilled anchors would require truck- or track-mounted drilling equipment to drill a hole 4 to 8 inches in diameter, 20 to 40 feet or more in depth. The anchor rod would be inserted into the open bore and secured to the soil or rock with epoxy or grout. Plate anchors are installed in a 3- to 4-foot-diameter excavation, 10 to 20 feet in depth, drilled by a truck- or track-mounted drilling rig. The anchor rod is attached to the plate anchor and the excavation is backfilled and compacted.

The single-shaft tubular steel poles and self-supporting steel lattice towers typically would be supported by cast-in-place drilled concrete pier foundations. For these structure types, vertical excavations for foundations would be made. Where soils permit, truck- or track-mounted augers of various sizes, depending on the diameter and depth requirements of the hole to be drilled, would be used. In rocky areas, the foundation holes may be excavated by drilling or blasting methods, or by installing special rock anchor or micro-pile type foundations. The rock anchoring or micro-pile system would be used in areas where site access is limited, or where adjacent structures could be damaged as a result of blasting or rock hauling activities.

After excavation and prior to structure installation, reinforced-steel anchor bolt cages would be installed. These cages would be assembled at the nearest laydown yard or staging area and delivered to the tower site via flatbed truck. These cages would be inserted in the holes then filled with concrete.

Typically, and because of the remote location of much of the transmission line route, concrete would be provided from portable batch plant areas as described above. Concrete would be delivered directly to the site in concrete trucks with a capacity of up to ten cubic yards. In the more developed areas along the route, the Contractor may use local concrete providers to deliver concrete to the site when economically feasible.



TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure 2-6
Potential
Transmission Line
Structure Types

Source: TWE 2011

06/04/14

Tower Erection

Typical tower erection and conductor stringing is depicted in **Figure 2-7**. **Table 2-4** identifies the approximate area of impact associated with conductor stringing and tensioning sites. Bundles of steel members and associated hardware (insulators, hardware, and stringing sheaves) would be transported to each structure site by truck. Wood blocking would be hauled to each location and laid out; the tower steel bundles would be opened and laid out for assembly by sections and assembled into subsections of convenient size and weight. Typically, the leg extensions for the towers would be assembled and erected by separate crews with smaller cranes to prepare for setting of the main tower assembly. The assembled subsections would be hoisted into place using a large crane and fastened together to form a complete tower. A follow-up crew then would tighten all the bolts in the required joints.

Special Construction Practices

In sensitive areas, such as habitat for endangered plant species, helicopters can be used for tower installation, avoiding or minimizing the need to put access roads through these areas. The use of helicopters for tower erection is similar to that described above; however, the initial assembly is completed at a fly yard according to the lift capacity of the helicopter. Completed tower assemblies are attached to the helicopter by cable and flown to the tower site. There, the assembly is placed on the foundation or atop the previous tower section. Guide brackets attached on the top of each section assist in aligning the stacked sections. Once aligned correctly, line crews climb the towers to permanently bolt the sections together. Use of these construction practices can eliminate the need for access roads and temporary work areas within and adjacent to the proposed ROW.

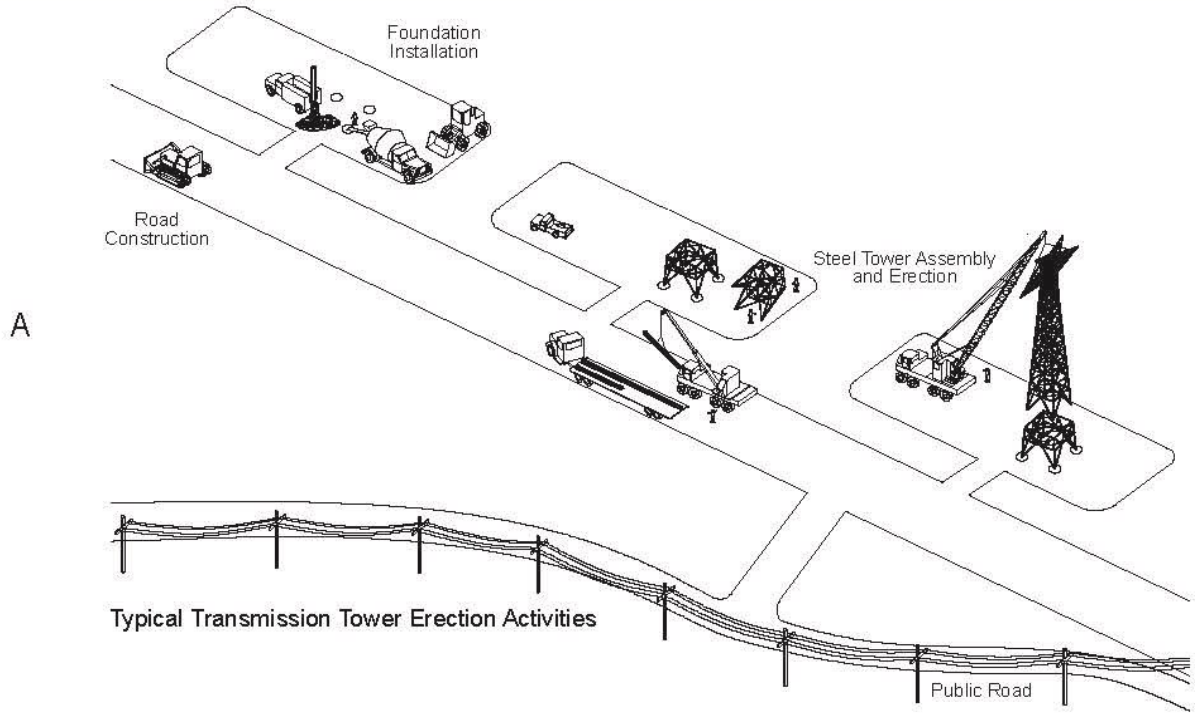
Stringing of Conductors, Shield Wire, and Fiber Optic Ground Wire

For protection of the public during stringing activities, temporary guard structures would be erected at road crossing locations where necessary. Guard structures would consist of H-frame wood poles placed on either side of the road to prevent ground wires, conductors, or equipment from falling on underlying facilities and disrupting road traffic. Equipment for erecting guard structures would include augers, backhoes, line trucks, boom trucks, pole trailers, and cranes. Guard structures may not be required for small roads. In such cases, other safety measures such as barriers, flaggers, or other traffic controls would be used. Following stringing and tensioning of all ground wires and conductors, the guard structures would be removed and the area restored.

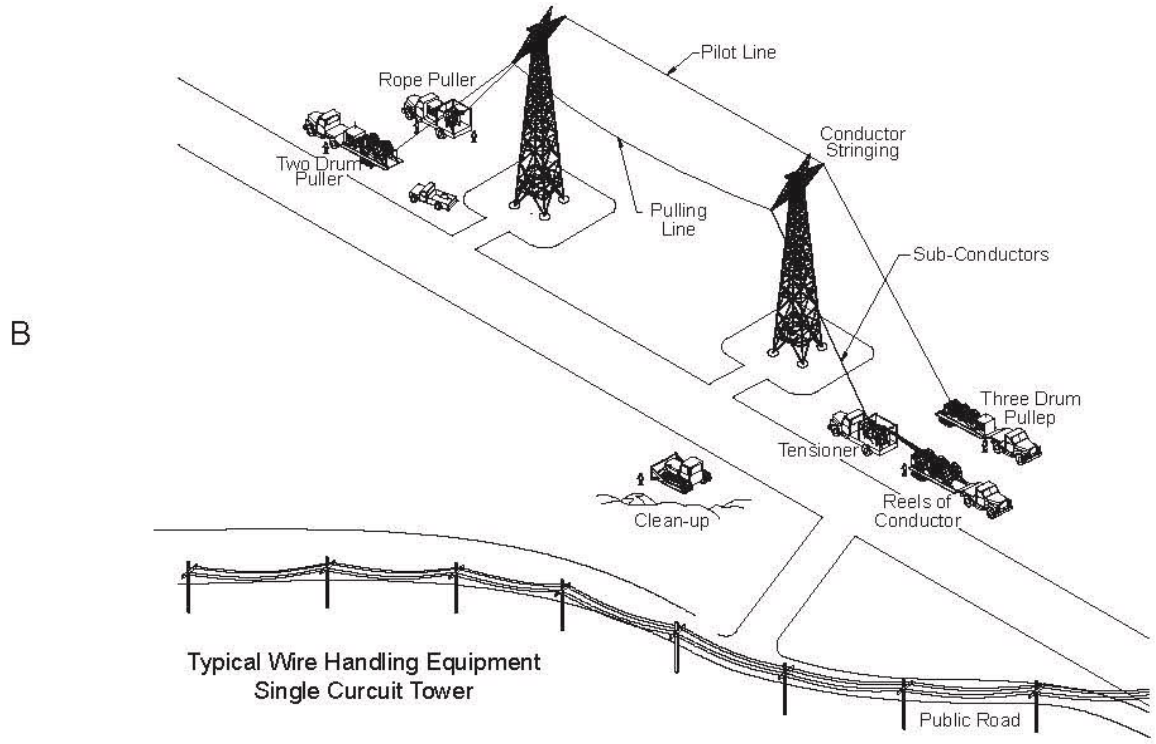
Insulators, hardware, and stringing sheaves would be delivered to each tower site. The towers would be rigged with insulator strings and stringing sheaves at each shield (ground) wire and conductor position.

Pilot lines would be pulled (strung) from tower to tower by either a helicopter or land operated equipment, and threaded through the stringing sheaves at each tower. Following pilot lines, a stronger, larger diameter line would be attached to conductors to pull them onto towers. This process would be repeated until the shield wire, optical ground wire, or conductor is pulled through all sheaves.

Shield wires, fiber optic cable, and conductors would be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end of a conductor segment. The tensioner, in concert with the puller, would maintain tension on the ground wires or conductor while they are fastened to the towers. Once each type of wire has been pulled in, the tension and sag would be adjusted, stringing sheaves would be removed, and the conductors would be permanently attached to the insulators. At tangent and small-angle towers, the conductors would be attached to the insulators using clamps while at the larger angle dead-end structures the conductors are cut and attached to the insulator assemblies by “dead-ending” the conductors using industry-recognized methods.



Typical Transmission Tower Erection Activities



Typical Wire Handling Equipment
Single Curcuit Tower

TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure 2-7
Typical Tower Erection and Conductor Stringing Construction

Source: TWE 2011

06/04/14

2.3.2.2 Ancillary Facilities

Communication System

The Project would require a number of critical telecommunications support subsystems. The primary communications for protection and control would be provided via the one fiber optic ground wire installed in the shield wire position on the transmission line. For redundancy purposes, a secondary communications path would be provided via existing or expanded/upgraded microwave systems or existing alternate buried fiber paths in the area.

The primary fiber optic system would require signal regeneration sites to amplify the signals if the distance between stations or regeneration sites exceeds approximately 50 miles. A total of 15 to 20 regeneration sites would be required for the proposed Project. In most cases, the regeneration communication sites would be located within the transmission line ROW and would typically be 100 feet by 100 feet or less in size. TransWest also may contract with third parties for the sale and use of excess fiber optic capacity. No additional facilities are anticipated for third-party use of excess fiber optic capacity.

The secondary communications path would be provided either by a private Project microwave system or purchasing/leasing capacity on existing utility-dedicated communication networks within the Project region. If required, a private microwave system would be structured to utilize existing developed communications sites, access roads and utility held sites to the maximum extent possible. A small number of new microwave sites may be required for the Project. A typical microwave communication site is less than 100 feet by 100 feet and consists of a fenced enclosure that contains a small building for the communications equipment and a tower for mounting the microwave antennas. The microwave tower may be 50 to 150 feet tall to meet the system's line-of-sight communications requirement.

To facilitate mobile communications along the transmission line route for transmission line patrol, inspection, routine maintenance and emergency operations, a mobile ultra-high frequency (UHF)/very high frequency (VHF) radio communications system would be implemented. For planning purposes, UHF/VHF radio equipment, towers, antennae and repeaters are assumed to be installed at each regeneration station.

Ground Electrode Systems

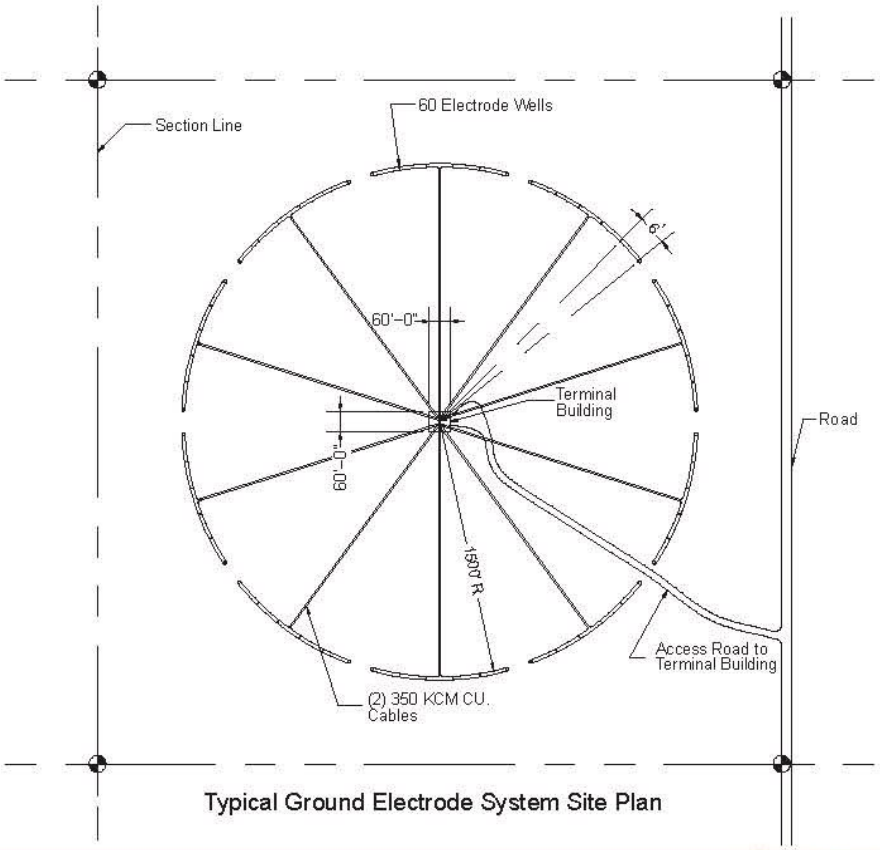
One ground electrode facility consisting of a small aboveground building and surrounding underground electrode bed wells (**Figure 2-8**) would be required within approximately 100 miles of each of the Northern and Southern terminals. This would establish and maintain electrical current continuity during normal operations and during any unexpected outage of the 600-kV DC terminal or converter station equipment. **Table 2-5** summarizes the area of disturbance associated with the two proposed ground electrode systems, Bolten Ranch in Carbon County, Wyoming, and Halfway Wash East in Clark County, Nevada.

Each ground electrode facility would consist of a network of approximately 60 deep-earth electrode wells arranged along the perimeter of a circle expected to be about 3,000 feet in diameter. Each electrode well would be a 12- to 18-inch-diameter bore drilled to a depth of 200 to 700 feet (depth based upon engineering and design). All wells at a site would be electrically interconnected and wired via approximately 10 low voltage underground cable "spokes" to a small control building. A low voltage electrode line would connect the ground electrode facilities to the AC/DC converter stations. To the extent practical, the overhead electrode line would be located on the 600-kV DC structures in the overhead shield wire position. Where the electrode line diverges from the 600-kV DC transmission line, it would be located on single-pole structures, similar to those used for a modified 34.5-kV/69-kV distribution transmission line, built within a separate 50-foot-wide ROW.

A

Typical Above Ground Installation at the Ground Electrode Facility

B



Typical Ground Electrode System Site Plan

TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure 2-8
Typical Ground Electrode System Above Ground Installation and Site Plan

Source: TWE 2011

During a DC transmission disturbance where one circuit becomes inoperable, the ground electrodes would carry a short-term large current that was previously flowing in the inoperable circuit. Contingency conditions that result in high ground electrode currents are most often the result of an unexpected outage on the transmission line or equipment in the AC/DC converter station. The high current operation of the ground electrode facilities and the use of the earth as a return path is limited to unexpected emergency conditions and typically only operated for 10 minutes to less than 1 hour following the loss of a circuit. Although the ground electrode facilities would be designed to operate at high current levels for up to 200 hours per year, typical yearly use at high currents is expected to be less than 30 hours per year. The use of these ground electrode facilities allows system operators to maintain a portion of the power transmission capacity to support power network reliability. This feature would allow critical time for network operators to determine the extent of the electrical disturbance and reconfigure the transmission and generation systems into a more stable configuration that minimizes disruption of customer loads.

The specific location of the ground electrode systems would be identified during final engineering and design; however, general siting areas associated with the Proposed Action, including the Bolten Ranch Facility and Halfway Wash East, have been identified in Regions I and III, respectively, and are analyzed in this BA. Additionally, the lower voltage connector lines from the 600-kV DC transmission line to each of the two ground electrode sites have been analyzed.

Terminals

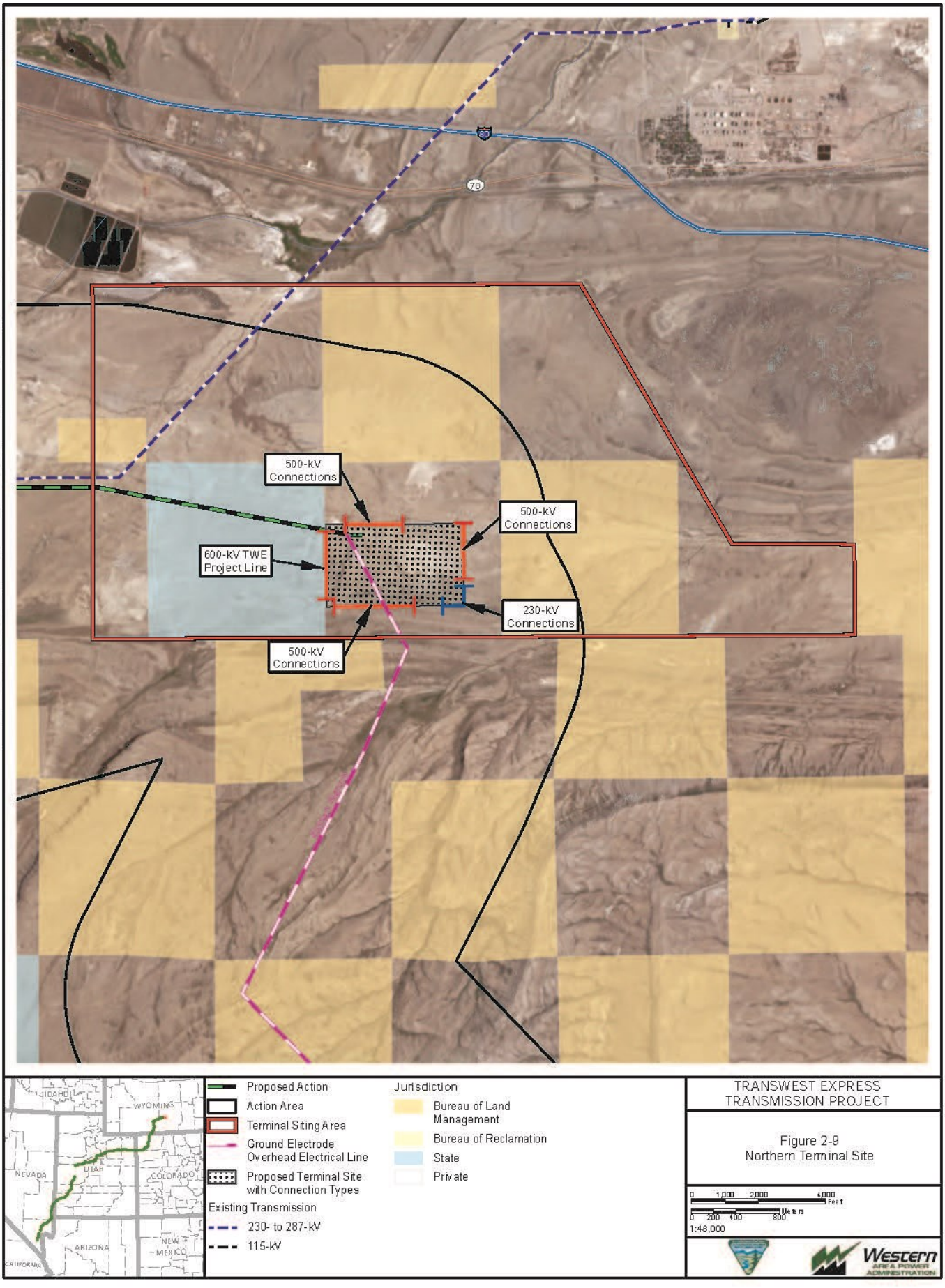
Northern and southern terminals would be required for the transmission line. The Northern Terminal would be located approximately 3 miles southwest of Sinclair, Wyoming; the Southern Terminal would be located approximately 1 mile northeast of the Marketplace Hub in the Eldorado Valley within the city limits of Boulder City, Nevada.

The terminal stations would include an AC/DC converter station and adjacent AC substation. The AC/DC converter station would include a 600-kV DC switchyard; AC/DC conversion equipment; transformers; and multiple equipment, control, maintenance, and administrative buildings.

Two buildings would house the AC/DC conversion equipment, each approximately 200 feet long by 80 feet wide and 60 to 80 feet high. Smaller buildings would house the control room, control and protection equipment, auxiliary equipment, and cooling equipment. The AC substation at the Northern Terminal would be a 500-/230-kV substation, and the AC substation at the Southern Terminal would be a 500-kV substation. The AC substations would include a switchyard, transformers, control equipment, and control buildings. Connections to the existing transmission infrastructure also would be constructed. **Table 2-6** summarizes the general terminal facility lengths and areas of disturbance.

Northern Terminal

The Northern Terminal facilities would be located on private lands in Carbon County, Wyoming, approximately 3 miles southwest of the Town of Sinclair, Wyoming (**Figure 2-9**). The Northern Terminal would connect to the existing Platte – Point of Rocks 230-kV line located within 1 mile of the terminal. If needed to provide connection to the Aeolus and Anticline substations, the Northern Terminal also could connect to the Energy Gateway West and Energy Gateway South 500-kV transmission lines currently proposed by PacifiCorp. TransWest requested an interconnection with both projects from PacifiCorp in 2009. Based on the approved alternative for the Energy Gateway West transmission project and pending the outcome of the National Environmental Policy Act (NEPA) process for the Energy Gateway South transmission line, it is reasonably foreseeable that the interconnections between these two projects and the Proposed Action would be at the Northern Terminal. The Northern Terminal would require the following components: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80
76
500-kV Connections
500-kV Connections
600-kV TWE Project Line
230-kV Connections
500-kV Connections
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
CALIFORNIA
Proposed Action
Action Area
Terminal Siting Area
Ground Electrode Overhead Electrical Line
Proposed Terminal Site with Connection Types
Existing Transmission
230- to 287-kV
115-kV
Jurisdiction
Bureau of Land Management
Bureau of Reclamation
State
Private
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 2-9
Northern Terminal Site
0 1,000 2,000 4,000 Feet
0 200 400 800 Meters
1:48,000
Western AREA POWER ADMINISTRATION

- An AC/DC converter station (a 600-kV DC switchyard and a converter building containing electronics and control equipment) approximately 30 acres in size.
- A 500-/230-kV AC substation approximately 135 acres in size.
- A 230-kV AC substation approximately 25 acres in size.
- An electrical connection from the AC/DC converter station to the 600-kV DC transmission line connecting to the Southern Terminal. All facilities for this connection are incorporated into the 600-kV DC transmission line.
- Two electrical connections from each (four connections total) of the proposed single circuit Energy Gateway West and Energy Gateway South 500-kV transmission lines (if approved) to the 500-/230-kV substation. These connections would connect the Northern Terminal to both the Aeolus and Anticline substations via the Energy Gateway West and Energy Gateway South 500-kV transmission lines (if approved). These two connections may require 500-kV transmission facilities, approximately 4 miles total or less in length, to connect the 500-/230-kV substation to the route of the Energy Gateway South 500-kV transmission line (if approved).
- Two electrical interconnections to the existing Platte – Point of Rocks 230-kV line, which would be rerouted into and out of the 230-kV substation. This 230-kV connection is assumed to require approximately 4 miles or less of double-circuit 230-kV transmission line.
- Up to six electrical interconnections from proposed and planned generation facilities by 230-kV transmission lines.

The three major components of the Northern Terminal (AC/DC converter station, 500-/230-kV AC substation, and 230-kV AC substation) would be co-located and contiguous. Although these three components would be stand-alone facilities and could be located on separate parcels connected together by short transmission lines, it is common practice and preferable for the AC/DC converter station and 500-/230-kV AC substation(s) to be adjacent to each other. It also is preferable to locate the 230-kV AC substation next to the 500-kV AC substation. However, depending on the availability of space and other constraints in this area, these stand-alone facilities could be separated by a distance of up to 2 miles.

Southern Terminal

The Southern Terminal facilities would be located in the Eldorado Valley on private or public land, within the city limits of Boulder City, in Clark County, Nevada (**Figure 2-10**). Two alternative sites are being analyzed for the Southern Terminal in the Eldorado Valley; either would contain the same facilities. The Southern Terminal would connect to all four of the existing 500-kV substations (Eldorado, Marketplace, Mead, and McCullough) located at the Marketplace Hub.

The Southern Terminal would require the following components:

- An AC/DC converter station (a 600-kV DC switchyard and a converter building containing power electronics and control equipment) approximately 30 acres in size.
- A 500-kV AC substation approximately 110 acres in size.
- An electrical connection from the AC/DC converter station to the 600-kV DC transmission line. All facilities for this connection would be incorporated into the 600-kV DC transmission line.
- Two electrical connections from the existing Mead – Marketplace 500-kV transmission line to the new 500-kV AC Substation. These connections would connect the Southern Terminal to both the Mead and Marketplace substations via the existing Mead – Marketplace 500-kV transmission line. These two connections may require 500-kV transmission facilities, assumed to total 4 miles or less in length, to connect the new 500-kV AC substation to the existing Mead – Marketplace 500-kV transmission line.

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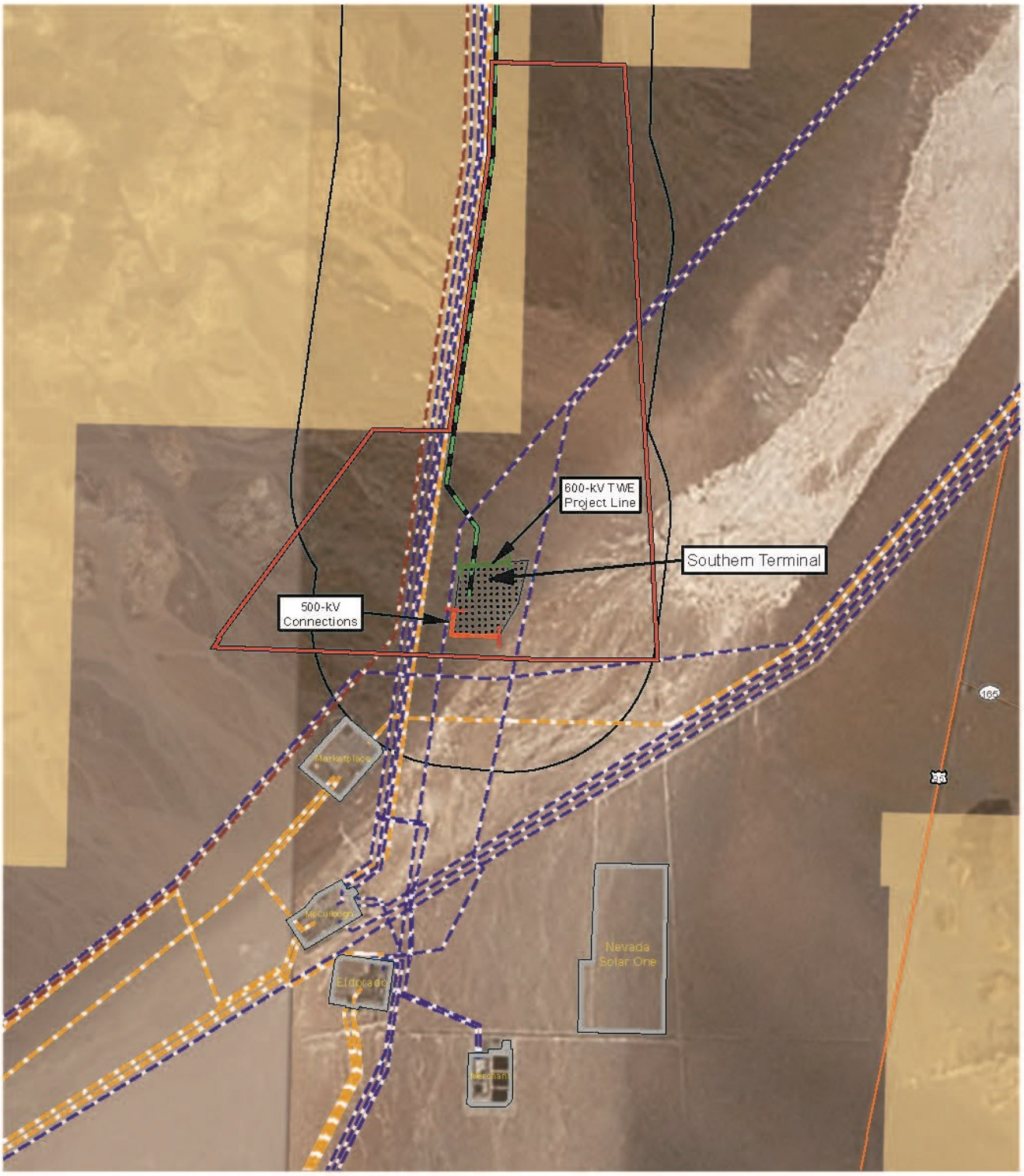


Proposed Action
Action Area
Terminal Siting Area
Proposed Terminal Site with Connection Types
Other Facilities

Existing Transmission
500-kV +/- DC
500-kV
230- to 287-kV

Jurisdiction
Bureau of Land Management
Private

TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure 2-10
Southern Terminal Site

0 1,000 2,000 4,000 Feet
0 200 400 800 Meters
1:64,000

Western AREA POWER ADMINISTRATION

Exported On: 2/20/2015

- Construction of 500-kV transmission line from the new 500-kV AC substation to each of the Eldorado and McCullough substations. These single circuit 500-kV transmission lines are each estimated to be 5 miles or less in length.
- Although not anticipated at this time, one or more of the existing 138-/230-kV lines within the Proposed Terminal Siting Area may need to be re-routed/re-configured to accommodate the Southern Terminal due to congestion within the area. If necessary, this reroute or reconfiguration of 138-/230-kV transmission line facilities is not anticipated to impact more than 5 miles of existing lines.

The two major components of the Southern Terminal (AC/DC converter station and the 500-kV AC substation) would be co-located and contiguous. Although these two components would be stand-alone facilities and could be located on separate parcels connected together by short transmission lines, it is common practice and preferable for the AC/DC converter station and 500-kV AC substation to be adjacent to each other.

2.3.3 Operations and Maintenance

During the operation and maintenance of the transmission line, tower location sites and communication sites would remain in place within the ROW. Access roads would remain to the extent they are required for structure and facility access. All construction sites and temporary work areas would be reclaimed upon completion of construction.

Regular inspection of transmission lines, terminals, substations, ground electrodes, and support systems is critical for safe, efficient, and economical operation of the Project. Regular ground and aerial inspections would be performed in accordance with the Applicant's established policies and procedures for transmission line inspection and maintenance (Western 2007). The Project ±600-kV DC, 500-kV AC, and 230-kV AC transmission lines, terminals, substations, ground electrode systems, communications system, and other ancillary facilities would be inspected regularly for corrosion, equipment misalignment, loose fittings, vandalism, and other mechanical problems. The need for vegetation management on transmission line ROWs also would be determined during inspection patrols.

2.3.3.1 Transmission Line

Inspection of the entire transmission line system would be conducted semi-annually. Aerial inspection would be conducted by helicopter semi-annually and would require two or three crew members, including the pilot. Detailed ground inspections would take place on an annual basis using access roads to each structure, where available. Ground inspection would use 4x4 trucks or 4x4 all-terrain vehicles (ATVs) for all structures with access roads. For structures in areas without permanent access roads, ground inspection would be on foot or by other approved means. The inspector would assess the condition of the transmission line and hardware to determine if any components need to be repaired or replaced, or if other conditions exist that require maintenance or modification activities. The inspector also would note any unauthorized encroachments and trash dumping on the ROW that could constitute a safety hazard. The inspector would access each of the structure locations along each line and use binoculars and spotting scopes to perform this inspection.

Routine maintenance activities are ordinary maintenance tasks that have historically been performed and are regularly carried out on a routine basis. The work performed is typically repair or replacement of individual components (no new ground disturbance), which is performed by relatively small crews using a minimum of equipment and usually is conducted within a period from a few hours up to a few days. Work requires access to the damaged portion of the line to allow for a safe and efficient repair of the facility. Equipment required for this work may include four-wheel-drive trucks, material (flatbed) trucks, bucket trucks (low reach), boom trucks (high reach), or man lifts. This work is scheduled and is typically required due to issues found during inspections. Typical items that may require periodic replacement on structures include insulators, hardware, or structural members. It is expected that these replacements would be required infrequently.

If during transmission line maintenance and monitoring, it is determined that new construction or reconstruction activities should be implemented, the Applicant would notify the appropriate land management agency or private landowner, and obtain proper approvals, as necessary.

Dust control during maintenance of the transmission line would be managed the same as during construction.

Transmission Line ROW

The Applicant would maintain work areas adjacent to structures and along the ROW for vehicle and equipment access necessary for operations, maintenance, and repair. Where long-term access is required for maintenance of the line, the Applicant would maintain the approved access roads in a safe, useable condition, as directed by an authorized officer from the appropriate land management agency or by the private landowner.

When needed, ROW repairs would be conducted in accordance with the stipulations outlined in the ROW grant. Maintenance may include grading or repair of existing maintenance access roads and work areas, and spot repair of sites subject to erosion, flooding or scouring. Access road maintenance entails activities to ensure that approved access roads are in appropriate condition for access to transmission lines by maintenance and inspection crews. These activities include re-grading, resurfacing, and re-constructing water diversions such as culverts, ditches and water bars. Required equipment may include a grader, backhoe, four-wheel-drive pickup truck, and a cat-loader or bulldozer. The cat-loader has steel tracks whereas the grader, backhoe, and truck typically have rubber tires. Repairs to the ROW would be scheduled as a result of line inspections, or would occur in response to an emergency situation. Refer to POD Appendix O, Section O6.0 for a description of access road management activities.

Snow removal, if necessary for terminal, substation, ground electrode and regeneration station access roads, would be performed with blades equipped with shoes to keep the blade off the road surface in order to avoid damage.

Vegetation within the ROWs would be managed in accordance with the TWE Project Vegetation Management Program described in detail below.

Vegetation Management Program

A Vegetation Management Program has been developed and would be implemented for the Project. The Program has been designed to meet North American Electric Reliability Corporation (NERC) reliability requirements in a cost-effective manner, and provide measures for minimizing potential conflicts with critical environmental resources or management issues. The vegetation management program for the Project transmission line ROWs is based on meeting reliability requirements of NERC through integrative vegetation management (IVM) practices (American National Standards Institute, Inc. [ANSI] 2006; NERC 2009). The Project program would comply with NERC reliability standards.

NERC has established reliability standard FAC-003-2 to prevent vegetation related outages from occurring on bulk transmission systems, which could lead to cascading outages. The standard was developed in response to serious outages and operational problems, which have resulted from interference between overgrown vegetation and transmission lines over the past 10 to 20 years. Compliance with this standard is mandatory. FAC-003-2 requires having and implementing a documented transmission vegetation management program, designed to control vegetation on transmission ROWs (NERC 2009).

IVM is a best management practice (BMP) conveyed in the American National Standard for Tree Care Operations, Part 7 (ANSI 2006) and the International Society of Arboriculture's Best Management Practices: Integrated Vegetation Management (Miller 2007). IVM is consistent with the requirements of FAC-003-2 and is recognized as containing the most appropriate techniques for transmission ROWs to

meet and exceed the NERC requirements (NERC 2009). IVM is a system of managing plant communities by setting objectives for desired conditions and identifying and managing ROWs for compatible and incompatible vegetation. Implementation of Project's Vegetation Management Plan would comply with NERC standards through IVM practices. IVM principles would serve as guidance in establishing and maintaining a desired condition for Project ROWs and associated facilities.

Maintenance activities include equipment testing, equipment monitoring and repair, and emergency and routine procedures for service continuity and preventive maintenance. Terminal, substation, ground electrode and regeneration station monitoring and control functions are performed wholly or in part remotely from the Applicant's central operations facilities. Unauthorized entry into the terminal, substations or regeneration stations is prevented with the provision of fencing and locked gates. Warning signs would be posted and entry to the operating facilities would be restricted to authorized personnel.

Surface disturbance associated with operation and maintenance activities is listed in **Table 2-4**.

2.3.4 Decommissioning

At the end of the Project's operational life (50 years or longer), if the facilities were no longer required, the transmission line would be decommissioned. At such time, conductors, insulators, and hardware would be dismantled and removed from the ROW. Structures would be removed and foundations removed to below ground surface. Following abandonment and removal of the transmission line structures and equipment from the ROW, any areas disturbed during line dismantling would be restored and rehabilitated. TransWest would be responsible for the decommissioning and reclamation of access roads following abandonment in accordance with the landowner's or land agency's direction.

2.4 Summary

Table 2-7 summarizes the individual components of the proposed action and identifies relevant design features and conservation measures applicable to each component and phase of the Proposed Action. This table is meant to assist the USFWS in "deconstructing the action" and evaluating the effects and associated impact avoidance and minimization measures in terms of individual project components. Refer to Chapter 3.0 for definitions of Applicant-committed design features and mitigation measures and additional conservation measures. Refer to Chapter 5.0 for a general assessment of project effects on listed, proposed, and candidate species by Project component and phase. Chapter 6 contains detailed, species-specific assessments and associated conservation measures.

Table 2-7 TransWest Transmission Line Project Phases, Activities, and Associated Conservation Measures

Project Phase	Activity	Applicable Design Features and Additional Conservation Measures[1]
Pre-construction	Environmental Surveys	TWE-1, TWE-2, TWE-26, TWE-31, TWE-34, TWE-64, SSWS-15, NX-1, SS-1
	Engineering Surveys	Same as for Environmental Surveys plus: TWE-4, TWE-29, TWE-32, WLF-1, WLF-2
	Geotechnical Investigations	Same as for Environmental and Engineering Surveys plus: TWE-5, TWE-22, TWE-47, TWE-61, TWE-62, SS-4, SS-5, SSS-1
Construction Activities	Transmission Line	
	• Access Roads	TWE-1, TWE-2, TWE-3, TWE-4, TWE-5, TWE-6, TWE-7, TWE-8, TWE-9, TWE-11, TWE-12, TWE-13, TWE-14, TWE-19, TWE-20, TWE-21, TWE-22, TWE-23, TWE-24, TWE-26, TWE-29, TWE-31, TWE-32, TWE-33, TWE-34, TWE-47, TWE-53, TWE-57, TWE-59, TWE-60, TWE-61, TWE-62, TWE-64, SSWS-15, SSWS-16, WLF-1, WLF-2, SSS-1, SSS-2, SSS-3, SSS-4, SSS-11, WR-3, NX-1, NX-2, VG-1, WET-1, WET-2, WET-3, SS-3, SS-4, SS-5, SS-6, SS-9, AB-1, AB-2, AB-3, AB-4
	• ROW and Temporary Work Areas	Same as for Access Roads plus: TWE-10, TWE-15, TWE-16, TWE-27, TWE-28, TWE-58, WLF-6, NX-3, NX-4, VG-3, VG-4, VG-5
Construction Activities (cont.)	• Tower Structures	
	– Foundations	TWE-23, TWE-25, TWE-53, SSS-2, SSS-4
	– Tower Erection	Special Construction Practices, including use of helicopters for tower installation, can eliminate need for access roads and temporary work areas in sensitive species' habitats
	– Stringing of Conductors	TWE-30, TWE-45, WLF-5, WLF-7, WLF-8
	Ancillary Facilities	
	• Communication System	TWE-8, TWE-9, TWE-12, TWE-13, TWE-19, TWE-22, TWE-23, TWE-26, TWE-28, TWE-29, TWE-31, TWE-32, TWE-33, TWE-57, TWE-58, TWE-59, TWE-60, TWE-61, TWE-62, TWE-64, SSWS-16, WLF-1, WLF-2, WLF-4, NX-1, NX-2, VG-1, VG-3, SS-3, SS-4, SS-9
	• Ground Electrode System	Same as Communication System
	• Terminals	Same as Communication System

Table 2-7 TransWest Transmission Line Project Phases, Activities, and Associated Conservation Measures

Project Phase	Activity	Applicable Design Features and Additional Conservation Measures[1]
Operations & Maintenance	Transmission Line and Ancillary Facilities	
	• Semi-annual aerial inspections	None
	• Annual ground inspections	TWE-1, TWE-2, TWE-3, TWE-24, TWE-31, TWE-32, TWE-45, TWE-64, SSWS-15, SSS-11, VG-3, SS-5, AB-2
	• Maintain access roads and work areas	TWE-9, TWE-12, TWE-24, TWE-31, TWE-32, TWE-47, TWE-61, TWE-62, TWE-64, SSWS-15, SSWS-16, WLF-1, WLF-2, WLF-10, SSS-1, NX-1, AB-2
	• Vegetation management	TWE-24, TWE-26, TWE-28, TWE-29, TWE-31, TWE-32, TWE-47, TWE-58, TWE-61, TWE-62, TWE-64, SSWS-15, SSWS-16, WLF-1, WLF-2, WLF-5, WLF-6, WLF-7, NX-1, NX-2, NX-3, NX-4, VG-3, SS-5, SS-6, SS-9, AB-2, AB-4
Decommissioning	Transmission Line and Ancillary Facilities	
	• Removal of aboveground structures, hardware, foundations	TWE-9, TWE-22, TWE-24, TWE-26, TWE-29, TWE-31, TWE-32, TWE-47, TWE-53, TWE-57, TWE-61, TWE-62, TWE-64, SSWS-16, WLF-1, WLF-2, SS-5, SS-6
	• Reclamation of ROW, access roads, and ancillary facility sites	TWE-6, TWE-12, TWE-13, TWE-16, TWE-24,TWE-26, TWE-29, TWE-31, TWE-32, TWE-47, TWE-57, TWE-61, TWE-64, SSWS-16, WLF-1, WLF-2, WLF-10, NX-1, NX-2, VG-1, VG-3, SS-5, SS-6

[1] Non-species-specific conservation measures are defined and described in Chapter 3.0; species-specific conservations measures are described in Chapter 6 in the individual species sections to which they apply.

1

3.0 Impact Avoidance and Minimization

This section summarizes and incorporates by reference existing impact avoidance and minimization measures that pertain, either directly or indirectly, to federally listed species. Existing measures that are part of BLM resource management plans (RMPs) or USFS land and resource management plans (forest plans) are incorporated by reference to Appendix C of the TWE Final EIS. These measures are identified by BLM Field Office and National Forest and incorporated by reference to the EIS in Section 3.1, below. For the purposes of this BA, Applicant-committed mitigation measures and design features are considered conservation measures and are summarized in Section 3.2, **Table 3-1**. Additional mitigation measures that have been developed to avoid or minimize adverse effects to wildlife, aquatic biota, plants, and other resources such as water bodies and wetlands, have been developed through the course of the TWE NEPA process and are presented in Table C.5-1 of the Final EIS. Those measures with direct or indirect applicability to conserving listed, EXP/NE, and candidate species are presented in **Table 3-2**. Conservation measures pertaining to individual species are presented in Chapter 6.0 of the BA under the species to which they apply.

3.1 Existing Impact Avoidance and Minimization Measures

Existing measures including the West-wide Energy Corridor (WWEC) Final Programmatic EIS BMPs, BLM RMP surface use and timing restrictions, and USFS Land Resource Management Plan (LRMP) standards and guidelines would require the Project to avoid and minimize impacts to federally listed species and their habitats. Additional protection would be provided by Applicant-committed design features and mitigation measures, which are listed in Appendix C.2 of the Final EIS as well as in TWE POD, which is located in Appendix D of the Final EIS.

Complete lists of these measures are contained in Appendix C of the Final EIS. WWEC BMPs (Final EIS Table C.1-1) must be adhered to wherever the Proposed Action is located within a WWEC-designated utility corridor, which includes considerable portions of the Project in Wyoming, eastern Colorado, west-central Utah, and southern Nevada. BLM surface use and timing restrictions pertaining to the BLM Rawlins (Tables C.3-4 and C.3-5), Little Snake (Tables C.3-8 and C.3-9), White River (Tables C.3-12 and C.3-13), Vernal (Tables C.3-14 and C.3-15), Salt Lake (Tables C.3-22 and C.3-23), Fillmore (Table C.3-24 and C.3-25), Cedar City (Tables C.3-26 and C.3-27), Caliente (Tables C.3-30 and C.3-31), and Las Vegas (Tables C.3-32 and C.3-33) FOs and USFS standards and guidelines associated with the USFS Uinta-Wasatch-Cache (Uinta Planning Area) (Final EIS Section C.4.4) and Fishlake (Final EIS Section C.4.3) National Forests apply to the Proposed Action analyzed in this BA. Many of these measures are specific to individual listed and special status species and their habitats and vary across BLM and USFS jurisdictions. Additional Project- and species-specific conservation measures have been developed during preparation of the TWE Final EIS and are listed in Appendix C, Table C.5-1 of the Final EIS. Other potential conservation measures have been provided by the USFWS and BLM during preparation of the BA. BLM, USFS, USFWS, and Project-specific mitigation and conservation measures have been considered in the analysis of Project effects on individual species and are presented in the relevant sections of Chapter 6, below.

Note that BLM and USFS management practicies pertaining to greater sage-grouse are currently being revised through the on-going greater sage-grouse land use plan amendment process. These amendments are expected to be finalized more or less concurrently with issuance of the TWE ROD. It is anticipated that the Project will not be entirely consistent with the linear utility siting restrictions contained in the applicable land use plans because the formulation of Project alternatives occurred well in advance of the plan amendment process. However, it is expected that the Project and associated greater sage-grouse impact avoidance, minimization, and compensatory mitigation measures will be generally consistent with the surface use and timing restrictions and other mitigation requirements outlined in the final RODs for the applicable land use plan amendments.

Applicant-committed mitigation measures and design features that would result in the general avoidance or minimization of Project impacts to species being carried forward for analysis in this BA are listed in **Table 3-1** below. WWEC BMPs, BLM surface use restrictions and timing limitations, and USFS standards and guidelines pertaining to other resources, such as soil conservation and noxious weed management, would have indirect benefits to federally listed, proposed, and candidate species affected by the Project. Per Applicant-committed measure TWE-1, all permitting agency requirements will be adhered to during Project planning, construction, operation, and decommissioning.

3.2 General Conservation Measures

Table 3-2 lists additional conservation measures that have been identified through development of the TWE Final EIS. Implementation of these general (i.e., non-species-specific) measures would avoid or minimize adverse effects to multiple species. The assessments of effects for individual species contained in Chapter 6.0 of this BA identify which of the following measures apply to a given species. These measures, along with the species-specific conservation measures described in Chapter 6.0, have been accounted for in evaluating residual impacts to individual species as well as in the determination of Project effects on these species.

Table 3-1 Applicant-committed Impact Avoidance and Minimization Measures Directly and Indirectly Applicable to Conservation of Federally Listed, Proposed, and Candidate Species in the TWE Action Area

Draft EIS No.	Phase(s)[1]	Topic	Description
GENERAL DESIGN FEATURES			
TWE-1	P	General, compliance with agency stipulations and RODs	The TWE Project will be planned, constructed, operated, and decommissioned in accordance with the agencies' RODs, the BLM's ROW grant stipulations, USFS Special Use Permit stipulations, and requirements of other permitting agencies.
TWE-2	P	General, compliance with laws and regulations	The Applicant will comply with all applicable environmental laws and regulations. Applicable laws and regulations may include, but are not limited to, the CWA Section 303(d) and Section 404; the Wild and Scenic Rivers Act, Section 3(a) or 2(a) ii; the ESA, Section 7; the National Historic Preservation Act (NHPA), Section 106; and the Native American Grave Protection and Repatriation Act of 1990 (NAGPRA). Compliance with all applicable laws and regulations will be documented in the Final POD/Construction, Operation, and Maintenance (COM) Plan.
TWE-3	P	General, mitigation monitoring plan	The POD will include a mitigation monitoring plan that will address how each mitigation measure required by permitting agencies in their respective decision documents and permits will be monitored for compliance.
TWE-4	P	General, environmental training	Prior to construction, all personnel will be instructed on the protection of cultural, paleontological, ecological resources, and other natural resources in accordance with the POD provisions. To assist in this effort, the construction contract would address (a) federal, state, and tribal laws regarding cultural resources, fossils, plants, and wildlife, including collection and removal; and (b) the importance of these resources and the purpose and necessity of protecting them.
PROJECT DESIGN, ACCESS, AND CONSTRUCTION			
TWE-5	P	General, compliance with laws and regulations	The POD will display the location of Project infrastructure (i.e., towers, access roads, substations) and identify short-term and long-term land and resource impacts and the mitigation measures that will be implemented for site-specific and resource-specific environmental impacts.
TWE-6	P	General, Access Road Plan	The POD will include an Access Road Plan that incorporates relevant agency standards regarding road design, construction, maintenance, and decommissioning. The Access Road Plan will incorporate BMPs, stipulated by the agencies in their respective decision documents and permits.
TWE-7	P	Access, visual	The alignment of any new access roads will follow the designated area's landform contours where practical, providing that such alignment does not additionally impact resource values. This will minimize ground disturbance and reduce scarring (visual contrast).
TWE-8	P, C	Access, tower placements, surface water, vegetation management, drainage, dust control	Crossings of streams and waterways will be done in compliance with federal, state, and local regulations. Roads will be built as near as possible at right angles to the streams and washes (Arizona crossing). Culverts will be installed where necessary. All construction and maintenance activities will be conducted in a manner that will minimize disturbance to vegetation, drainage channels, and intermittent or perennial stream banks. In addition, road construction will include dust-control measures during construction in sensitive areas. All existing roads will be left in a condition equal to, or better than, their condition prior to the construction of the transmission line. Structures will be sited with a minimum distance of 200 feet from streams, wherever possible.
TWE-9	C, O	Access	All construction vehicle movement outside the ROW normally will be restricted to pre-designated access or public roads.
TWE-10	P, C	General ROW, visual	The area limits of construction activities will normally be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents will be applied to rocks or vegetation to indicate survey or construction activity limits.
TWE-11	P, C	Access, visual	In construction areas where re-contouring is not required, vegetation will be left in place, wherever possible, and original contour will be

Table 3-1 Applicant-committed Impact Avoidance and Minimization Measures Directly and Indirectly Applicable to Conservation of Federally Listed, Proposed, and Candidate Species in the TWE Action Area

Draft EIS No.	Phase(s)[1]	Topic	Description
			maintained to avoid excessive root damage and to allow for re-sprouting.
TWE-12	P, C, O	Access, soils, vegetation, water, cultural visual resources	Except for repairs necessary to make roads passable, no widening or upgrading of existing access roads will be undertaken in the area of construction and operation, where soils or vegetation are sensitive to disturbance. In designated areas, structures will be placed to avoid sensitive features such as, but not limited to, riparian areas, water courses and cultural sites, or to allow conductors to clearly span the features within limits of standard structure design. This will minimize the amount of disturbance to the sensitive feature or reduce visual contrast.
TWE-13	C	Vegetation management, restoration, erosion control	In construction areas (e.g., marshalling yards, structure sites, spur roads from existing access roads) where ground disturbance is significant or where re-contouring is required, surface restoration will occur as required by the landowner or land management agency. The method of restoration will normally consist of returning disturbed areas back to their natural contour, reseeding (if required), installing cross drains for erosion control, placing water bars in the road, and filling ditches.
TWE-14	P, C	General, soils, erosion control, visual	The POD will show the location of borrow sites, from which material will be obtained. Borrow pits will be stripped of topsoil to a depth of approximately 6 inches. Stripped topsoil will be stockpiled and, upon completion of borrow excavation, spread to a uniform depth of 6 inches over areas of borrow pits from which removed. Before replacing topsoil, excavated surfaces will be reasonably smooth and uniformly sloped. The sides of borrow pits will be brought to stable slopes with slope intersection shaped to carry the natural contour of adjacent undisturbed terrain into the pit to give a natural appearance. When necessary, borrow pits will be drained by open ditches to prevent accumulation of standing water.
TWE-15	C	Clean-up	The POD will include a Flagging, Fencing, and Signage Plan. Except for permanent survey markers and material that locate proposed facilities, stakes, pins, rebar, spikes, and other material will be removed from the surface and within the top 15 inches of the topsoil as a part of final clean-up. Fences on ROW will be removed where necessary and replaced to the original condition or better when the work is finished. Where existing fences are removed to facilitate the work, temporary fence protection for lands adjacent to the ROW will be provided at all times during the continuation of the Contract. Such temporary fence protection will be adequate to prevent public access to restricted areas. Temporary fencing constructed on the ROW will be removed by the Contractor as part of the clean-up operations prior to final acceptance of the completed work.
TWE-16	C	Site restoration and clean-up, water resources, land use	Watering facilities (tanks, natural springs and/or developed springs, water lines, wells, etc.) will be repaired or replaced, if damaged or destroyed by construction activities, to their pre-disturbed condition as required by the landowner or land management agency.
GEOLOGY AND SOILS			
TWE-19	C	Drainage, soil erosion control	The POD will include an Erosion Control Plan as part of the Stormwater Pollution Prevention Plan (SWPPP). Grading will be performed to provide adequate drainage around structure sites and sufficient clearance under conductors. Excavated material will be spread around the site where it was excavated. Topsoil will be piled separately and replaced after work completion.
GROUNDWATER, SURFACE WATER, AND WETLANDS			
TWE-20	P	Water quality	As part of the CWA 404 Permit for the TWE Project, the COM Plan will include a Water Resources Protection Plan, which will incorporate measures to avoid and minimize impacts to wetlands and waters of the U.S (WUS). to the extent practical. The POD will include a SWPPP. The Applicant will identify all streams in the vicinity of the proposed project sites that are listed as impaired under Section 303(d) of the CWA and develop a management plan to avoid, reduce, and/or minimize adverse impacts to those streams.

Table 3-1 Applicant-committed Impact Avoidance and Minimization Measures Directly and Indirectly Applicable to Conservation of Federally Listed, Proposed, and Candidate Species in the TWE Action Area

Draft EIS No.	Phase(s)[1]	Topic	Description
TWE-21	P	Water quality	The Applicant will obtain a National Pollutant Discharge Elimination System (NPDES) permit from the U.S. Environmental Protection Agency (USEPA) prior to construction.
TWE-22	C	Water quality	Runoff from excavated areas, construction materials or wastes (including truck washing and concrete washes), and chemical products such as oil, grease, solvents, fuels, and pesticides will be controlled. Excavated material or other construction material will not be stockpiled or deposited near or on stream banks, lake shorelines, ditches, irrigation canals, or other areas where runoff could impact the environment.
TWE-23	C	Water quality	Washing of concrete trucks or disposal of excess concrete in any ditch, canal, stream, or other surface water will not be permitted. Concrete wastes will be disposed of in accordance with all federal, state and local regulations.
TWE-24	C, O	Surface water, wetlands	Vehicle refueling and servicing activities will be performed in designated construction zones located more than 100 feet from wetlands and intermittent streams and more than 500 feet from perennial streams. Spill prevention and containment measures or practices will be incorporated as needed.
TWE-25	P	Dewatering	A dewatering permit will be obtained from the appropriate agencies if required for construction dewatering activities.
VEGETATION AND SOILS MANAGEMENT			
TWE-26	P, C	Vegetation management and noxious weeds	The POD will include a Reclamation Plan and a Noxious Weed Management Plan. The Reclamation Plan will address plant removal and selective clearing. The Noxious Weed Management Plan will be developed in accordance with appropriate land management agencies' standards, consistent with applicable regulations and agency permitting stipulations for the control of noxious weeds and invasive species (Executive Order [EO] 13112). Included in the Noxious Weed Management Plan will be stipulations regarding construction, restoration, and operation (use of weed-free materials, washing of equipment, etc.).
TWE-27	C	Vegetation management	In construction areas where re-contouring is not required, vegetation will be left in place wherever possible and original contour will be maintained to avoid excessive root damage and allow for re-sprouting.
TWE-28	C	Vegetation management, visual	Clearing will be performed so as to minimize marring and scarring the countryside and preserve the natural beauty to the maximum extent possible. Except for danger trees, no clearing will be performed outside the limits of the ROW.
ECOLOGICAL RESOURCES			
TWE-29	P, C	Ecological, special status species	The POD will include a Wildlife and Plant Conservation Measures Plan, which will identify important, sensitive, or unique habitats and BLM sensitive, USFS sensitive and state-listed species in the vicinity of the TWE Project. The POD will identify measures to be taken to avoid, minimize, or mitigate impacts to these habitats and species.
TWE-30	P	Ecological, raptors	In applicable areas, the TWE Project will be designed to meet or exceed the raptor safe design standards described in the *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (Avian Power Line Interaction Committee [APLIC] 2006).
TWE-31	P, C, O	Ecological, special status species	Mitigation measures that will be developed during the consultation period with the BLM and the USFWS under Section 7 of the ESA will be adhered to, along with mitigation developed in conjunction with state authorities.
TWE-32	P, C, O, D	Ecological, special status species	Seasonal restrictions may be implemented in certain areas to mitigate impacts on wildlife. With the exception of emergency repair situations, the activities of ROW construction, restoration, maintenance, and decommissioning will be modified or discontinued in designated areas during sensitive periods (e.g., nesting and breeding periods) for candidate, proposed or listed threatened and endangered, or other sensitive animal species, as required by permitting agencies. Potential seasonal restrictions and avoidance buffers for nesting raptors will be identified in the

Table 3-1 Applicant-committed Impact Avoidance and Minimization Measures Directly and Indirectly Applicable to Conservation of Federally Listed, Proposed, and Candidate Species in the TWE Action Area

Draft EIS No.	Phase(s)[1]	Topic	Description
			Draft EIS. The Wildlife and Plant Conservation Measures Plan will incorporate the seasonal restrictions and stipulations contained in the federal agency RODs.
TWE-33	P, C	Ecological, special status species and habitats	Prior to the start of construction, the Applicant will provide training to all Contractor and Subcontractor personnel and others involved in construction activities where/if there is a known occurrence of protected species or habitat in the construction area. Sensitive areas will be considered avoidance areas. Prior to any construction activity, avoidance areas will be marked on the ground and maintained through the duration of the Contract. The Applicant will remove markings during or following final inspection of the Project.
TWE-34	C	Ecological, special status species and habitats	If evidence of a protected species not previously identified or known is found in the Project area, the Contractor will immediately notify the appropriate land management agencies and provide the location and nature of the findings.
LAND USE AND VISUAL RESOURCES			
TWE-45	P, C, O	Structure design and public safety	Structures and/or shield/ground wire will be marked with high-visibility devices where required by governmental agencies (Federal Aviation Administration [FAA]). Structure heights will be less than 200 feet, where feasible, to minimize the need for aircraft obstruction lighting.
TWE-46	P, C, O	Visual resources	The Applicant will comply with federal permitting agency stipulations regarding visual resources.
AIR QUALITY			
TWE-47	P, C	Air quality, dust control	The POD will include a Dust Control and Air Quality Plan. Requirements of those entities having jurisdiction over air quality matters will be adhered to and dust control measures will be developed. Open burning of construction trash will not be allowed unless permitted by local authorities.
PUBLIC HEALTH AND SAFETY			
TWE-53	P, C	Blasting	The POD will include a Blasting Plan, which will identify methods and mitigation measures to minimize the effects of blasting, where applicable. The Blasting Plan will document the proposed methods to achieve the desired excavations, proposed methods for blasting warning, use of non-electrical blasting systems, and provisions for controlling fly rock, vibrations, and air blast damage.
HAZARDOUS MATERIALS, WASTE, AND WASTEWATER MANAGEMENT			
TWE-57	P	Hazardous materials	As part of the POD, the Applicant will provide a Spill Prevention and Response Plan. The Plan will address compliance with all applicable federal, state, and local regulations, and will include: spill prevention measures, notification procedures in the event of a spill, employee awareness training, and commitment of manpower, equipment, and materials to respond to spills, if they occur.
TWE-58	P	Hazardous materials	As part of the POD, the Applicant will provide a Pesticide Use Plan as a component of the Noxious Weed Management Plan. The Plan will address compliance with all applicable federal, state, and local regulations.
TWE-59	P	Hazardous materials	As part of the POD, the Applicant will provide a Hazardous Materials Management Plan that has been approved by applicable federal, state or local environmental regulatory agencies. The plan will address on-site excavation of contaminated soils and debris and will include identification of contaminants, methods of excavation, personnel training, safety and health procedures, sampling requirements, management of excavated soils and debris, and disposal methods.
TWE-60	C	Waste management	No non-biodegradable debris will be deposited in the ROW. Slash and other biodegradable debris will be left in place or disposed of in

Table 3-1 Applicant-committed Impact Avoidance and Minimization Measures Directly and Indirectly Applicable to Conservation of Federally Listed, Proposed, and Candidate Species in the TWE Action Area

Draft EIS No.	Phase(s)[1]	Topic	Description
			accordance with agency requirements.
TWE-61	C, O	Hazardous materials, waste management	As part of the POD, the Applicant will provide a Hazardous Materials Management Plan. Hazardous materials will not be drained onto the ground or drainage areas. Totally enclosed containments will be provided for all trash. All construction waste including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials will be removed to a disposal facility authorized to accept such materials.
TWE-62	C, O	Hazardous materials	If a reportable release of hazardous substance occurs at the work site, the Contractor will immediately notify the Applicant and all environmental agencies, as required by law. The Contractor will be responsible for the clean-up.
FIRE PROTECTION			
TWE-64	P, C	Fire, safety	The POD will include a Fire Protection Plan. The Applicant or its Contractor(s) will notify the BLM of any fires and comply with all rules and regulations administered by the BLM and USFS concerning the use, prevention, and suppression of fires on federal lands, including any fire prevention orders that may be in effect at the time of the permitted activity. The Applicant or its Contractor(s) may be held liable for the cost of fire suppression, stabilization, and rehabilitation. In the event of a fire, personal safety will be the first priority of the Applicant or its Contractor(s). The Applicant or its Contractor(s) will: • Operate all internal and external combustion engines on federally managed lands per 36 CFR 261.52(j), which requires all such engines to be equipped with a qualified spark arrester that is maintained and not modified; • Carry shovels, water, and fire extinguishers that are rated at a minimum as ABC-10 pound on all equipment and vehicles. If a fire spreads beyond the suppression capability of workers with these tools, all workers will cease fire suppression action and leave the area immediately via pre-identified escape routes; • Initiate fire suppression actions in the work area to prevent fire spread to or on federally administered lands. If fire ignitions cannot be prevented or contained immediately, or it may be foreseeable that a fire would exceed the immediate capability of workers, the operation must be modified or discontinued. No risk of ignition or re-ignition will exist upon leaving the operation area; • Notify the appropriate fire center immediately of the location and status of any escaped fire; • Review weather forecasts and the potential fire danger prior to any operation involving potential sources of fire ignition from vehicles, equipment, or other means. Prevention measures to be taken each workday will be included in the specific job briefing. Consideration will be given to additional mitigation measures or temporary discontinuance of the operation during periods of extreme wind and dryness; • Operate all vehicles on designated roads. Vehicle parking to be restricted to areas free of vegetation, on roads, or within the permitted ROW and designated work areas; • Operate welding, grinding, or cutting activities in areas cleared of vegetation within range of the sparks for that particular action. A spotter will be required to watch for ignitions; and • Use only diesel-powered vehicles in areas where excessive heat from vehicle exhaust systems could start brush or grass fires.

[1] Phase definitions: P-Planning, C-Construction, O-Operation, D-Decommission.

Table 3-2 Additional Impact Avoidance and Minimization Measures Directly and Indirectly Applicable to Conservation of Federally Listed, Proposed, and Candidate Species in the TWE Action Area

Final EIS No.	Description	Effectiveness
GENERAL WILDLIFE		
WLF-1	To minimize disturbance to migratory birds during the breeding and nesting season, no vegetation clearing or trimming, blasting, or other new surface-disturbing activities would occur during the avian breeding season as defined by Project Region and illustrated in Figures 3.22-5, 3.22-8, and 3.22-13 of the Final EIS. If avoidance of vegetation clearing during the nesting season is not possible, then a qualified biologist would conduct nest searches no more than 7 days prior to clearing and trimming activities. Active nests would be identified and protected in accordance with the following procedure. On lands administered by the BLM and USFS, spatial avoidance buffers and seasonal restrictions would be applied as required by applicable land and RMP stipulations (Appendix C). On federal lands for which there are no stipulations applicable to non-raptorial migratory birds, the habitat- or species-specific nest buffers recommended by the BLM Ely District (BLM 2012) would apply. Seasonal and spatial nest buffers that are more restrictive than the applicable required BLM and USFS plan stipulations and BLM Ely District recommendations would be applied at the discretion of local federal and state wildlife management agency biologists. Additionally, the BLM Ely District-recommended nest buffers would be applied to all other land jurisdictions in coordination with TransWest and respective landowners whose lands would be crossed by the Project.	This conservation measure would minimize disturbance to nesting migratory birds by limiting disturbance from construction and maintenance activities during critical breeding periods.
WLF-2	To minimize disturbance to nesting raptors, no vegetation clearing or trimming, blasting, or other new surface-disturbing activities would occur within the appropriate spatial buffer for an occupied nest during the breeding season of the species using it. Raptor breeding seasons vary widely based on species, weather conditions, prey availability, latitude, elevation, and other factors. Figures 3.22 5, 3.22-8, and 3.22-13 of the Final EIS present approximate raptor breeding seasons by species and Project region. If surface-disturbing activities within the appropriate spatial buffer cannot be avoided during the associated raptor nesting season, preconstruction raptor nest surveys and monitoring using agency-approved protocols would be performed to identify and protect occupied nests. Spatial avoidance buffers and seasonal restrictions would be applied as required by applicable BLM and USFS land and resource management plan stipulations (Appendix C) on lands administered by these agencies. Seasonal and spatial raptor nest buffers recommended by the USFWS and the appropriate state wildlife agency that are more restrictive than the applicable, required BLM and USFS plan stipulations would be applied at the discretion of these land management agencies (Table 3.22-4). Additionally, raptor seasonal and spatial buffers recommended by USFWS and the appropriate state wildlife agency would be applied to all other land jurisdictions in coordination with TransWest and respective landowners whose lands would be crossed by the Project.	This conservation measure would minimize disturbance to nesting raptors by limiting disturbance from construction and maintenance activities during critical breeding periods.
WLF-4	For the protection of migratory birds, TransWest would be required to install dark-sky lighting at all terminals, sub-stations, and series compensation facilities that is fully shielded to keep light from extending above the horizontal plane and is designed to provide the minimum amount of illumination necessary for safety and security purposes.	This conservation measure would minimize collision impacts to migratory birds which could be attracted by lighting at Project components.
WLF-5	In Audubon Important Bird Areas (IBAs) crossed by the 250-foot-wide transmission line ROW, TransWest would employ line marking as recommended in Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012). In addition, vegetation management level 3, as described in the Project Vegetation Management Plan, would be employed in IBAs crossed by the 250-foot-wide transmission line ROW.	This conservation measure would minimize impacts to habitat at Audubon IBAs. It also would minimize collision risk in areas of high avian use.

Table 3-2 Additional Impact Avoidance and Minimization Measures Directly and Indirectly Applicable to Conservation of Federally Listed, Proposed, and Candidate Species in the TWE Action Area

Final EIS No.	Description	Effectiveness
WLF-6	To minimize fragmentation impacts to forested habitats on public lands, TransWest would employ vegetation management Level 3, as described in the Project Vegetation Management Plan, to portions of the 250-foot-wide transmission line ROW located in forest and woodland habitat areas identified by local, federal, or state wildlife management agency biologists as being of particular importance to wildlife. In these areas, TransWest also would be required to leave downed woody debris greater than 3 inches in diameter (not including merchantable timber) in place to provide habitat for insects, small mammals, and other small prey species utilized by owls, raptors, and other predators. USFS Land and Resource Management Plans (aka Forest Plans) specify the amounts of down logs and woody debris to be left in logged areas. For instance, on USFS lands, five 8-foot-long logs 12 inches in diameter should be left per acre on average per stand in mixed conifer and spruce/fir habitats. In aspen habitats, five 8-foot-long logs 6 inches in diameter should be left on average per stand. Where possible, 10 tons of woody debris greater than 3 inches in diameter should be left on average per stand in mixed conifer and spruce/fir habitats and 3 tons per acre of woody debris greater than 3 inches in diameter should be left on average per stand in aspen habitats. Refer to applicable Forest Plans for detailed guidelines applicable other vegetation types.	This conservation measure would minimize impacts to wildlife species, their prey, and to forested habitats. USFS standards & guidelines specify the amount of down logs and coarse woody debris to be left in place as habitat for prey species. Following these guidelines will help to ensure that habitat for small animals is retained while providing for reasonable hazardous wildfire fuels reduction.
WLF-7	In Bird Habitat Conservation Areas (BHCAs), TransWest would employ line marking as recommended in Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012). In addition, vegetation management Level 3, as described in the Project Vegetation Management Plan, would be employed in BHCAs crossed by the 250-foot-wide transmission line ROW.	This conservation measure would minimize impacts to habitat in BHCAs. It also would minimize collision risk in areas of high avian use.
WLF-8	To minimize collision potential for avian species, TransWest would design the project to meet or exceed the standards described in the Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012).	This conservation measure would minimize avian collision potential.
WLF-10	To avoid or minimize long-term disturbance to wildlife associated with public use of the ROW and new access roads during Project operation, these roads would be closed or rehabilitated using methods and monitoring developed through consultation with the landowner or land management agency. Depending on facility and ROW maintenance needs, methods for closure could include gates, obstructions such as berms or boulders, or partial or full restoration to natural contour and vegetation.	This conservation measure would minimize impacts to sensitive wildlife species and their habitats by limiting public access. Limiting public access would decrease human disturbance to wildlife, particularly nesting birds, and prevent habitat degradation by humans and vehicles. This conservation measure also would reduce the potential for nest abandonment due to noise and human activity.
SPECIAL STATUS WILDLIFE		
SSWS-15	If evidence of a protected species not previously identified or known is found in the Project area, the Contractor will immediately notify the appropriate land management agencies and provide the location and nature of the findings. Construction in the vicinity of the newly located protected species would be halted and would resume when a biologist from the appropriate agency determines that the species would not be affected by continued construction.	This conservation measure would minimize impacts to special status species that may be encountered during construction along the 250-foot-wide transmission line ROW.
SSWS-16	To reduce impacts to federally listed wildlife species, TransWest would be required to obtain approval from the USFWS, lead agencies, and all applicable land management agencies prior to applying dust palliatives to	This conservation measure would minimize impacts to federally listed special status species that may be

Table 3-2 Additional Impact Avoidance and Minimization Measures Directly and Indirectly Applicable to Conservation of Federally Listed, Proposed, and Candidate Species in the TWE Action Area

Final EIS No.	Description	Effectiveness
	construction areas located within areas designated as suitable habitat for federally listed species.	adversely impacted by the application of dust palliatives within the 250-foot–wide transmission line ROW during construction and decommissioning.
AQUATIC BIOLOGICAL RESOURCES		
AB-1	(Fish Passage): When avoidance of perennial streams with fish populations is not feasible and a culvert is required during construction, flow would be maintained in a portion of the stream to allow unrestricted fish passage. Any plan for dewatering the stream at the culvert site must be approved by the appropriate federal and state agencies. Culvert size and type would be selected to facilitate the continued and long-term connectivity and movement of target aquatic species. If the culvert is proposed to be in place during project operation, approval must be obtained from the federal or state agency management authority. An alternative crossing method may be required.	This conservation measure would be highly effective in maintaining fish movement through the construction area.
AB-2	(Avoid Game Fish Spawning Periods): If spawning areas for game fish species are known to occur at streams proposed for vehicle crossing or culvert construction, instream disturbance would be scheduled to avoid the spawning period. The exact dates for avoidance would be determined through discussions with Wyoming Game and Fish Department (WGFD), Colorado Parks and Wildlife (CPW), Utah Division of Wildlife Resources (UDWR), or USFS. All disturbed areas would be restored to pre-construction conditions prior to the next spawning season.	This conservation measure would be highly effective in avoiding impacts on game fish spawning.
AB-3	(Invasive Aquatic Species Protection): It is assumed that any waterbody could contain aquatic invasive species and invasive weed species. If work occurs in or near a waterbody, all equipment would be decontaminated. Decontamination would occur before arrival at a project site to avoid the transfer of aquatic invasive species from a previous work site in or near water. Decontamination would consist of either of these actions: 1) drain all water from equipment and compartments; clean equipment of all mud, plants, debris, and aquatic organisms; and dry equipment for specified time by season (5 days in June through August, 18 days in March through May, and 3 days in December through February when temperatures are at or below freezing); or 2) use a high pressure (2,500 pounds per square inch [psi]) hot water (140 degrees Fahrenheit [°F]) pressure washer to thoroughly clean equipment and flush all compartments that may hold water. A field monitor would be present to ensure that the cleaning was completed prior to vehicle and equipment moving to other streams and drainages.	This conservation measure would be highly effective in avoiding the transfer of invasive aquatic species due to the cleaning technique.
AB-4	(Herbicide Use Plan): As part of vegetation management, the applicant would prepare an Herbicide Use Plan. The Plan would identify a list of approved herbicides that may be used as well as locations of areas that may be treated. Licensed herbicide applicators would be used in the treatment process. All herbicides would be used in accordance with label instructions for the chemical. The Plan also would discuss compliance with applicable federal, state, and local agencies.	This conservation measure would be highly effective in avoiding toxic effects of herbicide use on aquatic species.
SPECIAL STATUS AQUATIC RESOURCES		
SSS-1	(Sediment Protection for Streams with Federally listed and Special Management Fish Species): Mitigation measure **WR-3** would be applied to perennial streams providing habitat for federally listed fish species or fish species requiring special management as mandated by existing federal land use plans. The measure would require coordination with the federal agencies having land jurisdiction. This coordination would include location and design of access roads and temporary work areas within 300 feet of streams providing habitat for these	This conservation measure would be highly effective in avoiding or minimizing sediment effects to streams with federally listed or special management fish species.

Table 3-2 Additional Impact Avoidance and Minimization Measures Directly and Indirectly Applicable to Conservation of Federally Listed, Proposed, and Candidate Species in the TWE Action Area

Final EIS No.	Description	Effectiveness
	species to minimize erosion and sedimentation effects. The agencies would coordinate and provide input to TransWest for potential modification of locations and designs within TransWest's final engineering schedule.	
SSS-2	(Avoidance of Water Withdrawal and Entrainment/Impingement Effects for Federally Listed Fish Species): Where critical habitat for the Colorado River federally endangered fish species cannot be avoided as water sources for construction purposes, TransWest would be required to obtain approval from the USFWS and state or federal agencies responsible for managing the land and critical habitat areas. Agency approval would ensure that water withdrawal methods would avoid or minimize entrainment or impingement effects to early life stages of endangered fish species. Requirements for water pumping in critical habitat areas would include: 1) avoidance of pumping between approximately April 1 through August 31, with specific dates dependent upon the water year; 2) intake hoses would be screened with 3/32-inch mesh size; 3) intake velocity would not exceed 0.33 feet/second in an area where larval stages of the federally endangered fish may be present; and 4) pumping from off-channel locations (i.e., no connection to the river during high spring flows) would use an infiltration gallery constructed in a USFWS-approved location. Additional guidance on pumping methodology is provided in the NMFS's (1997) document entitled Fish Screening Criteria for Anadromous Salmonids.	This conservation measure would be highly effective in avoiding the entrainment or impingement effects on federally listed fish species in their critical habitat areas.
SSS-3	(Avoidance of Water Withdrawal and Entrainment/Impingement Effects for Conservation Agreement Fish Species): Where streams containing conservation agreement fish species (bluehead sucker, Bonneville cutthroat trout, Colorado River cutthroat trout, flannelmouth sucker, southern leatherside chub, and Virgin River spinedace) cannot be avoided as construction water sources, approval must be obtained from federal, state, and/or land management agencies regarding water withdrawal sites and methods. A site specific withdrawal plan would be prepared by TransWest for review/approval by the agencies. Requirements for water pumping for hose screening and intake velocities would be the same as identified in mitigation measure **SSS-1**. Additional requirements include the use of private, off-stream water sources if possible; withdrawal sites must be reviewed/approved by applicable agencies; and approval should include provisions to maintain adequate instream flows to protect aquatic species and their habitat.	This conservation measure would be highly effective in providing management direction to avoid water withdrawal in habitat occupied by conservation agreement fish species.
SSS-4	(No Permanent Structures or New Roads in Critical Habitat for Federally Listed Fish Species): No permanent structures or new roads would be constructed in critical habitat for federally endangered fish species. Any temporary disturbance to soils in the 100-year floodplain within critical habitat would be minimized to the extent possible and restoration would be completed to maintain existing conditions. TransWest would avoid siting temporary facilities such as staging areas and helicopter pads in the 100-year floodplain that is designated critical habitat. Additionally, TransWest would avoid temporary river crossings by vehicles within designated critical habitat.	This conservation measure would be highly effective in avoiding direct disturbance to critical habitat for Colorado pikeminnow in Regions I and II and razorback sucker in Region II.
SSS-11	(No Vehicle Crossings or New Roads in the Muddy River): No vehicle crossings or new roads would be constructed for the Muddy River. This measure would protect habitat for Virgin River chub by avoiding habitat alteration or loss.	This conservation measure would be highly effective in avoiding direct disturbance to habitat for special status fish species in the Muddy River.

Table 3-2 Additional Impact Avoidance and Minimization Measures Directly and Indirectly Applicable to Conservation of Federally Listed, Proposed, and Candidate Species in the TWE Action Area

Final EIS No.	Description	Effectiveness
WATER RESOURCES		
WR-3	As part of the ROW grant and prior to the Notice to Proceed, TransWest would consult with federal agencies having land jurisdiction regarding location and design of access roads and temporary work areas near impaired streams to avoid erosion and sedimentation effects. The proposed design and location of new and upgraded access roads and temporary work areas within watersheds (Hydrographic Unit Code HUC]10) containing sediment- or ion-impaired waters (according to 303(d) lists) would be provided by TransWest to the agencies upon completion of conceptual design of these facilities. The agencies would coordinate and provide input (as deemed applicable by the agencies) to TransWest for modification of locations and designs within TransWest's final engineering schedule to prevent the Project from contributing additional sediment to impaired waters.	Consultation with agencies would encourage the consideration of best-science tools and local information, thus maximizing the final design process.
VEGETATION AND WETLAND RESOURCES		
NX-1	The Noxious Weed Management Plan to be developed as part of the COM Plan would include the following: 1. Pre-construction surveys for noxious weeds in the footprints of the ROW, access roads, and ancillary facilities; 2. Pre-construction weed control; 3. Education of construction and operation personnel in each Project region; 4. Washing of vehicles and equipment before entering and leaving the ROW; 5. Herbicide spraying; and 6. Annual monitoring and reporting. Survey information collected during pre-construction surveys would include species name, global positioning system location of weed infestations, percent cover, and approximate size of weed infestations. Control of noxious and invasive species could include chemical, physical, and biological methods and would be developed in consultation with the land agencies and private landowners. The plan would identify species of concern for each BLM FO and USFS and focus monitoring and control methods on these species. The plan would comply with the existing BLM, USFS, USFWS, state, and federal regulations concerning noxious weed management. Post-construction annual monitoring would be determined with the appropriate land management agencies.	This conservation measure would minimize impacts to potential special status species habitat.
NX-2	Herbicide spraying would be conducted following all applicable state and federal laws regarding chemical use, adverse weather, chemical storage, and chemical drift. Further guidelines and protocols for herbicide spraying on BLM land are provided in the Final BLM Vegetation Treatment Using Herbicides Programmatic EIS (BLM Vegetation EIS) (BLM 2007). Standard operating procedures for herbicide spraying include buffers for sensitive areas such as riparian and wetland areas and threatened and endangered species habitat, timing restrictions, and safety protocols.	This conservation measure would minimize impacts to habitat for listed, proposed, and candidate plant, wildlife, and aquatic species.

Table 3-2 Additional Impact Avoidance and Minimization Measures Directly and Indirectly Applicable to Conservation of Federally Listed, Proposed, and Candidate Species in the TWE Action Area

Final EIS No.	Description	Effectiveness
NX-3	On lands managed by the BLM, an approved Pesticide Use Proposal (PUP) would be obtained from each BLM FO prior to herbicide spraying. PUPs would have site-specific information about the herbicides to be used. The PUPs and associated reporting requirements would be submitted on the schedule required for each BLM FO. Herbicide spraying in desert tortoise habitat in Nevada would require consultation with the BLM and USFWS.	This conservation measure would ensure that coordination occurs with local agency personnel with site- and species-specific expertise and jurisdictional authority. As such, it would minimize impacts to habitat for local populations of federally listed, proposed, and candidate plant, wildlife, and aquatic species.
NX-4	The cut-stumps of mature salt cedar stands that are cut as part of vegetation clearing will be immediately painted with herbicides. The specific control methods and herbicide to be used would be determined in consultation with the Nevada BLM State and FOs. Additional control measures could include the planting of native or desired plant species following treatment to provide erosion control, and the use of biocontrols.	This measure would improve the control and management of salt cedar stands that are to be cleared as part of the construction and maintenance activities. Coordination with appropriate BLM State and FOs is critical for ensuring that tamarisk removal does not adversely affect listed species that may use these areas as habitat (e.g., southwestern willow flycatcher).
VG-1	Native seed mixes to be used for reclamation would be developed in consultation with the land managers for the various regions crossed by the Project. Seed mixes would meet the requirements of the individual agency FO's crossed by the Project. Site-specific seed mixes for soils with low reclamation potential (LRP) would be developed. The LRP seed mixes would be specifically designed for alkaline, saline, or sodic soils and would be used in areas where reclamation would potentially be difficult based on soil conditions. Additional soil amendments may be required in these areas, and would be implemented at the direction of the land manager. Reclaimed areas would be monitored annually by the applicant to ensure successful reclamation is occurring. The length of time for the annual monitoring, and the definition of successful reclamation would be determined by the appropriate land management agency. Subsequent actions in areas without successful reclamation would be determined in consultation with the appropriate land management agency.	Implementation of this measure would mitigate impacts to saltbush communities and other areas that may be difficult to reclaim to pre-disturbance native vegetation conditions. The clearing of pinyon-juniper woodland would be determined through consultation with the land management agencies and surface land owners.
VG-3	A vegetation reclamation and monitoring plan will be developed as part of the POD. The reclamation monitoring plan would define reclamation success for each vegetation type and management agency, list reclamation seed mixes, and detail reclamation monitoring for both interim and final reclamation. Interim and final reclamation success would be monitored quarterly for the first year, and then annually for at least 3 years, or until reclamation success as defined by each land management agency crossed by the project is achieved. Reporting of construction, reclamation progress, and monitoring results would be submitted to each land management agency per each office's reporting requirements.	Implementation of this measure would assist in ensuring post-reclamation success through monitoring and reporting of reclamation results. Impacts to each vegetative community would occur in less than 1 percent of the total of each vegetative community in the analysis area.
VG-4	During vegetation clearing, if chipping and spreading woody material in the ROW, wood chips will not exceed 3 inches in depth. Distribute chips in discontinuous patches that do not result in a continuous chip mat (<40% of surface covered by 3 inches of chips).	Implementation of this measure would mitigate impacts to soil and vegetation resources from the spreading of chipped material in the ROW as part of vegetation clearing activities.

Table 3-2 Additional Impact Avoidance and Minimization Measures Directly and Indirectly Applicable to Conservation of Federally Listed, Proposed, and Candidate Species in the TWE Action Area

Final EIS No.	Description	Effectiveness
VG-5	Masticated material spread in the ROW will not exceed a depth of 3 to 6 inches. Distribute material in discontinuous patches that do not result in a continuous chip mat (<40% of surface covered 3 to 6 inches thick).	Implementation of this measure would mitigate impacts to soil and vegetation resources from the spreading of masticated material in the ROW as part of vegetation clearing activities.
WET-1	Wetland surveys would be conducted at terminal, ROW, ancillary facilities, and along proposed access roads corridors to identify wetland, WUS, and riparian areas located in these areas. Survey information collected would include wetland type, type and cover of hydrophytic and riparian vegetation species present, soil characteristics, site hydrology, global positioning system location of the wetland, and associated information required to determine jurisdictional status. Based on survey results, no surface disturbance including temporary and permanent facilities, the placement of fill material or vegetation clearing for storage, parking, construction activities, or construction work areas as feasible will occur within the avoidance buffer, or surface use restriction defined in the resource management plan for each BLM FO and USFS national forest. If avoidance is not feasible, U.S. Army Corps of Engineers (USACE), BLM, USFS, and USFWS crossing and construction techniques for wetlands and riparian areas will be employed. The wetland crossing and construction techniques will be approved by the USACE, BLM, USFS, and USFWS and will be outlined in the Final POD.	Implementation of conservation measures **WET-1** through **WET-3**, in conjunction with design feature TWE-20, would mitigate impacts to wetlands and riparian areas through identification and mapping of wetlands, riparian areas, and drainages and the avoidance of surface disturbance in these areas. These measures would minimize impacts to a several listed wildlife and plant species that use wetland and riparian habitats.
WET-2	For any features identified during field surveys as jurisdictional under the USACE and USEPA guidance under Section 4 of the CWA, consultation with the USACE will occur prior to construction. Mitigation for these features will be determined in consultation with the USACE and BLM.	
WET-3	Access roads will be routed around riparian areas, wetlands, intermittent or perennial drainages, and ephemeral channels to the extent practical. If jurisdictional wetlands or WUS cannot be avoided, USACE approved construction techniques for construction in wetlands and WUS will be applied. BLM and USFS construction techniques for non-jurisdictional wetlands, riparian areas, intermittent drainages, and ephemeral channels would be applied on BLM and USFS lands, as appropriate. These include the use of timber mats, erosion controls, and the placement of equipment outside of the wetland, riparian areas, intermittent drainages, and ephemeral channels boundaries.	

Table 3-2 Additional Impact Avoidance and Minimization Measures Directly and Indirectly Applicable to Conservation of Federally Listed, Proposed, and Candidate Species in the TWE Action Area

Final EIS No.	Description	Effectiveness
SPECIAL STATUS PLANT RESOURCES		
SS-1	(Species-specific Surveys) – Species requiring surveys would be identified by the BLM and Western in consultation with the appropriate agency. For the species that are identified as requiring surveys, site- and species-specific surveys would be conducted. The timing and methodology of the surveys would be determined by the BLM in consultation with the appropriate agency and the Applicant. Surveys would be conducted in areas identified as potential habitat through models developed for the EIS, or from agency-provided models for specific species. If individuals or populations are identified during surveys in potential habitat areas, species-specific avoidance through structure and ROW design modifications would be developed and implemented. For species that cannot be avoided, species-specific mitigation would be developed in consultation with the appropriate agency and BLM. Species-specific mitigation may include compensatory mitigation, and transplanting of individuals. For federally listed species, the species-specific mitigation would be identified as conservation measures in the Biological Assessment. For USFS Sensitive species, the species-specific mitigation would be described in the Biological Evaluation (BE).	With implementation of conservation measure **SS-1**, in addition to TransWest's design features and the WWEC BMPs, no direct impacts to special status plant species and their associated suitable habitats are anticipated. If species or habitat avoidance remains infeasible, impact minimization and mitigation measures would be developed in consultation with the BLM, Western, USFWS, and USFS prior to construction.
SS-3	Construction would occur downslope of special status plants and populations where feasible; if surface disturbance must be sited upslope, erosion controls would be implemented at the direction of the BLM, USFS, or USFWS, as appropriate, to prevent sedimentation and erosion from upslope surface disturbance. Additional buffer distances greater than the minimum 300-foot buffer distance described in mitigation measure **SS-4** may be required.	With implementation of conservation measure **SS-3**, erosion and sedimentation impacts to special status species would be minimized through Project design, avoidance buffers, and erosion controls.
SS-4	A minimum 300-foot buffer distance would be established between federally listed individuals and populations and surface disturbance. Avoidance areas would be visible during construction through fencing, signing, rebar, etc. during construction. Construction and operation traffic would stay on designed routes, and other cleared or approved areas.	Implementation of conservation measure **SS-4** would minimize impacts to federally listed individuals and populations through the use of avoidance buffers.
SS-5	The Dust Control and Air Quality Plan would include dust abatement measures to minimize impacts to special status plant species; including use of slower speed limits on unpaved roads, gravel on roads in occupied habitat and avoidance areas, and the application of water for dust abatement.	Implementation of conservation measure **SS-5** would mitigate impacts to special status species resulting from fugitive dust.
SS-6	Prior to vegetation management activities, including vegetation removal, herbicide use, and off-road vehicle access, within federally listed occupied habitat, the applicant will coordinate with the USFWS and BLM to minimize impacts to federally listed species.	Implementation of conservation measure **SS-6** would mitigate impacts to special status species resulting from vegetation management.
SS-9	(Avoidance of High Quality Habitats) – In instances where complete habitat avoidance is not possible due to topographical, biological, or engineering constraints, all "high quality" habitats as determined during site- and species-specific surveys would be avoided by all direct disturbances during construction and operational activities. High quality habitat are defined as areas that are within the geographic range of the species, have been field-verified as having the majority of required habitat characteristics; and/or the species has been observed in the immediate vicinity, resulting in high occurrence potential for the identified species.	Implementation of conservation measure **SS-9** would reduce impacts to special status species resulting from loss of suitable habitat. Conservation of high quality habitat in the action area would facilitate the maintenance and recovery of listed species.

4.0 Information Sources, Definitions, and Consultation History

4.1 Information Sources

Information regarding federally listed, candidate, and proposed species and their habitat within the Action Area was obtained from a review of existing published and unpublished sources, agency reports, field surveys, species range information obtained from the USFWS Ecological Conservation Online System (ECOS) website and Information, Planning, and Conservation (IPaC) System, and species occurrence data obtained from the Wyoming Natural Diversity Database (WYNDD), Colorado Natural Heritage Program (CNHP), Utah Natural Heritage Program (UNHP), and Nevada Natural Heritage Program (NNHP). In addition, agency input on species occurrence within the Action Area was provided through participation in the BRTG, which involved monthly conference calls to discuss the Project and associated biological resource issues.

Field surveys were conducted for desert tortoise and Utah prairie dog to determine species presence and habitat within the Action Area. Because final engineering and facility micro-siting will not be completed unless the Project is approved, surveys have not been conducted for the other listed, candidate, and proposed species with potential to occur along the transmission line route. Should the Project be approved, TransWest would conduct detailed habitat analyses and/or species-specific surveys for listed, proposed, and candidate species likely to be affected by the Project prior to final design and micro-siting of towers and ancillary facilities and/or preconstruction clearance surveys immediately prior to construction. Species-specific survey needs are identified in Chapter 6.0 of this BA. For plant species, pre-construction surveys would occur during the appropriate flowering period for the species immediately prior to or during the year in which construction is initiated. Similarly, pre-construction wildlife surveys would occur in the appropriate survey window just prior to start of construction. The results of the surveys would be used to avoid and minimize impacts to listed, proposed, and candidate species through micro-siting of proposed facilities, changes to timing of construction and operations and maintenance activities, or to determine the level of unavoidable impacts, including potential take of listed species. All pre-final design and pre-construction clearance survey efforts would be carried out by qualified biologists and botanists in coordination with the USFWS, BLM, Western, applicable land management agencies, and private land owners, as appropriate. For species without complete or current occurrence data within the action area, this BA takes a conservative, programmatic approach and assumes that modeled potentially suitable habitat is occupied. Project effects to these species are therefore based on whether and the extent to which modeled habitat would be affected by proposed facilities.

For the purposes of this BA, wildlife species lacking agency-developed/approved habitat models and for which Project-specific field surveys have not been conducted have had their habitats modeled by AECOM using a geographic information system (GIS). These habitat models are based on each species known geographic range and habitat association. Northwest Regional Gap Analysis Project (NWReGAP) and Southwestern Regional Gap Analysis Project (SWReGAP) land cover data provided the vegetation base layer that was used to determine the distribution and extent of upland wildlife species' potential habitats. These datasets were determined to be inadequate for identifying riparian and wetland species' potential habitats. For those species, National Wetlands Inventory (NWI) data and/or the National Hydrographic Dataset (NHD) were used to identify and map potential habitat. For plant species carried forward in the BA, with the exception of the Ute ladies'-tresses orchid, all habitat models were developed by the USFWS and/or the BLM. The Ute ladies'-tresses habitat model was developed by AECOM based on habitat parameters provided by the USFWS. The model was further refined based on comments from the USFWS and BLM.

4.2 Direct Effects

As described in Section 2.2, the action area for the proposed action is based on the following components of the Final EIS Agency Preferred Alternative: 1) transmission line refined corridor with a preliminary engineered alignment and 250-foot transmission line ROW centered on the alignment; 2) access roads and temporary work areas (which may be sited up to 1 mile from the preliminary engineered alignment); 3) ground electrode sites; and 4) the northern and southern terminals. Because the actual location of project facilities involving temporary work areas, terminal locations, electrode bed sites, and access roads have not been determined at this time, TransWest has provided acreages and assumptions for these facilities. Siting areas were provided for the terminals and ground electrode systems. Final engineering design will be completed following the ROD and prior to the BLM Notice to Proceed.

As per the Endangered Species Consultation Handbook (USFWS and NMFS 1998), under Section 7 of the ESA, direct effects of a proposed action refer to the immediate effects of the project on a listed species or its habitat. In this BA, direct effects include short-term construction-related impacts associated with temporary use areas that would be reclaimed and revegetated following construction. These would include cleared and graded areas around tower bases, other work areas within the ROW, as well as concrete batch plants, material storage yards, stringing and tensioning sites, and other facilities as described in Chapter 2.0 of this BA. Both short- and long-term direct effects to listed, proposed, and candidate species and their habitats would occur during construction as a result of clearing and grading new access roads, removing vegetation over 6 feet in height from the ROW, constructing transmission tower structures and constructing the ground electrode systems and terminals. Long-term direct effects also include activities associated with the operation and maintenance phase of the Project. These activities include increased human presence resulting in species disruptions and disturbance to habitat from vegetation maintenance.

Direct effects also may include the effects of interrelated actions and interdependent actions. Interrelated actions refer to activities that are part of the proposed action and depend on the proposed action for their justification. For the Project, an example of an interrelated action would be the soil borings required for the geological hazard analysis and geotechnical testing. These investigations would take place prior to final engineering design and facility micro-siting and would have potential to affect some of the species analyzed in this BA. Interdependent actions are actions that have no independent utility apart from the action under consultation. There are no interdependent actions associated with the Project.

4.3 Indirect Effects

Indirect effects of a proposed action are caused by or result from the proposed action and occur later in time but are reasonably certain to occur. For the Project, indirect effects to listed species and their habitats have potential to result from the transmission line augmenting nesting and perching sites for ravens and raptors. Increased concentrations of these species might then result in increased predation of listed species in these areas. Another source of indirect effects (as well as direct effects) to listed species is water depletions. Potential water depletions to the Platte and Colorado River systems associated with dust control and the production of concrete for facility footings and foundations could occur during construction. Depending on the amount and location of withdrawal, these depletions could have an indirect effect on habitat quality for downstream species later in time from when the withdrawal occurred.

4.4 Cumulative Effects

Under the ESA, cumulative effects include future non-federal (i.e., state, tribal, local, or private) activities that are reasonably certain to occur within the action area (50 CFR 402.02), and would have potential to affect one or more of the same species that would be affected by the proposed action. For this BA, future non-federal activities on private and state lands were identified through direct contact with state and local governments with jurisdiction over lands crossed by the proposed action. In addition, state, county, and

city websites were reviewed for information on future activities identified for these lands. The area for the information search for future non-federal activities comprised an approximately 4-mile-wide corridor centered on the preliminary engineered alignment (i.e., the TWE Draft EIS 2-mile-wide corridor buffered by 1 mile on either side). This area was expanded for some species to include critical habitat that could be affected by construction water use. Very little information was found on non-federal activities within the TWE Action Area.

4.5 Consultation History

As the lead federal agencies for the TWE Project EIS, the BLM and Western were signatories for a Section 7 Consultation Agreement along with cooperating agencies including the Bureau of Reclamation, Bureau of Indian Affairs, USFS, USACE, and USFWS. The Agreement was signed in March 2013.

Numerous informal activities have been completed to meet the ESA Section 7 consultation requirements for the Project. These activities involved meetings, phone calls, and e-mails among the lead agencies, USFS, USFWS, and AECOM regarding issues related to federally listed, proposed, and candidate species; monthly BRTG calls; and review of USFWS information related to species occurrences with the action area, survey protocols, contents of the BA, and conservation measures.

The following list highlights the key informal consultation activities for the TransWest Transmission Project:

- An informal request was made to the USFWS Colorado, Nevada, Utah, and Wyoming State Offices by Environmental Planning Group (EPG) to confirm a list of federal species for the Energy Gateway South and TransWest Transmission projects.
- USFWS identified the federal listed, proposed, and candidate species that may be present in the proposed project areas for the Energy Gateway South and TransWest Transmission projects in a letter dated August 23, 2009.
- A biological resources coordination meeting was held on January 19, 2010 at the BLM Wyoming State FO, with participants from the BLM, USFWS, and AECOM. The purpose of the meeting was to define the coordination and communication process and develop special status species lists including federally listed species.
- USFWS identified the federally listed, proposed, and candidate species that may be present in the proposed project area for the TWE Project in a letter dated August 25, 2010.
- BLM and AECOM compiled occurrence information for the federally listed, proposed, and candidate species and incorporated these data with the areas associated with the proposed project facilities. Based on this mapping effort, the initial USFWS species list was modified.
- Feedback on the modified species list and occurrences within the project area was obtained from the USFWS and other cooperating agencies through the BRTG process and reviews of the Preliminary Draft EIS (PDEIS) and Draft EIS. Monthly BRTG phone discussions were conducted from August 2009 through April 2014. The 2009 BRTG calls involved discussions for both the TransWest Express Transmission and Energy Gateway South projects. Starting in January 2010, the BRTG calls were held separately for both projects.
- AECOM prepared a survey protocol document that described the survey methods to be used for special status species including federal listed, proposed, and candidate species (AECOM 2012). Feedback was obtained through BRTG calls and document reviews. A final survey protocol document was completed in April 2012. Additional detail on the survey schedule for each species was added in 2013 and 2014.
- Habitat modeling was completed for the federally listed, proposed, and candidate plant species as part of the species occurrence analysis. Details on the habitat modeling methodology and results are presented for the plant species discussions in Section 6, Environmental Baseline and

Assessment Effects. As stated in section 3.1 above, the USFWS provided or was integrally involved in the review and approval of GIS models used to identify potential habitat and analysis areas for listed plant species carried forward in the BA.

- An impact assessment approach document was prepared by the USFWS's Colorado, Nevada, Utah, and Wyoming FOs for three riparian species (Ute-ladies tresses orchid, western yellow-billed cuckoo, and southwestern willow flycatcher) for the Agency Preferred Alternative, as identified in the PDEIS, Version 2. The document that was provided to the BLM on June 27, 2013, described information that would be needed to complete impact analyses for these three riparian species.
- A January 21, 2014, meeting was held to discuss the BA outline and the species to be carried forward into the BA analysis. The USFWS provided an updated list of species analyzed in the BA on February 21, 2014.
- BLM, AECOM, and the USFWS discussed existing protection measures and additional proposed conservation measures as part of the impact evaluations for species.
- AECOM met with USFWS Utah FO to discuss and finalize analysis areas for listed species in Utah.
- Following the change in the Agency Preferred Alternative in September 2014, AECOM revised the list of species to be carried forward in the BA. BLM submitted the revised list to USFWS on October 27, 2014. On October 31, 2014, USFWS confirmed the proposed changes to the list, identified an additional change, and advised the BLM regarding the proposed rule establishing critical habitat for the western yellow-billed cuckoo.

5.0 Deconstructing the Action

The following sections identify general impacts to vegetation and wildlife associated with each of the project components and phases described in Chapter 2.0. This text has been developed to assist the USFWS in understanding the different types of impacts that federally listed, EXP/NE, and candidate species could incur as a result of Project implementation.

5.1 Plants

5.1.1 Pre-construction Activities

5.1.1.1 Environmental Surveys

Environmental surveys, including special status species surveys, noxious weed surveys, wetland delineations, and cultural and paleontological resources investigations, would be conducted in the approved ROW, refined transmission corridor, and potential disturbance area, as needed, following approval of the Proposed Action and issuance of the Project RODs. Special status plants found during these survey efforts would be recorded via global positioning system (GPS) for use in final Project design and construction planning. Engineering surveys and other environmental surveys that would occur within modeled or potential habitat for any listed plant species would be preceded by habitat assessments and, if necessary, species-specific surveys conducted using USFWS-approved protocols. Habitat assessments would be conducted by qualified botanists capable of verifying the presence or absence of suitable habitat in areas modeled as potential habitat for a listed species. Verified suitable habitats would then either be avoided or, if complete avoidance is not feasible, species-specific surveys would be conducted in areas with potential to be affected by Project activities. In accordance with the general conservation measures described in Chapter 3.0 and species-specific measures described in Chapter 6.0, any listed plant species individuals or populations found during these survey efforts would be mapped and avoided during subsequent environmental or engineering survey efforts, geotechnical investigations, and Project construction.

5.1.1.2 Engineering Surveys

Like the environmental surveys described above, engineering surveys would take place following issuance of the Project RODs. As stated above, engineering surveys that would have potential to adversely affect verified suitable habitat for federally listed plant surveys would be preceded by species-specific surveys conducted by qualified individuals using USFWS-approved protocols. Subsequent engineering surveys in these areas would avoid impacts to suitable habitats and/or extant individuals or populations of listed plant species that had been mapped and flagged or fenced in accordance with USFWS and the appropriate federal land management agency input following completion of the habitat assessment and/or species-specific surveys.

5.1.1.3 Geotechnical Investigations

Geotechnical investigations would result in ground disturbance associated with accessing testing sites (i.e., proposed and alternate transmission tower locations) and boring test holes in these areas. Geotechnical investigations would take place following the environmental and engineer surveys described above. Consequently, the locations of any suitable habitat and individuals or populations of federally listed plant species with potential to be affected by these activities would be known prior to initiating geotechnical fieldwork. Potential impacts to these areas would then be avoided by siting access roads, project facilities, and associated geotechnical sampling sites away from these individuals and populations. Implementation of Applicant-committed measures TWE-8 and TWE-47 would control the generation of fugitive dust in sensitive areas, thereby minimizing potential indirect impacts to special status plants resulting from Project-related dust deposition.

5.1.1.4 Impact Avoidance and Minimization during Pre-construction Surveys

Implementation of the applicant-committed design features and mitigation measures and additional conservation measures listed in **Table 2-7** and described in Chapter 3.0 would avoid and minimize impacts to federally listed plant species. Measures relevant to pre-construction surveys include but are not limited to: TWE-1, TWE-2, TWE-3, TWE-4, TWE-5, TWE-22, TWE-26, TWE-29, TWE-31, TWE-34, TWE-47, TWE-64, NX-1, SS-1, and SS-5.

5.1.2 Construction Activities

5.1.2.1 Transmission Line

Construction-related surface-disturbing activities would occur in the 250-foot-wide transmission line ROW, the refined transmission corridor, and at ancillary facilities. Within the ROW, surface-disturbing activities would consist of ROW clearing, installation of transmission line structures and wires, and construction of temporary use (e.g., concrete batch plants) and long-term use (e.g., fiber optic regeneration stations) facilities.

Direct surface disturbing impacts to vegetation would include the trampling/crushing of vegetation, the removal of vegetation, and soil compaction. Indirect effects to vegetation could include increased erosion, sedimentation, fugitive dust generation, the potential spread and establishment of noxious and invasive weed species, and habitat fragmentation.

Vegetation clearing in the ROW during construction would occur as described in the ROW Preparation and Vegetation Management Plan (Appendix R of the POD). The development of a Vegetation Management Plan is a requirement of NERC reliability standard FAC 003 02. NERC reliability standard FAC-003-2 is focused on preventing vegetation-related outages from occurring on transmission lines. TransWest's vegetation management program was developed in accordance with NERC Reliability Standards and is described below.

Vegetation Management

The vegetation management program is composed of three distinct vegetation management levels to be implemented based on resource concerns and management requirements along the ROW. Level 1 would be applied to the majority of the ROW while Levels 2 and 3, due to their increased initial and long-term maintenance costs, would only be applied to areas identified as sensitive based on biological, cultural, visual, or other characteristics. The definitions and specific details of the individual management levels are explained in Appendix R of the POD, including outlines of which of the three vegetation management levels would be applied in various vegetation community types. Vegetation management levels would be applied during both construction and operation activities.

For all three vegetation management levels, vegetation removal techniques would be similar. Trees to be cleared would be cut off at ground level, and the stumps left in place for erosion control. Vegetation would be removed using mechanical means appropriate for the area. Slash would be removed from the ROW or chipped and spread according to approved land agency practices. Vegetation debris and density would be assessed to determine wildfire risks and additional mitigation. Depending on access needs during construction activities, the remaining vegetation not removed during clearing would be driven over. This practice would leave the root stock and topsoil in place in the majority of the ROW. TransWest's three vegetation management levels are described below.

Level 1 – Standard ROW Vegetation Management

Level 1 would be applied to the entire ROW except for areas identified as highly sensitive and critically sensitive, such as riparian areas and verified suitable habitat for listed species, which would require Level 2 or 3 Vegetation Management. For construction clearing and during long-term maintenance, woody vegetation over 6 feet in height would be cleared or removed as described above. Vegetation over 6 feet in height includes trees and larger shrub species predominately found in the following

vegetation community types: Aspen Forest and Woodland, Conifer Forest, Deciduous Forest, and Pinyon-Juniper Woodland. Low-growing trees, shrubs, and ground vegetation under 6 feet in height would be left in place and driven over if access is required. Danger trees, defined as trees or tree limbs (located off of the transmission line ROW, and thus outside of normal clearing limits), which are of such height, condition (e.g., leaning, rotted), location (e.g., side hill, proximity to transmission lines, soil characteristics), and/or species type that they represent a threat to the integrity of the transmission line conductors, pole structures, or other Project facilities, would be removed. The desired condition resulting from application of Level 1 vegetation management is low-growth plants composed of grasses and forbs and low-growing shrubs (heights ranging from 2 to 6 feet) (see POD, Appendix R, Figure R2).

Level 2 – Selective ROW Wire-Border Zone Vegetation Management

Level 2 vegetation management would be applied in areas where highly sensitive or constrained resource or agency management issues have been identified. The Wire-Zone/Border-Zone concept would be implemented for Level 2 vegetation management (Bramble and Byrnes 1996). This concept defines two zones within the ROW, the Wire Zone and the Border Zone. The Wire Zone is defined as the section of the ROW that is directly under the wires and extends outward a distance sufficient to accommodate anticipated wire movement (90 feet in width centered on the centerline of the transmission line); the Border Zone starts at the outer edge of the wire zone (i.e., 45 feet from the centerline) and runs to the ROW boundary. Refer to Appendix R of Final EIS Appendix D, POD, Figure R5 for an illustration of the wire zones and border zones associated with different tower types.

Each zone would have different maximum tree heights. Within the Wire Zone, maximum tree heights and vegetation management would be as described for Level 1 above. Within the Border Zone, the only trees to be removed would be trees identified as danger trees, trees over 25 feet tall within the center span (i.e., the center half of the span between two towers), and trees over 35 feet tall in the quarter span (i.e., the first and last quarters of the span nearest to towers) (see POD, Appendix R, Figure R6). Other vegetation management techniques to be used in Level 2 include selective mechanical or manual tree removal, side pruning, and selective use of herbicide. Quaking aspen trees would be cleared during construction. During operations, aspens would be allowed to grow, but would be managed to allowable tree heights and densities. Depending on growth and density characteristics of individual trees, taller vegetation might be allowed in canyons and low-lying valleys.

Level 3 – Selective ROW Clearance Based Vegetation Management

Level 3 would be applied in areas of the ROW where critical resource or agency management issues associated with vegetation within the Wire Zone have been identified. The only trees to be removed would be trees over the minimum clearance heights and fast growing or invasive species. Minimum clearance for the proposed 600-kV DC line is 29 feet (at a maximum elevation of 10,000 feet above mean sea level [amsl]).

Level 3 could be applied in montane forests, pinyon-juniper woodlands, and mountain shrublands where there are sensitive species or other habitat concerns. Level 3 would be the standard vegetation management level applied to riparian and wetlands crossings. Level 3 is expected to be feasible in most of these areas due to increased clearances associated with canyon or low-valley crossings. In some locations, Level 3 also may be achieved by increasing the height of structures to allow a greater diversity and height of vegetation to remain. In Level 3 management areas existing vegetation would be retained in the ROW except where fuel load is too great or where conductor clearances cannot be maintained. Trees would be selectively cleared based on allowed vegetation types, heights, and densities.

Regardless of vegetation management level, in sensitive areas such as riparian zones and forested habitats, the root mat and low growing understory vegetation would be left in place to minimize sediment erosion, and debris that falls in streams would be carefully removed to minimize stream bank damage. Access would be limited to use of existing roads and/or low-impact vehicles for overland travel (i.e., no

new road construction). Helicopters or gin-poles may be used for tower erection. Construction in inventoried roadless areas (IRAs) would occur over a shorter time frame (6 to 9 months).

The depth of wood chips spread over the ROW after vegetation clearing activities could impact vegetation and soil resources in the ROW. Spreading wood chips at a 3-inch depth could increase soil temperature in the winter, moderately increase soil moisture, and substantially decrease soil nitrogen supply and understory vegetation. The increase in soil temperature and soil moisture would have relatively minor ecological effects. However, reductions in the soil nitrogen supply may temporarily reduce productivity of the soil and affect revegetation rates (Binkley et al. 2003). These impacts would increase in magnitude and duration with increasing depth of mulch.

Driving over remaining vegetation not cleared during construction clearing would result in trampling and/or crushing of the vegetation. Leaving the root stock and topsoil in place would allow the vegetation in the ROW to re-sprout from the existing seed bank and root stock. For forest communities, the removal of woody vegetation over 6 feet in height would result in changes in vegetation community structure through increases in the amount of light and open areas in the ROW. Depending on the species present and the length of time required for woody species to re-establish in the ROW, woody communities could temporarily or permanently shift to communities dominated by herbaceous and/or low growing shrubs. In addition, increased light and open areas in the ROW could lead to increased noxious and invasive weed species establishment and spread.

Biological soil crusts damaged during construction activities could affect the health and successful restoration of native vegetative communities. Refer to Section 3.3, Soil Resources, of the Final EIS for further discussion of impacts related to compaction and topsoil. Impacts to wetlands would be avoided to the extent practicable or otherwise mitigated in accordance with the Project's Clean Water Act Section 404 permit.

Potential indirect impacts to vegetation and special status plants from ROW clearing could include increased runoff, erosion, and sedimentation, potential spread and establishment of noxious and invasive species, herbicide drift, changes in the quantity and arrangement of surface fuels, and changes in surface runoff from additional surface disturbance. Application of the design features and mitigation measures listed in **Table 2-7** and described in Chapter 3.0 would result in the avoidance or minimization of most of these potential impacts. The amount of vegetation indirectly affected as a result of Project implementation would vary depending on the type of disturbance. Typically, indirect impacts occur between 100 and 300 feet away from the construction disturbance but could affect vegetation communities farther away should there be increased sedimentation into drainages that could, in turn, affect individual plants and vegetation communities downstream (USFWS 2013).

Construction activities may increase erosion and sedimentation, which can modify the floodplain surface as well as channel beds and banks. These effects may create indirect impacts on nearby riparian vegetation, may directly affect habitat for wildlife and endangered fish, and may adversely impact water quality, which could result in indirect adverse effects to plants, wildlife, and aquatic biota further downstream. Following surface disturbance activities, noxious weeds and invasive species may colonize areas that have minimal vegetation cover. However, it is expected that the Applicant-committed design features/mitigation measures and the additional conservation measures listed in Chapter 2.0 and described in Chapter 3.0 of this BA would minimize the potential for noxious and invasive weed colonization in the action area.

Within the ROW and corridor, temporary and long-term access roads would be required to provide surface access to all structures and work areas. To minimize disturbance, existing access roads would be used wherever practical. Existing roads would be improved as necessary. Non-graded overland access (drive and-crush) would be used where terrain and soil conditions are suitable. Vegetation along existing access roads could be affected (e.g., reduction in growth rate) as a result of dust deposition. No access roads are proposed in IRAs.

Where access to structures or work areas is prohibited by lack of existing roads or where topographic conditions prohibit safe overland access to the site, new access roads would be constructed. To limit surface disturbance from construction of new access roads, the new roads would be located within the ROW where practical, and sited to minimize potential environmental impacts. TransWest has prepared a Framework Access Road Siting and Management Plan (Appendix A of the POD), which would be refined during detailed engineering and design if the Proposed Action is approved. This plan would define site-specific access routes along the ROW. Access roads would be constructed in accordance with AASHTO standards and guidelines and BLM, USFS, and county road requirements on public lands. Water crossings to be implemented for access roads are described in Section 5.7.4 of the POD.

Direct surface disturbance impacts from access road construction would include vegetation trampling/crushing, vegetation removal, grading, and compaction. Indirect impacts from access road construction could include increased erosion, sedimentation, fugitive dust generation, the potential spread and establishment of noxious and invasive weed species, and habitat fragmentation. Outside of the ROW, construction impacts would be limited to the construction of access roads and temporary work areas.

Temporary work areas would be located approximately within 1 mile of the alignment (i.e., in the potential disturbance area described in Chapter 2.0) and would include staging areas, material storage yards, fly yards, pulling, tensioning, and splicing sites, work areas at each structure site, batch plant sites, and guard structures. The portion of surface disturbance associated with each of these areas varies. Staging areas, fly yards, and batch plant sites would be collocated to the extent possible and located in areas that have been previously disturbed or areas of minimal vegetation to minimize surface disturbance. The vegetation in these areas would be cleared only to the extent necessary. Staging areas and fly yards might be bladed and graveled. Equipment staging and refueling sites would be collocated with other temporary work areas. Wire pulling, tensioning, and splicing sites, as well as a structure work areas, would be completely cleared of vegetation during construction. The Applicant would locate wire pulling, tensioning, and splicing sites such that clearing and blading activities would be minimized to the extent practical. The work area around each structure location would be 250 feet x 200 feet (1.15 acres) located within the ROW. Areas around each structure that would be completely cleared of vegetation would vary by tower type. The use of guyed steel lattice structures would require clearing approximately 0.9 acre of vegetation around the tower base vs. 0.4 acre of clearing for self-supporting steel lattice structures, and 0.3 acre of clearing for self-supporting tubular steel towers (POD Appendix R, Figures R3 and R4).

Landscape fragmentation would result from the development of the access road network, facilities, and transmission line towers. Landscape fragmentation is defined as the transformation or break-up of large patches of continuous, connected areas into a number of patches of smaller total area which are isolated from each other. Landscape fragmentation, through the construction of access roads, utility corridors, and facilities, breaks up native habitats into smaller units separated by areas of disturbance or different habitat types. Landscape fragmentation can result in loss of habitat area, increased edge effects, effects on sensitive plant populations, and increased competition from noxious and invasive weed species.

Linear surface disturbances such as those associated with transmission lines and roads have been shown to provide pathways for further spread of noxious and invasive species into adjacent undisturbed areas (Gelbard and Belnap 2003; Watkins et al. 2003) and serve as a vector for weed propagules (D'Antonio et al. 2001). Localized surface disturbances can facilitate the invasion of noxious and invasive species by removing native vegetative cover, creating areas of bare ground (Burke and Grime 1996; Watkins et al. 2003), and increasing light and nutrient availability (Stohlgren et al. 2003, 1999). Noxious and invasive weed species compete with native plants, can degrade and modify native communities, and can reduce resources for native plant species (e.g., moisture, soil nutrients, and light).

5.1.2.2 Ancillary Facilities

Communication System

The proposed fiber optic regeneration/repeater stations would have a total maximum disturbance footprint of 4.6 acres (comprised of up to 20, 10,000-square-foot sites) primarily located within the proposed ROW and spread along the length of the Project. There is a high degree of flexibility in the exact locations of these facilities and they could be easily located outside of known or potentially suitable habitat for federally listed plant species.

Similarly, any new microwave antenna towers needed for the secondary communications path would be few in number and could be sited to avoid impacts to federally listed plant species following completion of pre-final design and/or pre-construction plant surveys. Consequently, no impacts to special status plant species are anticipated as a result of Project communication system construction and operation.

Ground Electrode System

The amounts of ground disturbance associated with the ground electrode system sites, Bolten Ranch in Region I and Halfway Wash East in Region III, are detailed in **Table 2-5**. For the Bolten Ranch site, approximately 93 percent of the construction and operation disturbance would be to the sagebrush and saltbush shrubland vegetation types. There are no federally listed plant species associated with these two vegetation communities in this area. It should be noted that Little Sage Creek bisects the Bolten Ranch Siting Area. Riparian wetlands associated with Little Sage Creek have potential to support Ute ladies'-tresses but there are no known occurrences in this area and impacts to this habitat would be avoided during construction and operation of this facility.

The Halfway Wash East ground electrode system siting area is located in desert shrub habitat and there are no occurrences of federally listed plant species associated within this the siting area. Thus, no impacts to these species are anticipated to result from the ground electrode system facilities.

Terminals

Northern Terminal

Construction of the Northern Terminal, including the converter station and substation footprints, access roads, a concrete batch plant site, temporary work areas, and pulling, tensioning, and splicing sites for the interconnections, would result in direct disturbance to 519 acres of vegetation. The majority of the disturbance associated with the Northern Terminal would occur in the saltbush and sagebrush shrubland vegetation communities. There is a small area of herbaceous wetland in the northwestern portion of the Northern Terminal Siting Area, which provides potentially suitable habitat for federally listed Ute ladies'-tresses orchid. The proposed terminal site is located over a mile from this area and impacts to these wetlands and, in turn, Ute ladies'-tresses, due to terminal construction are unlikely. NWReGAP land cover data indicates that 28 acres of woody riparian and wetland vegetation would be impacted by construction of the Northern Terminal. These areas do not have perennial streamflows and are dominated by salt-tolerant shrubs such as greasewood and tamarisk. Consequently, they are unlikely to support any special-status plant species.

Vegetation would be cleared within the entire Northern Terminal location plus an additional buffer of 8 to 10 feet outside the fence (249 acres). After vegetation clearing, the area would be graded to a level surface as needed and the drainage design would be implemented. A soil sterilizer would be applied to prevent regrowth of vegetation and a 4- to 6-inch layer of crushed rock would be laid down resulting in a loss of vegetation for the footprint of the terminal site. Following completion of Northern Terminal construction, 270 acres of disturbed land would be immediately reclaimed pursuant to TransWest's Final POD. Reclamation would consist of re grading, mitigating soil compaction, seeding and replanting in accordance with land management agency or private landowner requirements.

Potential indirect effects associated with construction of the Northern Terminal could include the establishment and spread of noxious and invasive weed species, changes in surface fuels due to establishment and growth of annual species, and fugitive dust generation. Following surface disturbance activities, noxious weeds and invasive species could colonize areas that have minimal vegetation cover. Populations of weedy annual species (e.g., halogeton, cheatgrass) could become established in localized areas. These effects would be avoided or minimized by implementation of the design features and conservation measures listed below.

Pre-construction surveys would determine whether and where wetlands and other WUS occur within the Northern Terminal Site. Any wetland habitats capable of supporting Ute ladies'-tresses that would be impacted by construction would be surveyed for this species. TransWest has developed a Framework Water Resources Protection Plan (Appendix W of the POD), which, in conjunction with the terms and conditions of the Project's CWA Section 404 Permit, would ensure that impacts to wetlands and other WUS are avoided or minimized to the maximum extent practicable. If jurisdictional wetlands are impacted by the Northern Terminal, compensatory mitigation measures would be developed through the CWA 404 permitting process. Any wetlands containing Ute ladies'-tresses would be avoided.

While BMPs, design features, and conservation measures would increase reclamation success, the loss of woody vegetation in temporary use areas would represent a long-term impact, as it would take up to 10 to 25 years following reclamation for mature shrub species to re-establish. Through the implementation of mitigation measures, direct impacts to wetlands and riparian areas would be avoided and the spread of noxious weeds would be minimized.

Southern Terminal

Construction of the Southern Terminal would result in direct disturbance to 557 acres of vegetation. Table 3.5-7 of the Final EIS identifies estimated acreages of Project-related surface disturbance by vegetation cover type within the Northern and Southern Terminal locations. The Southern Terminal is located in only two vegetation community types (desert shrub and developed/disturbed). The majority of the disturbance in the Southern Terminal would occur in the developed/disturbed community type.

Surface disturbance activities and site clearing operations associated with the Southern Terminal would be identical to those associated with the Northern Terminal. Since the predominant cover type within the Southern Terminal Siting Area is developed/disturbed and there are no known special status plant species in the area, no direct impacts to federally listed species are anticipated. As with the Northern Terminal, indirect effects associated with construction of the Southern Terminal include the establishment and spread of noxious and invasive weed species and fugitive dust generation.

Southern Terminal Alternate

Construction of the Southern Terminal Alternate location would result in direct disturbance effects to 755 acres of vegetation. The Southern Terminal Alternate is located in the same siting area as the Southern Terminal. Within the site for the Southern Terminal Alternate are two vegetation community types (desert shrub and developed/disturbed). The majority of the disturbance in the Southern Terminal Alternate site would occur in the developed/disturbed community type.

Surface disturbance activities, site clearing operation, and decommissioning impacts associated with the Southern Terminal Alternate would be identical to those described for the Northern Terminal. Indirect impacts to vegetation, wetlands, and noxious weeds would be similar to those discussed for the Southern Terminal.

5.1.2.3 Impact Avoidance and Minimization during Project Construction

Implementation of the applicant-committed design features and mitigation measures and additional conservation measures listed in **Table 2-7** and described in Chapter 3.0 would avoid and minimize impacts to federally listed plant species resulting from construction activities. Relevant general measures

include but are not limited to: TWE-1, TWE-2, TWE-4, TWE-5, TWE-6, TWE-7, TWE-8, TWE-9, TWE-10, TWE-11, TWE-12, TWE-13, TWE-14, TWE-15, TWE-19, TWE-20, TWE-21, TWE-22, TWE-23, TWE-24, TWE-26, TWE-27, TWE-28, TWE-29, TWE-31, TWE-33, TWE-34, TWE-47, TWE-58, TWE-61, TWE-64, SSWS-14, SSWS-15, SSWS-16, SSWS-22, WR-3, NX-1, NX-2, NX-3, NX-4, VG-1, VG-2, VG-3, VG-4, VG-5, WET-1, WET-2, WET-3, SS-3, SS-4, SS-5, SS-6, and SS-9. Applicable species-specific conservation measures are described in the individual species sections below.

5.1.3 Operation and Maintenance Activities

5.1.3.1 Transmission Line

Following reclamation and revegetation of temporary use sites disturbed during Project construction, there would be long-term impacts to vegetation resulting from operation and maintenance activities along the transmission line ROW. These impacts would include the permanent loss of vegetation due to facility, structure, and access road footprints, maintenance activities in the ROW, and increased use of access roads. To the extent that federally listed plant species occur in or immediately adjacent to the ROW, there could be long-term impacts to these species in the absence of BMPs or other mitigation measures. Acres of operation-related surface impacts are listed in **Table 2-4**

Vegetation maintenance for the ROW would be defined by the Vegetation Management Plan as described under the Construction Activities section above. Any ROW maintenance activities that occur in wetlands or adjacent riparian areas and could result in deposition of dredged or fill materials or contaminants in wetlands and other WUS would require USEPA, State Department of Environmental Quality (DEQ), or USACE approval.

Noxious weed and invasive species impacts could result from maintenance activities and increased use of access roads. Maintenance activities can aid in the mechanical transport of propagules from outside the ROW. Removal of taller vegetation can create open patches of vegetation and bare ground and facilitate the invasion of noxious and invasive species with increased light and nutrient availability (Burke and Grime 1996; Stohlgren et al. 2003, 1999; Watkins et al. 2003). Applicant-committed design features and mitigation measures and additional conservation measures related to noxious weed control during operation and maintenance of the Proposed Action are the same as those identified for construction activities.

For all areas disturbed and reclaimed, a general mitigation monitoring plan would be developed as part of the COM Plan that would address how each mitigation measure would be monitored for compliance, as described in the Appendix R of the POD. Reclamation of the vegetation communities back to their native diversity and composition would vary across the Project due to various factors such as soil mixing, timing and duration of disturbance, topography, slope, soil moisture, and precipitation. Reclamation standards for the Project would vary by the requirements defined by each land management agency crossed by the Project. In general, reclamation success is defined as re-establishing a self-sustaining, diverse vegetation community composed of species native to the region in sufficient species density and diversity to closely approximate natural, undisturbed vegetation potential. In herbaceous communities, reclamation is often determined by the establishment of adequate ground cover to prevent erosion and provide forage for wildlife species and grazing operations.

It is estimated that, overall, herb-dominated plant communities would require a minimum of 2 to 5 years to establish adequate ground cover to prevent erosion and provide forage for wildlife species and grazing operations. Woody-dominated plant communities would require at least 10 to 25 years for shrubs to recolonize the area while re-establishment of mature woodlands would require at least 30 to 50 or more years. Depending on the composition and topography of existing woodlands, recovery could take up to 80 to 100 years to achieve mature trees of similar stature to pre-construction conditions. In areas with soil reclamation constraints, low regional annual precipitation rates, and the invasion and spread of noxious and invasive weed species, successful reestablishment of native vegetation may require additional measures, and take a longer timeframe. The success of woodland re-establishment could be

impacted by collocated disturbances and adverse environmental conditions including wildfire, drought, climate change, insects, and disease (Folke et al. 2004; Loehman et al. 2011).

In areas with soil reclamation constraints, low regional annual precipitation rates, and the invasion and spread of noxious and invasive weed species, community recovery is anticipated to be long-term, and may not be successful (10 to 100 years depending on the community structure). Some plant communities may not return to pre-construction conditions due to alteration of soil communities, noxious weed invasion, and loss of biological soil crusts. The implementation of additional reclamation techniques such as minimization of surface disturbance, soil amendments, and noxious weed control may be required in these areas to achieve successful reclamation. Areas with soil reclamation constraints are identified in Section 3.3, Soil Resources.

5.1.3.2 Ancillary Facilities

Communication System

Operation and maintenance of the communication system is not anticipated to have any additional effects to federally listed plant species beyond those described for operation and maintenance of the transmission line.

Ground Electrode Facilities

Over 90 percent of the area affected by ground electrode system sites and their associated power lines would be reclaimed and revegetated following construction. The remaining long-term operation and maintenance impacts associated with these facilities would be associated with the 6-acre footprint of the control buildings at each site and access roads to each site. For the Bolten Ranch site in Region I, there would be a total of 52 acres of long-term surface disturbance and for the Halfway Wash East site in Region III, there would be a total of 15 acres of long-term disturbance. The difference in impacts between these two sites is due to the length of the access roads. Refer to **Table 2-6** for a summary of impact acreages for these facilities. Neither of these facilities are expected to affected federally listed or candidate plant species as a result of long-term operation and maintenance activities.

Terminals

Northern Terminal

After completion of interim reclamation of temporary use areas, remaining surface disturbance would be approximately 249 acres and consist of the footprints of the access roads, station facilities, and the perimeter fence. Potential long-term impacts to vegetation resulting from the establishment and spread of noxious and invasive weed species would be avoided or minimized through implementation of the Applicant-committed design features, mitigation measures, and additional conservation measures listed below. Long-term operation of the Northern Terminal is expected to have no effect on federally listed plant species.

Southern Terminal and Southern Terminal Alternate

Following reclamation of temporary use areas, long-term operation of the Southern Terminal would occupy 226 acres of land. Long-term operation-related effects are expected to be similar to those described above for the Northern Terminal.

5.1.3.3 Impact Avoidance and Minimization during Project Operation & Maintenance

Implementation of the applicant-committed design features and mitigation measures and additional conservation measures listed in **Table 2-7** and described in Chapter 3.0 would avoid and minimize impacts to federally listed plant species resulting from Project operation and maintenance activities. Relevant general measures include but are not limited to: TWE-1, TWE-2, TWE-3, TWE-5, TWE-6, TWE-12, TWE-24, TWE-26, TWE-31, TWE-58, TWE-61, TWE-62, TWE-64, SSWS-14, NX-1, NX-2,

NX-3, NX-4, VG-2, VG-3, SS-5, SS-6, and SS-9. Applicable species-specific conservation measures are described in the individual species sections below.

5.1.4 Decommissioning Activities

Decommissioning activities would include the removal of the transmission line, towers, access roads (in accordance with landowner or land management agency desires), communication facilities, and ground electrode systems and the reclamation and revegetation of the footprints of these facilities. Potential decommissioning and reclamation-related impacts to vegetation and federally listed plant species occurring in or immediately adjacent to the ROW would be similar to those discussed for construction activities. The magnitude of these impacts would, however, be considerably less than during construction because relatively little vegetation would need to be removed during decommissioning. The reclamation activities described above for interim reclamation of construction-related temporary use sites would be applied to the project footprint as a whole during the decommissioning phase of the Project. Many of the same BMPs, design features, and conservation measures applicable to construction would be applied during this phase to reduce impacts to special status plants during decommissioning activities.

5.2 Wildlife

5.2.1 Pre-construction Activities

5.2.1.1 Environmental Surveys

Environmental surveys including sensitive plant and animal surveys, cultural and paleontological investigations would use existing access roads to the extent possible. Where surveys areas cannot be accessed by the existing road network, all field work would be conducted on foot. Potential impacts to federally listed, EXP/NE, and candidate wildlife species resulting from these surveys would likely be limited to avoidance of human activity and temporary displacement from survey areas. To the extent that ground-nesting birds occur within the survey area and surveys are conducted during the avian breeding season, it is possible that environmental surveys could result in the loss or abandonment of nests. Implementation of the Applicant-committed design features and mitigation measures and additional conservation measures listed below would avoid or minimize these impacts, likely rendering them negligible or discountable across the project as a whole.

5.2.1.2 Engineering Surveys

Potential impacts to special status wildlife species resulting from engineering surveys would be similar to but potentially more intensive and extensive than those described above for environmental surveys. While engineering surveys would use existing roads to the extent possible, there would likely be some level of off-road motorized travel. Depending on terrain and vegetation, off-road travel would be conducted on foot or using low-impact rubber-tired ATVs in accordance with the appropriate land management agency or landowner requirements. To the extent that surveys are conducted using ATVs, they would have a greater potential for impacting small mammals and ground-nesting birds and have a greater radius of disturbance associated with noise and human activity relative to the environmental surveys.

5.2.1.3 Geotechnical Investigations

Impacts to federally listed, EXP/NE, and candidate wildlife species resulting from geotechnical investigations would be similar to but greater than those described above for environmental and engineering surveys. A drill rig, water truck, and 4-wheel drive support vehicles would be used to access sampling sites where soil borings 6 to 8 inches in diameter and up to 70 feet deep would be taken. Geotechnical sampling would be performed using rubber-tired, rubber-tracked, or low-impact drill rigs and approved access routes and methods in accordance with appropriate land management agency or landowner requirements. Relative to other pre-construction surveys, the greater number and size of

vehicles and equipment needed to complete geotechnical investigations would result in greater potential impacts to wildlife. Each sampling site would require a work area typically 40 x 40 feet in size (0.37 acre) and a disturbance area approximately 5 feet in diameter. Surface disturbance at boring sites would result in an incremental loss of wildlife habitat and would likely be so small relative to the extent of surrounding habitats as to have negligible direct effects on special status wildlife species. Due to the greater number of vehicles, equipment, and personnel, geotechnical investigations would have a larger radius of indirect disturbance to wildlife associated with noise and human activity than other pre-construction survey efforts. These effects would be short in duration, lasting approximately 0.5 day per sampling site.

5.2.1.4 Impact Avoidance and Minimization during Project Pre-construction Activities

Implementation of the applicant-committed design features and mitigation measures and additional conservation measures listed in **Table 2-7** and described in Chapter 3.0 would avoid and minimize impacts to federally listed, EXP/NE, and candidate wildlife species resulting from pre-construction environmental and engineering surveys and geotechnical investigations. Relevant general measures include but are not limited to: TWE-1, TWE-2, TWE-4, TWE-5, TWE-26, TWE-31, TWE-32, TWE-61, TWE-62, TWE-64, SSWS-15, SSWS-22, WLF-1, WLF-2, and NX-1. Applicable species-specific conservation measures are described in the individual species sections below.

5.2.2 Construction Activities

5.2.2.1 Transmission Line

Potential transmission line construction-related impacts to federally listed, EXP/NE, and candidate wildlife species include habitat loss, fragmentation, and wildlife mortalities as a result of vehicle collisions and crushing of nests and burrows. Construction impacts account for all disturbance during construction of the Project (e.g., clearing of vegetation for footing construction, upgrading access roads, etc.) and are typically short-term. Construction activities would likely result in wildlife avoidance of otherwise suitable habitat in and around the Project disturbance areas during the construction period. Whereas forest-interior species could be displaced from the action area for the life of the project, displacement impacts to species associated with more open shrubland and grassland habitats would likely be short term with species returning to habitats remaining along the ROW following completion of construction activities.

Construction of the proposed Project would result in the alteration, degradation, and loss of wildlife habitat, of which a percentage would be immediately reclaimed following construction of the facilities. The remaining disturbance area would be reclaimed at the end of the life of the Project (estimated at 50 years). General recovery times of the various vegetation communities that provide habitat for wildlife species within the action area are discussed in Section 5.1.3.1, above.

Habitat loss or alteration from surface disturbance could result in direct losses of smaller, less mobile species of wildlife, such as small mammals and reptiles, and the displacement of more mobile species into adjacent habitats. Surface disturbance also would result in an increase in habitat fragmentation along the proposed Project until reclamation has been completed and vegetation is re-established.

The road network, which would be constructed or upgraded to fulfill the construction requirements of the proposed Project, may impact wildlife species to varying degrees depending on the geographic location, type of habitat disturbed, and wildlife species potentially impacted. There are seven types of potential impacts to wildlife habitat associated with roads including: 1) increased mortality from road construction; 2) increased mortality from collisions with vehicles; 3) modification of wildlife behavior; 4) alteration of the physical environment; 5) alteration of the chemical environment; 6) spread of invasive and exotic species; and 7) increased alteration and use of habitats by humans (Trombulak and Frissell 2000). Not all species and ecosystems are equally impacted by roads, but overall, the presence of roads is highly correlated with changes in species composition, population sizes, and hydrologic and geomorphic processes that shape aquatic and riparian habitats (Trombulak and Frissell 2000).

Though not federally listed, big game species provide an important source of prey for the endangered gray wolf and a source of carrion for the California condor. Potential direct impacts to big game species (e.g., pronghorn, mule deer, elk, moose) would include the incremental loss of potential forage and the increase of habitat fragmentation from vegetation removal associated with surface disturbance. The primary potential indirect impact would be wildlife avoidance (displacement) of otherwise suitable habitat in the vicinity of Project disturbance areas due to noise and human activity. Impacts due to disturbance also may include both short- term changes to big game migration corridors during periods of construction activity. Such impacts likely would be more pronounced in big game crucial winter range, fawning/calving areas, and elk foraging areas depending on the timing of construction in these areas. Impacts to crucial winter range would include the loss of potential cover and forage consisting primarily of woody/shrubby vegetation such as sagebrush, bitterbrush, and winterfat. Loss of available forage (e.g., woody shrubs, such as sagebrush) could result in a long-term (greater than 25 years) impact to wintering big game species.

Construction of the proposed Project could result in direct impacts, including the loss of habitat, to small game species (e.g., upland game birds and small game mammals) including greater sage-grouse and prey species for the threatened Canada lynx. Impacts from Project construction also would include animal displacement from the disturbance areas and increased habitat fragmentation. Potential construction-related impacts also could include nest and burrow abandonment or loss of eggs or young. These losses could reduce productivity for that breeding season, depending on timing and duration of construction activities in a specific area. Indirect impacts associated with human activity and noise have been shown to negatively impact small game populations, especially upland game birds. These species may experience increased mortality rates due to increased access as a result of new and improved roads (Holbrook and Vaughan 1985). Vehicular traffic may injure or kill individuals and local populations may experience higher levels of hunting and poaching pressure, due to improved human access (Holbrook and Vaughan 1985). In most instances, suitable habitat adjacent to disturbance areas would continue to be available for use by small game species. However, to the extent that small game are adversely impacted by construction, there would be an incremental loss in prey for federally listed forest carnivores.

Indirect impacts from the construction of the proposed Project would result from increased human activity and noise in the vicinity of the terminal locations and the approved ROW. The most common wildlife responses to noise and human activity are avoidance or accommodation. Avoidance would result in displacement of animals from an area larger than the actual disturbance area. Following avoidance of human activity and noise-producing areas during construction, certain wildlife species may acclimate to the activity and begin to return to areas that were formerly avoided. For example, during construction, it is likely that big game species (i.e., pronghorn, mule deer) would be displaced from a larger area than the actual disturbance sites due to the avoidance response. Displacement of big game species as a result of direct habitat loss and indirect reduction in habitat quality has been widely documented (Irwin and Peek 1983; Lyon 1983, 1979; Rost and Bailey 1979). Studies have shown that big game species tend to move away from areas of human activity and roads, thereby reducing habitat utilization near disturbance areas (Cole et al. 1997; Sawyer et al. 2006). However, big game species have demonstrated the ability to acclimate to a variety of activities as long as human harassment levels do not increase substantially (Forman et al. 2003). Therefore, it is possible that the extent of displacement would approximate the actual disturbance area after the first few years of operation (Forman et al. 2003). Mule deer and pronghorn appear to be more tolerant of human activity than desert bighorn sheep. For mule deer, displacement distances from new roads ranged from 330 feet to 0.6 mile, depending on the presence of vegetative cover (Rost and Bailey 1979). However, disturbance associated with construction activities would occur over a relatively short period and it is assumed that big game species would return to the area following completion of Project construction. In addition to an avoidance response, increased human activity intensifies the potential for wildlife/human interactions ranging from harassment of big game species to legal harvest or poaching.

Noise levels associated with construction may impact migratory bird species that occupy habitats in the migratory bird analysis area. Studies also have shown that reductions in bird population densities in both open grasslands and woodlands also may be attributed to a reduction in habitat quality produced by elevated noise levels (Reijnen et al. 1997, 1995). Although visual stimuli in open landscapes may contribute to reduced bird densities at relatively short distances, the impacts of noise appear to be the most critical factor since breeding birds of open grasslands (threshold noise range of 43 to 60 decibels on the A weighted scale [dBA]) and woodlands (threshold noise range of 36 to 58 dBA) respond very similarly to disturbance by traffic volume (Reijnen et al. 1997). Reijnen et al. (1996) determined a threshold of effect for bird species to be 47 dBA, while a New Mexico study in a pinyon-juniper community found that impacts of gas well compressor noise on bird populations were strongest in areas where noise levels were greater than 50 dBA. However, moderate noise levels (40 to 50 dBA) also showed some effect on bird densities in this study (LaGory et al. 2001).

5.2.2.2 Ancillary Facilities

Communication System

The proposed fiber optic regeneration/repeater stations would have a total maximum disturbance footprint of 4.6 acres primarily located within the proposed ROW and spread along the length of the Project. Due to the small size of these facilities and their location within the ROW, their additional incremental impact to federally listed, EXP/NE, and candidate wildlife species is expected to be negligible.

Similarly, any new microwave antenna towers needed for the secondary communications path would be few in number and could be sited to avoid or minimize impacts to habitat for special status wildlife species. Consequently, no substantive impacts to these species are anticipated as a result of Project communication system construction.

Ground Electrode Facilities

The amounts of surface disturbance associated with the ground electrode system sites, Bolten Ranch in Region I and Halfway Wash East in Region III, are detailed in **Table 2-5**. For the Bolten Ranch site, approximately 93 percent of the construction disturbance would be to the sagebrush and saltbush shrubland vegetation types. Construction of this site would impact greater sage-grouse nesting and brood-rearing habitat (there are 10 occupied leks within 4 miles of the Bolten Ranch Siting Area and associated power line). There is a small amount of riparian vegetation (<1 acre) in the Bolten Ranch siting area that could provide habitat for yellow-billed cuckoo but it is not expected to be directly affected by construction of this facility.

The Halfway Wash East ground electrode system siting area is located in desert shrub habitat and provides suitable habitat for desert tortoise. Construction of this facility would have potential to adversely affect tortoise but implementation of conservation measure SSWS-4 would avoid or minimize these impacts.

Terminals

Northern Terminal

The existing conditions at the proposed Northern Terminal siting area relative to wildlife habitat can be characterized as highly disturbed and fragmented. Located close to the urbanized areas of Sinclair and Rawlins, Wyoming, the siting area exhibits multiple types of anthropogenic disturbance. The major source of disturbance is the Interstate 80 (I-80) and State Highway (SH)-76 corridor located approximately 2.2 miles to the north. This highly active corridor provides constant disturbance from vehicle traffic and fragments the landscape for several miles in both directions. In addition, the Northern Terminal sitting area is fragmented by several existing pipeline ROWs, a transmission line, SH-71 to the west and a Union Pacific Railroad rail line to the north. Other notable sources of disturbance near the

Northern Terminal siting area include the Sinclair petroleum refinery located approximately 3 miles to the northeast and the Wyoming State Penitentiary located approximately 3.4 miles to the west.

Construction of the Northern Terminal would result in the disturbance of 491 acres of potential wildlife habitat. Of this, approximately 255 acres of temporary use areas would be reclaimed immediately following construction. Impacts to wildlife resulting from this surface disturbance would include the loss and additional fragmentation of wildlife habitat. Habitat loss or alteration could result in direct losses of smaller, less mobile wildlife species, such as small mammals and reptiles, and the displacement of more mobile species into adjacent habitats. The only federally listed or candidate species with potential to be affected by construction of the Northern Terminal is greater sage-grouse. There are four occupied leks within 4 miles of the siting area and, whereas the proposed terminal site is located primarily in saltbush shrubland habitat, there is potential sage-grouse nesting and brood-rearing habitat in sagebrush and riparian wetland habitats adjacent to the site.

Applicant-committed design features and mitigation measures, and additional conservation measures applicable to the terminal sites are identified in **Table 2-7** and described in Chapter 3.0. After considering the level of existing disturbance and the application of design features and conservation measures, remaining terminal construction impacts to greater sage-grouse would be limited to habitat loss and fragmentation and potential disturbance during construction and interim reclamation of temporary use sites.

Southern Terminal and Southern Terminal Alternate Siting Area

The existing conditions at the proposed Southern Terminal Siting area relative to wildlife habitat can be characterized as moderately disturbed and fragmented. The majority of human disturbance near the siting area results from US-95 located approximately 3.5 miles to the east. This highway is a major source of fragmentation in the local area. Multiple high-voltage transmission lines are located on both sides of the two sites. An existing electrical substation is located approximately 0.5 mile to the southwest of the siting area and the Solar One energy plant is located approximately 1.5 miles to the southeast of the siting area. These facilities contribute to the level existing disturbance and habitat fragmentation adjacent to the siting area.

Construction of the Southern Terminal and the Southern Terminal Alternate would affect primarily desert shrubland vegetation, which provides potentially suitable habitat for the federally listed threatened Mojave desert tortoise. Based on SWReGAP land cover data, construction of the Southern Terminal would result in impacts to 63 acres of desert shrubland habitat during construction. Approximately 38 acres of temporary use areas would be reclaimed following construction. Similarly, construction of the Southern Terminal Alternate would result in impacts to 85 acres of desert shrubland habitat during construction. Of this, approximately 56 acres of temporary use areas would be reclaimed immediately following construction. Implementation of Applicant-committed design features and mitigation measures and additional conservation measure SSWS-4 (described in Section 5.4.3.1 Desert Tortoise, below), would avoid or minimize potential impacts to desert tortoise resulting from construction of the Southern Terminal or Southern Terminal Alternate.

5.2.2.3 Impact Avoidance and Minimization during Project Construction

Implementation of the applicant-committed design features and mitigation measures and additional conservation measures listed in **Table 2-7** and described in Chapter 3.0 would avoid and minimize impacts to federally listed, EXP/NE, and candidate wildlife species resulting from Project construction. Relevant general measures include but are not limited to: TWE-1, TWE-2, TWE-3, TWE-4, TWE-5, TWE-6, TWE-7, TWE-8, TWE-9, TWE-10, TWE-12, TWE-13, TWE-15, TWE-16, TWE-20, TWE-22, TWE-23, TWE-24, TWE-26, TWE-27, TWE-28, TWE-29, TWE-30, TWE-31, TWE-32, TWE-33, TWE-34, TWE-45, TWE-53, TWE-58, TWE-59, TWE-60, TWE-61, TWE-62, TWE-64, SSWS-14, SSWS-15, SSWS-16, SSWS-22, WLF-1, WLF-2, WLF-6, NX-1, NX-2, NX-3, VG-1, VG-2, VG-3, WET-1, WET-2,

and WET-3. Applicable species-specific conservation measures are described in the individual species sections below.

5.2.3 Operations & Maintenance Activities

5.2.3.1 Transmission Line

Following construction, temporary use sites would be reclaimed and revegetated. Timeframes for successful reclamation can vary depending on multiple factors including soil types and conditions, climate (e.g., drought persistence), noxious weed invasions, and effective monitoring and adaptive management in problem areas. Impacts to federally listed, EXP/NE, and candidate wildlife species during the operation phase of the project would be less intensive as well as less extensive that the construction impacts but be of much longer duration. These impacts would last at least as long as the Project is in operation and maintenance activities are conducted, estimated at 50 years. Examples of potential operation impacts include long-term habitat loss and degradation in and around the footprints of Project facilities, wildlife mortalities that occur as a direct and indirect result of the facilities themselves, possible injuries and mortalities associated with maintenance activities, increased predation of local prey populations by perching raptors and corvids, and habitat degradation resulting from increased noise and human activity in and along the ROW and access roads.

Potential impacts associated with operation of the power lines and associated facilities include avian mortalities as a consequence of electrocution or collision with Project components. Electrocution is primarily associated with smaller (i.e., 60 kV or less) transmission and distribution lines, due to the smaller size of towers and closer spacing of the conductors (APLIC 2006). Because of their smaller towers and close spacing of conductors, the overhead electrical lines associated with the ground electrode systems are the Project components with the highest avian electrocution potential. However, these lines typically would be energized for less than 30 hours per year. Thus, the likelihood that they would result in electrocutions is very low.

Collision potential typically is dependent on variables such as the location in relation to high use habitat areas (e.g., nesting, foraging, and roosting); line orientation to flight patterns and movement corridors; species composition; visibility; and line design (APLIC 2006). However, avian mortality from collisions with power lines is well documented (Brown and Drewien 1995). Although rarely impacting healthy populations with good reproductive potential, collision mortality can be biologically significant to small local populations and endangered species (APLIC 2012; Faanes 1987). Avian loss is often greatest where power lines cross migratory paths, bisect feeding and nesting-roosting sites, or occur adjacent to major avian use areas (Savereno et al. 1996). Higher risk also exists when land topography funnels birds through power-line corridors (Bevanger 1990; Faanes 1987). While some species of birds (e.g., upland game birds and certain grassland migratory birds) are predominantly ground dwelling species, the risk for collision during flight is heavily dependent upon transmission line locations, such as locations between loafing and feeding areas or migration routes. Highest collision probabilities appear to occur where birds typically fly between foraging and loafing habitats bisected with overhead lines (Science Applications International Corporation [SAIC] 2001).

Factors that influence the risk of collision to individual birds as they encounter power lines are varied and include flight characteristics, previous experience with power lines (typically a function of age), weather, and power line structural characteristics (APLIC 2006, 1994). The static wire, also referred to as the shield or groundwire, has been shown to pose the greatest collision danger to birds (APLIC 2012; Faanes 1987). Research has indicated that most collisions occur with static wires when birds increased their altitude in apparent attempts to avoid conductor wires. Birds maneuvering to avoid the conductor wires actually increased collision risk and in the absence of static wires most collisions could have been avoided. If power lines must be placed above ground, the risk of collision would probably be reduced if all wires were in a single horizontal plane (Bevanger 1994).

Research on communication and meteorological towers suggests that the use of guy wires increases avian collision risk and mortality (Erickson et al. 2005; Gehring et al. 2009; Manville 2009, 2005). Although these types of towers tend to be considerably taller and have more complex guy wire configurations than the transmission line tower designs being considered for this project, the use of guyed transmission towers could increase avian collision risk relative to unguyed towers. This risk is expected to be higher for species with high wing loading and rapid flight such as greater sage-grouse and waterfowl. Where guy wires must be used, they should be adequately marked with bird diverters to reduce avian collision risk (Manville 2005).

Research conducted by Savereno et al. (1996) indicates that the height of the transmission lines relative to a bird's flight heights could be a potential risk factor. Empirical data and theoretical considerations indicate that species with high wing loading and low aspect run a high risk of colliding with power lines. These birds are characterized by rapid flight and the combination of heavy body and small wings restricts swift reactions to unexpected obstacles (Bevanger 1998). Raptors have a much greater wing to body ratio, and are more likely to fly at levels well above the transmission line heights, and maintain flight levels for an extended period of time. Other bird species, such as greater sage-grouse, may have a greater potential for collision risk because of the smaller wing to body ratio, resulting in lower flight heights and a greater occurrence of takeoffs and landings crossing the transmission line levels.

Operation-related impacts to big game and small game species would result primarily from vegetation management and other maintenance activities, including semi-annual aerial and annual ground-based transmission line inspections. Depending on species sensitivity, some species may experience disruption or additional stress due to helicoper flights and the presence of 4x4 trucks, 4x4 ATVs, and/or ground crews. Vegetation maintenance would have impacts similar to those described above for construction activities. Noise and human activity impacts also are discussed above.

Avian predators, particularly raptors, are attracted to overhead utility lines because they provide perches for various activities, including hunting (APLIC 2006). Power poles increase a raptor's range of vision, allow for greater speed during attacks on prey, and serve as territorial markers (APLIC 2006; Manville 2002; Steenhof et al. 1993). Small game species would have potential increased risk of predation by raptor and corvid species, which may perch on transmission lines and towers. Increased predation rates of small game would result in an incremental reduction in prey availability for Canada lynx.

Transmission line structures can impact small game, nongame, migratory bird, reptile, and amphibian populations by enhancing raptor and corvid populations. Raptors and corvids nest and perch on transmission structures which create vertical structure in generally treeless shrub-steppe habitats (Knight and Kawashima 1993; Steenhof et al. 1993). Raptors and corvids may then occur at higher densities than normal due to increased nesting locations and perches. For example, within one year of construction of a 372.5-mile-long transmission line in southern Idaho and Oregon, raptors and common ravens began nesting on the transmission towers. Within 10 years of construction, 133 pairs of raptors and ravens were nesting along this stretch (Steenhof et al. 1993). Along a transmission line in Nevada, the mean number of the most common raptor species observed over a 6-year period, 1 year prior to and 5 years after construction of the line, remained relatively stable. However, the mean number of common ravens seen per survey point dramatically increased during the first 4 years after construction before declining drastically the fifth year after construction (Nonne et al. 2011).

5.2.3.2 Ancillary Facilities

Communication System

Operations and maintenance of the communication system would not involve any additional ground disturbance beyond the 4.6-acre footprint of the facilities. Incremental impacts to wildlife associated with human activity and noise would be associated with facility inspections and maintenance. Regeneration stations would be inspected every 2 to 3 months by a 2-person crew in a light truck. Annual maintenance would be conducted by a 2-person crew over a 2- to 5-day period. With implementation of the Applicant's

design features and mitigation measures, BMPs, and the general and species-specific conservation measures listed below, impacts to wildlife from these activities is expected to be minimal and unlikely to have any additional effect on federally listed, EXP/NE, and candidate species beyond those described above for the operation and maintenance of the transmission line ROW.

Ground Electrode System

Following interim reclamation, there would be 52 acres of long-term habitat loss/fragmentation associated with the Bolten Ranch ground electrode facility and 15 acres of long-term habitat impacts associated with the Halfway Wash East facility. Of this total, only 6 acres of habitat impacts would be associated with the facilities themselves. The remaining habitat impacts would be primarily associated with access roads. Inspections and maintenance of ground electrode facilities would take place with the same frequency as for communication system components. These visits can be timed to avoid or minimize activity during sensitive time periods (e.g., greater sage-grouse breeding season around Bolten Ranch, desert tortoise activity periods around Halfway Wash East). Implementation of the Applicant-committed design features and mitigation measures, BMPs, and additional general and species-specific conservation measures would avoid or minimize impacts to federally listed, EXP/NE, and candidate wildlife species with potential to occur on the ground electrode facility sites.

Terminals

Long-term habitat impacts associated with the Northern and Southern Terminals would comprise 249 acres and 226 acres, respectively. Outside of this footprint, there would be some level of habitat degradation associated with noise and human activity, and night-lighting. Each of the terminals may have a control room that is staffed 24 hours a day, 365 days a year by 2 to 3 system operators and supervisory personnel. In addition to control room staffing, 8 to 20 technicians, engineers, maintenance, security, and supervisory personnel may be staffed at each terminal. Routine maintenance for the terminals would be performed by on-site staff. Major inspection or maintenance activities would, however, require additional personnel and equipment estimated at 15 to 20 craft, technician, engineering, manufacturer, consultant, and supervisory staff for a period of 2 to 4 weeks on an annual basis. These activities could result in temporary displacement of federally listed, EXP/NE, and candidate wildlife species from the immediate vicinity of the terminals. Both the terminals would have lighting installed inside the fence for safety and security reasons and for emergency night repair work, which is expected to be uncommon. Lights would be operational from dusk to dawn. Although night-lighting can affect bat behavior and distribution and can pose a hazard to nocturnally migrating birds during inclement weather, it is not expected to have a substantive impact on federally listed, EXP/NE, and candidate species with potential to occur in these areas.

5.2.3.3 Impact Avoidance and Minimization during Project Operation and Maintenance

Implementation of the applicant-committed design features and mitigation measures and additional conservation measures listed in **Table 2-7** and described in Chapter 3.0 would avoid and minimize impacts to federally listed, EXP/NE, and candidate wildlife species resulting from Project operation and maintenance. Relevant general measures include but are not limited to: TWE-1, TWE-2, TWE-3, TWE-6, TWE-8, TWE-12, TWE-24, TWE-26, TWE-29, TWE-31, TWE-32, TWE-45, TWE-58, TWE-61, TWE-62, TWE-64, SSWS-14, SSWS-15, SSWS-16, SSWS-22, WLF-1, WLF-2, WLF-5, WLF-6, WLF-7, WLF-10 NX-1, NX-2, VG-2, and VG-3. Applicable species-specific conservation measures are described in the individual species sections below.

5.2.4 Decommissioning Activities

Removal of project structures during decommissioning would result in the same types of impacts discussed for construction activities. Direct disturbance to wildlife habitat would occur as a result of vehicle and equipment traffic and increased levels of human activity in and along the ROW. The Applicant would be responsible for reclamation of access roads following abandonment in accordance with landowner's or land agency's direction. Many of the same BMPs and design features implemented

during construction would be applied to reduce impacts during decommissioning activities. Over time, reclamation and revegetation of the ROW and closed access roads would replace wildlife habitats lost or degraded during Project construction and operation. For portions of the line that are not located adjacent to other linear utilities and developed lands, previously fragmented habitats would once again become contiguous in areas where reclamation and revegetation efforts are successful.

5.3 Fish

5.3.1 Pre-construction Activities

With the exception of wetland delineations and, where necessary, habitat assessments and surveys for listed species with potential to occur in emergent and riparian wetlands, environmental surveys and subsequent engineering surveys and geotechnical investigations would occur in upland habitats and would have no effect on fish and other aquatic biota. No surveys for fish are currently anticipated and impacts to aquatic habitat from wetland delineations and habitat assessments or species-specific surveys would be brief and discountable. Geotechnical sampling would be conducted in tower locations, which are located on topographic high points rather than wetlands. Should it be necessary to place a tower in a floodplain, it would be located in upland habitat outside of the active floodplain and suitable habitat for listed species. While there is potential for indirect impacts to fish resulting from pre-construction activities, these impacts could easily be avoided using existing BMPs and Applicant-committed design features and mitigation measures.

5.3.1.1 Impact Avoidance and Minimization during Pre-construction Activities

Applicant-committed design features and mitigation measures and additional conservation measures relevant to avoiding and minimizing impacts to listed and candidate fish species from pre-construction activities include the following: TWE-1, TWE-2, TWE-4, TWE-5, TWE-31, TWE-34, TWE-61, TWE-62, SSS-1, and SSS-6. Applicable species-specific conservation measures are described in the individual species sections below.

5.3.2 Construction Activities

5.3.2.1 Transmission Line

Equipment and vehicle traffic within the ROW and access roads could cross small and moderate-size streams (generally less than 100 feet in wetted width) or springs. To the extent that these streams contain or are tributary to rivers, streams, and springs that contain federally listed and candidate fish species, Project-related crossings could result in direct or indirect impacts to these species.

Two types of crossings would be used for flowing streams: fords and culverts. The estimated disturbance per crossing for these two methods include 1,250 feet^2 (25-foot width x 50-foot length) for the ford technique, and 7,500 feet^2 (50-foot width x 150-foot length) for culverts. Flow would be maintained during construction involving stream crossings. If needed, culverts would be installed under the direction of a qualified engineer in coordination with hydrologists and aquatic biologists from the BLM, USFS, USACE, and state agencies. Compliance with necessary permits also would be required. For streams that contain fish, culverts would be designed to maintain or improve passage for fish species. Vehicle crossings would result in mortalities to macroinvertebrates and possibly early life stages of fish. Juvenile and adult fish would likely move from the disturbed area. Stream crossings also would alter bottom substrates. Habitat alteration could affect various activities or values for fish such as cover, feeding, or life stage functions for spawning or early life stage development.

Construction at stream crossings also would remove riparian vegetation. Vegetative cover along streambanks provides cover for fish, shading, bank stability, and increased food and nutrient supply as a result of deposition of insect and vegetative matter into the watercourse. Riparian vegetation also contributes woody material to streams that is used for fish cover and can be part of forming habitat features such as pools. Disturbance to the streambank areas at stream crossings would represent a

relatively small width (portion of 250-foot-wide transmission line ROW on each streambank). Given the relatively small width of the disturbance area associated with an individual stream crossing, impacts would be considered low in relation to the entire stream system.

Vehicle and equipment disturbance within or near waterbodies could result in sedimentation of these waterbodies. Sediment entering the water column would be redeposited in areas downstream of the disturbed area. The extent of the sedimentation effect would depend on the flow conditions, substrate composition, stream configuration, and types of aquatic communities located within the affected areas. The indirect effects of sedimentation could range from potential detrimental effects on species behavior, physiological functions, or spawning (Waters 1995). In general, salmonid (trout) species are more sensitive to increased turbidity compared to many of the warmwater fish species. Sediment deposition in substrates used for spawning could detrimentally affect successful egg development. The impact level would be determined by fish species presence, the timing of the construction in relation to spawning periods, and the closest spawning areas to the disturbance area. The duration of sediment impacts could last for several months to approximately 1 year depending on the timing of construction in relation to spring flows and other precipitation events that would flush sediments. The recovery period for biological communities could range from several months for macroinvertebrates to 1 year for fish (Waters 1995). The recovery period could be less if sediment levels were at relatively low concentrations.

Vehicle and equipment use within or near waterbodies also would pose a risk to aquatic biota from fuel or lubricant spills. If fuel reached a waterbody, aquatic species could be exposed to toxic conditions. Spills also would result in chemical residues within or on substrate in waterbodies. Impacts could include direct mortalities or reduced health of aquatic organisms. The magnitude of impacts would depend on the volume of spilled fuel, flow conditions, channel configuration, and presence of aquatic species.

Stream crossings by vehicles and equipment pose a risk of transferring invasive aquatic species between drainages during construction. Aquatic invasive species of concern in the four states traversed by the Project include whirling disease, zebra and quagga mussels, New Zealand mudsnail, and rusty crayfish. Various life stages of these invasive species could attach to vehicles or equipment and be introduced to a waterbody during the waterbody crossings associated with construction and maintenance activities. Management plans (e.g., UDWR 2009; WGFD 2010b) or regulations are being used by federal and state agencies to prevent the spread of these aquatic invasive species.

The estimated water use required per mile of transmission line construction is approximately 3,400 gallons for foundation concrete and 240,000 gallons for dust control. Water would be obtained from municipal sources, commercial sources, or a temporary water use agreement with landowners or irrigation companies holding existing water rights. As water sources are identified, a determination would be made whether the water counts towards the amount covered by the depletion consultation, based on an evaluation of their potential surface flows, groundwater connection, or if covered by existing consultations.

5.3.2.2 Ancillary Facilities

Communication System

The proposed fiber optic regeneration/repeater stations would have a total maximum disturbance footprint of 4.6 acres primarily located within the proposed ROW and spread along the length of the Project. Due to the small size of these facilities and the ability to site them in locations that avoid impacts to aquatic habitats, they are expected to have no impact on federally listed and candidate fish species.

Similarly, any new microwave antenna towers needed for the secondary communications path would be few in number and sited on topographic high points. Water requirements associated with construction of the communication system are expected to be minimal relative to those calculated for construction of the transmission line. Thus, potential impacts to federally listed and candidate fish from water withdrawals for communication system construction are expected to be negligible. Consequently, no impacts to federally

listed and candidate fish species are anticipated as a result of Project communication system construction.

Ground Electrode System

The Bolten Ranch Ground Electrode Facility site is located adjacent to Little Sage Creek and intermittent tributaries to this stream bisect the site. Consequently, construction of this facility would have potential to contribute sediment to Little Sage Creek with downstream impacts as described above. Little Sage Creek is tributary to the North Platte River, which in turn is tributary to the Platte River. The federally endangered pallid sturgeon occurs in the Platte River but any sediment contributed to Little Sage Creek as a result of ground electrode facility construction would be expected to have no impact on this species.

Similarly, the Halfway Wash East Ground Electrode Facility is located adjacent to an ephemeral wash that is tributary to the Virgin River. Construction of this facility would have potential to contribute sediment to the Virgin River in the event there was a flash flood in this area during construction of the facility. The incremental increase in sediment above what would naturally flow into the river during such an event and the low probability of such an event occurring during construction suggest that potential impacts to the Virgin River chub and associated critical habitat resulting from construction of this facility are highly unlikely.

Water requirements associated with construction of the ground electrode facilities would be minimal relative to estimated water needs for construction of the transmission line. Thus, potential impacts to federally listed and candidate fish from water withdrawals for communication system construction are expected to be negligible.

Terminals

Northern Terminal

Construction of the Northern Terminal would not result in direct disturbance effects, since waterbodies (i.e., Eightmile Lake and Separation Creek) located within the proposed siting area do not contain federally listed or candidate fish species. In addition, road access would not adversely affect special status fish species because existing or new roads would not cross waterbodies inhabited by these species. In summary, surface disturbance and use of access roads would not adversely affect special status aquatic species, since habitat is not located within the proposed disturbance area for the Northern Terminal.

Water use for terminal construction would require approximately 1.8 acre-feet for dust control. Water would be obtained from municipal sources, commercial sources, or a temporary water use agreement with landowners or irrigation companies holding existing water rights. The effect determination of new and existing water depletions in Wyoming would be made by the Wyoming State Engineer. Whether or not construction water use could affect surface flows for species using the Platte River system such as pallid sturgeon is discussed in Section 5.4, below.

Southern Terminal

Construction of the Southern Terminal would disturb upland areas in the Eldorado Valley watershed near Boulder, Nevada. The only waterbody located adjacent to and downslope of the siting area is a large playa lake. No perennial waterbodies are located in this area. No special status aquatic species habitat is located within the playa lake. Thus, surface disturbance and use of access roads would not adversely affect federally listed and candidate fish species, since there is no habitat located within the proposed disturbance area for the Southern Terminal.

Water required for the construction of the Southern Terminal is estimated to be 1.2 acre-feet. The source of the water would be existing rights. The effect determination of new and existing water depletions would be made after the water sources are identified and an evaluation of their potential connection to

surface flows is completed. Consultation with the USFWS would be completed to determine if construction water use could affect federally listed fish species and their critical habitat in the Colorado River Basin.

5.3.2.3 Impact Avoidance and Minimization during Construction Activities

Implementation of the applicant-committed design features and mitigation measures and additional conservation measures listed in **Table 2-7** and described in Chapter 3.0 would avoid and minimize impacts to federally listed and candidate fish species resulting from Project construction. Relevant general measures include but are not limited to: TWE-1, TWE-2, TWE-3, TWE-4, TWE-5, TWE-6, TWE-8, TWE-9, TWE-12, TWE-13, TWE-16, TWE-19, TWE-20, TWE-21, TWE-22, TWE-23, TWE-24, TWE-25, TWE-29, TWE-31, TWE-32, TWE-33, TWE-34, TWE-57, TWE-58, TWE-59, TWE-61, TWE-62, NX-2, WET-1, WET-3, AB-1, AB-2, AB-3, AB-4, and SSS-1, SSS-2, SSS-3, SSS-4, and SSS-11. Applicable species-specific conservation measures are described in the individual species sections below.

5.3.3 Operation and Maintenance Activities

5.3.3.1 Transmission Line

The direct and indirect effects of operation of the Project would involve use of access roads and the ROW for repair and maintenance activities and vegetation management. Impacts associated with operation activities would involve several of the same types of effects discussed for construction activities.

Direct disturbance to stream habitat would occur due to vehicle traffic during the annual transmission line inspection and vegetation clearing. In most situations, vehicles would use existing access roads. However, movement along the ROW may require crossings of small streams where access roads do not exist. It is assumed that fewer stream crossings may be required because the access road system would have been constructed. Project design would limit stream crossings if feasible. Some of the roads that cross streams would have culverts to protect the waterbody from future vehicle disturbance. The types of direct impacts would be the same as discussed for construction. Some riparian vegetation may be trimmed to maintain the buffer zones from wires. However, the applicant would retain as much riparian vegetation as possible at stream crossings. BLM stipulations would protect riparian areas on public lands by restricting surface distance in these areas. The buffer distance varies from 100 to 500 feet. However, riparian stipulations do not exist for the entire analysis area. The reduction of riparian vegetation at stream crossings would result in the same types of impacts on aquatic habitat, as discussed for construction.

Operation activities would not permanently remove habitat and affect fish population numbers. Temporary reductions in macroinvertebrate numbers could occur at stream crossings, but this community would recover as they recolonize aquatic areas.

Stream crossings by vehicles and equipment pose a risk of transferring invasive aquatic species between drainages during operation and maintenance activities. Impacts would be similar to construction activities except that fewer stream crossings may be required, since the road access system would be established during construction.

Vehicle traffic within the ROW and access roads near streams could result in increased sediment and fuel spill risks. The effects of these water quality changes on aquatic habitat and species would be the same as discussed for construction. The same BMPs and design features would be applied to minimize these types of impacts on aquatic biological resources. Herbicides may be used to control vegetation as part of maintenance activities in the ROW. Adverse effects on aquatic species would be minimized by following the Herbicide Use Plan, as described in the TWE Plan of Development, Appendix N – Noxious Weed Management Plan, and applicable regulations regarding the selection of approved herbiciess and

application and cleanup techniques. Additional conservation measures involving herbicide use are described in NX-1, NX-2, NX-3, and AB-4.

5.3.3.2 Ancillary Facilities

Operation and maintenance of ancillary facilities including communication sites, ground electrode facilities, and the Northern and Southern Terminals would have no effect on waterbodies and, thus, no effect on special status fish species.

5.3.3.3 Impact Avoidance and Minimization during Operation and Maintenance Activities

Implementation of the applicant-committed design features and mitigation measures and additional conservation measures listed in **Table 2-7** and described in Chapter 3.0 would avoid and minimize impacts to federally listed and candidate fish species resulting from Project operation and maintenance. Relevant general measures include but are not limited to: TWE-1, TWE-2, TWE-3, TWE-9, TWE-12, TWE-24, TWE-31, TWE-32, TWE-61, TWE-62, NX-2, AB-2, and AB-4. Applicable species-specific conservation measures are described in the individual species sections below.

5.3.4 Decommissioning Activities

Removal of project structures during decommissioning would result in the same types of impacts discussed for construction activities. Direct disturbance to aquatic habitat would occur as a result of vehicle traffic across streams. The Applicant would be responsible for reclamation of access roads following abandonment in accordance with landowner's or land agency's direction. Water quality changes involving increased sediment and fuel spill risks would occur as a result of vehicle traffic within or near waterbodies. The potential spread of invasive aquatic species also could result from vehicle crossings and movement between drainages. Many of the same BMPs and design features would be applied to reduce impacts during decommissioning activities. Removal of riparian vegetation would not be required as part of decommissioning.

6.0 Environmental Baseline and Assessment of Effects

6.1 Federally Listed Threatened and Endangered Species

6.1.1 Mammals

6.1.1.1 Canada Lynx (Threatened)

Environmental Baseline

Conservation Status

The contiguous U.S. Distinct Population Segment (DPS) of the Canada lynx was designated as threatened on March 24, 2000 (65 Federal Register [FR] 16051). This DPS includes lynx inhabiting forested portions of multiple states, including Colorado and Utah. In response to a 2002 court order, the USFWS reconfirmed the species' status as threatened (68 FR 40076). A Final Rule on revised critical habitat for the Canada lynx was issued in September 2014 (79 FR 54782). Designated critical habitat does not exist within the Canada lynx analysis area. A 5-year species status review was initiated in 2007 (72 FR 19549). Although a formal recovery plan has not been published for the Canada lynx, an interim Recovery Outline was issued in 2005 to guide recovery efforts and critical habitat designation for the DPS until a draft recovery plan is completed (USFWS 2005a).

The Canada lynx is broadly distributed across northern North America from the forested regions of eastern Canada to the northern border of Alaska. In the contiguous U.S., lynx historically occurred in the Cascades Ranges of Washington and Oregon; the Rocky Mountain Range in Montana, Wyoming, Idaho, eastern Washington; eastern Oregon, northern Utah, and Colorado; the western Great Lakes Region; and the northeastern U.S. region, from Maine southwest to New York. The species is strongly associated with boreal forests and its range coincides with that of its primary prey, the snowshoe hare.

The southern periphery of the North American boreal forest region extends into parts of the northern contiguous U.S., where it transitions to Acadian forest in the Northeast, deciduous temperate forest in the Great Lakes region, and subalpine forest in the Rocky Mountains and Cascade Mountains. These transitional boreal forests are fragmented, preventing both lynx and snowshoe hares from achieving densities as high as those of the northern boreal forests of Canada and Alaska (USFWS 2014d). The Canada lynx remains fairly widespread throughout its northern range but has receded from much of the southern periphery of its former range. In Utah, lynx have been documented in the Uinta Range (Ruediger et al. 2000). A few records also exist from the Wasatch Range and the Manti-La Sal National Forest. However, it is unlikely that the La Sal or Abajo mountains ever supported a resident lynx population, given the scarcity of records and the absence of snowshoe hares. The last verified records of lynx from Utah were physical remains in 1977 and tracks in 1982. The lynx has been protected from harvest since 1974, and is listed as a sensitive species by the State of Utah (Ruediger et al. 2000).

Until recently, it was generally assumed that the lynx was an indigenous but uncommon species in the southern Rocky Mountain geographic area. However, both Allen (1874) and Cary (1911) indicate that lynx may have been relatively common in Colorado, at least near or prior to 2000 (Ruediger et al. 2000). Despite the lack of recent specimens, evidence indicates lynx have persisted to the present, but are rare in the ecosystem. Severe reduction of lynx in Colorado led the Colorado Division of Wildlife (CDOW), now known as Colorado Parks and Wildlife (CPW), to undertake reintroduction efforts that are ongoing. CPW released 218 wild-caught adult lynx from Alaska between 1999 and 2006. Of the 218 lynx released, at least 122 (56 percent) died by June 2010 (USFWS 2013a).

In 2006 critical habitat was designated in Minnesota, Montana, and Washington; however, there is no critical habitat within the analysis area for this project.

Life History and Habitat Association

Canada lynx require early, mid-, and late successional forested habitats. Early and mid-successional forests are utilized for hunting snowshoe hares, and late successional forests are utilized for denning and raising kittens. Uneven-aged stands with relatively open canopies and well-developed understories are suitable habitat for snowshoe hares and consequently Canada lynx (Armstrong et al. 2011). In the northern portion of their range, boreal forests are preferred Canada lynx habitat; however, in the Intermountain West, spruce-subalpine fir and lodgepole pine forests are preferred. Canada lynx are negatively associated with topographic complexity, and typically occur where low topographic relief creates a continuous forest with variable aged trees. In Wyoming, the species occurs above 6,500 feet and in Colorado and Utah, Canada lynx typically occur above 8,000 feet (Ulev 2007).

Canada lynx are highly mobile with large home ranges spanning a variety of forested habitats. Home range size can vary between 6 and 85 square miles, depending on the sex; age; population density; prey density; and survey method used. Home ranges for males are generally larger than for females (Ulev 2007).

Densities of Canada lynx populations in northern boreal forests are highly correlated with the abundance of snowshoes hares, and lynx density fluctuates greatly with cycles of snowshoes hare populations (an approximate 10-year population cycle). During peak hare populations, lynx density can reach 30 to 45 individuals per square kilometer (km). The approximate10-year population cycle of Canada lynx occurs in phases, coinciding with the snowshoe hare cycle. The “low population density phase” lasts 3 to 5 years. The “population increase phase” lasts approximately 3 years and is a result of high fecundity, high kitten survival, and low adult mortality. The “peak phase” lasts approximately 2 years, with little population growth. The “crash phase” occurs 1 to 2 years following the crash in the snowshoe hare population, and is due to high natural mortality, a decline in recruitment, and increased dispersal rates (Ulev 2007).

In the southern periphery of their range, where snowshoe hare densities are lower, average lynx density is three individuals per square km (Armstrong et al. 2011). Populations of snowshoes hares in southern areas do not appear to fluctuate cyclically, and this could make lynx populations more stable (Armstrong et al. 2011). Reasons for an apparent absence of population cycles could include greater habitat fragmentation; lower, but more stable snowshoe hare populations; the presence of predators and competitors that do not occur in northern areas; and/or lynx predation on alternative prey species (Ulev 2007).

Lynx are polygamous and females are believed to be seasonally polyestrous. Most lynx breeding occurs in March and April (Armstrong et al. 2011). Gestation lasts for approximately 60 to 65 days (Ulev 2007). Lynx typically produce 1 litter per year, with 1 to 6 young (average 3), but can produce up to 4 litters in a season. Males do not help with the rearing of kittens, and the young disperse in the fall or the following spring after learning to hunt from their mothers (Armstrong et al. 2011). Lynx are primarily solitary and nocturnal; however, they have been observed travelling in pairs or with their young and hunting cooperatively (Armstrong et al. 2011).

Snowshoe hares are the primary prey of lynx, comprising 35 to 97 percent of the diet throughout the range of the lynx. Other prey species include red squirrel, grouse, flying squirrel, ground squirrel, porcupine, beaver, mice, voles, shrews, fish, and ungulates as carrion or occasionally as prey (Ruediger et al. 2000). Most research has focused on the lynx winter diet, and diets in the summer are poorly understood throughout the species’ range. The lynx summer diet includes a greater diversity of prey species (Ruediger et al. 2000). Mowat et al. (2000) reported through their literature review that summer diets include less snowshoe hare and more alternative prey, possibly because of a greater availability of alternative prey species. Southern populations of lynx could prey on a wider diversity of species than northern populations because of lower average hare densities and differences in other small mammal communities. In areas characterized by fragmented lynx habitat, the species could prey

opportunistically on other species that occur in adjacent habitats, including white-tailed jackrabbit, black-tailed jackrabbit, greater sage-grouse, and Columbian sharp-tailed grouse (Ruediger et al. 2000).

Threats

Persistence of the Canada lynx in the contiguous U.S. appears to be dependent on dispersal from larger populations and maintenance of connectivity between northern and southern populations (Schwartz et al. 2002). For lynx in Wyoming and Colorado, this requires maintaining connectivity between populations in those states, and between populations that could disperse from Canada into Montana and subsequently Wyoming (Schwartz et al. 2002). Threats affecting the Canada lynx include human alteration of forested habitat, including tree distribution and abundance, species composition, successional stages, and connectivity of forests; and the resulting changes in carrying capacity to sustain lynx populations. Humans have altered forests through timber harvest, fire suppression and conversion of forest lands to agriculture. Forest fragmentation could eventually become severe enough to isolate suitable lynx habitat into small areas, thereby reducing the viability of lynx populations that are dependent on larger areas of forest habitat (USFWS 2005a). In addition, one of the primary reasons for listing the Canada lynx is the residual effect of excessive trapping pressure that is believed to have occurred in the 1970s and 1980s (USFWS 2005a). Lynx also have been threatened by inadequacy of existing regulatory mechanisms. Other factors that could pose a threat to lynx population viability include: high traffic roads that bisect lynx habitat and negatively affect lynx behavior and movement, and human alteration of habitat that has led to an increase in lynx competitors such as coyote, bobcat, and mountain lion (USFWS 2005a).

Recovery

Initially, the USFWS identified the main threat to the Canada lynx contiguous U.S. DPS as the inadequacy of existing regulatory mechanisms to protect the species and its habitat; particularly the lack of protection conferred by USFS LRMPs (65 FR 16051). To address this inadequacy, the USFS, BLM, and USFWS developed the Lynx Conservation Assessment Strategy (LCAS) to provide a consistent and effective approach to conserve Canada lynx on federal lands across the contiguous U.S. (Ruediger et al. 2000). The LCAS included the identification of Lynx Analysis Units (LAUs). LAUs are based upon 5th and 6th level HUCs, and a HUC becomes a LAU when at least 30 percent of the HUC is suitable Canada lynx habitat. LAUs have been identified in suitable lynx habitat throughout lands managed by the USFS and BLM. With the exception of lynx habitat management plans on some private and state lands in Washington, no management plans that specifically address lynx conservation exist for the remainder of the contiguous U.S. (USFWS 2005a).

The USFS and BLM signed 4-year Conservation Agreements with the USFWS in 2000. The USFS agreement was revised and renewed in 2005 (USFS and USFWS 2005). The BLM agreement has not been renewed, although the agency continues to work within the agreement. Under the USFS and BLM agreements, lynx habitat was mapped on all USFS and BLM managed lands across the contiguous U.S. and Section 7 consultation is required on these lands. Determination of project effects on lynx is based on the most current science, including the LCAS (Ruediger et al. 2000).

The USFWS preliminary recovery strategy lists the recovery priority number for Canada lynx as 15, on a scale of 1C (highest) to 18 (lowest). This ranking is based on a low degree of threat; a high potential for recovery; and a taxonomic classification as a Distinct Population Segment under the ESA (USFWS 2005a). According to the preliminary recovery strategy, the recovery goal is to address threats to the Canada lynx so that protection of this species under the ESA is no longer required, and delisting is warranted.

Based on historic and recent evidence, lynx habitat and occurrence within the contiguous U.S. can be categorized as: 1) core areas, 2) secondary areas, and 3) peripheral areas. The areas with the strongest long-term evidence of lynx population persistence within the contiguous U.S. are defined as "core areas." Core areas have both persistent verified records of historic lynx occurrence and recent

evidence of reproduction. Six core areas and one “provisional” core area are identified within the contiguous U.S. (USFWS 2005a).

Recovery of the lynx will be achieved when conditions have been attained that will allow lynx populations to persist long-term within each of the identified core areas. The following preliminary recovery objectives and measures have been established by the USFWS in order to progress towards delisting the lynx.

- Objective 1: Retain adequate habitat of sufficient quality to support the long-term persistence of lynx populations within each of the identified core areas.
- Objective 2: Ensure that sufficient habitat is available to accommodate the long-term persistence of immigration and emigration between each core areas and adjacent populations in Canada or secondary areas in the U.S.
- Objective 3: Ensure that habitat in secondary areas remains available for continued occupancy by lynx.
- Objective 4: Ensure that threats have been addressed so that lynx populations will persist in the contiguous U.S. for at least the next 100 years.

USFWS Recovery Actions needed to attain objectives:

1. Establish management commitments in core areas that will provide for adequate quality and quantity of habitat such that there is a reasonable expectation that persistent lynx populations can be supported in each of the core areas for at least the next 100 years.
2. Maintain baseline inventories of lynx habitat in each core area, monitoring changes in structure and the distribution of habitat components.
3. Monitor lynx use in lynx analysis units (as defined in Ruediger et al. 2000) or other appropriate management units at least once every 10 years to determine distribution and occupancy within the core area.
4. Develop habitat facility movement between each core area and lynx populations in Canada.
5. Ensure that habitat in secondary areas remains available for occupancy by lynx.
6. Identify population and habitat limited factors for lynx in the contiguous U.S.
7. Develop a post-delisting monitoring plan.

Core Areas of Canada lynx habitat ensure the continued persistence of lynx in the contiguous U.S. by providing:

- Representation by conserving the breadth of ecological settings of the DPS;
- Redundancy by retaining a sufficient number of populations to provide a margin of safety to withstand catastrophic events; and
- Resiliency by maintaining sufficient numbers of animals in each population to withstand randomly occurring events and prey population dynamics.

Provisional Core Area has been designated in the southern Rocky Mountains in Colorado and Wyoming. Criteria include:

- Verified evidence of long-term historical and current presence of lynx populations;
- Recent (within the past 20 years) evidence of reproduction;
- Average snowshoe hare densities over time are at least 0.5 hare/hectare;

- Contains a minimum of 483 square miles of boreal forest habitat (can include boreal forest habitat directly adjacent in Canada). Habitat patches must be sufficiently large and connected to enable movement within and between patches within a core area; and
- Snow conditions favor the competitive advantage of Canada lynx.

No Secondary Habitat Areas are designated in the southern Rocky Mountains. Peripheral Habitat Areas could enable successful dispersal of lynx between populations or sub-populations. Peripheral lynx habitat has been identified in Utah (79 FR 54782). Criteria include:

- Few historic or recent verified records of lynx exist for the area; and
- Habitat occurs in small patches and is not well-connected to larger patches of high quality habitat.

Assessment of Effects

Area of Analysis

The Canada lynx analysis area is defined as potential habitat (aspen forest and woodland, conifer forest, and tundra vegetation communities) within the action area, as defined in Section 2.2. The lynx analysis area includes 18,325 acres of potential Canada lynx habitat and is depicted in **Figure 6-1**.

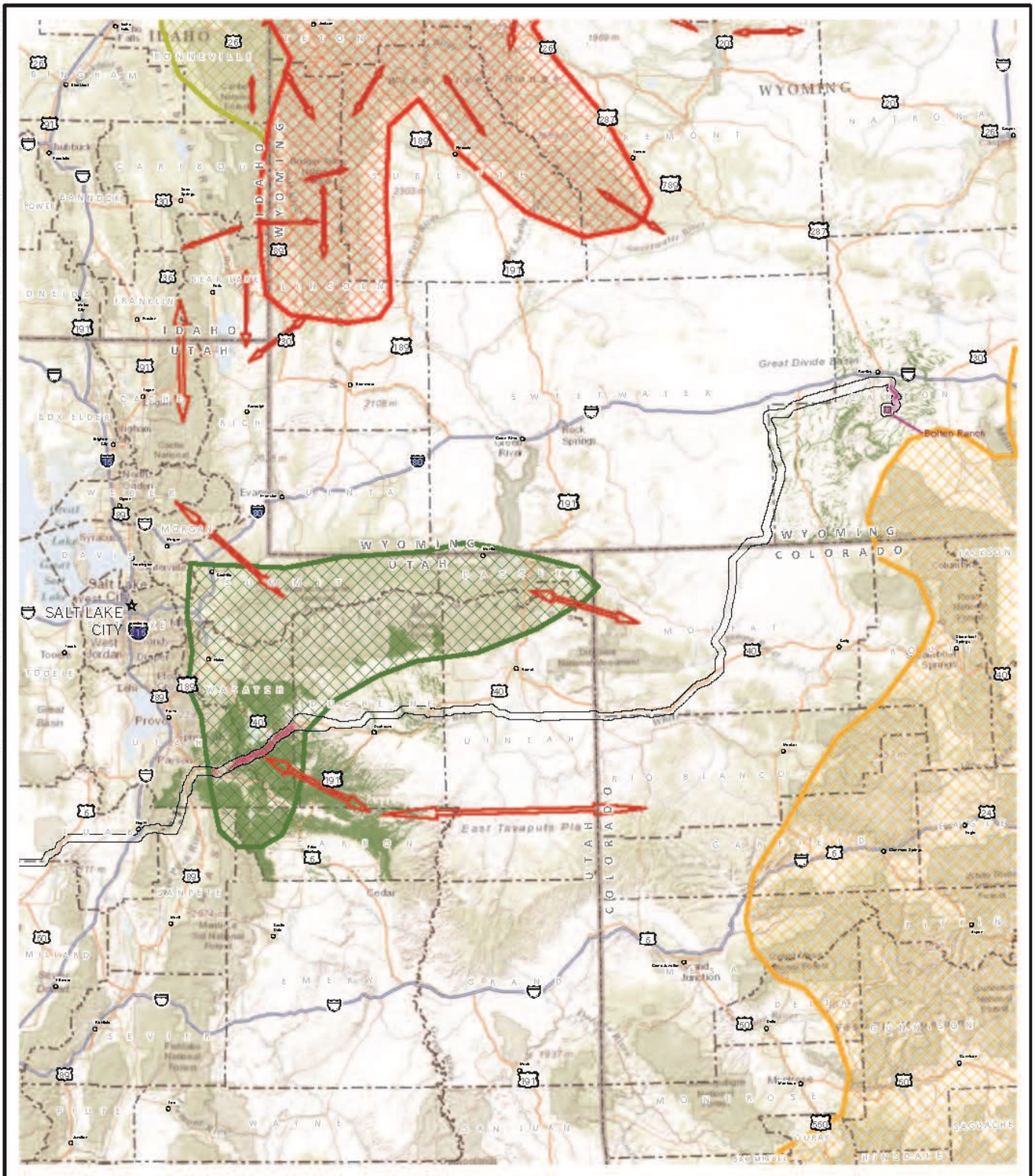
The Canada lynx could occur within high elevation forests in northeastern Utah, primarily in the Ashley and Uinta-Wasatch-Cache National Forests (USFS 2007), and in the Routt National Forest in northwestern Colorado (USFS 2006). Although this species is extremely rare in Utah, transient Canada lynx from Colorado have been documented within 5 miles of the analysis area in Uintah County, Utah (UNHP 2010). Existing lynx habitat in Utah has been identified as “peripheral” by the USFWS (79 FR 54782). Peripheral habitat is characterized as sub-optimal habitat where the capacity to support adequate snowshoe hare or lynx populations is questionable. In areas of potentially suitable peripheral habitat within the Canada lynx analysis area there is no evidence of long-term presence or reproduction that might indicate colonization or sustained use of these areas by lynx (Interagency Lynx Biology Team 2013). The Canada lynx analysis area also encompasses identified “linkage areas” in northeastern Utah and northwestern Colorado (**Figure 6-1**, USFS 2007). Linkage habitat is defined as areas that facilitate movements of lynx beyond their home range, such as dispersal, breeding season, or exploratory movements. Linkage areas typically incorporate topographic features that tend to funnel animal movements and might encompass areas of non-lynx habitat (Interagency Lynx Biology Team 2013). To the extent that lynx use these linkage areas, they could traverse the action area in Moffat County, Colorado, when travelling back and forth between the Routt and Ashley National Forests.

A reproducing lynx population has been established in south-central Colorado as a result of a reintroduction program initiated in 1999 by the CPW. Individuals from this population have been documented in northern Colorado and Utah.

Conservation Measures

Impacts to Canada lynx habitat would be minimized through implementation of the following design features and conservation measures described in Chapter 3.0:

- Applicant-committed conservation measures and design features: TWE-1 – TWE-5, TWE-9, TWE-12, TWE-26 – TWE-28, TWE-31, TWE-33, TWE-34, and TWE-64.
- Conservation measures: **WLF-6, WLF-10,** and **SSWS-15**.


IDAHO
WYOMING
UTAH
COLORADO
SALT LAKE CITY
Bohen Ranch
East Tavaputs Plateau
Great Divide Basin
Action Area
Analysis Area
Canada Lynx Potential Habitat
Linkage Area (USFS 2003)
Lynx Recovery Areas
Core
Provisional Core
Secondary
Peripheral
Ground Electrode Siting Area
Ground Electrode Overhead Electrical Line
Action Area Buffer for Analysis Area: None
NEVADA
ARIZONA
NEW MEXICO
CALIFORNIA
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 6-1
Area of Analysis for Canada Lynx
0 10 20 40 Miles
0 10 20 40 km
1:3,000,000
Western AREA POWER ADMINISTRATION
Exported On: 4/2/2015
K:\Projects_4\TransWestExpress\12907_003_TransWest_Express\figures\Document\Figures\2015_BA_v2\SWildlife\Fig_6_01_CanadaLynx.mxd

The following species-specific conservation measure would be implemented for the Canada lynx:

SSWS–11: To avoid or minimize impacts to Canada lynx, TransWest would:

1. Limit disturbance to and within suitable habitat by staying on approved access routes.
2. Limit new access routes created by the Project.
3. Dirt and gravel roads traversing lynx habitat (particularly those that could become highways) should not be paved or otherwise upgraded (e.g., straightening of curves, widening of roadway, etc.) in a manner that is likely to lead to significant increases in traffic volume, traffic speed, increased width of the cleared ROW, or would foreseeably contribute to development or increases in human activity in lynx habitat.

   Effectiveness: This conservation measure would minimize impacts to the Canada lynx and its habitat by restricting disruptive activities and limiting construction of new access roads.

Direct and Indirect Effects

Within the action area, Canada lynx potential habitat occurs only in Utah where it is relatively scarce and located in high elevation forests with dense tree canopies. These areas are primarily located in the Ashley National Forest and in the Uinta Planning Unit of the Uinta-Wasatch-Cache National Forest. Project-related disturbance is possible for lynx that could be dispersing through the area during construction or maintenance. However, individual lynx would likely avoid noise and human presence. Operation of the transmission line would not restrict lynx movement, and would allow dispersal. The proposed Project does not cross any LAUs in Utah. Therefore, impacts to the Canada lynx would be limited primarily to impacts including habitat loss and fragmentation.

Impacts to the Canada lynx habitat would include the construction and operation disturbance of 162 acres (0.9 percent) and 59 acres (0.3 percent), respectively, of peripheral lynx habitat within the analysis area. Impacts to lynx habitat would include the loss of potential cover and den locations consisting of large conifer trees and woody debris. Loss of available foraging habitat (e.g., early successional, high-tree-density areas with dense understory vegetation preferred by the snowshoe hare) would result in indirect impacts to the Canada lynx. In Utah, snowshoe hare (the primary lynx prey species) habitat exists within the analysis area in Duchesne, Wasatch, Utah, Sanpete, and Juab counties. Impacts to snowshoe hare habitat and the habitat of other prey species could indirectly impact to Canada lynx due to reduced foraging opportunities.

After considering design features and conservation measures, remaining Project construction and operation impacts to the Canada lynx would be limited to habitat loss and fragmentation, and potential disturbance during construction and routine maintenance activities. This disturbance is anticipated to have very little effect on Canada lynx, given the infrequency of lynx activity within the Project disturbance areas and the extent of native habitats in the surrounding Project region.

Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the proposed Project action area for the Canada lynx.

Monitoring

There are currently no known short- or long-term monitoring and reporting plans for Canada lynx in the Project analysis area.

Determination

Effect on the Species: The Proposed Action *may affect, but is not likely to adversely affect* the Canada lynx as a result of construction and operation of the proposed Project.

Effect on Critical Habitat: No critical habitat has been designated for the Canada lynx within the action area; therefore, there would be no effect on critical habitat.

Rationale: Construction and operation activities would be unlikely to directly affect the Canada lynx, since there have been no recent documented occurrences of lynx in the Canada lynx analysis area. The species is highly mobile and secretive and would likely avoid construction and maintenance activities along the ROW. The project would cross peripheral Canada lynx habitat in the Uinta-Wasatch-Cache National Forest in Utah and a linkage area in northwestern Colorado. However, the project is not expected to result in substantive long-term impacts that would affect the species ability to survive, reproduce, and/or disperse through the area.

6.1.1.2 Gray Wolf (EXP/NE in Wyoming, Endangered in Utah and Colorado)

Environmental Baseline

Conservation Status

The gray wolf (Northern Rocky Mountain Population) was designated as endangered on January 4, 1974 (39 FR 1175-1176). A wolf recovery team for the Northern Rocky Mountain Region was appointed in 1974 and a Recovery Plan was released on August 3, 1987 (USFWS 1987). In 1978, the USFWS published a rule (43 FR 9607, March 9, 1978) reclassifying the gray wolf as an endangered population at the species level *(Canis lupus)* throughout the conterminous 48 States and Mexico, except for the Minnesota gray wolf population, which was classified as threatened. In 1995 and 1996 the USFWS reintroduced 66 wolves from Canada into wilderness areas of central Idaho and Yellowstone National Park in Wyoming as EXP/NE (59 FR 60252, November 22, 1994) under Section 10(j) of the ESA (16 USC 1539(j)) with the goal of reestablishing a sustainable gray wolf population in the northern Rocky Mountains (Wyoming, Idaho, and Montana).

Between 2003 and 2008 the USFWS published several rules revising the 1978 conterminous listing for *Canis lupus* (68 FR 15804, April 1, 2003; 72 FR 6052, February 8, 2007; 73 FR 10514, February 27, 2008; 74 FR 15070 and 74 FR 15123, April 2, 2009) and each of these revisions was challenged in court. As a result of court orders and a settlement agreement, by the spring of 2010 the listing for the gray wolf (50 CFR 17.11) remained unchanged from the reclassification that occurred in 1978 (except for the addition of the three experimental populations (Yellowstone Experimental Population Area (59 FR 60252, November 22, 1994), Central Idaho Experimental Population Area (59 FR 60266, November 22, 1994), and the Mexican Wolf Experimental Population (63 FR 1752, January 12, 1998) (USFWS 2012a). On May 5, 2011, the USFWS published a Final Rule, reinstating the April 2, 2009, delisting rule which identified the Northern Rocky Mountain population of gray wolf as a DPS and, with the exception of Wyoming, removed gray wolves in the DPS from the List of Endangered and Threatened Wildlife (76 FR 25590).

On September 12, 2012 the USFWS released a Final Rule that delisted the gray wolf in Wyoming and removed it's designation as EXP/NE (77 FR 55530). On June 13, 2013 the USFWS published a Proposed Rule to remove the gray wolf from the List of Threatened and Endangered Wildlife but to maintain endangered status for the Mexican wolf by listing it as a subspecies (78 FR 35663). On February 20, 2015, the USFWS published a final rule reinstating the gray wolf's status in Wyoming as EXP/NE in compliance with a September 23, 2014, order by the U.S. District Court for the District of Columbia (80 FR 9218). The gray wolf currently remains listed as endangered outside of the Northern Rocky Mountain DPS, including most of Utah and Colorado, where it continues to be listed as endangered under the ESA.

The gray wolf occurs worldwide, ranging from Europe to northern Asia; however, it has been extirpated from much of its former range. In North America, the gray wolf once ranged from the southern border of Greenland south through mid-Mexico, coast to coast. The species occupied most regions of the U.S. except deserts and high mountaintops (Snyder 1991). By the time wolves were protected by the ESA of 1973, only a few hundred remained in extreme northeastern Minnesota and a small number on Isle Royale, Michigan (USFWS et al. 2011).

Natural recovery of the northern Rocky Mountain wolf population began in the early 1980s when wolf packs from Canada began to recolonize areas of northwestern Montana. In order to further facilitate recovery, in 1995 and 1996 wolves were reintroduced from southwestern Canada to remote public lands in central Idaho and Yellowstone National Park in Wyoming. These reintroductions, combined with mortality management, have greatly expanded the numbers and distribution of wolves in the northern Rocky Mountains. Subsequent management plans and regulations developed by the applicable States to maintain these recovered populations at healthy levels have led to the recent proposed delisting of gray wolves in most of the northern Rocky Mountains (USFWS 2012a).

By the end of 2011, the northern Rocky Mountain gray wolf population had exceeded, for the twelfth consecutive year, the numerical and distributional recovery goal (minimum of 30 breeding pairs and over 300 wolves well-distributed among Idaho, Montana, and Wyoming; and contained a minimum population estimate of over 1,700 wolves and over 100 breeding pairs. This is a slight increase from 2010 estimates despite State run harvests that took over 300 wolves in 2011. This population is about five and a half times higher than the minimum population recovery goal and about three and a half times higher than the breeding pair recovery goal (USFWS 2012a).

No critical habitat has been designated for the Northern Rocky Mountain population of the gray wolf.

Life History and Habitat Association

Wolves utilize a broad spectrum of habitats and are considered to be habitat generalists. Key components of wolf habitat include: 1) a sufficient year-round prey base of ungulates (big game) and alternate prey species, 2) suitable and somewhat secluded denning and rendezvous sites (resting and gathering areas occupied by wolves after den has been abandoned), and 3) sufficient habitat with minimal exposure to humans (USFWS 1987).

Wolves are social animals that live in groups, called packs, which typically include a breeding pair (the alpha pair), their offspring, and other non-breeding adults. Wolves are capable of mating by age two or three and often form lifelong bonds. They can live for up to13 years and breed past 10 years of age (USFWS 2011g). In most wolf populations, reproductive packs occupy exclusive territories, and nonbreeding individuals either live in areas between territories or avoid the packs. These territories are a means of partitioning food resources in areas where prey is randomly distributed and does not undergo major seasonal movements (USFWS 1987). Pack territories can range in size from 50 square miles to over 1,000 square miles, depending on the available prey and their seasonal movements. Most wolf pack territories range from 20 to 200 square miles. Wolves travel over large areas to hunt, sometimes as far as 30 miles in a day. Although they usually trot at 5 miles per hour, wolves can run as fast as 40 miles per hour for short distances (USFWS 2011g).

The breeding season for wolves occurs from late January through April. Pups are born between late March and May after a gestation period of approximately 63 days. Litter size ranges from four to seven pups (USFWS 1987). Gray wolves often excavate natal dens in well-drained soils in meadows near water and could use the same den for several years. They also will den under tree roots, rock outcrops, or even in hollow logs. After 1 to 2 months, these natal dens are abandoned and the wolves move to an open area called a rendezvous site where pups are guarded by a few adult pack members while the rest of the pack hunts. Most wolves disperse from their natal grounds at ages ranging from 9 to 28 months. However, in areas with a high density of wolves, dispersal might not occur at all (USFWS 1987).

Gray wolves prey primarily on large ungulates, such as moose, deer, elk, and caribou, often concentrating on the young, old, and sick members of ungulate populations. Voigt et al. (1976) reported that the gray wolf diet varies, depending on relative prey abundance. Other prey species include mountain goats, bison, pronghorn, various rodents, upland game birds, waterfowl, snowshoe hare, and black bear. Occasionally gray wolves prey on domestic livestock (Snyder 1991).

Threats

The population decline of wolf populations within the U.S., including those in the Northern Rocky Mountain region, was the result of: 1) intensive human settlement, 2) direct conflict with owners of domestic livestock, 3) a lack of understanding of the species' ecology and habits, 4) fears and superstitions concerning wolves, and 5) extreme control programs designed to eradicate the species (USFWS 1987). Threatened Wildlife of the U.S. (USFWS 1973) lists the primary reasons for the decline of the Northern Rocky Mountain wolf population as: land development, loss of habitat, poisoning, trapping, and hunting.

Recovery

At the start of the most recent 5-year review (USFWS 2012a), the Recovery Priority Number for the gray wolf was 15C. This number indicates that the species faces a low degree of threat; has a high recovery potential; and is in conflict with construction, development, or other forms of economic activity. The original 1980 Northern Rocky Mountain Gray Wolf Recovery Plan objective was to re-establish and maintain viable populations of the species in its former range where feasible (USFWS 1980). However, the plan did not contain any recovery goals. The 1987 revision did include a recovery goal, which was later re-evaluated and modified several times between 1994 and 2009.

Natural re-colonization of wolves in northwestern Montana and reintroductions in Idaho and in Yellowstone National Park, combined with mortality management, greatly expanded the number and distribution of wolves in the northern Rocky Mountains. Subsequent management plans and regulations developed by Idaho, Montana, and Wyoming wildlife management agencies serve to maintain these recovered populations at healthy levels and have led to the recent delisting of gray wolves in most of the northern Rocky Mountains (USFWS 2012a).

By the end of 2011, the Northern Rocky Mountain gray wolf population had exceeded the recovery goal of a minimum of 30 breeding pairs and over 300 wolves well-distributed among the 3 States (Idaho, Montana, and Wyoming) and contained a minimum population estimate of over 1,700 wolves and over 100 breeding pairs (USFWS 2012a). This population is approximately five and a half times higher than the minimum population recovery goal and about three and a half times higher than the breeding pair recovery goal. On June 13, 2013, the USFWS published a Proposed Rule to remove the gray wolf from the List of Threatened and Endangered Wildlife (78 FR 35663).

By every biological measure, the Northern Rocky Mountain Distinct Population Segment wolf population is fully recovered and remains secure under State management. Resident packs have saturated suitable habitat in the core recovery areas and the population has exceeded recovery goals for 13 consecutive years. This wolf population is expected to stabilize at a lower equilibrium based on natural carrying capacity in suitable habitat and human social tolerance (USFWS 2014a).

As the northern Rocky Mountain Distinct Population Segment wolf population has increased, minimum population estimates have become less precise. However, wolf populations in Montana, Idaho, and Wyoming far exceeded recovery goals at the end of 2013, and monitoring methods adequately documented this conclusion (USFWS 2014a).

The status of the northern Rocky Mountain Distinct Population Segment has consistently exceeded recovery goals since 2002. This is demonstrated by pack distribution and the number of individual wolves, packs, and breeding pairs in 2013. Documented dispersal of radio-collared wolves and effective dispersal of wolves between recovery areas determined through genetic research further

substantiate that the metapopulation structure of the northern Rocky Mountain Distinct Population Segment has been maintained solely by natural dispersal.

Potential threats to the gray wolf include the following five factors:

- The present or threatened destruction, modification, or curtailment of its habitat or range;
- Overutilization for commercial, recreational, scientific, or educational purposes;
- Disease or predation;
- Inadequacy of existing regulatory mechanisms; and
- Other natural or man-made factors affecting its continued existence (including public attitudes, genetic considerations, climate changes, catastrophic events, and impacts to wolf social structure)

In 2013, the USFWS analyzed these five factors as part of a proposed rule to delist the species (USFWS 2013). At that time, none of the five factors rose to a level that threatened survival and recovery of the northern Rocky Mountain Distinct Population Segment of the gray wolf. Delisting the species in portions of its range has not jeopardized the northern Rocky Mountain Distinct Population Segment wolf population, nor increased any risk to it. Biologically, wolves in the northern Rocky Mountain Distinct Population Segment remain recovered (USFWS 2014a).

Assessment of Effects

Area of Analysis

The gray wolf is a habitat generalist and the species is rare throughout its range in the Rocky Mountain region. Since the gray wolf utilizes a wide variety of habitats, the species may be present in any habitat type along any portion of the Project route in Wyoming, Colorado, and northern Utah. However, it is most likely to occur in areas away from human activity where game species are more abundant. Consequently, for the purposes of this analysis, we have assumed the gray wolf is associated with more mountainous habitats. Accordingly, the gray wolf analysis area is defined as potential habitat (aspen forest and woodland, conifer forest, montane grassland, montane shrubland, and tundra vegetation communities) within the Project action area defined in Section 2.2. These areas represent 35,336 acres of potential gray wolf habitat.

Although the potential for wolves to occur within the Project area is considered low, wolves that might be dispersing through the area during construction or maintenance activities could be adversely affected by the Project. However, such animals would likely avoid noise and human presence within the Project area. In August, 2014, there were confirmed sightings of a wolf on the south slope of the Uinta Mountains that had been radio-collared in northern Idaho (UDWR, Salt Lake Tribune, October 10, 2014). In December, 2014, a wolf that had been radio-collared in Cody, Wyoming, was accidentally shot by a hunter on the south end of the Tushar Mountains near Beaver, Utah (Salt Lake Tribune, December 29, 2014). These sightings were within about 25 miles and 35 miles of the action area, respectively. Given that these wolves had both traveled over 500 miles from their respective collaring locations, they could easily have traversed the proposed Project route in one or more locations; however, there have been no documented sightings of wolves any closer to the action area. Prior to these sightings, the most recent documentation of a wolf in Utah was in 2006.

Conservation Measures

Impacts to gray wolf potential habitat would be minimized through implementation of the following design features and conservation measures described in Chapter 3.0:

- Applicant-committed mitigation measures and design features: TWE-1 – TWE-5, TWE-9, TWE-12, TWE-26 – TWE-28, TWE-31, TWE-33, TWE-34, and TWE-64.
- Conservation measures: **WLF-6, WLF-10,** and **SSWS-15**.

Direct and Indirect Effects

The gray wolf could utilize any habitat type in mountainous regions present along the Project route in Wyoming, Colorado, or northern Utah. If gray wolves are present within the analysis area, both direct and indirect impacts could occur as a result of construction of the proposed Project. Direct impacts to gray wolves would include loss of foraging or denning habitat; habitat fragmentation; and animal displacement (both wolf and prey species). The proposed Project would result in the construction and operation disturbance of 4,015 acres (11 percent) and 1,054 acres (2.9 percent) respectively, of potential gray wolf foraging and denning habitat within the analysis area. Direct impacts to the gray wolves would be limited primarily to noise and human activity during construction. Effects on this species from long-term habitat modification are expected to be negligible.

Dispersing or roaming wolves could be disturbed during construction or maintenance. However, individual wolves would likely avoid noise and human presence. Thus, operation of the transmission line would not restrict wolf movement, and would allow dispersal. Habitat fragmentation disrupts the movements of large mammal prey species and foraging gray wolves. Impacts to large mammal and other prey species habitat could indirectly impact gray wolves due to reduced foraging opportunities. Indirect impacts would include increased noise and human activity associated with Project construction and operation, potential reductions in prey species populations within the project area resulting from disturbances, and changes in vegetation communities resulting from potential invasive and noxious weed infestations.

After considering design features and conservation measures, remaining Project construction and operation impacts to the gray wolf would be limited to fragmentation and incremental loss of potential habitat; disruption of prey populations; and disturbance during construction and routine maintenance activities. Given the infrequency of gray wolf activity in the Project action area and the extent of native habitats in the surrounding Project region, this disturbance is anticipated to have little impact on the species.

Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the proposed Project action area for the gray wolf.

Monitoring

There are currently no known short- or long-term monitoring and reporting plans for gray wolf in the Project analysis area.

Determination

Effect on the Species: The Proposed Action *may affect, but is not likely to adversely affect* the gray wolf as a result of Project construction and operation.

Effect on Critical Habitat: Critical habitat has not been designated for the gray wolf.

Rationale: Given the infrequency with which gray wolves dispersing from Idaho and Wyoming have been documented in the vicinity of the action area, construction and operation activities are unlikely to result in any direct, adverse effects on this species. Furthermore, should dispersing wolves occur within the action area they would likely avoid construction and maintenance activities due to their highly mobile and secretive nature. Project-related impacts to habitat for large mammals and other prey species and temporary, construction-related displacement of these species from the action area could indirectly

impact any gray wolves in the area due to reduced foraging opportunities. However, these impacts would not be expected to result in any substantive, long-term impacts to this species.

6.1.1.3 Utah Prairie Dog (Threatened)

Environmental Baseline

Conservation Status

The Utah prairie dog was designated as endangered on June 4, 1973, due to a substantial decline in population from 1970 to 1972 (Pizzimenti and Collier 1975). In 1979 the UDWR petitioned the USFWS to remove the Utah prairie dog from the endangered species list. The USFWS published a Final Rule on May 29, 1984 (49 FR 22330), to reclassify the Utah prairie dog as threatened, with a special rule to allow for regulated take. In 2003, the USFWS received a petition to reclassify the species as endangered. In February 2004, the USFWS received a Notice of Intent to Sue for failure to issue a 90-day finding for the petition. Eventually the petitioning party and the USFWS reached a settlement agreement to make a 90-day finding on the petition by February 17, 2007. Published in the FR on February 21, 2007, the USFWS issued a notice of the 90-day petition finding that the petition failed to provide substantial scientific or commercial information to warrant the reclassification of the species to endangered status (72 FR 7843). With this determination, the USFWS also initiated a 5-year review of the species to determine whether the status of the Utah prairie dog should be changed. No critical habitat has been designated for the Utah prairie dog (USFWS 2012b).

The Utah prairie dog has the most restricted range of all prairie dog species in the U.S. and is limited to the southwestern quarter of Utah (USFWS 2012g). Historically, the species' distribution included portions of Beaver, Garfield, Iron, Kane, Juab, Millard, Piute, Sanpete, Sevier, Washington, and Wayne counties (USFWS 2012b). Currently, Utah prairie dogs are limited to the central and southwestern quarter of Utah in Beaver, Garfield, Iron, Kane, Piute, Sevier, and Wayne counties (USFWS 2012b). As of 2010, the majority of Utah prairie dog populations occurred in only three areas: the Awapa Plateau; the Paunsaugunt region along the east fork and main stem of the Sevier River; and the West Desert region of eastern Iron County (USFWS 2010f). Several isolated colonies also exist in the mountain and desert valleys in western Iron and Beaver counties (Pizzimenti and Collier 1975; USFWS 1991).

Historic abundance of the Utah prairie dog has been estimated at approximately 95,000 animals (USFWS 2012b). However, these estimates are not considered to be reliable because they were derived largely from informal interviews rather than actual survey data. Utah prairie dog populations began to decline when control programs were initiated in the 1920s, and by the 1960s the species' distribution was greatly reduced as a result of poisoning, sylvatic plague (a non-native disease), drought, and habitat alteration caused by agricultural and grazing activities (USFWS 1991). The exact magnitude of this decline is not known. However, by the early 1970s, the Utah prairie dog was eliminated from major portions of its historic range and its population had declined to an estimated 3,300 individuals, distributed among 37 colonies (USFWS 2012b).

Spring counts from the past 30 years show considerable annual fluctuations, but indicate stable to increasing long-term trends in adult Utah prairie dog numbers. Range-wide counts were as high as 7,527 in the 1989 spring census, with a low count of 1,866 animals in 1976 (USFWS 2012i). Recent Utah prairie dog population trends appear to be stable to increasing, although the species remains vulnerable to several serious threats, particularly urban expansion and sylvatic plague (USFWS 2012i).

Life History and Habitat Association

This species inhabits semi-arid shrub-steppe and grassland habitats in central and southern Utah, and is found at elevations ranging from approximately 4,900 to 9,800 feet amsl (USFWS 2012b). The Utah prairie dog prefers swale formations where moist vegetation is available even during times of drought (USFWS 1991). Because most of their water requirement is met through plant ingestion, there is a positive correlation between the amount of available moisture in vegetation and Utah prairie dog

population densities. Utah prairie dogs typically avoid areas where shrub species dominate, and will eventually decline or disappear in areas invaded by shrubs (Collier 1975; Player and Urness 1982). Vegetation within a colony must be low enough to allow a standing Utah prairie dog to scan the environment for predators and maintain visual contact with other members of the colony. However, this species has been known to occur in open pine-fir forests, such as in Bryce Canyon National Park (USFWS 2012b). Utah prairie dogs require well-drained soils for their burrows to be able to burrow deeply enough to be protected from predators and environmental temperature extremes (USFWS 1991).

The Utah prairie dog is a colonial species organized into social groups known as clans. A clan consists of an adult male, several adult females, and their offspring (Hoogland 2001). Colony population densities vary considerably, ranging from 6.25 per acre to more than 185 per acre. Habitat condition is the most likely influence on population density (Pizzimenti and Collier 1975).

Utah prairie dogs spend 4 to 6 months underground each year during winter (Hoogland 2001). Some observations suggest that Utah prairie dogs hibernate. However, other evidence suggests that at lower elevations Utah prairie dogs might enter torpor more intermittently at the beginning and end of the hibernation season and can be seen above ground in mild weather (USFWS 2012b). Adult males cease surface activity during August and September, followed by females several weeks later. Utah prairie dogs emerge from hibernation in late February or early March, with males emerging 1 to 3 weeks before females.

Utah prairie dogs have a lower rate of reproduction relative to other rodents. They begin mating a few days after emerging from hibernation (USFWS 2012b). Female Utah prairie dogs come into estrous, a period of greatest female reproductive responsiveness, only 1 day during the breeding season (Hoogland 2001). Approximately 97 percent of adult female Utah prairie dogs successfully breed each year. Litter sizes range from one to seven pups, with an average of 3.7 to 5.5 pups (USFWS 2012b). Utah prairie dog pups are born after a gestation period of 28 to 30 days, and depend almost entirely on nursing while in their burrow. Young Utah prairie dogs emerge from their nursery burrows when they are 5 to 6 weeks old, usually around mid-June. In late summer, young prairie dogs (mostly male) will disperse from their natal area, with average dispersal distances of 0.35 mile; long-distance dispersal distances of 0.75 mile; and unusually long-distance dispersal distances of 4 miles (USFWS 2012b). Most dispersing prairie dogs move to adjacent territories in suitable habitat.

Utah prairie dogs are primarily herbivores, though they also will eat insects. The species forages on grasses and forbs, often selecting those with higher moisture content. Forbs are consumed in the spring, and prairie dogs show a preference for alfalfa over grasses when both are present. Alfalfa is abundant in agricultural fields in Utah, and Iron County produces the second highest alfalfa harvest in Utah. Vegetation quality and quantity are essential for Utah prairie dogs to ensure survival during hibernation, lactation, and other periods of high nutrient demand. Plant species composition is correlated with increased weight gain; higher juvenile to adult population ratios; and higher population densities (USFWS 2012b).

Threats

In addition to natural population dynamics, site-specific prairie dog numbers are influenced by various environmental and human factors, including disease (e.g., epizootic plague); climate cycles; habitat loss, alteration, and fragmentation from environmental or human activities; and unlawful lethal take (USFWS 2012b).

The most recent 5-year review in 2010 indicates that threats to the Utah prairie dog include plague, urban expansion, overgrazing, cultivated agriculture, vegetation community changes, invasive plants, off-highway vehicle (OHV) and recreation uses, climate change, energy resource exploration and development, fire management, poaching, and predation (USFWS 2012b). Based on the Utah Prairie Dog Recovery Team's threat assessment results, urban expansion and plague comprise the most serious threats to Utah prairie dog populations. Threats of moderate concern include over-grazing,

OHV/recreational land uses, cultivated agriculture, vegetation community changes, and invasive plants. Threats of least concern include climate change, energy resource exploration and development, poaching, predation, and fire management (USFWS 2012b).

Recovery

The initial Recovery Plan for the Utah prairie dog was approved on September 30, 1991 (USFWS 1991). In March 2012, the USFWS issued a Revised Recovery Plan, which includes revised recovery criteria and updated actions that are likely necessary to achieve recovery (USFWS 2012g). In the Revised Recovery Plan, the USFWS redefined the designation of Utah prairie dog "recovery area" to "recovery units" (RUs). There are three RUs: the Awapa Plateau RU, the Paunsaugunt RU, and the West Desert RU. These RUs are geographically distinct and are essential to the conservation and recovery of the entire population of Utah prairie dogs. The USFWS recovery strategy for the Utah prairie dog focuses on the need to address habitat loss and fragmentation and disease through a program that encompasses threat abatement, population management, research, and monitoring (USFWS 2012b).

In 2010, the Recovery Priority Number for the Utah prairie dog was classified as 8C. The rank of 8C is based on a moderate degree of threat (conflicts with economic development activities and plague); a high degree of controversy regarding the species and its recovery; high recovery potential; and taxonomic standing as a species (USFWS 2012b).

The goal of the USFWS Recovery Plan is to recover the Utah prairie dog such that it no longer meets the ESA's definition of threatened and can be removed from the Federal List of Endangered and Threatened Wildlife (i.e., delisted). The recovery objectives (USFWS 2012b) for the Utah prairie dog include the following:

1. To protect suitable habitat that is of sufficient size to support a viable Utah prairie dog population and is spatially distributed to provide connectivity within each RU; and
2. To establish and maintain viable Utah prairie dog populations in each RU.

The best scientific and commercial information available indicates that all of the below criteria should be met to satisfy these recovery objectives and to allow USFWS to consider delisting the species.

1. At least 5,000 acres of occupied habitat are protected in perpetuity in each RU (West Desert, Paunsaugunt, and Awapa Plateau). These occupied habitat criteria will be spatially distributed to provide sufficient connectivity and gene flow within each RU;
2. At least 2,000 adult animals (at least 1,000 counted adults in the spring counts) are present in each RU (West Desert, Paunsaugunt, and Awapa Plateau) within protected habitat for 5 consecutive years;
3. Management strategies are in place to prevent and respond to threats from disease;
4. Education, outreach, and public relations programs and State and/or local regulations are in place and are sufficient to minimize illegal take, manage legal lethal control post-delisting, and foster habitat management practices; and
5. Utah prairie dog-specific adaptive management strategies are in place on protected lands to improve suitable habitat in a manner that will facilitate management responses to changing climatic conditions and other threat factors that are difficult to predict.

If the recovery actions are accomplished on schedule, recovery of the Utah prairie dog can be achieved by the year 2042 (USFWS 2012b).

Assessment of Effects

Area of Analysis

The Utah prairie dog analysis area is defined as suitable habitat within High- and Low-Intensity Level Survey areas traversed by the Project action area, plus a 0.5-mile buffer centered on the ROW. These areas represent approximately 133,840 acres of potential Utah prairie dog habitat and are depicted in **Figure 6-2**. The proposed Project would cross the West Desert Utah Prairie Dog RU. Within this RU, occupied Utah prairie dog colonies occur in Beaver and Iron counties. The proposed Project traverses High-Intensity-Level Survey Areas in these counties, but no occupied colonies were identified during 2014 surveys. A small, Low-Intensity-Level Survey Area occurs along the proposed Project in Millard County and was surveyed in 2013. No Utah prairie dog colonies were identified in this area.

The nearest occupied Utah prairie dog habitat in relation to the action area is located to the west of the Town of Lund, Utah. This mapped habitat includes a series of colonies called the West Lund Complex, which comprise colonies 0121a, 0121c, 0121e, and 0121g (**Table 6-1**). These colonies range from 0.43 mile (colony 0121g) to 1.83 miles (colony 0121a) from the edge of the analysis area. These colonies have exhibited very low spring counts since 2008. In fact, no prairie dogs were observed in this complex in 2010 and 2012 (**Table 6-1**). Unoccupied colony UN01T3SB097, the only Utah prairie dog site documented during surveys, is located approximately 3.44 miles from Colony 0121c (the closest colony with the West Lund Complex). Other than the West Lund Complex, the Utah prairie dog is not known to occupy the survey area or neighboring areas.

Low- and High-Intensity-Level surveys for this species were completed in 2013 and 2014, respectively. No occupied Utah prairie dog colonies were identified. However, one unoccupied/historic Utah prairie dog site was documented within the Utah prairie dog analysis area between milepost 196 and 197 in Iron County, Utah (AECOM 2014a). This unoccupied site is located approximately 700 feet from the project ROW. No recent Utah prairie dog activity was documented at this site; however, numerous historic mounds and burrows, and old scat were observed. Observations made at this location indicate that this site was likely previously used by Utah prairie dogs. A determination was made by BLM and UDWR to document this site as an unoccupied/historic site. There were several burrows that demonstrated the characteristics of a Utah prairie dog burrow; however, the majority of burrows displayed occupancy by other wildlife such as burrowing owls or ground squirrels. Old scat was present that had characteristic of Utah prairie dog scat; however, most of it appeared to have been excavated by the burrows current occupants. A determination was made to consider this an unoccupied/historic site. This unoccupied Utah prairie dog site encompasses approximately 32 acres on public land.

The Utah Prairie Dog Recovery Implementation Team (UPDRIT) identified 13 Population Focus Areas (PFA) within the current range of the species. PFAs are landscape level management areas identified as those areas most suitable for support of persistent Utah prairie dog populations. The TranWest refined transmission corridor would not cross any PFAs and therefore no impacts to PFAs are anticipated.

Conservation Measures

Impacts to the Utah prairie dog and its habitat would be minimized through implementation of the following design features and general conservation measures described in Chapter 3.0:

- Applicant-committed mitigation measures and design features: TWE-1 – TWE-5, TWE-9, TWE-12, TWE-26, TWE-27, TWE-28, TWE-31, TWE-33, and TWE-34.
- Conservation measures: **SSWS-15, NX-1**, and **NX-2**.

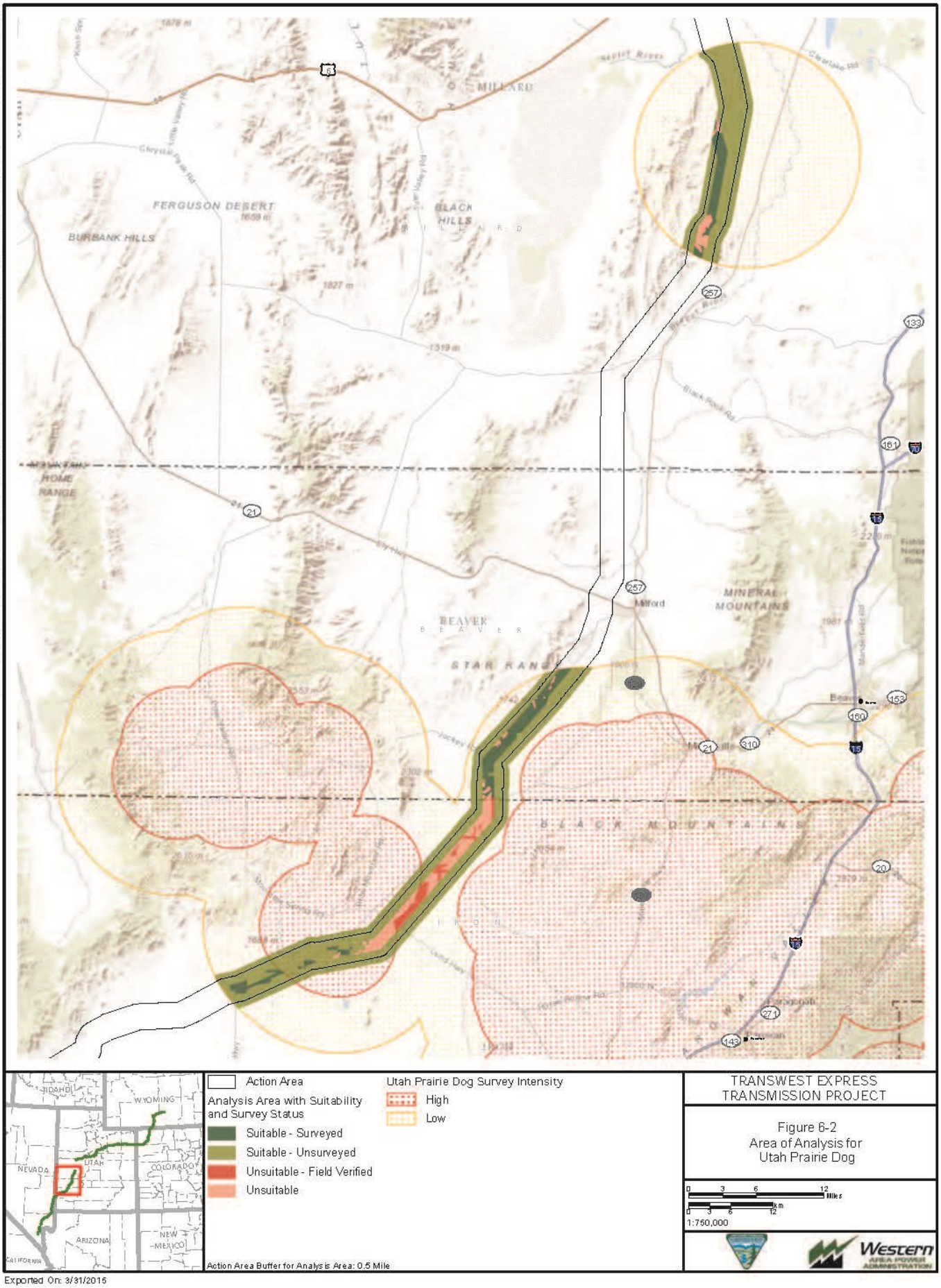

K:\Projects_4\TransWestExpress\12907_003_Transwest_Express\Figures\Document Figures\2015_EA_v2\SWildlife\Fig_6_02_UTPrairieDog.mxd
MILLARD
FERGUSON DESERT
BURBANK HILLS
BLACK HILLS
HOME RANGE
BEAVER
MINERAL MOUNTAINS
STAR RANGE
BLACK MOUNTAINS
Milford
Beaver
Action Area
Analysis Area with Suitability and Survey Status
Suitable - Surveyed
Suitable - Unsurveyed
Unsuitable - Field Verified
Unsuitable
Utah Prairie Dog Survey Intensity
High
Low
Action Area Buffer for Analysis Area: 0.5 Mile
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
CALIFORNIA
TRANSWEST EXPRESS
TRANSMISSION PROJECT
Figure 6-2
Area of Analysis for
Utah Prairie Dog
Miles
km
1:750,000
Western
AREA POWER ADMINISTRATION
Exported On: 3/31/2015

Table 6-1 Spring Counts for the West Lund Utah Prairie Dog Complex

Utah Prairie Dog Complex ID	Colony ID	Ownership	Distance from TWE Centerline	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
121	A - West Lund	BLM	2.3	31	27	33	10	18	40	66	2	1	0	0	2	0	1
121	A - West Lund	Private	2.3											0	0	0	0
121	B[1]	BLM	2.3	2	0	0		0	0	see 'A'	2	0	1	see A	see A	see A	0
121	C	Private	1.2	0	3	12		21	21	5	9	2	0	0	0	0	0
121	C	BLM	1.2						10	17	9	0	0	0	0	0	0
121	C	SITLA	1.2						0	0	0	0	0	0	0	0	0
121	D[2]	Private	1.2	0	4	3		4	see C	see C	see C	see c	see c	see C	see C	see C	0
121	D[2]	BLM	1.2	0	5	3		4						0	see C	see C	0
121	D[2]	SITLA	1.2	0	5	3		3						0	see C	see C	0
121	E	Private	1.0	0	0	3		0	0	0	0	0	0	0	0	0	0
121	E	SITLA	1.0										0	0	0	0	0
121	G	Private	0.9			5			0	0	0	0	0	0	0	0	0
121	G	SITLA	0.9											0	0	0	0

[1] Colony B was incorporated into Colony A in 2010.

[2] Colony D was incorporated into Colony C in 2005.

1

To reduce impacts to Utah prairie dogs, TransWest has conducted surveys to determine whether occupied habitat occurs within the disturbance footprint of the proposed Project. Surveys were conducted following USFWS protocols and did not identify any locations of occupied habitat within the Project refined transmission line corridor. If general pre-construction surveys identify active Utah prairie dog colonies within the action area, implementation of the following species-specific conservation measures would be required.

SSWS-7: To avoid or minimize impacts to the Utah prairie dog, TransWest would implement the following measure:

1. Pre-construction surveys during the active season, would be conducted according to approved methods, at a minimum of 2 weeks prior to surface disturbance within suitable habitat (as determined during 2013 and 2014 surveys), unless species occupancy and distribution information is complete, current, and available through coordination with local agencies (BLM, UDWR, and USFWS). Surveys would be conducted by USFWS-certified Utah prairie dog surveyors. In the event species occurrence is verified, consultation with USFWS would be re-initiated and TransWest may be required to modify operational plans, at the discretion of the authorized officer, to include additional appropriate protection measures for the minimization of impacts on the Utah prairie dog and its habitat.

   Effectiveness: This conservation measure would minimize impacts to the Utah prairie dogs that might be encountered prior to construction along the 250-foot-wide transmission line ROW.

2. All Project employees would be informed of the occurrence of the Utah prairie dog in the general area, and of the threatened status of the species. They would be informed of activities that constitute “take,” and the potential penalties (up to $200,000 in fines and 1 year in prison) for taking Utah prairie dogs, which are listed under ESA.

   Effectiveness: This conservation measure would minimize impacts to the Utah prairie dogs that might be encountered during construction along the 250-foot-wide transmission line ROW.

3. Project-related vehicle maintenance activities would be conducted in maintenance facilities. Should it become necessary to perform vehicle or equipment maintenance on-site, these activities would avoid identified Utah prairie dog colonies, or would be conducted outside of a 350-foot buffer surrounding the colonies. Precautions would be taken to ensure contamination of maintenance sites by fuels, motor oils, grease, etc., does not occur, and such materials are contained and properly disposed of off-site. Inadvertent spills of petroleum based, or other toxic materials would be cleaned up and removed immediately.

   Effectiveness: This conservation measure would minimize impacts to the Utah prairie dogs that might be encountered during construction along the 250-foot-wide transmission line ROW.

4. Construction equipment and materials extending beyond one breeding season (i.e., laydown yards) would not be staged within 0.5 mile of an occupied Utah prairie dog colony. Temporary laydown yards (that do not extend beyond more than one breeding season) may be approved within 350 feet of identified Utah prairie dog colonies; however, to ensure Utah prairie dogs do not move into these areas additional conservation measures such as silt fencing and barriers would be applied.

   Effectiveness: This conservation measure would minimize impacts to the Utah prairie dogs that might be encountered during construction along the 250-foot-wide transmission line ROW.

5. Reclamation and restoration efforts in suitable Utah prairie dog habitat would be conducted in accordance with the Vegetation Composition Guidelines for Utah Prairie Dog Habitat using native seed, unless otherwise specified in coordination with the USFWS and BLM.

   Effectiveness: This conservation measure would minimize impacts to Utah prairie dog potential habitat following construction of the proposed Project.

6. Project personnel would not be permitted to have firearms or pets in their possession while on the Project site within Utah prairie dog habitat.

   Effectiveness: This conservation measure would protect Utah prairie dogs that could be encountered during construction along the 250-foot-wide transmission line ROW by ensuring that they would not be shot; hunted or disturbed by pets; or exposed to disease by pets.

7. If a dead or injured Utah prairie dog is located, initial notification would be made to the USFWS Division of Law Enforcement, Utah FO at (801) 975-3330, to the Southern Region UDWR at (435) 865-6100, and to the BLM Authorized Officer at (435) 865-3000. Instruction for proper handling and disposition of such specimens would be issued by the Division of Law Enforcement. Care would be taken in handling sick or injured animals to ensure effective treatment, and care and in handling dead specimens to preserve biological material in the best possible state.

   Effectiveness: This conservation measure would minimize impacts to Utah prairie dogs that that could be encountered during construction along the 250-foot-wide transmission line ROW by ensuring proper care and handling of dead or injured individuals.

8. To limit the potential for adverse impacts resulting from contact with construction equipment, vehicles, and personnel, TransWest would implement a project area vehicle speed limit of 15 miles per hour (mph) in areas of suitable habitat identified by the USFWS, BLM, and UDWR.

   Effectiveness: This conservation measure would minimize impacts to Utah prairie dogs that that could be encountered during construction along the 250-foot-wide transmission line ROW by ensuring construction and maintenance vehicles travel at speeds likely to reduce the possibility of collisions with individual Utah prairie dogs.

Direct and Indirect Effects

Impacts to the Utah prairie dog would result in disturbance to potentially suitable habitat located within Low- and High-Intensity-Survey Areas. The proposed Project would result in the construction and operation disturbance of 574 acres (0.4 percent) and 110 acres (<0.1 percent), respectively, of potentially suitable habitat in the analysis area.

Impacts to Utah prairie dogs could result from increased habitat fragmentation, noxious weed invasion, and human activity and noise, both during construction and maintenance activities of the transmission line and access roads. Impacts also could include increased predation by raptors which may perch on transmission structures located near the West Lund Complex. Access roads may occur in proximity to the West Lund Complex or in unoccupied Utah prairie dog habitat. Vehicle travel and noise associated with these access roads could impact Utah prairie dogs by altering movement and dispersal by individuals living in nearby colonies.

It is not anticipated that construction activities would permanently restrict colonization of the 250-foot-wide transmission line ROW by Utah prairie dogs. In fact, habitat disturbance could encourage future colonization, based on the availability of soft, permeable soils that would occur along the ROW subsequent to the Project construction. However, prairie dogs may avoid overhead structures due to the potential increase in avian predators. Impacts would primarily be the result of habitat loss and fragmentation. Remaining impacts to the Utah prairie dog would be limited to temporary habitat disturbance. This disturbance is anticipated to have little impact given the extent of native habitats in the surrounding Project region.

The USFWS and UDWR have identified potential reintroduction sites for future relocations of Utah prairie dogs in western Utah. The USFWS has reviewed all relocation sites for potential impacts resulting from construction and operation of the project and has made a determination that no impacts are anticipated under the current preferred alternative (USFWS 2015).

Impacts would be more pronounced in areas located in proximity to mapped Utah prairie dog habitat. However, the West Lund Complex has experienced very low population counts since 2008 (**Table 6-1**). The colonies range from 0.43 mile (colony 0121g) to 1.83 miles (colony 0121a) from the edge of the analysis area. Implementation of the above design features, general conservation measures, and Utah prairie dog-specific conservation measures would reduce potential Project-related impacts to prairie dog colonies associated with the West Lund Complex, historic colonies, and potentially suitable habitat.

After considering design features and conservation measures, remaining Project construction and operation impacts to the Utah prairie dog would be limited to habitat loss; habitat fragmentation; and disturbance during construction and routine maintenance activities. This disturbance is anticipated to have little impact on the species, given the lack of occupied habitat within the potential areas of disturbance and the extent of available native habitats in the surrounding Project region.

Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the proposed Project action area for the Utah prairie dog.

Monitoring

There are currently no known short- or long-term monitoring and reporting plans for Utah prairie dog in the Project analysis area.

Determination

Effect on the Species: The Proposed Action *may affect, but is not likely to adversely affect* the Utah prairie dog as a result of the proposed Project construction and operation.

Effect on Critical Habitat: Critical habitat has not been designated for the Utah prairie dog. Consequently, implementation of the Proposed Action would have no effect on critical habitat for this species.

Rationale: Construction and operation activities would not directly affect the Utah prairie dog. No occupied Utah prairie dog colonies were identified during 2013 and 2014 surveys conducted within the Utah prairie dog analysis area. In addition, the nearest occupied Utah prairie dog habitat is located at the West Lund Complex, which comprise colonies 0121a, 0121c, 0121e, and 0121g. These colonies are located between 0.43 mile (colony 0121g) and 1.83 miles (colony 0121a) from the edge of the analysis area. Therefore, construction and operation of the proposed Project would not likely adversely affect the Utah prairie dog due to the absence of the species from the analysis area and the distance of existing colonies from the proposed Project and low population numbers at existing sites. Preconstruction surveys of the project ROW would identify any new colonies that have been established since protocol level surveys were conducted in 2013 and 2014. In the event that newly established colonies are observed within the project ROW, TransWest would be required to avoid and minimize any potential impacts through micro-sitting and implementation of mitigation measure SSWS-7.

6.1.2 Birds

6.1.2.1 California Condor (Endangered, EXP/NE)

Environmental Baseline

Conservation Status

The California condor was designated as endangered on March 11, 1967 (FR 32:4001) and later listed under the ESA upon its conception in 1973. Despite protection, populations continued to decline, and by 1982 only 22 wild condors remained (Arizona Game and Fish Department [AGFD] 2012; Peregrine Fund 2008). A special provision of the ESA, the 10(j) rule, allows for the designation of non-essential populations (EXP/NE) of listed species (AGFD 2008), and re-introduction efforts for the condor were

developed under this rule. This listing covers only those populations within the U.S. and excludes the non-essential populations (NEPs) in specific portions of Arizona, Nevada, and Utah (61 FR 54043-54060). Current re-introduced condor populations are considered 10(j) populations, except where they occur within National Parks where they receive protection under the ESA endangered status.

In March 2009, a 5-Year Review of the status of the California condor was initiated. Designated critical habitat does not occur within the California condor analysis area. The current recovery plan for the species was issued in April 1996 (Third Revision).

During the late Pleistocene Era which ended 10,000 years ago, the range of the California condor extended across much of North America, with records from Oregon, California, Nevada, New Mexico, Texas, Florida, New York, and Mexico (Emslie 1987; Steadman and Miller 1987). By the time of the arrival of explorers in North America, California condors occurred only in a narrow Pacific coastal strip from British Columbia, Canada to Baja California Norte, Mexico (Wilbur 1978). California condors were observed in the northern portion of the Pacific Coast region, as far north as the Columbia River Gorge, until the mid-1800s and as far south as northern Baja California until the early 1930s (USFWS 2013b). By about 1950, California condors were confined to a wishbone-shaped area encompassing six counties just north of Los Angeles, California. In the 1984 California Condor Recovery Plan, this area was designated by the California Condor Recovery Team as the range of primary concern. It has been used by management agencies and the public for planning purposes.

Conservation measures, focused primarily on habitat preservation, began in the 1930s. However, the wild population of California condors continued to decline. Population estimates suggest that there were 50 to 60 California condors in 1968, 25 to 35 in 1978, and 25 to 30 in 1980. A captive breeding program began in 1982 using eggs and chicks removed from the wild and a single captured adult condor, leaving an estimated 21 individuals in the wild. In the winter of 1984–1985, a population crash claimed 6 condors (40 percent of the wild population at that time), leaving only a single breeding pair in the wild. In 1986 and 1987, all nine remaining adult and juvenile wild birds were captured in order to ensure their safety and preserve the species' genetic diversity. From that point, 27 birds (as well as 13 wild eggs and 4 chicks) would form the foundation of the captive breeding program (USFWS 1996a).

California condors were extinct in the wild until 1992 when the first eight birds raised in captivity were released in southern California. The reintroduction of birds continued in Arizona in 1996, central coastal California in 1997, northern Baja California, Mexico, in 2002, and Pinnacles National Monument, California, in 2003 (USFWS 1996a). Population growth has been steady over the last two decades, and in late 2008 the wild California condor population exceeded the captive population for the first time since 1983. As of November 30, 2013, there were 123 wild condors in California, 75 in Arizona, and 29 in Baja, California, for a total of 227 wild condors (Peregrine Fund 2013). The current range of the condor population in Arizona is centered on the Colorado River Basin in northern Arizona and southern Utah. This population occurs outside the California condor analysis area; however, condors regularly forage, roost, and might nest in southern Utah. Condors commonly occur in Utah between April and November, but peak numbers usually occur from June through August. Condors can travel up to 200 miles in 1 day (UDWR 2011). Therefore, individuals could occur within the California condor analysis area (UDWR 2005).

On September 24, 1976, the USFWS published a final rule in the FR (Vol. 41, No. 187, September 24, 1976) designating nine critical habitat areas for the California Condor including Blue Ridge, Tulare County Rangelands, Kern County Rangelands, Tejon Ranch, Mt. Pinos, Sespe-Piru, Matilija, Sisquoc-San Rafael, and Hi-Mountain-Beartrap East and West. No critical habitat is present within the California condor analysis area.

Life History and Habitat Association

California condors have an expansive home range and are capable of travelling from 50 to over 100 miles in a single day. Condors require open habitat for soaring and easily locating feeding

opportunities. Condors do not build nests; rather, they move sand, branches, rocks, and other materials around in nest sites to produce an appropriate substrate needed for egg laying (USFWS 2013b). Breeding habitat is typically located in steep remote mountainous or canyon terrain on rock or cliff escarpments at low to moderate elevation.

Condor habitat must support large mammals, which they consume as carrion. Foraging habitats differ from nesting habitat and consist of open foothill grasslands and oak savanna foothills that support populations of deer, elk, and cattle. Condors require large foraging areas because feeding opportunities are limited and often widely distributed across their range. Roosts, found in or near both foraging and nesting habitat areas typically consist of large trees or snags with open lateral branches or cliff faces and rock spires with available perches. Because they are such large birds, they typically select roosting sites near cliffs where updrafts provide adequate lift for them to take flight (AGFD 2012; American Ornithologists' Union (AOU) 2004; Snyder and Rea 1998; USFWS 1996b).

Courtship and nest site selection by breeding California condors occurs from December into spring. Female condors typically lay a single egg between late January and early April. The egg is incubated by both parents and hatches after approximately 56 days. Both parents share responsibilities for feeding the chick. Feeding usually occurs daily for the first 2 months and tapers off thereafter. Condor chicks leave the nest at 2 to 3 months of age, but remain in the vicinity of the nest where they are fed by their parents. Chicks begin to fly at 6 to 7 months of age, but do not become fully independent from their parents until the following year. Parent birds occasionally continue to feed a fledgling even after it has begun to make longer flights to foraging grounds. California condors may lay a replacement clutch if their first (Harrison and Kiff 1980) or even second egg is lost (Snyder and Hamber 1985). California condors typically do not nest until they are at least six years old and it is a long lived species, living up to 50 years (USFWS 1996b).

California condors are opportunistic scavengers that only feed on carrion. Condors are social feeders with typical foraging behavior consisting of long-distance reconnaissance flights, circle-soaring over a carcass, and hours of waiting at roosts or on the ground near a carcass (USFWS 1996b). Condors do not use their sense of smell to locate food but instead rely on sight and the presence of other scavengers such as eagles and ravens to indicate the presence of food. Prior to Euro-American settlement of North America, condors inhabiting interior California likely fed on mule deer, elk, pronghorn, and smaller mammals. Condors have been observed feeding on 24 different mammal species in the last two centuries and 95 percent of the diet consisted of cattle, domestic sheep, ground squirrels, mule deer, and horses. Over half of these observations were of condors feeding on cattle carcasses, mostly calves (USFWS 2013b). There also is some evidence that suggests California condors prefer deer over cattle. As part of the California condor release program, California condors also are provided supplemental food in the form of stillborn calves (USFWS 1996a).

Threats

There is some uncertainty as to the primary mortality factors that caused the overall California condor population decline. However, there is evidence that human-caused lead poisoning and hunting have contributed disproportionately to the decline of the species in recent years (USFWS 1996a). Eggshell thinning caused by the pesticide DDT may have been a serious cause of decline in the 1950s and 1960s. Recent studies also indicate that breeding California condors sometimes ingest small man-made materials (microtrash) and feed these items to their nestlings. Recorded microtrash ingested by condors includes nuts, bolts, washers, copper wire, plastic, bottle caps, glass, and spent ammunition cartridges. The ingestion of these items by nestlings can cause digestive problems and result in death. Of the known causes of mortality in wild nestlings, 8 of 18 (44 percent) have been as a result of mircrotrash ingestion (USFWS 2013b). Other factors formerly contributing to the decline of the species include egg and specimen collecting, capture of live birds for sport or display, Native American ceremonial use, and drowning in uncovered oil sumps. These activities are no longer believed to represent threats to California condors.

Snyder and Schmitt (2002) reported that lead poisoning is likely the most important cause of the recent decline of California condors, and may have accounted for much of the historic decline. However, Sorenson et al. (2009) reported that in California, power lines are currently the number one known cause of death with lead poisoning a close second. As of 2005, 6 percent of California condors that have been released into the wild since 1992 were killed by electrocution (APLIC 2006), and deaths from power line collisions also have occurred. However, the USFWS and other California Condor Recovery Program partners participating in captive condor rearing have developed powerline aversion training on condors before releasing them in to the wild. New wild born condor fledgling without such training are the most vulnerable to collision with powerlines.

Currently, sufficient remaining habitat exists in California and in southwestern states to support a large number of condors, if density-independent mortality factors including shooting, lead poisoning, microtrash ingestion, and collisions with human-made objects, can be controlled. The possibility of eventual genetic disorders resulting from the species' propagation from a perilously low population size cannot be discounted (USFWS 2013b).

Recovery

The current Recovery Plan for the species was issued in April 1996 (Third Revision) and a 5-Year Review of the status of the California condor was published in June, 2013. The Recovery Priority in the third revision to the Recovery Plan for the California Condor (Recovery Plan) in 1996 was 1C, which indicates a monotypic genus that faces a high degree of threat and has a stable or increasing population and a high potential for recovery. At the start of the most recent 5-year review (USFWS 2013b), the Recovery Priority Number for the California condor was designated as 4C. As defined in the Endangered and Threatened Species Listing and Recovery Priority Guidelines, the Recovery Priority Number is based on a 1 to 18 ranking system where 1 is the highest rank and 18 the lowest (48 FR 4309, as corrected in 48 FR 51985). The existing 4C designation indicates that the California condor is a monotypic genus that faces a high degree of threat and has a low potential for recovery. The “C” indicates conflict with construction, development projects, or other forms of economic activity.

The strategy of the USFWS recovery program (USFWS 1996a) was to: 1) increase reproduction in captivity to provide condors for the release program, 2) release condors into the wild, 3) minimize condor mortality factors, 4) maintain habitat for condor recovery, and 5) implement condor information and education programs. The primary objective of the Recovery Plan is reclassification of California condor from endangered to threatened status (USFWS 1996a).

The Recovery Plan for the California Condor (USFWS 1996a) does not specify criteria for removing the species from the List of Endangered and Threatened Wildlife. At that time, there were too few condors in existence to anticipate all the actions that would be necessary to bring about full recovery. The Recovery Plan does outline one minimum criterion, along with five conditions that need to be achieved before reclassifying the species to a threatened status. The minimum criterion is the maintenance of at least two non-captive (wild) populations and one captive population. The five conditions that must be met, in addition to the minimum criterion, are that these populations:

1. Must each number at least 150 individuals;
2. Must each contain at least 15 breeding pairs; and
3. Must be reproductively self-sustaining with a positive rate of population growth.

Furthermore, the non-captive (wild) populations

4. Must be spatially disjunct and non-interacting; and
5. Must contain individuals descended from each of the 14 founders.

Assessment of Effects

Area of Analysis

In Utah, the condor population is considered as EXP/NE south of I-70 and east of I-15, except within National Parks. Any condors occurring outside of the experimental population area, including those on National Park lands and in southeastern Nevada, are listed as endangered under the ESA. In Utah, the Project action area lies entirely east of and outside of the 10(j) boundary (**Figure 6-3**), thus any impacts to California condor in Utah would be to federally listed endangered individuals. In southern Nevada, the Halfway Wash East ground electrode bed and most of its associated transmission line, lie to the east of I-15 and are therefore within the 10(j) boundary. Any impacts to California condor associated with the ground electrode bed facility would therefore be to EXP/NE individuals. The transmission line action area crosses I-15 into the 10(j) area approximately 50 miles northeast of Las Vegas and back out of the 10(j) boundary on the southern end of the line south of Boulder City. The California condor analysis area is defined as potential foraging habitat (all land cover types within the range of the California condor) within the Project action area as defined in Section 2.2. These areas represent 497,229 acres of potential California condor foraging habitat and are depicted in **Figure 6-3**.

Condors regularly forage, roost, and may even nest in southern Utah (Sutter et al. 2005). The current range of this population is centered on the Colorado River Basin in northern Arizona and southern Utah. Although condors often winter in Arizona, many condors from the southwestern population forage over Utah. They can travel back and forth between the Grand Canyon and Zion National Park in a single day. Condors commonly occur in Utah between April and November, but peak numbers usually occur from June through August. Based on their ability to travel up to 200 miles in 1 day (UDWR 2011), this species could occur anywhere within the California condor analysis area.

Conservation Measures

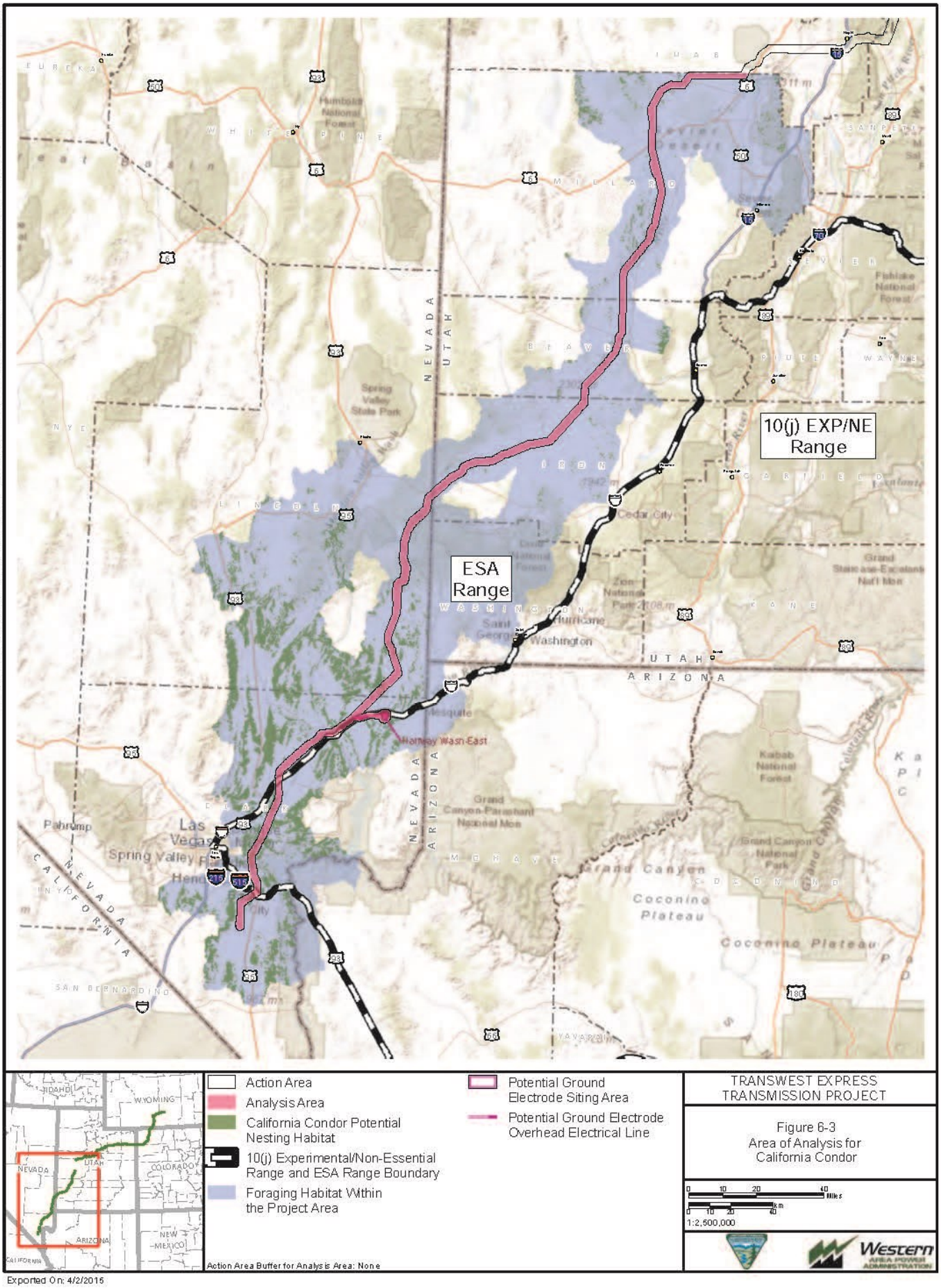
Impacts to the California condor would be minimized through implementation of the following design features and conservation measures described in Chapter 3.0:

- Applicant-committed mitigation measures and design features: TWE-1 – TWE-5, TWE-26, TWE-27, TWE-29, TWE-30, TWE-31, TWE-32, TWE-33, TWE-34, TWE-45, TWE-60, and TWE-61.
- Conservation measures: **SSWS-15**, **WLF-2,** and **WLF-8**.

Direct and Indirect Effects

Since 1995 there have been a total of seven transmission line-related California condor deaths in California and Arizona (Ventana Wildlife Society [VWS] 2007). In response, the USFWS and other California Condor Recovery Program partners participating in captive condor rearing have developed powerline aversion training, which is provided to condors before they are released into the wild. New wild-born condor fledglings without such training are the most vulnerable to collision with powerlines. California condors normally produce only a single egg every other year (AGFD 2012). Because they have a low reproductive rate, populations can be impacted by even sporadic mortality (USFWS 1996a).

Direct Project-related impacts to the California condor would primarily result from the transmission line presenting a collision hazard during the operation phase of the project (AGFD 2012; Snyder and Rea 1998; Terres 1980; USFWS 1996a). Due to the wide spacing of conductors and ground wires (40 to 50 feet), the transmission line itself would pose negligible potential for electrocution of condors. Because condors wingspans can reach 9.5 feet, the electrode line connecting the Halfway Wash East electrode bed to the Project, which has a conductor spacing of approximately 6 feet, has potential to result in condor electrocutions. However, these lines are expected to be energized at high currents for less than


10(j) EXP/NE Range
ESA Range
Action Area
Analysis Area
California Condor Potential Nesting Habitat
10(j) Experimental/Non-Essential Range and ESA Range Boundary
Foraging Habitat Within the Project Area
Potential Ground Electrode Siting Area
Potential Ground Electrode Overhead Electrical Line
Action Area Buffer for Analysis Area: None
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 6-3
Area of Analysis for California Condor
1:2,500,000
Western AREA POWER ADMINISTRATION
Exported On: 4/2/2015

30 hours per year, or less than 0.4 percent of a year. The combination of the fact that condor observations in Nevada are considered rare and the limited time that the Halfway Wash East electrode bed would be energized reduces the potential electrocution risk for condors from the Halfway Wash East electrode line. Consequently, the probability of a condor coming into contact with the Halfway Wash East electrode line while it is energized is so small as to be discountable. The Southern Terminal is not expected to pose an electrocution hazard to condors because it would be fenced and no large animals would be able to access the area and provide a source of carrion that would attract condors to the site.

Because the species has such a large foraging range, the proposed Project would result in the construction and operation disturbance of 4,254 acres (0.9 percent) and 830 acres (0.2 percent), respectively, of potentially suitable habitat in the analysis area. Condors are cavity-nesting birds and most nest sites have been found in caves, on rock ledges, or in tree cavities. Direct impacts to condor nesting habitat from construction activities are unlikely because the species nests in rugged, remote locations. Although **Figure 6-3** depicts some limited nesting habitat within the Analysis Area, this is due to the coarseness of land cover datasets incorporated in the condor habitat model. There are no suitable cliffs for roosting or nesting currently known to occur within the Analysis Area.

Implementation of TransWest's applicable design features (e.g., TWE-30) and conservation measure WLF-8 listed above would avoid or minimize operation-related impacts to the California condor. Remaining impacts to the California condor would be limited to temporary disturbance of potential foraging habitat during construction. This disturbance is anticipated to have negligible impact given the linear nature of the Project and extent of native habitats in the surrounding Project region.

Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the proposed Project action area for the California condor.

Monitoring

Condors are subject to intensive long-term monitoring by entities such as The Peregrine Fund that are involved in the species' recovery program. No additional long-term monitoring requirements have been identified for the Proposed Action.

Determination

Effect on the Species: The Proposed Action *may affect, but is not likely to adversely affect* the federally listed population of this species as a result of the Project construction and operation. The Proposed Action *is not likely to jeopardize* EXP/NE individuals on the east side of the 10(j) boundary in southern Nevada.

Effect on Critical Habitat: The Proposed Action would have *no effect* on California condor critical habitat.

Rationale: Operation of the transmission line could pose a collision hazard to foraging California condors, especially wild-born condors that have not been exposed to powerline aversion training. APLIC guidelines would be implemented to avoid and minimize potential collision and electrocution risk to this species. Given the large-diameter/high visibility of the proposed conductors and their wide spacing, the probability of condors colliding with or being electrocuted by the transmission line is so small as to be discountable. Due to its infrequency of use at high voltages, the probability for electrocution of condors by the Halfway Wash East electrode line is considered insignificant and discountable.

6.1.2.2 Southwestern Willow Flycatcher (Endangered)

Environmental Baseline

Conservation Status

The southwestern willow flycatcher was listed as endangered, without designated critical habitat, on February 27, 1995 (60 FR 10693-10715). Critical habitat was later designated on July 22, 1997 (62 FR 39129-39147). A court decision in 2001 resulted in a subsequent Final Rule on Critical Habitat on October 19, 2005 (70 FR 60885-61009). Critical habitat for the southwestern willow flycatcher was revised in 2013 (201378 FR 343 534). In total, approximately 1,227 stream miles have been designated as critical habitat, with a lateral extent including riparian areas and streams that occur within the 100-year flood plain or flood-prone areas totaling 208,973 acres. A 5-year review of the subspecies was completed by the USFWS in 2005 (73 FR 14995-14997).

The southwestern willow flycatcher breeds in dense riparian habitats in southwestern North America. The historic breeding range of this species includes southern California (from the Santa Ynez River south); Arizona; New Mexico; southwestern Colorado; extreme southern portion of Nevada and Utah, western Texas, and the possibly extreme northern Baja California, Sonora, and Chihuaha in Mexico. The flycatcher's current range is similar to the historical range, but the quantity of suitable habitat is much reduced from historical levels (USFWS 2002a). All species of willow flycatcher breed in North America, but winter in Mexico, Central America, and northern South America (Sogge et al. 1997).

Throughout the range of the southwestern willow flycatcher, important riparian habitat is rare, widely separated, and small and/or linear locales. Marshall (2000) found that 53 percent of southwestern willow flycatchers were located in just 10 sites (breeding groups) range-wide, while the other 47 percent were distributed among 99 small sites of ten or fewer territories. This species has experienced extensive loss of habitat and also is endangered by other factors, including brood parasitism by the brown-headed cowbird (USFWS 1995b). Unitt (1987) reviewed historical and contemporary records of the southwestern willow flycatcher throughout its range, determining that it had ''declined precipitously,'' and that ''although the data reveal no trend in the past few years, the population is clearly much smaller now than 50 years ago, and no change in the factors responsible for the decline seem likely.''

When the southwestern willow flycatcher was listed as endangered in 1995, approximately 350 territories were known to exist (Sogge et al. 2001). As of the 2001 breeding season, the minimum known number of southwestern willow flycatchers was 986 territories. Though much suitable habitat remains to be surveyed, the rate of discovery of new nesting pairs has recently leveled off (Sogge et al. 2001). A coarse estimate is that an additional 200 to 300 nesting pairs may remain undiscovered, yielding an estimated total population of 1,200 to 1,300 pairs/territories. Unitt (1987) estimated that the total flycatcher population may be 500 to 1,000 pairs; thus, nearly a decade of intense survey efforts have found little more than slightly above the upper end of Unitt's estimate. The surveys of the 1990s have been valuable in developing a range-wide population estimate, but cannot identify a range-wide trend over that period.

Critical habitat for the southwestern willow flycatcher was recently revised in 2013 (201378 FR 343 534). In total, approximately 1,227 stream miles have been designated as critical habitat, with a lateral extent including riparian areas and streams that occur within the 100-year flood plain or flood-prone areas totaling 208,973 acres. There is no designated critical habitat within the southwestern willow flycatcher analysis area.

Life History and Habitat Association

The southwestern willow flycatcher is restricted to riparian habitats along rivers, streams, or wetlands (Hiatt and Boone 2003). Four specific types of breeding habitats have been described for the southwestern willow flycatcher. The first is comprised of dense stands of willows 10 to 23 feet in height, with no distinct overstory. This community is often associated with sedges, rushes, or other herbaceous

wetland plants. A second habitat type includes nearly monotypic, dense stands of salt cedar or Russian olive up to 33 feet in height. These species form a dense, closed canopy, with no distinct understory layer. Native broadleaf-dominated communities composed of a single species (often a willow species) or mixtures of native broadleaf trees and shrubs (cottonwood, willows, boxelder, ask, alder) form a third habitat type. The final habitat type is a mixture of native and exotic riparian species (Sogge et al. 1997).

Regardless of the vegetation species composition, all of these habitats share common structural characteristics. Occupied southwestern willow flycatcher habitats always have dense vegetation in the interior, and dense areas are often interspersed with small clearings, open water, or areas of sparse shrubs. Habitat patches can vary in size and shape, with some occupied areas being relatively dense, linear, contiguous stands, and others being large, irregularly shaped mosaics of dense vegetation intermingled with open areas. Habitat patch sizes can range from as little as 2 acres to several hundred or a thousand acres. Southwestern willow flycatchers can occur at elevations as high as 7,875 feet amsl. They also inhabit willow or cottonwood riparian areas that extend out into desert regions (Terres 1980). Migration and winter habitat could differ from breeding habitat for this subspecies. During migration, riparian habitat along major southwestern drainages is commonly utilized, but a close association with water may not always exist. These drainages might be considered stopover areas, and could be very important migration habitat for the southwestern willow flycatcher (USFWS 2002a).

Southwestern willow flycatchers are usually monogamous in their breeding habitats; however, rates of polygyny may vary between 10 and 20 percent. Males generally arrive at breeding areas approximately 1 or 2 weeks before the female and nest building usually begins a week thereafter. Nests are constructed as open cup nests approximately 8 centimeters (cm) high and 8 cm wide, which are typically placed in the fork of a branch. Egg-laying can begin as early as late May, but typically occurs in early to mid-June. Clutch size is usually 3 or 4 eggs for initial nests. Incubation last between 12 and 13 days from the date the last egg is laid, and eggs typically hatch within 24 to 48 hours of each other. Chicks can be present in the nest mid-June through early August and fledging typically ensues from late June through mid-August. Adults then depart from breeding areas between mid-August to mid-September (Sogge et al. 1997).

The breeding season diet of southern willow flycatchers is exclusively insectivorous. Flycatchers forage on a wide range of prey taxa ranging in size; however, diet can vary between years and among different habitat types. Foraging is done primarily by sallying from a perch to perform aerial hawking and gleaning. Foraging frequently takes place at edges and opening with a habitat patch, or at the top of the upper canopy (Sogge et al. 2010).

Threats

The most significant indirect threats to the southwestern willow flycatcher include extensive loss, fragmentation, and modification of riparian breeding habitat, (Sogge et al.1997), with consequent reductions in population levels (USFWS 2002). Destruction and modification of riparian habitats have been caused mainly by reduction of surface and groundwater due to diversion and groundwater pumping, changes in flood and fire regimes due to dams and stream channelization, clearing and controlling vegetation, livestock grazing, changes in water and soil chemistry due to disrupted hydrologic cycles, and establishment of invasive plant (USFWS 2002a). This species also is affected directly by factors that impact their survival and reproductive success, such as brood parasitism by brown-headed cowbirds, which further reduce population levels.

Recovery

On March 5, 2003, a Final Recovery Plan for the southwestern willow flycatcher was issued (68 FR 10485). Habitat and breeding site characteristics, potential threats, management responsibilities and status, and recovery options vary widely among breeding sites across the species range. Thus, six RUs, further subdivided into Management Units, were designated based on watershed and hydrologic units within the breeding range of the flycatcher. This allows for a strategy to characterize populations,

structure recovery goals, and facilitate effective recovery actions that should closely resemble realities on the ground (USFWS 2002a).

The overall recovery objective for the flycatcher is to increase the population level and attain an amount and distribution of habitat sufficient to provide for the long-term persistence of metapopulations, despite local extirpations. This would require ameliorating the threats that led to listing the flycatcher as an endangered species. The specific objectives, outlined in the 2013 Recovery Plan include:

- Recovery to the point that reclassification to "threatened" is warranted.
- Recovery to the point that delisting is warranted.

Reclassification from endangered to threatened could be considered when either of the following criterion have been met:

- Criterion A: Increase the total known population to a minimum of 1,950 territories (equating to approximately 3,900 individuals), geographically distributed to allow proper functioning as metapopulations, so that the flycatcher is no longer in danger of extinction. For reclassification to threatened status, these prescribed numbers and distributions must be reached as a minimum, and maintained over a 5-year period.
- Criterion B: Increase the total known population to a minimum of 1,500 territories (equating to approximately 3,000 individuals), geographically distributed among Management Units and RUs, so that the flycatcher is no longer in danger of extinction. For reclassification to threatened status, these prescribed numbers and distributions must be reached as a minimum, and maintained over a 3-year period, and the habitats supporting these flycatchers must be protected from threats and loss.

The southwestern willow flycatcher could be removed from the list of threatened and endangered species when both of the following criteria have been met:

- Criterion 1. Meet and maintain, at a minimum, the population levels and geographic distribution specified under reclassification to threatened Criterion A; increase the total known population to a minimum of 1,950 territories (equating to approximately 3,900 individuals), geographically distributed to allow proper functioning as metapopulations.
- Criterion 2. Provide protection from threats and create/secure sufficient habitat to ensure maintenance of these populations and/or habitats over time. The sites containing flycatcher breeding groups, in sufficient number and distribution to warrant downlisting, must be protected into the foreseeable future through development and implementation of conservation management agreements (e.g., public land management planning process for federal lands, habitat conservation plans (under Section 10 of the ESA), conservation easements, and land acquisition agreements for private lands, and intergovernmental conservation agreements with Tribes). Prior to delisting, the USFWS must confirm that the agreements have been created and executed in such a way as to achieve their role in flycatcher recovery, and individual agreements for all areas within all Management Units (public, private, and Tribal) that are critical to metapopulation stability (including suitable, unoccupied habitat) must have demonstrated their effectiveness for a period of at least 5 years.

Date of Recovery

- Reclassification to threatened could be initiated in 2020, or sooner.
- Delisting could be accomplished within 10 years of reclassification.

Assessment of Effects

Area of Analysis

The southwestern willow flycatcher analysis area is defined as potential habitat (riparian and woody riparian and wetlands vegetation communities) within the action area plus a 0.5-mile buffer centered on the 250-foot-wide ROW. The Project's action area is defined in Section 2.2. This analysis area represents 1,910 acres of potential southwestern willow flycatcher habitat and is depicted in **Figure 6-4**.

Along the Project action area in Utah, Iron County is within the range of the southwestern willow flycatcher. In Nevada, this species is known to occur in Lincoln and Clark counties and has potential to occur where the action area traverses Meadow Valley Wash (Segment 1540.1) and Muddy River, (Segment 1540.2). Downstream of the action area, essential habitat for southwestern willow flycatcher has been identified along the Muddy River in the Overton State Wildlife Area (78 FR 343). There are records of occurrence for southwestern willow flycatcher in Las Vegas Wash (Segment 1660), but no confirmed breeding in this area.

In the vicinity of the action area, critical habitat has been designated along the Virgin River in Clark County, Nevada. This area of critical habitat extends upstream along the Virgin River from the upper end of Lake Mead to Berry Springs in Washington County, Utah (78 FR 343) (**Figure 6-4**). The total length of critical habitat along the Virgin River is 94 miles (78 FR 343).

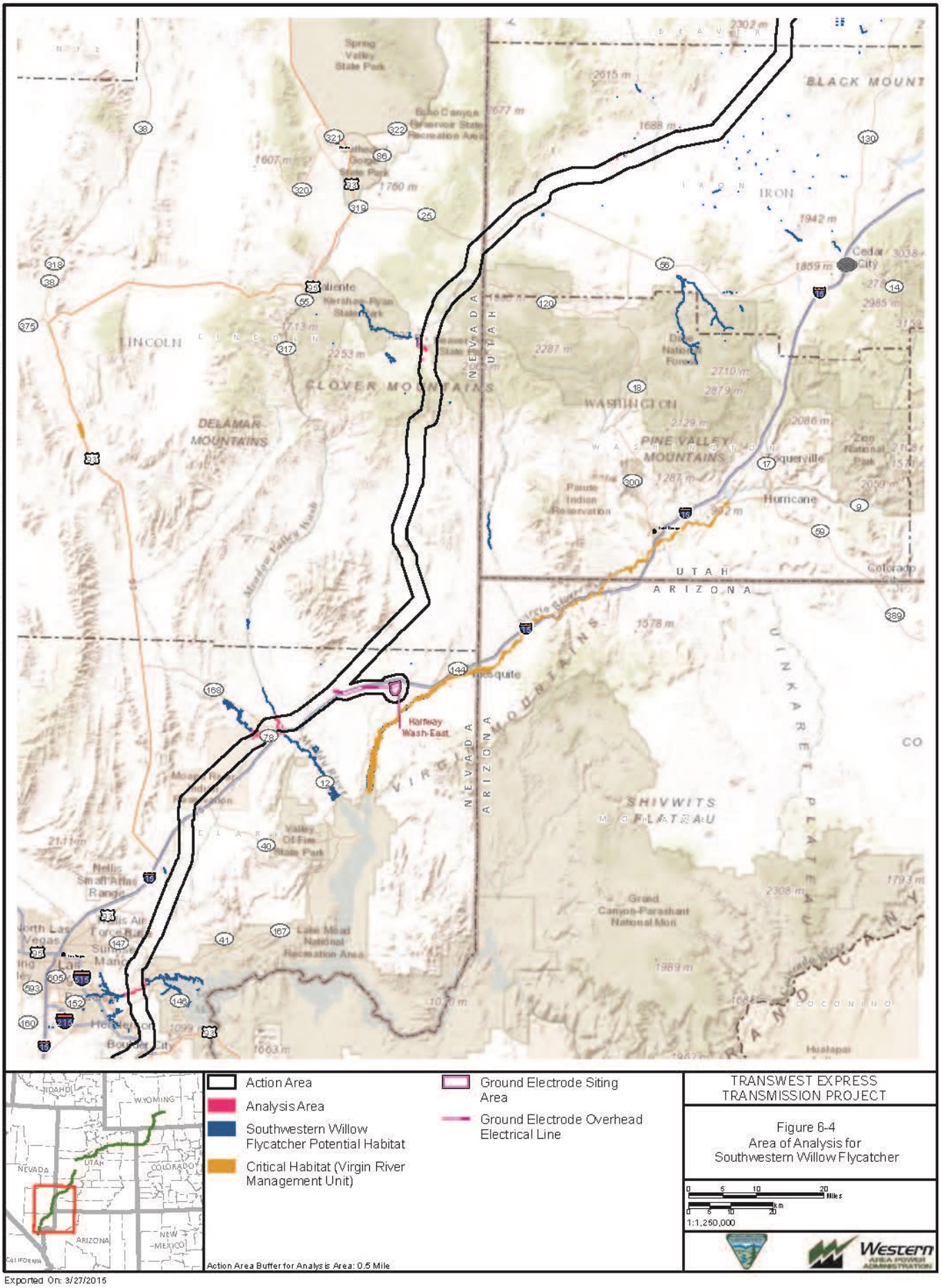
Conservation Measures

Impacts to the southwestern willow flycatcher and its habitat would be minimized through implementation of the following design features and conservation measures described in Chapter 3.0:

- Applicant-committed conservation measures and design features: TWE–8, TWE–24, TWE–25, TWE–26, TWE–29, TWE-31, TWE-32, TWE–33, and TWE–34.
- Conservation measures: **SSWS–15**, **WLF–1**, **WLF–4**, **WLF–5**, **WLF-6**, **WLF-7**, **WLF–8,** and **WLF-10**.

The following additional conservation measure is proposed to avoid or reduce effects of the Proposed Action on the southwestern willow flycatcher.

- **SSWS-8**: To prevent impacts to the southwestern willow flycatcher, TransWest would implement the following measures:
    1. All surface disturbing activities would be restricted within a 0.25-mile buffer from suitable riparian habitats and permanent surface disturbances would be avoided within 0.5 mile of suitable southwestern willow flycatcher habitat.
        - Unavoidable ground disturbing activities in occupied southwestern willow flycatcher habitat would only be conducted when preceded by current year USFWS-protocol level survey, would only occur between August 16 and April 30 (the period when southwestern willow flycatcher are not likely to be breeding), and would be monitored to ensure that adverse impacts to southwestern willow flycatcher and suitable habitat are minimized or avoided, and to document the success of project-specific mitigation/protection measures. As monitoring is relatively undefined, project specific requirements must be identified.
    2. Native species would be preferred over non-native for revegetation of habitat in disturbed areas.


Action Area
Analysis Area
Southwestern Willow Flycatcher Potential Habitat
Critical Habitat (Virgin River Management Unit)
Ground Electrode Siting Area
Ground Electrode Overhead Electrical Line
Action Area Buffer for Analysis Area: 0.5 Mile
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 6-4
Area of Analysis for
Southwestern Willow Flycatcher
1:1,250,000
Western AREA POWER ADMINISTRATION
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3. Habitat disturbances would be avoided within 0.25 mile of occupied Southwestern willow flycatcher habitat from May 1 to August 15.

Effectiveness: This conservation measure would result in the avoidance or minimization of impacts to the southwestern willow flycatcher and its habitat.

Direct and Indirect Effects

Potential direct impacts to southwestern willow flycatcher would include the construction and operation disturbance of potentially suitable breeding, roosting, and foraging habitat. Impacts could result from the loss or alteration of suitable woody riparian and wetland habitats, reduction in forage base, and increased human disturbance. Impacts to the southwestern willow flycatcher could occur as a result of the construction and operation disturbance of 6.9 acres (0.4 percent) and 1.6 acres (<0.1 percent), respectively, of potentially suitable southwestern willow flycatcher habitat within the analysis area.

Construction has potential to disrupt native and non-native vegetation used by southwestern willow flycatchers, but this disruption would be temporary and it is anticipated that additional, better quality vegetation would be established once reclamation is complete. It is likely that areas where vegetation is removed would contain primarily introduced species, and native vegetation would be removed only on an incidental basis.

Improved access as a result of Project roads could further fragment suitable habitat and result in increased disturbance to the species. Impacts would be more pronounced if construction were to occur during the southwestern willow flycatcher breeding season (March 15 to October 15). Operation of the proposed Project would incrementally increase the collision potential for southwestern willow flycatchers.

Implementation of the design features and general conservation measures along with SSWS-8 listed above would essentially eliminate the potential for Project-related impacts to southwestern willow flycatcher. Moreover, potentially suitable habitat in portions of the analysis area in which this species is most likely to occur including Meadow Valley Wash, Muddy River, and Las Vegas Wash, can easily be spanned by the transmission line as evidenced by existing transmission lines in these areas with which the Proposed Action would be co-located.

It also should be noted that TransWest has developed an operational policy and a comprehensive strategy for avoiding, minimizing, and monitoring impacts to birds during construction and operation of the Proposed Action. This policy/strategy has been incorporated into a single, over-arching document, an Avian Protection Plan (APP), which is included in Appendix B of the TWE POD (Appendix D of the Final EIS). The APP outlines principles of avian protection, potential avian interactions with the transmission line facilities, construction design standards, training and monitoring requirements, nest management, and adaptive management in accordance with the APP Guidelines developed by the USFWS and APLIC in 2005 (APLIC 2012). Adherence to the TWE APP would further ensure that potential impacts to southwestern willow flycatcher are avoided or minimized.

Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the proposed Project action area for the southwestern willow flycatcher.

Remaining impacts to southwestern willow flycatchers would be limited to temporary disturbance of potential foraging habitat. This disturbance is anticipated to have little impact given the linear nature of the proposed Project and the extent of foraging habitat in the surrounding Project region.

There are currently no known short- or long-term monitoring and reporting plans for southwestern willow flycatcher in the Project analysis area.

Monitoring

There are currently no species-specific monitoring requirements for southwestern willow flycatchers within the area of analysis. However, general monitoring of avian interactions along the Proposed Action would occur with implementation of TransWest's APP described above.

Determination

Effect on the Species: The Proposed Action *may affect, but is not likely to adversely affect* the southwestern willow flycatcher.

Effect on Critical Habitat: The Proposed Action would have *no effect* on southwestern willow flycatcher critical habitat.

*Rationale: Riparian habitats most likely to support southwestern willow flycatchers can easily be spanned by the proposed transmission line. In addition, direct and indirect impacts to this species and its habitat would be avoided through implementation of the design features and general conservation measures listed above (and described in Chapter 3.0) and the species-specific conservation measure (**SSWS-8**) described above. Designated critical habitat for the southwestern willow flycatcher would not be affected by the Proposed Action as there is no critical habitat within the action area.*

6.1.2.3 Yuma Clapper Rail (Endangered)

Environmental Baseline

Conservation Status

The Yuma clapper rail was listed as an endangered species on March 11, 1967 under the Endangered Species Preservation Act of 1966 (32 FR 4001). Only the U.S. population is designated as endangered under the ESA. No critical habitat has been designated for this subspecies. The Yuma Clapper Rail Recovery Plan was issued in 1983 (USFWS 1983a). A draft Revised Recovery Plan was issued on February 10, 2010 (USFWS 2010a). There have been no revisions to the listing. A downlisting package was prepared for the FR in 1983 (USFWS 1983b); however, flooding of important clapper rail habitat on the lower Colorado River in that year resulted in the proposal not being published. Instability of population numbers after 1983 precluded reconsideration of the proposal (USFWS 2010a).

The historical distribution of the Yuma clapper rail is not clear. The species might have benefited from human activities that create habitat (backwaters with sedimentation and emergent vegetation), such as the construction of dams on the Colorado River and some of its tributaries. This creation of habitat could have contributed to the expansion of the Yuma clapper rails' historic range. The present distribution of the Yuma clapper rail is similar to the historic distribution, except for some possible range expansions northward along the Colorado River into Lake Mead and the Virgin River. The Yuma clapper rail currently occurs along the lower Colorado River and tributaries (Virgin River, Bill Williams River, lower Gila River) in Arizona, California, Nevada, and Utah; the Salton Sea in California; and the Cienega de Santa Clara and Colorado River Delta in Mexico (USFWS 2010a). There is approximately 10,551 acres of Yuma clapper rail habitat in the U.S. compared to 18,532 acres in Mexico (USFWS 2010a).

Accurate population size estimates have been difficult to obtain due to differences in survey timing, varying surveyor experience, and completeness of the survey efforts. Surveys conducted in 1973, 1974, and 1981 in the U.S. yielded Yuma clapper rail counts of 702, 821, and 787, respectively (USFWS 1983b). Then, in the most recent 5-year review of the Yuma clapper rail (USFWS 2006a) the USFWS indicated that the species status is stable based on survey data from 1998 to 2002, which showed Yuma clapper rail numbers remaining in the range of 500 to 600 birds. More recent surveys discussed in the 2010 draft recovery plan indicated that during the 2000 to 2008 timeframe, the minimum number of Yuma clapper rails in the U.S. has fluctuated between 503 and 890 individuals, and has reached the minimum recovery population 6 of 700 in 5 of those 9 years.

No critical habitat is proposed or designated for the Yuma clapper rail.

Life History and Habitat Association

The Yuma clapper rail is unique among clapper rails in that it is the only rail that occupies freshwater marshes during the breeding seasons yet primarily winters in brackish marshes south of the U.S. (Anderson and Ohmart 1985). The Yuma clapper rail breeds and forages in freshwater marshes with dense emergent vegetation along the Colorado River. Ideal habitat components include a mosaic of emergent vegetation typically greater than 6 feet in height, shallow (less than 12 inches) open water areas as channels or pools with minimal daily water fluctuation, open dry ground between water, vegetation or marsh edge, and a strip of riparian vegetation along the edges of the marsh for that provide cover and buffer areas that could be used seasonally (USFWS 2010a). Some populations of Yuma clapper rails are thought to be non-migratory, remaining near their breeding grounds through the winter where they occupy tall, dense bulrush/cattail stands. They also utilize flooded salt cedar and willow stands (Rosenberg et al. 1991). Yuma clapper rails were originally thought to migrate to Mexico because they were not detected on their breeding grounds in the U.S. during the winter months. It is possible that they were not detected during the winter because wintering populations are almost completely silent (Rosenberg et al. 1991).

Yuma clapper rail home range size and habitat selection varies seasonally. Home ranges are typically smallest during the breeding season (March through July) at 17 to 20 acres and largest in the post breeding season (August through October) at 37 acres and during late winter (January through February) at 59 acres. Males and females tend to have similar home range sizes (USFWS 2010a). Although Yuma clapper rails can inhabit a wide range of marsh sizes, their success is dependent on the mosaic of habitat features summarized above. Large blocks of suitable habitat are essential in providing more opportunities to maintain this mosaic (USFWS 2010a).

Yuma clapper rails breed from March through July, after breeding territories have been established. They are highly territorial during breeding season, with both sexes defending territory. Nests are constructed on a platform of vegetation raised 3 to 6 inches above the ground and concealed in dense marsh vegetation. Incubation begins after the last egg is laid (rails lay one per day), and lasts approximately 21 to 23 days. All eggs hatch within a 24-hour period (AGFD 2006). Clutch size can vary widely from 5 to 15 eggs, but typically consists of 8 to 10 eggs (Patten 2005). Most eggs hatch during the first week of June. Precocial young begin following adults through the marsh within 48 hours of hatching. Family groups of clapper rails typically stay together for approximately 24 to 30 days after hatching. Young clapper rails begin flying 63 to 70 days post hatching (AGFD 2006).

Yuma clapper rails forage while walking on substrates such as mud flats, sandbars, recumbent stems of marsh plants, and between stems of marsh plants (AGFD 2006). The Yuma clapper rail feeds primarily on crayfish, but also forages on small fish, tadpoles, clams, and other aquatic invertebrates (Patten 2005; USFWS 2010a). Crayfish are an introduced species to the Lower Colorado River Basin and their introduction could have been pivotal to the range expansion of the Yuma clapper rail, as crayfish provided a more abundant and secure food supply (USFWS 2010a). Seasonal variability of crayfish is correlated with shifts in habitat use by clapper rails. During periods of low prey availability, daily foraging movements of Yuma clapper rails tend to be over a larger area (USFWS 2010a). Rosenberg et al. (1991) have suggested that crayfish abundance might be a limiting factor in determining Yuma clapper rail occurrence today.

Threats

At the time the Yuma clapper rail was listed as endangered in 1967, threats to the species included loss of habitat due to river channelization and changes in flows due to managed water deliveries. Agricultural and municipal water diversions from the Lower Colorado River nearly eliminated freshwater flow to the Delta, degrading Yuma clapper rail habitat. Currently, existing habitats are primarily either human-made, as are the managed ponds at Salton Sea or the effluent-supported marshes at the Cienega de Santa

Clara, or formed behind dams and diversions on the Lower Colorado River at the time those structures were created. All habitat is subject to natural successional processes that reduce habitat value for clapper rails over time unless natural or human induced restorative events (e.g., fires, scouring floods) occur. The greatest threat to the Yuma clapper rail is that without active management and protection of water sources supporting the habitat, these habitat areas will be permanently lost. Other threats to this species include continuing land use changes in floodplains, disturbance from human activities, environmental contaminants (particularly increases in selenium levels), and reductions in connectivity between core habitat areas (USFWS 2010a, 2006a).

Recovery

A draft Revised Recovery Plan for the Yuma clapper rail was issued on February 10, 2010 (USFWS 2010a). The species' Recovery Priority Number is 6, which indicates a subspecies with a high degree of threat and low recovery potential from loss of habitat due to lack of natural river processes that create and maintain marshes, lack of security relative to the protection of existing habitat, a low chance of recovery because of habitat losses in the U.S., and the lack of protection for clapper rail habitat in Mexico (USFWS 2010a).

To achieve recovery, the Yuma clapper rail must reach and maintain a viable population level and have sufficient protected and managed marsh habitat to provide for long-term persistence of populations in the three major core areas (Lower Colorado River, Salton Sea, and Cienega de Santa Clara) and movement corridors between them. The focus of the USFWS recovery strategy is providing long-term management and protection for a sufficient amount of core and other habitats to support a viable population of Yuma clapper rails, monitoring of populations and habitats, research to provide effective conservation and recovery, and application of research results and monitoring through adaptive management. The ultimate recovery goals are to achieve population stability and habitat protection sufficient to downlist and/or delist the Yuma clapper rail. A summary of recovery objectives and recovery criteria (USFWS 2010a) are provided below.

1. Documentation of a stable or increasing trend for numbers of rails in the U.S. as shown through annual rail surveys based on maintaining a statistically secure minimum population size determined by research and modeling (as exemplified in Fleischer et al. 1995).
2. Protection of sufficient breeding and wintering habitat to support the desired minimum population size from identified threats and allow for connectivity of habitat.
3. Development of management plans for all important federal and state-owned habitat areas in the U.S. and for the Cienega de Santa Clara in Mexico that provide for habitat development, maintenance of suitable habitat conditions, and protection from human disturbances.
4. Completion of an assessment of the degree of threat from existing and predicted selenium levels to adult rails and recruitment of young rails and, if necessary, implementation of management actions to control this threat in rail habitats.
5. Evaluation of potential migration pathways between the Lower Colorado River, Salton Sea, and Mexican core habitat areas that provide for connectivity that supports population viability and, if appropriate, development of management plans to protect stop-over habitats.
6. Completion of efforts to protect and secure for the long-term an adequate water supply to support rail habitat at current levels at the Salton Sea and in the Cienega de Santa Clara.

The Yuma clapper rail will be considered for <u>downlisting</u> when the following criteria are met:

1. Annual rail surveys document a stable or increasing trend in population based on a minimum of 824 rails in the U.S. for at least 5 consecutive years.
2. Management plans for all important federal and state-owned habitat areas are developed. For the Lower Colorado River, these areas are: Havasu National Wildlife Refuge (NWR), Bill

Williams NWR, Cibola NWR, Imperial NWR, Mittry Lake State Wildlife Area, Imperial Division Lands of the Bureau of Land Management; for the Salton Sea: Sonny Bono Salton Sea NWR and Imperial State Wildlife Area.

3. Long-term contracts providing for a quality and quantity of water to support the Yuma clapper rail habitats at the Salton Sea are in place. The amount and quality of the water supply should be sufficient to maintain healthy cattail marsh habitat at Sonny Bono Salton Sea NWR and Imperial State Wildlife Area.

The Yuma clapper rail will be considered for delisting when the downlisting criteria and the following additional criteria have been met.

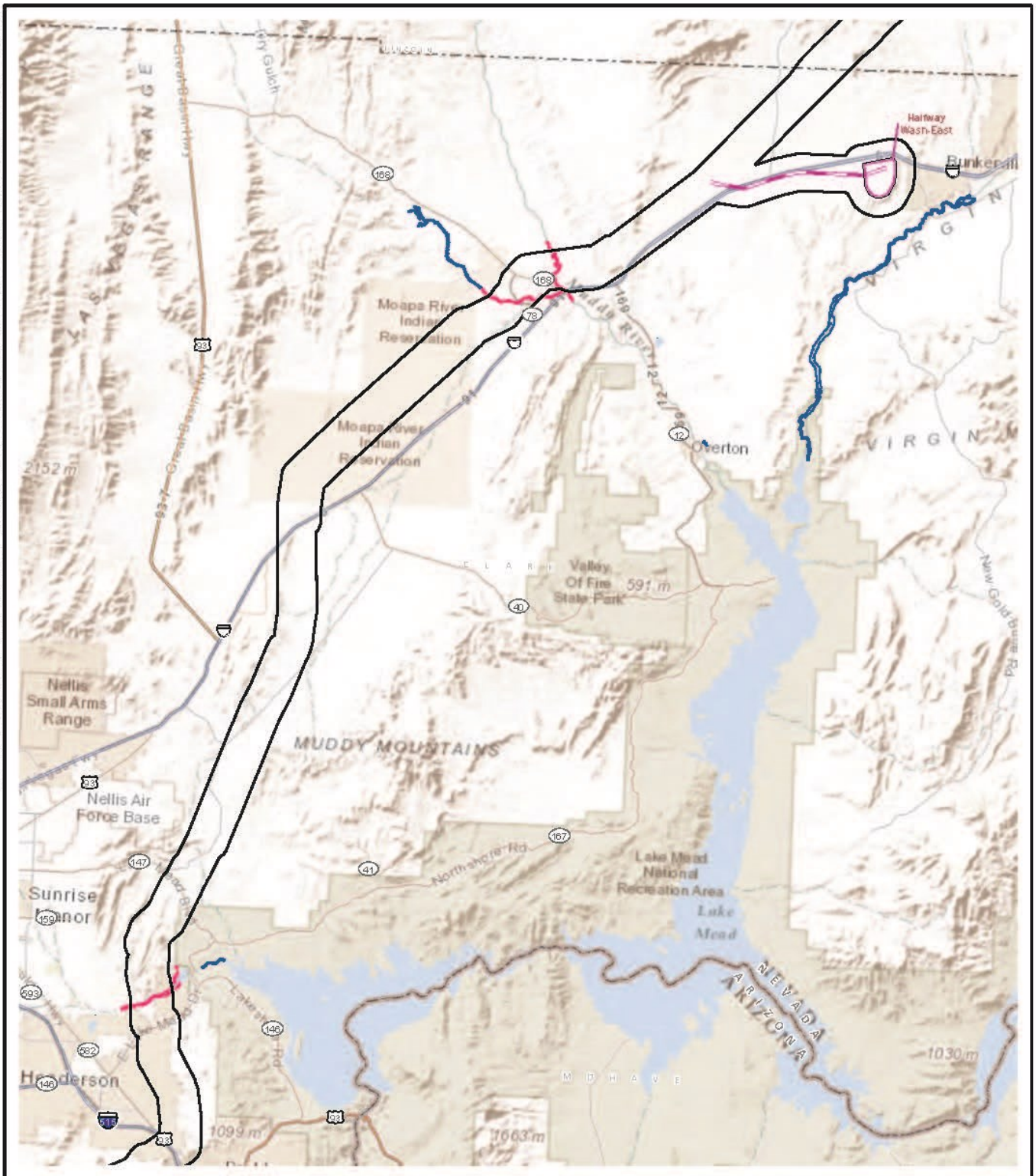
1. Annual rail surveys document a stable or increasing trend in population based on a desired population of 824 individuals (or a higher minimum population size established through research and modeling) in the U.S. for at least 5 years beyond that needed for downlisting.
2. The amount of habitat needed to support a minimum population size (as determined in #4 above) is established, protected, and managed to ensure adequate breeding and wintering habitat in the U.S.
3. An assessment of the degree of threat from existing and predicted selenium levels to adult rails and recruitment of young rails is completed, and, if necessary, management actions to control this threat in rail habitats are implemented.
4. An evaluation is completed of potential migration pathways between the Lower Colorado River, Salton Sea, and Mexican core habitat areas that provide for connectivity that supports population viability and, if appropriate, management plans are developed to protect stopover habitats.
5. A water supply of sufficient quality to ensure the continuation of current levels of rail habitat, in terms of both quantity and quality has been secured for the long-term for the Cienega de Santa Clara. This water supply can be of the current quantity (approximately 100,000 acre-feet per year), and quality (averaging less than 2,660 parts per million [ppm]) or that needed to maintain salinities in the Cienega below that needed for cattail growth [5,000-6,000 ppm]) over the long term.

Assessment of Effects

Area of Analysis

The Yuma clapper rail was formerly restricted to an area near Yuma, Arizona, but has since expanded its range. Over 70 percent of the breeding population winters along the lower Colorado River (Rosenberg et al. 1991). In the vicinity of the action area, the subspecies has potential to occur along the Muddy and Virgin Rivers and the Las Vegas Wash (GBBO 2010).

The Yuma clapper rail analysis area is defined as potential habitat (herbaceous wetlands) within the Project action area and 0.5 mile buffer in Clark County, Nevada. These areas represent 1,213 acres of potential Yuma clapper rail habitat and are depicted in **Figure 6-5**.



TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure 6-5
Area of Analysis for Yuma Clapper Rail

0 2.5 5 10 Miles
0 2.5 5 10 km
1:500,000

Western Area Power Administration

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Conservation Measures

Impacts to the Yuma clapper rail and its habitat along the proposed Project alignment would be minimized through implementation of the following design features and general conservation measures described in Chapter 3.0:

- Applicant-committed conservation measures and design features: TWE-8, TWE-24, TWE-25, TWE-29, TWE-31, TWE-32, TWE-33, and TWE-34.
- Conservation measures: **SSWS-15, WET-1. WET-2, WET-3, WLF-1**, **WLF-4**, **WLF-5**, **WLF-6**, **WLF-7**, **WLF-8,** and **WLF-10**.

No species-specific conservation measures have been identified for the Yuma clapper rail.

Direct and Indirect Effects

Within the area of analysis, the Yuma clapper rail could occur within suitable marsh habitat along the Muddy River and Las Vegas Wash.

Potential direct impacts to Yuma clapper rail include the construction and operation disturbance of potentially suitable breeding, roosting, and foraging habitat. Impacts could result from the loss or alteration of suitable herbaceous wetland habitat, reduction in forage base, and increased human disturbance, particularly during the breeding season. If construction of the proposed Project was to occur during Yuma clapper rail breeding season (approximately March 15 to October 15), impacts to breeding rails could include the loss of nests or nest abandonment caused by increased noise and human activity in proximity to an active nest site.

The Proposed Action could result in the construction and operation disturbance of up to 5.3 acres (0.4% percent) and 1.2 acres (<0.1 percent), respectively, of potentially suitable Yuma clapper rail habitat. These acreages are a conservative estimate of potential habitat impacts and are based on general assumptions about the amount of project impacts per unit length of the transmission line, regardless of habitat. In reality, impacts to Yuma clapper rail habitat are expected to be avoided. As evidenced by existing, co-located transmission lines, the portions of the analysis area in which this species is most likely to occur, i.e., along the Muddy River and Las Vegas Wash, can be easily spanned by the Project.

Implementation of the Applicant-committed measures and design features and the additional conservation measures listed above would essentially eliminate the potential for this species to be adversely affected by the project during construction. Although operation of the proposed Project would incrementally increase the collision potential for Yuma clapper rails, the probability of collision is low due to this species' preference for walking or running rather than flying. To the extent that this species is non-migratory within the analysis area, the probability of collision is further reduced.

As noted above, TransWest has developed a plan for avoiding, minimizing, and monitoring impacts to birds during construction and operation of the Proposed Action. This plan has been incorporated into a single, over-arching document, an APP, which is included in Appendix B of the TWE POD (Appendix D of the Final EIS). The APP outlines principles of avian protection, potential avian interactions with the transmission line facilities, construction design standards, training and monitoring requirements, nest management, and adaptive management in accordance with the APP Guidelines developed by the USFWS and APLIC in 2005 (APLIC 2012). Adherence to the TWE APP would further ensure that potential impacts to the Yuma clapper rail are avoided or minimized.

Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the analysis area for the Yuma clapper rail.

Monitoring

There are currently no species-specific monitoring requirements for Yuma clapper rails within the area of analysis. However, general monitoring of avian interactions along the Proposed Action would occur with implementation of TransWest's APP described above.

Determination

Effect on the Species: Construction and operation of the proposed Project *may affect, but is not likely to adversely affect* the Yuma clapper rail.

Effect on Critical Habitat: Critical habitat has not been designated for the Yuma clapper rail; thus, the Proposed Action would have *no effect* on critical habitat for this species.

Rationale: Herbaceous wetland habitats within the Yuma clapper rail area of analysis can easily be spanned by the Proposed Action. As a result, there would be no direct impacts to potential habitat for this species. Indirect impacts to this species could occur as a result of human activity and noise during construction. Such impacts could temporarily displace Yuma clapper rail from the analysis area but would not be expected to rise to the level of take. Implementation of the Applicant-committed measures and design features and conservation measures listed above would further ensure that Project-related disturbance to Yuma clapper rail habitat is avoided or minimized.

6.1.2.4 Western Yellow-billed Cuckoo (Threatened)

Environmental Baseline

Conservation Status

In 1998 the USFWS received a petition to list the yellow-billed cuckoo under the ESA stating that the species is endangered in a significant portion of its range and that this range is coterminous with a valid subspecies, the western yellow-billed cuckoo (*Coccyzus americanus occidentalis*). In 2000, a 90-day petition was announced (65 FR 8104) concluding that further scientific or commercial information was required to determine the taxonomic validity of a western subspecies, and to determine if listing the western population as a DPS was warranted. Then, in 2001, the USFWS published a 12-month petition finding (66 FR 38611) concluding that the western yellow-billed cuckoo constituted a valid DPS and that the DPS was warranted for listing; however, this action was precluded by higher priority listing action, and the DPS was placed on the candidate species list. The Western U.S. DPS of the yellow-billed was proposed for listing as threatened on October 3, 2013 (78 FR 61622). On November 3, 2014, the species was listed as threatened by the USFWS (79 FR 59992).

Critical habitat for the western yellow-billed cuckoo was proposed by the USFWS on August 15, 2014 (79 FR 48548). On November 12, 2014 the USFWS extended the public comment period on proposed critical habitat in nine states including Wyoming, Colorado, Utah, and Nevada (79 FR 67154).

Life History and Habitat Association

Based on historic accounts, the western yellow-billed cuckoo was once widespread and locally common in California and Arizona, locally common in a few river reaches in New Mexico, locally common in portions of Oregon and Washington, generally local and uncommon in scattered drainages of arid and semiarid portions of western Colorado, western Wyoming, Idaho, Nevada, and Utah (USFWS 2013k).

Over the past 90 years, the species' range has contracted and the northern limit of breeding along the west coast in now in the Sacramento Valley with a small potentially breeding population in coastal

northern California (USFWS 2013k). The western subspecies has been nearly extirpated and is restricted to small isolated populations (Bennett and Keinath 2003). The current geographical breeding range of the western yellow-billed cuckoo in North America includes suitable habitat within the low- to moderate-elevation areas west of the crest of the Rocky Mountains in Canada and the U.S. including the upper and middle Rio Grande, the Colorado River Basin, the Sacramento and San Joaquin River systems, the Columbia River system, and the Fraser River. In Mexico the range includes the Cape Region of Baja California Sur, and river systems in the Mexican States of Sonora, Sinaloa, western Chihuahua, and northwestern Durango (USFWS 2013k).

Yellow-billed cuckoo populations in western North America have declined dramatically from their former numbers, primarily because of the loss or degradation of high-quality riparian habitat. Yellow-billed cuckoos are now considered very rare in Utah, Colorado, Nevada, and Wyoming with few if any observations reported annually. Total current population size for the western subspecies in the U.S. is estimated to be 475 to 675 pairs with a similar number likely in Mexico (Bennett and Keinath 2003).

Accurate population trends are difficult to estimate because quantitative data, including historical population estimates, are generally lacking. Cuckoos are no longer found in British Columbia, Washington, or Oregon. Idaho, Montana, Utah, Wyoming, and Nevada report occasional scattered observations and remaining populations in California, Arizona, New Mexico, and Texas are vastly reduced (Bennet and Keinath 2003).

WYNDD ranked the historical trend for yellow-billed cuckoos as a “large decline” (a decrease of over 50 percent since 185) based on near extirpation of the species in the West. In addition, WYNDD ranked the recent trend as a “moderate decline” (a decrease of less than 50 percent since 1950) since most declines in abundance occurred prior to 1950 (Bennett and Keinath 2003). Although the Western Slope of Colorado probably never supported many cuckoos, the birds have now become extremely rare. The *Colorado Breeding Bird Atlas* states that the status of western yellow-billed cuckoos in Colorado mimics the rest of the continent, in that they are nearly extirpated (Kingery 1998). According to the *Atlas of Breeding Birds of Nevada*; yellow-billed cuckoos are declining and are now rare in both Nevada and Utah (Floyd et al. 2007).

The Rocky Mountains geographically separate the two subspecies of yellow-billed cuckoo. The western (*Coccyzus americanus occidentalis*) and eastern (*Coccyzus americanus americanus)* subspecies exemplify the significant ecological differences between these areas. The western yellow-billed cuckoo depends on old-growth riparian woodlands with dense understories whereas the eastern subspecies is associated with more open woodlands with thick undergrowth (Kingery 1998). In the arid West, yellow-billed cuckoos are riparian specialists (Floyd et al. 2007). Cuckoos typically inhabit large stands of mature, dense willows, but they also use smaller patches of mesquite, tamarisk, hackberry, and other wood vegetation (Floyd et al. 2007). Cuckoos typically do not utilize conifer and mixed broad/leaf/conifer forests and/or urban areas (Bennet and Keinath 2003).

The western yellow-billed cuckoo is a long-distance, complete Neotropical migrant and generally one of the last migrants to arrive on breeding grounds in the U.S., arriving in late May, and peaking in June (Hughes 1999). Cuckoos depart for wintering grounds beginning in late August to mid-September. The migratory route of the western yellow-billed cuckoo is not well known because few specimens collected on wintering grounds have been ascribed to the western or eastern subspecies (Bennett and Keinath 2003). The western yellow-billed cuckoo likely moves down the Pacific Slope of Mexico and Central America to northwestern South America.

Western yellow-billed cuckoos appear to require large areas of riparian woodland for nesting. Nesting home ranges vary from 25 acres to over 100 acres. Nesting densities range from 1 to 27 pairs per 99 acres, depending on local conditions (USFWS 2001). In the western U.S., nests are typically constructed in willows, Fremont cottonwood, mesquite, hackberry, soapberry, alder, or cultivated fruit trees on horizontal branches or vertical forks of the large tree or shrub (Hughes 1999). Nests are

generally placed between 1 and 6 meters (3 and 20 feet) above the ground and hidden by foliage (Hughes 1999). Nest sites in arid regions are restricted to relatively humid river bottoms, ponds, swampy areas, and damp thickets (Hughes 1999). Both members of the pair build a well-concealed nest of twigs in dense foliage that is usually within 10 m of the ground.

The western yellow-billed cuckoo has a short breeding season, lasting only about 4 months from time of arrival on breeding grounds in the spring to fall migration. Western yellow-billed cuckoos typically lay a single clutch per season of 2 or 3 eggs in mid-June to mid-July, and incubation occurs over 9 to 11 days (Hughes 1999; Johnson et al. 2008). However, two or even three clutches in a season can occur. Cuckoos are a monogamous species and incubation is shared equally between males and females and both parents brood and tend young (Hughes 1999). Development of the young is very rapid, with fledgling occurring in 6 to 9 days; the entire breeding cycle may be only 17 days from egg laying to fledging of the young (Hughes 1999). Fledglings are dependent upon parents for up to 3 weeks following fledgling (Johnson et al. 2008). The western yellow-billed cuckoo is infrequently parasitized by the brown-headed cowbird, possibly because its short breeding period reduces the chance of successful nest parasitism (Hughes 1999).

The primary food items consumed by cuckoos include large insects such as caterpillars, cicadas, and grasshoppers (Hughes 1999). They also will occasionally prey on small lizards, frogs, and eggs or young of other birds. Additionally, cuckoos will are known to small fruits and seeds on wintering grounds and occasionally during the breeding season (Bennett and Keinath 2003). Cuckoos hunt prey via a sit-and-wait strategy whereby they perch inconspicuously and scan the surrounding vegetation for moving prey. Cuckoos also glean insects from vegetation while perched or hovering, and will occasionally hawk insects, similar to a flycatcher. Cuckoos also will actively pursue grasshoppers, frogs, and lizards on the ground or in vegetation (Hughes 1999).

Threats

Habitat loss is the primary threat to the western yellow-billed cuckoo (Corman and Wise-Gervais 2005; Floyd et al. 2007). Western yellow-billed cuckoos appear to require large tracts of contiguous habitat (UDWR 2005) and population declines across the western U.S. are primarily due to the loss of cottonwood-dominated riparian habitat. This loss is primarily a result of conversion to agriculture, dams and river flow management, bank protection, overgrazing, and competition from exotic plants such as tamarisk (Bennett and Keinath 2003). Western yellow-billed cuckoos are further threatened by their low population size, extreme population fluctuations, and patchy distribution (Bennett and Keinath 2003). Heavy pesticide usage during the last 50 years also has likely contributed to population declines by removing prey, directly poisoning birds, and causing egg shell thinning (Bennet and Keinath 2003).

Under the ESA and USFWS policy, the USFWS determines whether a species (or a distinct population segment of a vertebrate species) is a threatened species based on any of the following five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. Of these five factors, the USFWS has determined that western yellow-billed cuckoo is threatened with (A) the threatened destruction, modification, or curtailment of its habitat and range and (E) other natural or manmade factors affecting its continued existence (A and E) (USFWS 2013k).

Factor A: Threats to yellow-billed cuckoo include habitat destruction, modification and degradation from dam construction operations; water diversions; riverflow management; stream channelization and stabilization; conversion to agricultural uses, such as crops and livestock grazing; urban and transportation infrastructure; and increased wildfires. These factors also contribute to habitat fragmentation, loss of habitat, and spread of non-native plant species, especially tamarisk (USFWS 2013k).

Factor E: Due to the rarity of yellow-billed cuckoo habitat and because populations tend to be small and isolated: the remaining populations in western North America are increasingly susceptible to further declines through lack of immigration, chance weather events, fluctuating availability of prey populations, pesticides, collisions with tall vertical structures during migration, spread of the introduced tamarisk leaf beetle as a biocontrol agent in the Southwest, and climate change (USFWS 2013k).

Recovery

A recovery plan has not yet been prepared for the western yellow-billed cuckoo; however, numerous conservation efforts that are aimed at recovery of the western yellow-billed cuckoo are underway. In Nevada, Arizona, and other southwestern states, conservation plans are in various stages of implementation that would result actions covering thousands of acres of riparian habitat that could benefit the western yellow-billed cuckoo. These included, but are not limited to, the Lower Colorado River Multi-Species Conservation Program, various State Wildlife Action Plans, the Virgin River Habitat Conservation and Recovery Program, Muddy River Recovery Implementation Program, and Las Vegas Wash Comprehensive Adaptive Management Plan (USFWS 2013k).

Assessment of Effects

Area of Analysis

The western yellow-billed cuckoo analysis area is defined as potential habitat (woody riparian and wetlands) within the action area plus a 0.5-mile buffer. These areas represent 18,146 acres of potential western yellow-billed cuckoo habitat and are depicted on **Figures 6-6** and **6-7**.

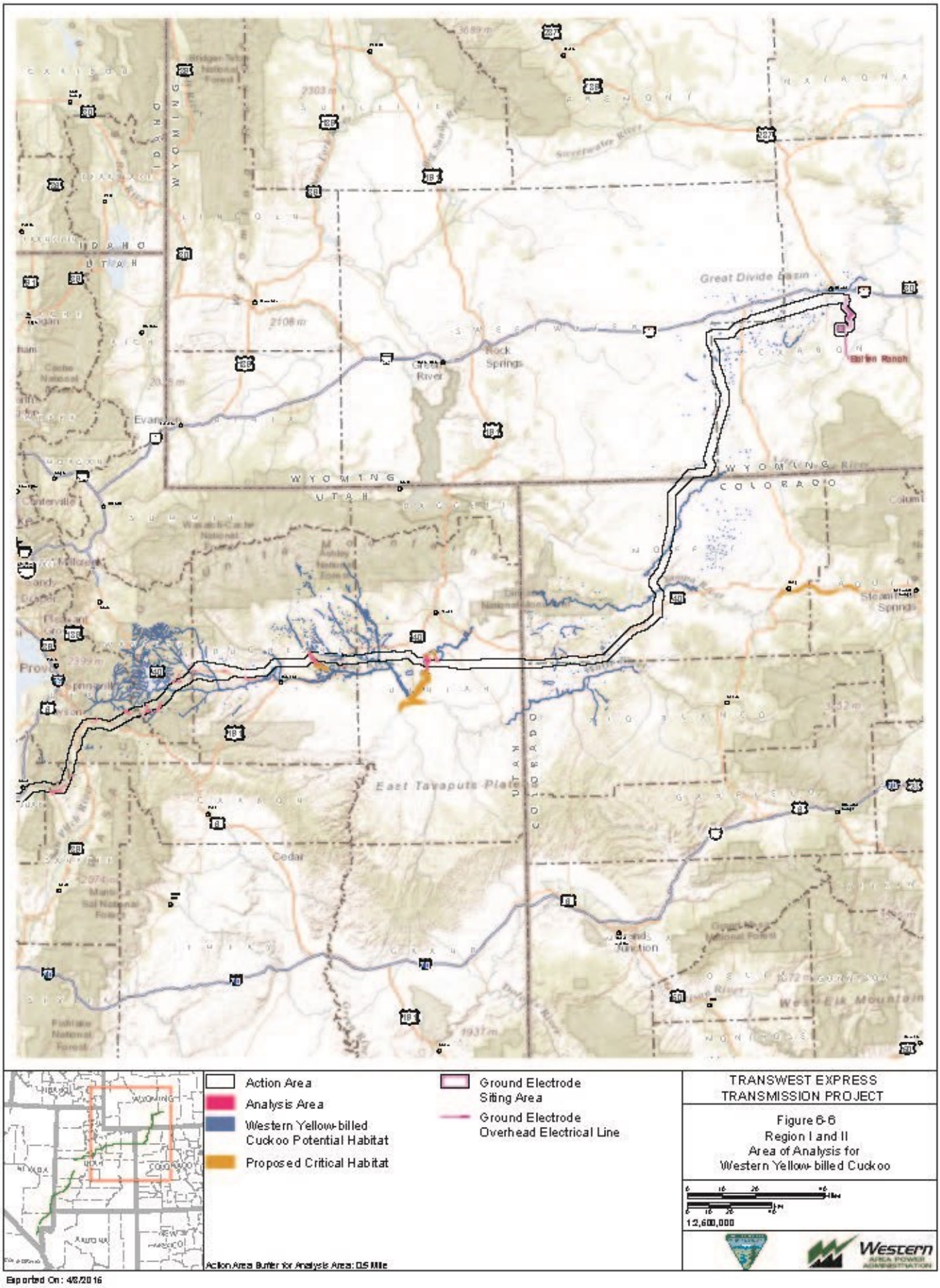
The range of the western population of yellow-billed cuckoo has been determined as the portion of yellow-billed cuckoo range west of the crest of the Rocky Mountains (USFWS 2001). Currently the western yellow-billed cuckoo is very rare in scattered drainages in western Wyoming, Colorado, Idaho, Nevada, and Utah (NatureServe 2012). Western yellow-billed cuckoos are extremely rare summer residents in western Wyoming and Colorado. The majority of potentially suitable habitat in the northern portion of the action area occurs along the Little Snake River and Yampa River (Project Segment 1187) in Moffat County, Colorado (**Figure 6-6**) and along the Green, Uinta, Lake Fork, and Duchesne Rivers in Uintah and Duchesne Counties, Utah. The species has been documented within 5 miles of the analysis area in Uintah, Duchesne, Utah and Wasatch counties, Utah (UNHP 2010, USFWS 2015b). In Nevada the species has been documented in or near the action area along the Muddy River (Project Segment 1540.2) (Floyd et al. 2007), in Meadow Valley Wash (Segment 1540.1), and along Las Vegas Wash (Segment 1660) (GBBO 2010) (**Figure 6-7**).

In Utah, proposed critical habitat is present where the action area traverses the Green River in Uintah County, and Lake Fork River in Duchesne County. In Nevada, proposed critical habitat is located along the Muddy River in Clark County, approximately 6 miles upstream (in the Moapa Valley National Wildlife Refuge) of the action area and as well as approximately 15 miles downstream of the action area.

Conservation Measures

Impacts to the western yellow-billed cuckoo and its habitat along the proposed Project route would be minimized through implementation of the following design features and conservation measures as described in Chapter 3.0:

- Applicant-committed conservation measures and design features: TWE-8, TWE-24, TWE-25, TWE-26, TWE-29, TWE-31, TWE-32, TWE-33, and TWE-34.
- Conservation measures: **WLF-1**, **WLF-4**, **WLF-5**, **WLF-6**, **WLF-7**, **WLF-8**, **WLF-10,** and **SSWS-15**.



TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure 6-6
Region I and II
Area of Analysis for
Western Yellow-billed Cuckoo

1:2,600,000

Western Area Power Administration

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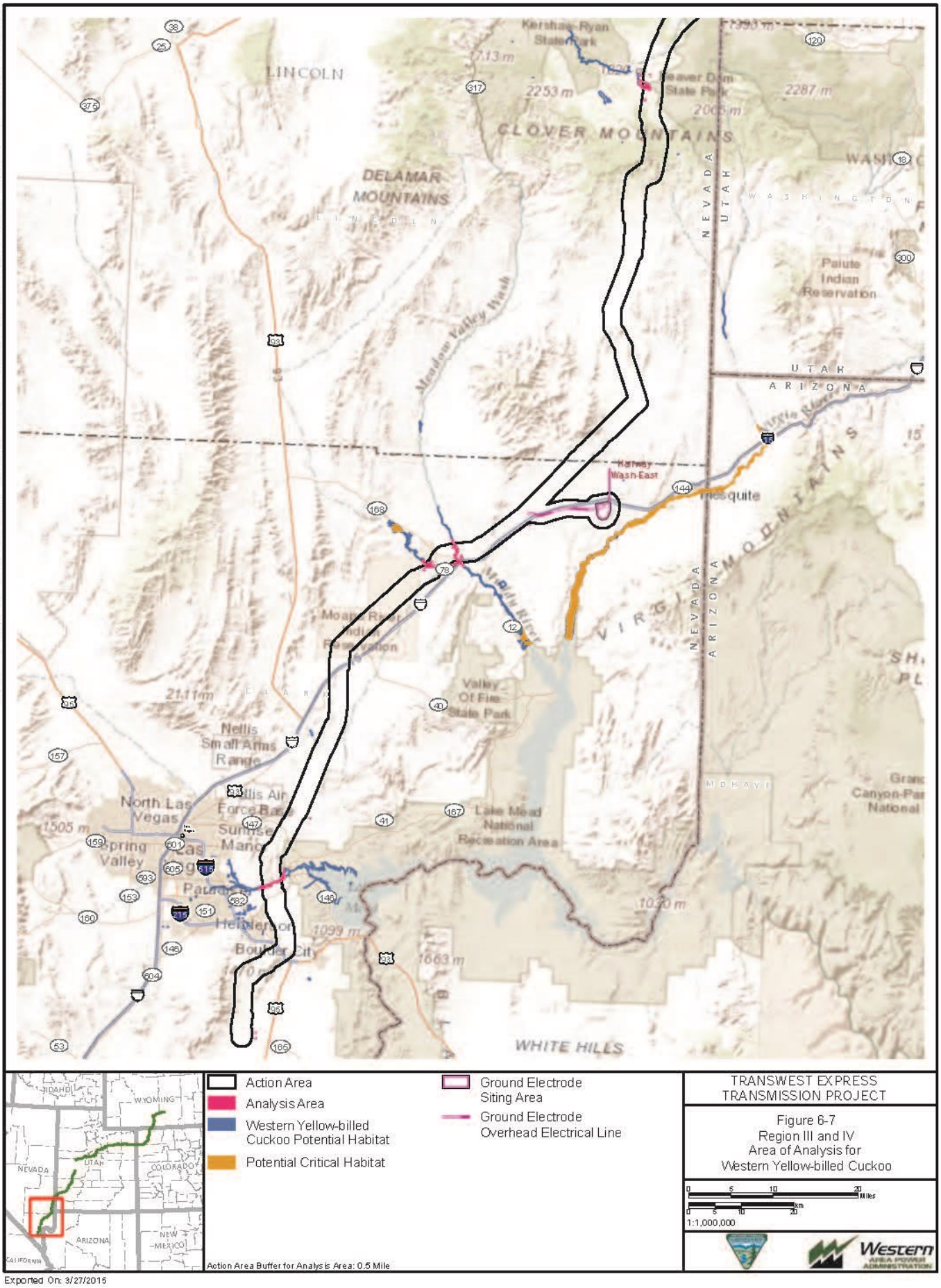

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The following additional conservation measure is proposed to avoid or reduce effects of the Proposed Action on the western yellow-billed cuckoo.

SSWS-6: To prevent impacts to the western yellow–billed cuckoo during the breeding season, TransWest would avoid all pre-construction, construction, operations, maintenance, decommissioning, vegetation clearing, spraying, and other surface–disturbing activities within 0.25 mile of suitable habitat from May 1 to September 15. Prior to construction, field surveys would be conducted within the refined transmission corridor to confirm all areas of suitable habitat. If avoidance is not possible, the following mitigation measures would apply:

- Breeding season surveys would be completed in suitable habitat for western yellow-billed cuckoo within the analysis area in accordance with established protocols. If western yellow-billed cuckoos are documented within this area, additional avoidance and minimization measures would be identified and implemented in coordination with the BLM, Western, USFWS, and applicable state wildlife agencies.
- If an active western yellow-billed cuckoo nest is identified during surveys, it would be avoided by a minimum of 500 feet, and Project activities would ensure that sufficient habitat within a minimum 50-acre habitat patch size is retained. Vegetation management would ensure that a 65 percent canopy cover with a mean canopy height of 23 to 33 feet would be retained. Herbicide application would be avoided within riparian areas, as described in conservation measure **NX-2** (**Table 3-2**).

Effectiveness: This proposed mitigation measure would minimize impacts to the western yellow-billed cuckoo and its habitat by avoiding construction activities in areas of suitable habitat, restricting disruptive activities within suitable habitat to outside of the active breeding season, and prohibiting alteration of native vegetation in areas of suitable habitat.

Direct and Indirect Effects

The proposed Project could result in the construction and operation disturbance of up to 80 acres (0.4 percent) and 17.5 acres (<0.1 percent), respectively, of modeled potential western yellow-billed cuckoo habitat. These acreages are a conservative estimate of potential habitat impacts and are based on modeled habitat (which is likely an overestimate of the amount of suitable habitat available for this species) and general assumptions about the amount of project impacts per unit length of the transmission line, regardless of habitat. In reality, impacts to yellow-billed cuckoo habitat are expected to be avoided. Aerial photo interpretation indicates that suitable habitat is not likely to be present where the preliminary engineered alignment crosses the Little Snake and Yampa Rivers in Colorado. Moreover, as evidenced by existing, co-located transmission lines where the Proposed Action would cross the Green and Uinta Rivers in Uintah County and the Lake Fork and Duchesne Rivers in Duchesne County, Utah; and the Muddy River and Las Vegas Wash in Clark County, Nevada, riparian habitat in these areas can be spanned by the Project. Consequently, impacts to suitable cuckoo habitat in these areas would be avoided. Impacts to breeding or nesting cuckoos may result from noise generated during pre-construction and construction activities and helicopter use within 0.5 miles of suitable habitat. Individual cuckoos disturbed by anthropogenic noise may avoid areas of suitable habitat or in some cases may abandon active nesting attempts depending on the proximity to the source and intensity of noise. Avoidance of disruptive activity within 0.25 miles of suitable habitat during the nesting season is required under conservation measure **SSWS-6**. Implementation of this measure would reduce the potential for impacts to suitable habitat or abandonment of nests but may not completely eliminate the potential for adverse impacts to individual cuckoos.

In addition to the above, implementation of the Applicant-committed measures and design features and the additional conservation measures listed above would essentially eliminate the potential for this species to be adversely affected by the project during construction. Following construction, the presence of the transmission line would increase the collision potential for western yellow-billed cuckoos, which are long-distance migrants that migrate predominately at night (Crawford and Stevenson 1984).

Implementation of conservation measure **WLF-8**, including use of bird flight diverters over waterbodies, would help to minimize the potential for migrating birds to collide with Project conductors and shield wires. Regardless of the effectiveness of installed bird flight diverters along the transmission line in areas of high bird use, some collision risk to migration cuckoos would still exist due to the presence of tall transmission structures located above vegetation and tree canopies.

As noted above, TransWest has developed a plan for avoiding, minimizing, and monitoring impacts to birds during construction and operation of the Proposed Action. This plan has been incorporated into a single, over-arching document, an APP, which is included in Appendix B of the TWE POD (Appendix D of the Final EIS). The APP outlines principles of avian protection, potential avian interactions with the transmission line facilities, construction design standards, training and monitoring requirements, nest management, and adaptive management in accordance with the APP Guidelines developed by the USFWS and APLIC in 2005 (APLIC 2012). Adherence to the TWE APP would further ensure that potential impacts to the western yellow-billed cuckoo are avoided or minimized.

Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the proposed Project action area for the western yellow-billed cuckoo.

Monitoring

There are currently no species-specific monitoring requirements for the western yellow-billed cuckoo within the area of analysis. However, general monitoring of avian interactions along the Proposed Action would occur with implementation of TransWest's APP described above.

Determination

Effect on the Species: Construction and operation of the Proposed Action *may affect but is not likely to adversely affect* the western yellow-billed cuckoo.

Effect on Critical Habitat: The Proposed action *may affect but is not likely to adversely modify* proposed critical habitat.

*Rationale: As noted above, riparian habitat along the Little Snake and Yampa rivers does not appear to be suitable for the western yellow-billed cuckoo. Consequently, construction-related impacts to this habitat would have no effect on this species. Project-related impacts to proposed critical habitat located along the Green River and Lake Fork River, and potentially suitable habitat along the Muddy River and Las Vegas Wash would be avoided by spanning. Implementation of Applicant-committed mitigation measures and design features and the general conservation measures listed above as well as the species-specific conservation measure (**SSWS-6**) described above would further ensure that potential impacts to the western yellow-billed cuckoo are avoided during project construction and operation.*

6.1.3 Reptiles

6.1.3.1 Desert Tortoise (Threatened)

Environmental Baseline

Conservation Status

The Mojave population of desert tortoise was designated as threatened in 1989 under the ESA (54 FR 32326). In 1994, a Draft Recovery Plan was issued. Critical habitat was designated in 1994, encompassing 6 million acres within six management units across California, Nevada, Utah, and Arizona (59 FR 5820). In 2011, the USFWS issued a Final Revised Recovery Plan, which reduced the number of RUs to five and changed some boundaries of the 1994 RUs (USFWS 2011a). Since then, no significant changes in the distribution of the species have been documented despite a decline in local populations, and no status change has been recommended (USFWS 2010a).

The desert tortoise genus is considered as two separate populations: the Mojave Desert population (*Gopherus agassizii*) and the Sonoran Desert population (*Gopherus morafkai*). The Mojave population, is defined as those tortoises north and west of the Colorado River and west of Beaver Dam Slope, Utah, and is distributed throughout southern Nevada, southeastern California, the Beaver Dam Mountains and Virgin River area of southwestern Utah, and northwestern Arizona (Germano et al. 1994; USFWS 2008a, 1990).

Population density studies have been conducted for many years in several areas throughout desert tortoise range; however, inconsistencies in sampling methods, study scale, environmental conditions, and research goals make long-term population trend determinations difficult. Those data could provide a general overview of the species' range-wide status and demonstrate considerable declines at the local level, particularly in the western Mojave Desert (Corn 1994; USFWS 2008a). Berry and Medica (1995), in their U.S. Geological Survey (USGS) report, estimated that densities ranged from approximately 13 to 168 adult tortoises per square mile, depending on location. Berry and Medica (1995) also found a density of approximately 44 tortoises per square mile in southeastern Nevada, and most populations discussed in that report showed a downward trend (Berry and Medica 1995).

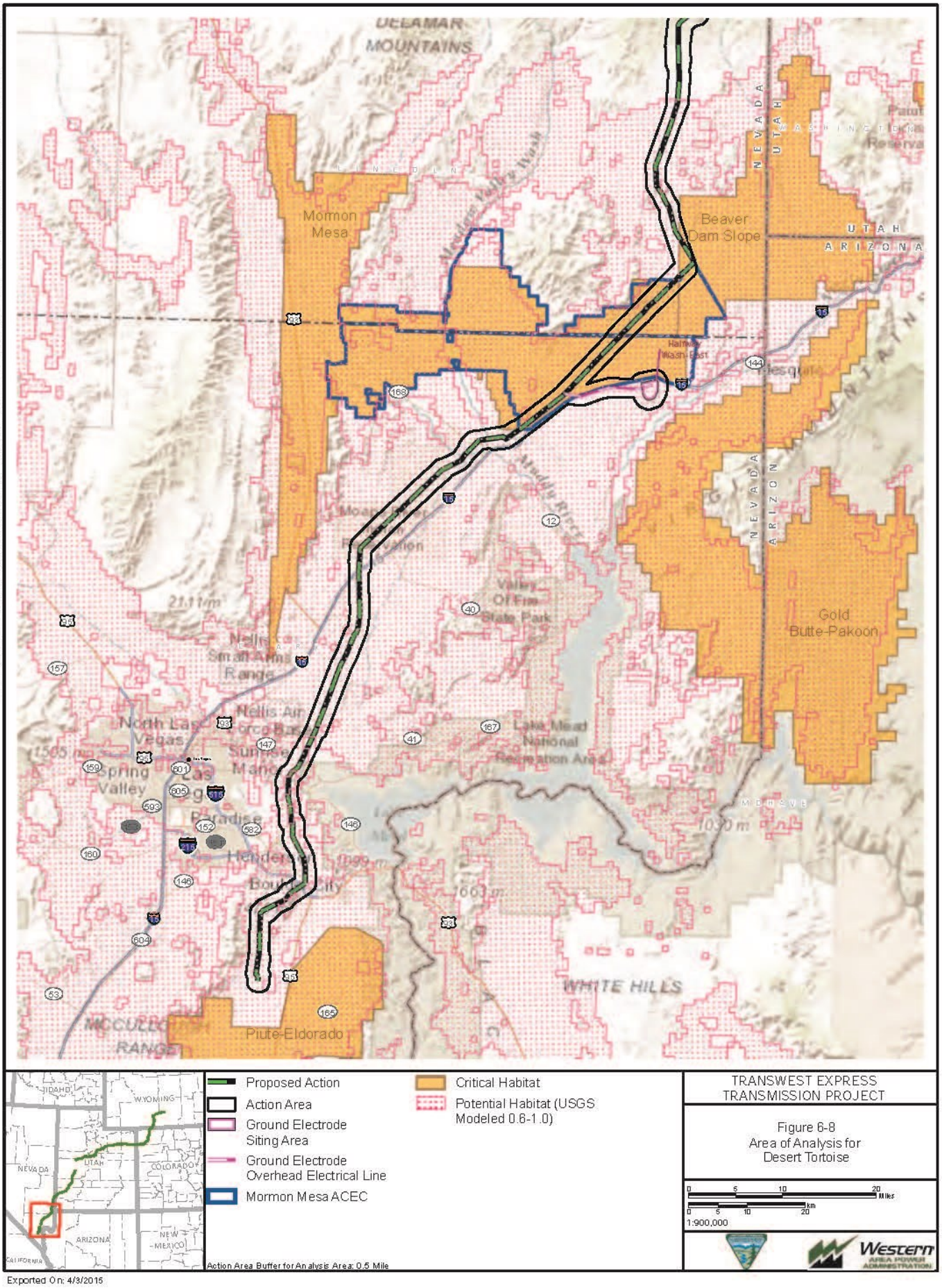
Beginning in 2001 (1999 in the Upper Virgin River RU) annual range-wide monitoring was initiated. Results from the first 5 years of this program estimated a population density low of 2 to 8 tortoises per square mile for the Northeastern Mojave RU and a high of 44 to 78 tortoises per square mile for the Upper Virgin River RU. Because this monitoring program is designed to measure long-term population trends, the first 5 years of the program essentially serve to establish baseline densities and variability between years and between RUs (USFWS 2006b).

The 1994 recovery plan identified general areas as proposed Desert Wildlife Management Areas where recovery efforts for the desert tortoise would be focused. Based on the recovery plan, USFWS designated critical habitat in February 1994, encompassing over 6,400,000 acres in portions of the Mojave and Colorado deserts (**Figure 6-8; Table 6-2**). This designation includes primarily federal lands in southwestern Utah, northwestern Arizona, southern Nevada, and southern California (USFWS 1994a).

Table 6-2 Desert Tortoise Critical Habitat by State and Land Management (acres)

Management Agency	Arizona	California	Nevada	Utah	Total
Bureau of Land Management	288,582	2,698,907	988,600	93,961	4,070,051
National Park Service	44,381	894,639	103,957		1,042,977
U.S. Fish and Wildlife Service			22,991		22,991
Bureau of Reclamation			3,335		3,335
Department of Defense		460,813			460,813
Department of Energy			499		499
Tribal Land				2,398	2,398
State Land	5,698	82,967		22,492	111,157
Private Land	2,500	600,756	101,959	9,895	715,109
Total	341,161	4,738,082	1,221,341	128,746	6,429,331

Source: USFWS 2011a.


DELAMAR MOUNTAINS
Mormon Mesa
Beaver Dam Slope
UTAH
ARIZONA
NEVADA
Gold Butte-Pakoon
Piute-Eldorado
WHITE HILLS
Lake Mead National Recreation Area
Valley Of Fire State Park
Nellis Small Arms Range
North Las Vegas
Spring Valley
Paradise
Henderson
Boulder City
Proposed Action
Action Area
Ground Electrode Siting Area
Ground Electrode Overhead Electrical Line
Mormon Mesa ACEC
Critical Habitat
Potential Habitat (USGS Modeled 0.6-1.0)
Action Area Buffer for Analysis Area: 0.5 Mile
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 6-8
Area of Analysis for Desert Tortoise
1:900,000
Western AREA POWER ADMINISTRATION
Exported On: 4/3/2015

Life History and Habitat Association

Desert tortoises of the Mojave population are found primarily in Mojave Desert scrub habitat. Typical habitat consists of creosote bush scrub vegetation characteristic of the Upper Sonoran life zones of the Mojave and Colorado deserts. Typical desert tortoise habitat extends to 5,500 feet amsl where annual precipitation ranges from 2 to 8 inches; the diversity of perennial plants is relatively high; and production of ephemerals is high. Aside from typical creosote scrub habitat, Mojave Desert tortoises also are associated with creosote bursage, shadscale scrub, and Joshua tree woodland vegetation communities. Some parts of their range contain abundant Joshua trees. Desert tortoises also inhabit mixed blackbrush scrub found in the northern extent of their range between 3,500 and 5,000 feet amsl (NatureServe 2013e).

In the Mojave Desert, tortoises occur most commonly on gently sloping terrain with sandy-gravel soils and a sparse cover of low-growing shrubs, which allows establishment of herbaceous plants. Soils must be friable enough for the digging of burrows, but firm enough so that burrows do not collapse (USFWS 2011a) Tortoise burrows are often located close to washes and arroyos, especially in Mojave Desert habitats consisting of sandy loam soils covered by a more coarse surface of pebbles, cobbles, or desert pavement (Luckenbach 1982).

Of particular importance to desert tortoises is the presence of suitable burrowing substrate and vegetation that offers protective thermal cover for extreme temperatures during the summer months. Desert tortoises can spend more than 98 percent of their lives underground, especially in drought year (Ernst and Lovich 2009). Mojave desert tortoises will usually construct their own burrows to avoid extreme hot or cold temperatures that could cause life-threatening conditions for this ectothermic species. Shelters such as caliche caves or overhangs might be utilized as well. Mojave desert tortoises often excavate burrows under vegetation (such as a creosote bush, ephedra spp., or bursage), which can extend to a depth of 33 feet. Desert tortoises typically use between 12 and 25 different burrows, dens, or pallets over the course of 1 year (Ernst and Lovich 2009). Home ranges of adults tend to be larger than those of juveniles, and male home ranges of an estimated 62 acres are typically twice the size of female home ranges, though individual and seasonal variation can be considerable (O'Conner et al. 1994).

The Mojave desert tortoise mating season typically begins in February or March when they emerge from hibernation, but can last into fall. Between one and seven eggs are laid in an excavated nest near a shrub or burrow entrance between May and July (Ernst and Lovich 2009). Hatching occurs 90 to 120 days later, depending on environmental conditions, especially temperature. Eggs and young are unattended by the parents. Hatchlings develop into females when the incubation (i.e., soil) temperature is greater than 89.3°F and males when the temperature is below that (Spotila et al. 1994). Egg hatch rates vary, but hatchling and juvenile mortalities are assumed to be very high, and it has been estimated that only one hatchling for every 15 to 20 nests will survive to reach sexual maturity. The average age of reproductive viability of females is primarily a function of individual size, but is usually between the ages of 12 and 25 years (USFWS 1994a). Females from the Mojave population produce from one to three clutches of eggs staggered throughout the reproductive season (Turner et al. 1986).

The desert tortoise is normally an obligate herbivore, subsisting largely on various annual and perennial forbs, grasses, cacti, and other non-woody plants (Ernst and Lovich 2009). A study of desert tortoise food habits in the Mojave Desert found that they will consume at least 43 plant species, including 37 annuals and 6 perennials. The diet showed a very strong preference for native plants (95 percent), and some of their preferred food plants were uncommon to rare (Jennings 1997). The most important food items seem to be desert annuals, plants that often have a life span of less than 30 days, and are generally available only from April to June. Preferred plants are often uncommon or rare in tortoise environments (Ernst and Lovich 2009; Jennings 1997). Tortoises are capable of eating large quantities of food when it is available; the contents of a tortoise's digestive tracts can constitute 11 to 21 percent of its total body bass (Ernst and Lovich 2009). Desert tortoises also ingest rocks, bones, and soil, possibly

to maintain intestinal bacteria; to provide additional minerals; or as gastroliths (small stones) to aid digestion (Ernst and Lovich 2009; Esque and Peters 1994).

Threats

The vast majority of threats to the desert tortoise or its habitat are associated with human land uses (USFWS 2011a). Large areas of tortoise habitat in the Mojave Desert have been negatively affected by urbanization, OHV use, overgrazing of domestic livestock, agriculture, construction of roads and utility corridors, military training activities, and litter that could be swallowed by or entangle individual tortoises. Raven predation on hatchling and juvenile tortoises has shifted the composition of the tortoise population to predominantly adults, which has adversely affect recruitment (Berry et al. 1986). Other threats include the proliferation of non-native plant species and higher frequency of anthropogenic fire which both negatively affect tortoises and their habitat (Ernst and Lovich 2009).

The most recent 5-year review in 2010 indicated that threats identified in the original listing rule continue to affect the species today, with invasive species, wildfire, and renewable energy development coming to the forefront as important factors in habitat loss and conversion. Overall, human-induced impacts that cause mortality and widespread habitat loss and fragmentation, such as urbanization, proliferation of roads and highways, OHV activity, grazing, and habitat invasion by non-native invasive species continue to threaten this species (USFWS 2010b).

Recovery

The desert tortoise requires 13 to 20 years to reach sexual maturity, has low reproductive rates during a long period of reproductive potential, and individuals experience relatively high mortality early in life. These factors make recovery of the species very difficult. Even moderate downward fluctuations in adult survival rates can result in rapid population declines. Thus, high survivorship of adult desert tortoises is critical to the species' persistence. Other factors important to desert tortoise recovery include maintaining the genetic variability of the species and sufficient ecological heterogeneity within and among populations to allow tortoises to adapt to changes in the environment over time. Because desert tortoises occupy large home ranges, the long-term persistence of extensive, intact habitat is essential for the survival of the species (USFWS 2011a).

In 2011, the USFWS issued a Final Revised Recovery Plan. Five RUs were established to provide for movement, dispersal, and gene flow; sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species; suitable substrates for burrowing, nesting, and overwintering; burrows, caliche caves, and other shelter sites; sufficient vegetation for shelter from temperature extremes and predators; and habitat protected from disturbance and human-caused mortality (USFWS 2011a). In addition, the 2011 Recovery Plan designated a recovery priority number of 12C and is predicated upon: 1) a moderate degree of threat, which, although increased since 1994, does not place the species at imminent risk of extinction; 2) a low potential for recovery, adjusted based on current uncertainties about various threats and ability to manage them; 3) listed population below the species level; and 4) potential conflict with development or other forms of economic activity (USFWS 2011a).

The goals of the 2011 Recovery Plan are recovery and delisting of the desert tortoise. A wide range of threats affect desert tortoise and their habitat; however, little is known about their demographic impacts on tortoise populations or the relative contributions each threat makes to tortoise mortality. Therefore, specific and meaningful threats based recovery criteria were not identified in the 2011 Recovery Plan. However, the USFWS has established three recovery objectives (USFWS 2011a) including:

1. Recovery Objective 1 (Demography): maintain self-sustaining populations of desert tortoises within each RU into the future.
    - Recovery Criterion 1: Rates of population change (λ) for desert tortoises are increasing (i.e., $\lambda > 1$) over at least 25 years (a single tortoise generation).

2. Recovery Objective 2 (Distribution): maintain well-distributed populations of desert tortoise throughout each RU.
    - Recovery Criterion 2**.** Distribution of desert tortoises throughout each tortoise conservation area is increasing over at least 25 years (i.e., ψ [occupancy] > 0).
3. Recovery Objective 3 (Habitat): ensure that habitat within each RU is protected and managed to support long-term viability of desert tortoise populations.
    - Recovery Criterion 3. The quantity of desert tortoise habitat within each desert tortoise conservation area is maintained with no net loss until tortoise population viability is ensured. When parameters relating habitat quality to tortoise populations are defined and a mechanism to track these parameters established, the condition of desert tortoise habitat also should be demonstrably improving.

If recovery actions are implemented promptly and are effective, including continued implementation of the current monitoring program which began in 2001, recovery criteria could be met by approximately 2025 (USFWS 2011a).

Assessment of Effects

Area of Analysis

The desert tortoise analysis area is defined as potential habitat (USGS modeled 0.6 – 1.0) and designated critical habitat within the action area, plus a 0.5-mile buffer centered on the ROW. The action area is defined in Section 2.2. These areas represent a total of 300,857 acres of desert tortoise habitat including 249,538 acres of potential habitat and 51,319 acres of desert tortoise critical habitat. These areas are depicted in **Figure 6-8**.

The transmission line corridor and engineered alignment cross USGS modeled habitat and USFWS designated critical habitat for desert tortoise in Clark and Lincoln counties, Nevada and in Washington County, Utah. The desert tortoise analysis area includes areas of high quality habitat that the USGS habitat model values 0.7 to 1.0. USGS habitat model ranks desert tortoise potential habitat on a scale from 0 to 1, where 1 indicates perfect model performance, 0.5 indicates the equivalent of a random guess, and less than 0.5 indicates performance worse than random (USGS 2011). The entire desert tortoise analysis area is located within the northeastern Mojave Desert RU (USFWS 2008a). Critical habitat units within this RU, and within the desert tortoise analysis area are: 1) Gold Butte-Pakoon Unit, Clark County, Nevada; 2) Beaver Dam Slope Unit, Lincoln, County, Nevada; 3) Beaver Dam Slope Unit, Washington County, Utah; and 4) Mormon Mesa Unit, Clark and Lincoln counties, Nevada (59 FR 5820).

Probabilistic desert tortoise surveys conducted in 2013 (AECOM 2014), 100 percent coverage surveys conducted for the Southern Nevada Intertie Project (2010), and existing data gathered from NNHP have confirmed the presence of desert tortoise along portions of the action area in southern Nevada. Survey data from AECOM (2014) was used to calculate a tortoise abundance estimate for the desert tortoise analysis area using the tortoise abundance formula described in the 2010 Pre-Project Field Survey Protocol for Potential Desert Tortoise Habitats (USFWS 2010b). Using the USFWS desert tortoise abundance and confidence interval equations, the mean number of desert tortoises within the survey area was estimated to be 60 individuals, with a 95 percent confidence interval and a range of 21:170 (AECOM 2014).

Conservation Measures

Impacts to the desert tortoise, its habitat, and critical habitat would be minimized through implementation of the following design features and conservation measures described in Chapter 3.0:

- Applicant-committed conservation measures and design features: TWE-29, TWE-31, TWE-32, TWE-33, and TWE-34.
- Conservation measure: **SSWS-15** and **SSWS-16**.

The following additional conservation measures are proposed to avoid or reduce effects of the Proposed Action on the desert tortoise:

- **SSWS-4**: To avoid and minimize impacts to the desert tortoise and its habitat, TransWest would coordinate with the BLM, Western, Boulder City, Clark County (Nevada), Bureau of Reclamation, and USFWS to implement appropriate conservation measures during construction, including but not limited to:

    1. Depending on the distance between concurrent construction activities in desert tortoise habitat, TransWest would provide at least one Field Contact Representative (FCR) to be responsible for overseeing compliance with protective measures for the desert tortoise. Where the distance between activities is over 100 miles, an additional FCR would be required. The FCR would be an authorized biologist approved by the BLM, applicable state wildlife agencies, such as the Nevada Department of Wildlife (NDOW) and the USFWS and would be present during all project activities within desert tortoise habitat. TransWest would ensure that FCR(s) and supporting authorized biologists and desert tortoise monitors would have authority to halt any activities that are in violation of the stipulations in the Biological Opinion (BO) for the project. The FCR would prepare and submit a daily report to the BLM and USFWS for all work activities within desert tortoise habitat.
    2. All TransWest employees and its contractors working in the field would be required to complete a desert tortoise education program prior to reporting in the field. The program would be approved by the BLM and USFWS and would cover such topics as desert tortoise distribution within the Project Area, general behavior and ecology, sensitivity to human activities, legal protection, penalties for violation (ESA), conservation and protection measures, reporting requirements, fire prevention, etc. All field workers would be instructed that activities must be confined to locations within the approved areas. The program would instruct participants to report all observations of desert tortoises and their sign during construction activities to the nearest tortoise monitor or authorized biologist who would, in turn, inform the FCR.
    3. An authorized desert tortoise biologist would possess at least a bachelor's degree in biology, ecology, wildlife science, herpetology, or closely related fields as determined by the BLM, NDOW, and USFWS. The authorized biologist must have demonstrated prior field experience using accepted resource agency techniques to survey for desert tortoises and tortoise sign. Authorized biologists would have special training in accepted techniques for moving desert tortoises, excavating tortoise burrows and relocating burrow contents including tortoises and eggs. As a guideline, USFWS approval of an authorized biologist requires that the applicant have at least 60 days project experience as a desert tortoise monitor. In addition, the biologist would have the ability to recognize and accurately record survey results and must be familiar with the terms and conditions of the BO that resulted from project-level consultation between BLM and the USFWS. All tortoise biologists would be familiar with the Desert Tortoise (Mojave Population) Field Manual (USFWS 2009).

        Desert tortoise monitors would possess at least a bachelor's degree in biology, ecology, wildlife science, herpetology, or closely related fields as determined by the BLM and USFWS and have prior field experience using accepted resource agency techniques to survey for desert tortoises and tortoise sign. Desert tortoise monitors would not be permitted to move tortoises or excavate tortoise burrows. All FCRs, other authorized biologists, and tortoise monitors would have the ability to recognize and accurately record biological information in the field.

4. TransWest would coordinate with the BLM and USFWS to ensure that an appropriate number of authorized biologists and tortoise monitors are onsite during construction to ensure the protection of desert tortoises. TransWest would submit the names of all authorized biologists and tortoise monitors to the BLM and USFWS for review and approval at least 30 days prior to initiation of any desert tortoise clearance surveys. Project activities would not begin until authorized biologists and tortoise monitors have been approved. Replacements of authorized biologists and tortoise monitors would require BLM and USFWS approval. Authorized biologists would be assigned to monitor each area of activity where conditions exist that may result in take of desert tortoise (for example, clearing, construction, grading, recontouring, and reclamation activities). The BLM and TransWest would ensure that a tortoise monitor or authorized biologist would be assigned to each piece/group of large equipment. All authorized biologists and tortoise monitors would be responsible for determining compliance with terms and conditions of the BO, the Project ROD, and other applicable agreements. With input from authorized biologists and tortoise monitors, the FCR(s) would maintain a detailed record of all desert tortoises encountered during project surveys and monitoring.

5. All construction vehicle movement outside of the ROW would to be restricted to pre designated access, contractor acquired access, or public roads. Any routes of travel that require construction or modification would have an authorized biologist or desert tortoise monitor survey the area for tortoises prior to modification or construction of the route. Off-road travel by vehicles and equipment would be prohibited.

6. To limit the potential for adverse impacts resulting from contact with construction equipment, vehicles, and personnel, TransWest would implement a Project area vehicle speed limit of 15 mph during the tortoise active season (temperatures >65ºF) and 20 mph during the tortoise inactive season (temperatures <65ºF).

7. Whenever a vehicle or construction equipment is parked longer than 2 minutes within desert tortoise habitat, whether the engine is engaged or not, the ground around and underneath the vehicle would be inspected for desert tortoises prior to moving the vehicle. If a desert tortoise is observed, the vehicle would not be moved and an authorized biologist would be contacted. If possible, the tortoise would be left to move on its own. If the tortoise does not move within 15 minutes, the tortoise would be removed and relocated by the authorized biologist in accordance with the tortoise handling procedures, as presented in the Desert Tortoise Field Manual (USFWS 2009), which should be included or incorporated by reference in the POD.

8. The area of construction activity will be pre-determined with removable flagging and confine all activities to these areas. All construction sites and access roads would be clearly marked or flagged at the outer limits prior to the onset of any surface-disturbing activity. All personnel would be informed that their activities must be confined within the marked or flagged areas. No permanent paint or other marking agents would be applied to vegetation or rocks.

9. All desert tortoise burrows and pallets that fall outside of, but within 50 feet of, the construction work area would be flagged for avoidance. Desert tortoise burrows would not be marked in a manner that facilitates poaching or provides a cue for predators. Avoidance flagging would be designed to be easily distinguished from access route or other flagging, and would be designed in consultation with experienced construction personnel and authorized biologists. All flagging would be removed immediately following construction activities.

10. Construction sites, staging areas, and access routes would be cleared by an authorized tortoise biologist before the start of construction. An authorized biologist(s) would survey the site for desert tortoises using survey techniques providing 100 percent coverage of the area proposed for disturbance. If construction occurs during the desert tortoise active season

(March 1 through October 31), or when temperatures and environmental conditions are conducive to tortoise activity as stated in the USFWS Desert Tortoise Handbook or determined by an authorized biologist, two surveys would occur to ensure all live tortoises have been cleared from the area of potential disturbance. The first survey would be conducted within 14 days prior to surface-disturbance; the second survey would occur immediately before surface disturbance. During the inactive season (November 1 through February 28, except as noted above) when conditions are not conducive to tortoise activity as determined by an authorized biologist, one survey would occur within 72 hours of surface disturbance or up to 5 days in advance of disturbance if conditions are not favorable for tortoise activity.

11. To limit the potential for adverse impacts resulting from contact with construction equipment, vehicles, and personnel, TransWest would ensure that all construction-related activities are monitored by an authorized biologist or desert tortoise monitor with the authority to stop construction activities upon the detection of a tortoise within the Project area. During the active season (March 1 – October 31), an authorized biologist or approved desert tortoise monitor would be onsite for the duration of construction activities in desert tortoise habitat. During the inactive season (November 1 through February 28, except when conditions are conducive to tortoise activity (i.e., when temperatures are above 65°F), authorized biologists or desert tortoise monitors would be onsite during all phases of transmission line construction to ensure that all construction vehicles and heavy equipment remain within the boundaries of the marked construction zone. If necessary, an authorized desert tortoise biologist would be brought on site to excavate any tortoise burrow that might be impacted.

12. Desert tortoises and eggs found within construction sites would be removed by authorized desert tortoise biologists in accordance with the most current protocols identified by BLM and USFWS. If any tortoise active nests are encountered, USFWS would be contacted immediately, prior to removal of any tortoises or eggs from those burrows, to determine the most appropriate course of action. Unoccupied burrows would be collapsed or blocked to prevent tortoise re-entry. All desert tortoises located in harm's way would be relocated to safe areas up to 1,000 feet from the point of capture. Desert tortoises that are found above-ground would be placed in the shade of a shrub and out of harm's way, following the most current protocol approved by BLM and USFWS. Relocated tortoises would not be placed in existing occupied burrows. If an existing burrow that is similar in size, shape, and orientation to the original burrow is unavailable, the authorized biologist would construct one. Desert tortoises moved during inactive periods would be monitored for at least two days after placement in the new burrows to ensure their safety. The authorized biologist would be allowed some judgment and discretion to ensure that survival of the desert tortoise is likely. Desert tortoises would not be placed on lands outside the administration of the federal government without the written permission of the landowner. Desert tortoises would be purposely moved only by authorized tortoise biologists and solely for the purpose of moving them out of harm's way.

13. Authorized desert tortoise biologists would follow procedures for handling tortoises in accordance with the most current protocols identified by BLM and USFWS. All tortoises would be handled using disposable surgical gloves. The gloves would be disposed of after handling each tortoise. Equipment or materials that contact desert tortoises would be sterilized, disposed of, or changed before contacting another tortoise. The authorized biologist would document each tortoise encounter/handling with the following information, at a minimum: a description of the situation; vegetation type; date of observation; weather conditions; condition and health; any apparent injuries and state of healing; if moved, the GPS location from which it was captured and the location in which it was released; map locations; whether the animal voided its bladder; and identifying markings (that is, identification numbers marked on lateral scutes or attached transmitters).

14. If desert tortoises need to be moved at a time of day when harmful ambient temperatures exist (i.e., less than 40°F or greater than 95°F or 35°C at 5 cm aboveground or 43°C at ground surface), they would be held overnight in a clean plastic box. These tortoises would be kept in the care of the authorized biologist under appropriate controlled temperatures and released the following day when temperatures are favorable. All cardboard boxes would be appropriately discarded after one use and never hold more than one tortoise.

15. Any excavated holes or trenches related to transmission line construction (e.g., tower foundations, ground electrode wells) left open overnight would be covered and/or tortoise-proof fencing would be installed to prevent the possibility of tortoises falling into the open holes. Any tortoise found in an excavated hole or trench would be promptly removed by an authorized desert tortoise biologist in accordance with USFWS-approved protocols or if the biologist is not allowed to enter the excavation for safety reasons, the alternative method for removal must have prior approval by USFWS. Tortoise escape ramps would be placed inside the excavation or trench so as to not entrap tortoises. All excavations would be inspected for tortoises before filling.

16. Any construction pipe, culvert, or similar structure with a diameter greater than 3 inches left above ground on the construction site for one or more nights would be inspected for tortoises before the material is moved, buried, or capped. As an alternative, all structures may be capped before being stored on the construction site.

17. Permanent tortoise-proof fencing would be installed around the perimeters of the Southern Terminal and approved ground electrode site to prevent tortoises from wandering onto the Project site where they would be in harm's way. Any gates or gaps in the fence would be constructed and operated so as to prevent tortoise entry (e.g., "tortoise guards and/or keeping gates closed). Tortoise fencing would be inspected on a daily basis during ground disturbing activities to ensure that there are no breaches in the fencing material. Fence specifications would be consistent with those approved by the USFWS (USFWS 2009). Permanent tortoise-proof fencing along the project area would be appropriately constructed, monitored, and maintained. Fencing would be inspected in accordance with Table SSWS-4.1 unless modified by the USFWS. Monitoring and maintenance would be conducted by TransWest staff or contractors and would include removal of trash and sediment accumulation and restoration of zero ground clearance between the ground and the bottom of the fence, including re-covering the bent portion of the fence if not buried. Maintenance activities would occur regularly for the life of the project and would be carried out concurrently and in conjunction with fence inspections. Fence monitoring and maintenance activities would be documented as they occur and this documentation would be provided to the BLM on a quarterly basis.

18. Water applied for dust control would not be allowed to pool outside of desert tortoise fenced areas, as this can attract desert tortoises. Leaks from water trucks or water tanks would be promptly repaired to prevent pooling water. During the desert tortoise active season, an authorized biologist or desert tortoise monitor would be assigned to patrol each area being watered. This individual would patrol the area immediately after the water is applied and at approximate 60-minute intervals until the ground is no longer wet enough to attract tortoises. No dust palliatives (e.g., calcium or magnesium chlorides, dust oils, plant or animal extracts, enzymes, synthetic polymers, etc.) other than water are approved for use in desert tortoise habitat.

19. In construction areas where re-contouring is not required, vegetation would be left in place wherever possible and original contours would be maintained to avoid excessive root damage and allow for re-sprouting.

20. If blasting is necessary, a 200-foot radius area around the blasting site would be surveyed and all desert tortoises located aboveground within this 200-foot radius of the blasting site would be moved 500 feet from the blasting site, placed in an unoccupied burrow, and

temporarily penned to prevent tortoises that have been temporarily relocated from returning to the site. Tortoises in burrows would be left in their burrows. All burrows, regardless of occupied status, would be stuffed with newspapers, flagged, and location recorded using a GPS unit. Immediately after blasting, newspaper and flagging would be removed. If a burrow or cover site that could be occupied has collapsed, it would be excavated to ensure that no tortoises have been buried and are in danger of suffocation.

21. Constructed road berms would be less than 12 inches in height and have slopes of less than 30 degrees. Where road berms consist primarily of rocks, gaps would be opened to allow for tortoise passage.

22. To prevent mortality, injury, and harassment of desert tortoises and damage to their burrows and cover sites, no pets would be permitted in any Project construction area.

23. To limit the potential for predation of desert tortoise by corvids and raptors, TransWest would construct self-supporting tubular/monopole towers with perch discouragers throughout USFWS-designated critical habitat and in all tortoise habitat (USGS model rating of 0.6 or higher) where the Project is not co-located with existing transmission lines with steel lattice towers. Islands of non-habitat (USGS model rating of <0.6) within surrounding tortoise habitat (USGS model rating of 0.6 or higher) also will be subject to self-supporting tubular/monopole towers with perch discouragers.

24. To limit the potential for predation of desert tortoise by corvids, TransWest would prepare a Raven Management Plan (in accordance with BLM Southern Nevada District requirements) that outlines active adaptive management strategies for controlling raven predation and nesting within the Project ROW, including post-construction monitoring for ravens and removal of raven nests, consistent with the restrictions implemented by the Migratory Bird Treaty Act. If evidence of raven nesting is observed in the ROW, the USFWS would be notified within three calendar days.

25. To limit the potential for predation of desert tortoise by corvids, coyotes, feral dogs, and other opportunistic predators, TransWest would require all construction waste to be contained and removed from the Project area in a manner that does not attract corvids to the Project area. All trash and food items would be placed in raven-proof containers and removed daily.

26. The use of herbicides within USFWS-designated critical habitat, ACECs, and general desert tortoise habitat (USGS model rating of 0.6 or higher) would be prohibited without prior approval from the USFWS, BLM, and applicable state wildlife agency.

27. TransWest would coordinate with the BLM to ensure that appropriate measures are implemented to minimize public access and use of the transmission line ROW following completion of the project. Such measures may include signs and substantial physical barriers, and rehabilitation actions that would make the ROW impassible to vehicles.

28. To compensate for desert tortoise habitat affected during construction, TransWest would offset these effects through either an acceptable land acquisition or an assessed financial contribution, based on the final construction footprint. The BLM requires Section 7 desert tortoise mitigation fees for all acres of new disturbance (permanent and temporary). As of March 1, 2015, the current rate is $834 per acre for tortoise habitat and is subject to a multiplier ranging from 1 to 6. The multiplier(s) used for TWE would be determined by USFWS based on habitat quality, timing and duration of impacts, existing and adjacent levels of disturbance, and other factors. This rate will increase on March 1, 2015.

29. Upon completion of construction, a thorough inspection of the site would be conducted by the FCR(s) and authorized biologists to determine the extent of compliance with the conditions of USFWS's BO, including agreements between TransWest and the agencies. Annual and comprehensive final project reports would be submitted to BLM and the USFWS's Southern Nevada Fish and Wildlife Office in Las Vegas. Project reports would

document the numbers and locations of desert tortoises encountered, all instances of tortoise take resulting from harassment, harm, injury, or mortality, their disposition, effectiveness of protective measures, practicality of protective measures, recommendations for future measures that allow for better protection or more workable implementation, and the number of acres disturbed. Annual reports would cover the calendar year and are due April 1 of the following year (e.g., the annual report for calendar year 2014 is due April 1, 2015). Final project reports are due within 60 days following completion of the project or each phase of the project.

30. All vehicles and equipment that are not in areas enclosed by desert tortoise exclusion fencing would stop activities in desert tortoise habitat during rainfall events in the more-active season (generally March 1 to October 31), and if temperatures are above 60°F but below 95°F for more than 7 consecutive days. The FCR or designee would determine, in coordination with the BLM and USFWS, when it is appropriate for project activities to continue.

31. Any deaths and injuries of desert tortoises would be investigated as thoroughly as possible to determine the cause. The wildlife staff of the USFWS Las Vegas FO (702-515-5230), BLM Las Vegas FO (702-515-5000), BLM Caliente FO (775-726-8100) and Nevada Department of Wildlife Las Vegas Office (702-486-5127) must be verbally informed of desert tortoise injuries or death immediately and within 5 business days in writing (electronic mail is sufficient). The FCR or other authorized desert tortoise biologist would complete a Desert Tortoise Handling and Take Report.

TranWest would undertake the following measures to minimize potential project effects on desert tortoises during operation and maintenance activities:

32. TransWest would submit a list of planned maintenance activities by name, category, location, and approximate start date to the BLM Las Vegas and Caliente FOs. TransWest also would forward the list of activities to the USFWS and state agencies. The agencies would have 30 days following receipt of the report to consider the proposed action. In the event of a rejection, TransWest would work with the agencies to resolve issues. Agency approval of the proposed list of projects is valid for one year after agency acceptance.

33. The following measures would apply to normal maintenance activities that do not result in new disturbance.

    a. All TransWest employees and its contractors involved with transmission line ROW inspection and maintenance activities would be required to take a tortoise education program described previously (Measure 2).

    b. If desert tortoises or their burrows occur in the work area, TransWest would implement appropriate measures described previously.

    c. Upon completion of each maintenance activity in the ROW, all used material and equipment would be removed from the site. This condition does not apply to fenced sites.

    d. Routine road surface maintenance activities on existing access and/or patrol roads would be conducted during the inactive season of the desert tortoise, unless accompanied by an authorized biologist. Localized repair of major damage may take place throughout the year.

34. All mitigation measures stipulated for construction activities during the construction phase for the desert tortoise inactive season would be applicable to operation and maintenance activities that result in surface disturbance during the inactive season.

35. All mitigation measures stipulated for construction activities during the construction phase for the desert tortoise active season would be applicable to operation and maintenance activities that result in surface disturbance during the active season.

36. All maintenance activities in critical tortoise habitat that use heavy equipment (whether there is surface disturbance or not) would require an authorized desert tortoise biologist to be on-site during the active season and on-call during the inactive season.

37. The following measures would apply to maintenance activities that may extend outside the transmission line ROW corridors.

    a. In addition to measures (b) and (c), TransWest would implement appropriate measures for operations and maintenance activities described for construction-phase activities (Measures 1-31, above);

    b. For maintenance activities that result in surface disturbance during the active season of the desert tortoise: the width of the activity corridor would be determined prior to the onset of ground-disturbing activities. Work areas would be restricted to the narrowest possible corridors and generally would not be expected to extend beyond the Project ROW; and

    c. TransWest would contact the BLM if activities may extend outside of the transmission line ROW in all or in part; re-initiation of section 7 consultation may be required for activities that extend beyond the ROW.

38. Emergency Repairs: for emergency situations, TransWest would notify the local BLM and USFWS offices within 48 hours. As a part of this emergency response, the BLM and USFWS may require specific measures to protect desert tortoises. During cleanup and repair, the agencies also may require measures to recover damaged habitats.

Effectiveness: All mitigation measures proposed to reduce impacts from the Project upon the desert tortoise have been developed in coordination with the USFWS, BLM Utah, BLM Nevada, UDWR, NDOW and other stakeholders. While the majority of specific measures listed under SSWS-4 are commonly accepted practices intended to avoid and minimize the potential for direct impacts to tortoises proven to be effective when applied to proposed projects within desert tortoise habitat, effectiveness determinations of certain practices and transmission structure types intended to avoid and minimize adverse indirect impacts to desert tortoise populations remain unclear.

Depredation of juvenile tortoise and nests has been attributed to multiple species, including common ravens. Common raven abundance has been documented to increase in response to newly constructed transmission lines (Coates et al. 2014; Howe et al. 2014). Recent research has documented increased raven abundance along transmission lines constructed of self-supporting tubular structures (Gibson et al. 2013) and other studies have been unable to identify significant differences in raven abundance between common transmission structure types (Steenhof et al. 1993). There are mixed conclusions in the scientific literature regarding reducing the occurrence of raven and raptor nests through the use of monopole structures. However, the BLM anticipates that transmission structures of solid construction are harder for large avian predators to nest on in comparison to the lattice structures, as suggested in Boarman (2003) and supported by empirical data in Dixon et al. (2013).

Perch deterrents were initially designed to reduce electrocution risks by discouraging birds from perching on smaller distribution power poles and transmission towers in locations were the separation distance between charged and grounded components was less than the average wingspan of common avian species and are not intended to remove all perching opportunities along a transmission line (APLIC 2006). Research into the use of perch deterrents has shown that the effectiveness of specific deterrents is limited and can vary by deterrent type and transmission structure configuration. Lammers and Collopy (2007) concluded that the use of perch deterrents were ineffective in completely eliminating perching by avian predators within occupied greater sage-grouse habitat in Nevada, but were shown to result in reduced perching duration by predators upon transmission structures. The effectiveness of perch deterrents can

vary by design and transmission structure type, but has been shown in significance tests to reduce perch frequency, duration, and prey captures (Dwyer and Doloughan 2014; Lammers and Collopy 2007; Oles 2007 [not peer reviewed]; Slater and Smith 2010,).

Although current scientific literature does not provide direct support of the effectiveness of these measures, the BLM's requirement to install self-supporting tubular structures and perch deterrents within designated critical habitat and in suitable desert tortoise habitat (USGS model rating of 6.0 or greater) where the Proposed Action would not be co-located with existing steel-lattice tower transmission lines is supported by unpublished data collected from monitoring of other recent transmission line projects in Nevada that have installed these design features to reduce perching opportunities and avian predation.

Direct and Indirect Effects

Potential impacts to the desert tortoise would result from incremental increases in habitat fragmentation caused by vegetation removal and other surface-disturbing activities associated with transmission line construction and operation. Direct impacts to desert tortoise habitat would occur as a result of the construction and operation disturbance of 2,023 acres (0.8 percent) and 603 acres (0.2 percent), respectively, of potentially suitable habitat within the analysis area. Approximately 377 acres (0.7 percent) and 117 acres (0.2 percent) of impact would occur to USFWS-designated desert tortoise critical habitat as a result of construction and operation activities, respectively. Approximately 112 miles of the Proposed Action is located in known or potential tortoise habitat (USGS model rating ≥ 0.6) within the North-East Mojave Recovery Unit.

Suitable habitat adjacent to disturbed areas would continue to be available for use by this species. However, displacement would increase competition and could result in some local reductions in desert tortoise populations if adjacent habitats are at carrying capacity. Potential impacts also could include burrow abandonment or loss of eggs or young.

Other direct impacts could occur as a result of mortality caused by construction equipment and support vehicles crushing individuals and destroying burrows, increased illegal collection of desert tortoises by construction workers or the public, and entrapment of tortoises in excavations. Long-term increases in vehicle traffic and human activity associated with operations also could have adverse effects on the desert tortoise. These impacts would be avoided or minimized by implementation of conservation measure **SSWS-4**, described above.

Operation-related impacts to desert tortoises would include increased human presence and noise during maintenance activities, which also could result in displacement. Implementation of the design features, general conservation measures, and the species-specific conservation measure **SSWS-4** would eliminate or minimize potential for desert tortoise mortality resulting from crushing by Project vehicles and equipment, entrapment in Project excavations, tortoise handling by untrained construction workers or the public, and removal of tortoises by construction workers or the public for pets.

Implementation of SSWS-4 also would minimize the potential for increased perching by a variety of raptor species and ravens, which may depredate juvenile desert tortoises. This measure also would minimize the potential for trash and food scraps to be left on site during construction and maintenance activities. Trash left on site can attract ravens and lead to detrimental effects to juvenile tortoise that are susceptible to predation due to their soft shells. Conservation measures also would minimize the potential for invasion of the action area by nonnative grasses and the potential for increased fire frequency, which also can adversely affect desert tortoises.

Cumulative Effects

No reasonably foreseeable non-federal actions have been identified within the vicinity of the desert tortoise analysis area.

Monitoring

There is short-term monitoring required in the Raven Management Plan for raven nests along transmission lines for the first 3 years during the breeding season that would require annual reporting. Long-term monitoring would include surveying for raven nests along the transmission line once per year during a maintenance flight.

Determination

Effect on the Species: Construction and operation of the Proposed Action *may affect, and is likely to adversely affect* the Mojave desert tortoise. Construction and operation activities could result in direct mortality to individuals, increased predation on the species, and reduction in habitat quality.

Effect on Critical Habitat: Construction, operation, and maintenance of the Proposed Action *may affect, and is likely to adversely affect* critical habitat for the Mojave desert tortoise.

*Rationale: Desert tortoises are known to occupy habitat within the Project action area in Lincoln and Clark counties, Nevada. Although implementation of the design features and conservation measures listed above and described in Chapter 3.0 and the species-specific measures under **SSWS-4** described above would minimize Project-related impacts to this species, it is unlikely that all impacts to desert tortoise would be avoided. To the extent that construction and operation activities could result in a reduction of habitat quality and direct or indirect mortality of individuals, the Project would have some adverse effect on this species. The Proposed Action would cross approximately 26 miles of designated critical habitat for the Mojave desert tortoise in the Mormon Mesa Critical Habitat Unit. Consequently, construction and operation activities would have unavoidable direct and indirect effects on desert tortoise critical habitat.*

6.1.4 Fish

6.1.4.1 Bonytail (Endangered)

Environmental Baseline

Conservation Status

Bonytail was listed as endangered under the ESA on April 23, 1980 (45 FR 27710). In 1994, the USFWS designated seven reaches of the Colorado River system as critical habitat for this species (59 FR 13374). A recovery plan was published for bonytail in 2002 (USFWS 2002b).

Currently, no self-sustaining populations are known to exist in the wild, with very few individuals being reported throughout the Colorado River Basin (USFWS 2002b). Wild adult bonytail have been captured in Lake Powell, Mohave Lake, and Lake Havasu and tributaries of the Colorado River. The most recent bonytail captures in the Upper Colorado River Basin (lower Yampa River and lower Green River below the Yampa River) occurred in the 1960s and 1970s shortly after the closure of the Flaming Gorge Dam. A few single captures were reported in the 1980s since that time. The recent trend for bonytail is unknown because of the few bonytail captures in the past 25 years. The wild population is considered to be in decline (NatureServe 2013a).

Life History and Habitat Association

Currently, no self-sustaining bonytail populations exist in the wild and very few individuals have been captured throughout the Colorado River system (USFWS 2002b). Bonytail have been collected in the Yampa River in Dinosaur National Monument, the Green River in Gray and Desolation canyons, the

Colorado River near Black Rocks and Cataract Canyon, Lake Mohave near the Arizona-Nevada border, and Lake Havasu in Arizona and California (USFWS 2002b).

The general types of habitat used by bonytail consist of mainstem riverine areas and impoundments in the Colorado system. Deep pools and eddies with slow to fast currents are characteristic of the riverine habitat (Kaeding et al. 1986). Based on five specimens captured in the Upper Colorado Basin, four were captured in deep, swift, rocky canyon areas (i.e., Yampa Canyon, Black Rocks, Cataract Canyon, and Coal Creek Rapid) (USFWS 2002b). The fifth specimen was collected in Lake Powell. All fish collected in the Lower Colorado Basin since 1974 were in reservoir habitats. Habitats required for conservation of the species include river channels and flooded, ponded, or inundated riverine areas, especially where competition from non-native fishes is absent or reduced (59 FR 13374-13400).

It is assumed that spawning occurs in June or July, based on fish being observed in reproductive condition at 18ºC (USFWS 2002b). The highest survival rate for hatchery-reared bonytail was 20ºC to 21ºC. Spawning has been observed in reservoirs over rocky shoals and shoreline areas (USFWS 2002b). Flooded bottomland habitats are considered important growth and conditioning areas, particularly as nursery areas for young. This species is a broadcast spawner that scatters adhesive eggs over gravel substrate at depths up to 30 feet. Newly hatched larvae and young bonytail develop in flooded bottomlands.

Seven reaches in the Colorado River system are designated as critical habitat for bonytail, including portions of the Colorado, Green, and Yampa rivers in the Upper Basin and the Colorado River in the Lower Basin (59 FR 13374-13400). In total, critical habitat for bonytail is 312 river miles. Critical habitat consists of the 100-year floodplain in the seven reaches where constituent elements including water, physical habitat, and biological requirements are present.

Threats

Threats to bonytail are considered to be a combination of the following factors: direct loss of habitat, changes in temperature and flow, blockage of migration routes from the construction of large reservoirs, competition with and predation by nonnative fish species, hybridization, and water quality contamination (USFWS 2002b). A summary of these threats is provided below.

- Direct Loss of Habitat – Population declines were reported in the Colorado River system following a period of dam construction throughout the Colorado River Basin.
- Temperature and Flow Changes – Coldwater releases downstream of dams have created temperature regimes outside of the thermal preferences of bonytail and eliminated turbid conditions that historically provided cover from predators (USFWS 2012d). Fish passage structures were constructed at the Redlands Water and Power Diversion Dam (Gunnison River) and the Grand Valley Irrigation Company Diversion Dam (Colorado River), and modified at the Price-Stubb Dam and Government Highline Dam in the Upper Colorado River to allow adequate movement of bonytail. Flows also have been reduced as a result of dam operation and the continual withdrawal of water within the Colorado River Basin. Flow recommendations have been developed throughout the Green River and the Upper Colorado subbasins to assist in managing habitat for the bonytail and other endangered fishes.
- Fish Movement Blockage – Seven barriers have been identified in the Upper Colorado River Basin upstream of Glen Canyon Dam within occupied bonytail habitat (USFWS 2012d).
- Competition and Predation from Nonnative Fishes – The introduction and development of nonnative fish species in the Upper and Lower Colorado system has resulted in negative interactions to bonytail (USFWS 2002b). Predator species that have been targeted for control programs for bonytail include bluegill, green sunfish, redear sunfish, channel catfish, and northern pike (USFWS 2012d). Procedures have been developed that evaluate and revise stocking of nonnative fish species in the Upper Colorado Basin, with the purpose of minimizing

negative interactions between nonnative fishes and bonytail. Control programs involving the removal of sunfishes, channel catfish, and northern pike in bonytail habitat in the Upper Colorado River Basin have been implemented to reduce predation effects.

- Hybridization – There is evidence that hybridization has occurred in *Gila* species in the Colorado River system. The current levels of hybridization are not considered to be significant by themselves (USFWS 2002b). The only population where hybridization is suspected is in Cataract Canyon. However, the incidence and potential effects of hybridization on bonytail will be monitored as fish are released into the wild.
- Contaminants – Potential contaminants involving petroleum products, radionuclides, selenium, pesticides, and heavy metals such as mercury are considered risks to bonytail. Actions that have been proposed to reduce risks of contaminants include the review and evaluation of hazardous material spills and federal and state response plans and the requirement for emergency shut-off valves at new pipeline crossings (USFWS 2012d). The second action is now required as part of Section 7 consultations.

Recovery

A recovery plan was published for bonytail in 2002 (USFWS 2002b). The upper basin subunit is composed of the Green River and Upper Colorado Basin and the lower basin unit includes the mainstem and tributaries of the Colorado River from Lake Mead downstream to the southerly International Boundary with Mexico. The most recent recovery review in 2012 indicated that bonytail has not yet achieved demographic recovery goals that are indicative of a healthy, viable, and sustainable population level (USFWS 2012d). The review also concluded that the most meaningful threats to bonytail include habitat availability, protection from predation, and degraded water quality. The recovery review indicated a recovery priority of 5C. The numerical part of the priority rating means that there is a moderate degree of threat and a low degree of recovery potential at the species level taxonomically (USFWS 2012d). The "C" identifies the potential for conflicts between recovery actions and economic activities.

Bonytail will be considered eligible for downlisting from "endangered" to "threatened" and removal from ESA protection when all of the following conditions are met:

- Self-sustaining fish populations reach the required numbers in the areas of the Green and Upper Colorado river subbasins and the Lower Colorado River Basin, and a genetic refuge is established in the Lower Basin;
- Essential habitats, including required instream flows, are legally protected; and
- Other identifiable threats that could significantly affect the population are removed.

The criteria for downlisting and delisting are listed in **Table 6-3**.

Table 6-3 Criteria for Bonytail Downlisting and Delisting

Downlisting	Delisting
Over a 5-year period: • Maintain reestablished populations in the Green and Upper Colorado River subbasins, each with >4,400 adults • Maintain established genetic refuge[1] of adults in the Lower Colorado Basin • Maintain two reestablished populations in the Lower Colorado Basin, each >4,400 adults	For 3 years after downlisting: • Maintain reestablished populations in the Green and Upper Colorado River subbasins, each with >4,400 adults • Maintain established genetic refuge of adults in the Lower Colorado Basin • Maintain two reestablished populations in the Lower Colorado Basin, each >4,400 adults

[1] Genetic refuge is a group of fish that, as a whole, represent a substantial portion of the genetic variability of the species (USFWS 2013d).

The *Recovery Implementation Program for Endangered Fish Species in the Upper Colorado Basin (Recovery Program)* was established in 1994 to assist in recovery for bonytail and three other listed species in the Upper Colorado River Basin. Funding from the Recovery Program Actions that are being taken to recover the bonytail with a focus on the following actions:

- Managing water to provide adequate instream flows and habitat;
- Constructing fish passages and screens at major diversion dams to provide endangered fish access to their critical habitat;
- Restoring floodplain habitat;
- Monitoring fish population numbers; and
- Managing nonnative fishes (USFWS 2013d).

In addition to these actions, the Recovery Program works to reestablish naturally self-sustaining populations of bonytail through propagation and stocking (USFWS 2013d). The Recovery Program maximizes the genetic diversity of broodstock used to produce fish in hatcheries, which increases the likelihood that stocked fish will survive and reproduce in the wild. Bonytail are raised at two hatchery facilities, the J.W. Mumma Native Aquatic Species Restoration Facility in Alamosa, Colorado, and the Wahweep Fish Hatchery in Big Water, Utah. All bonytail for these hatcheries come from the USFWS's Dexter National Fish Hatchery and Technology Center in Dexter, New Mexico, which maintains the broodstock. Bonytail raised at these facilities are stocked in the Green and upper Colorado rivers in Colorado and Utah. Stocked fish have been recaptured in several locations within both river systems. Stocking efforts have expanded into floodplain wetlands to enhance bonytail growth and survival.

Assessment of Effects

Area of Analysis

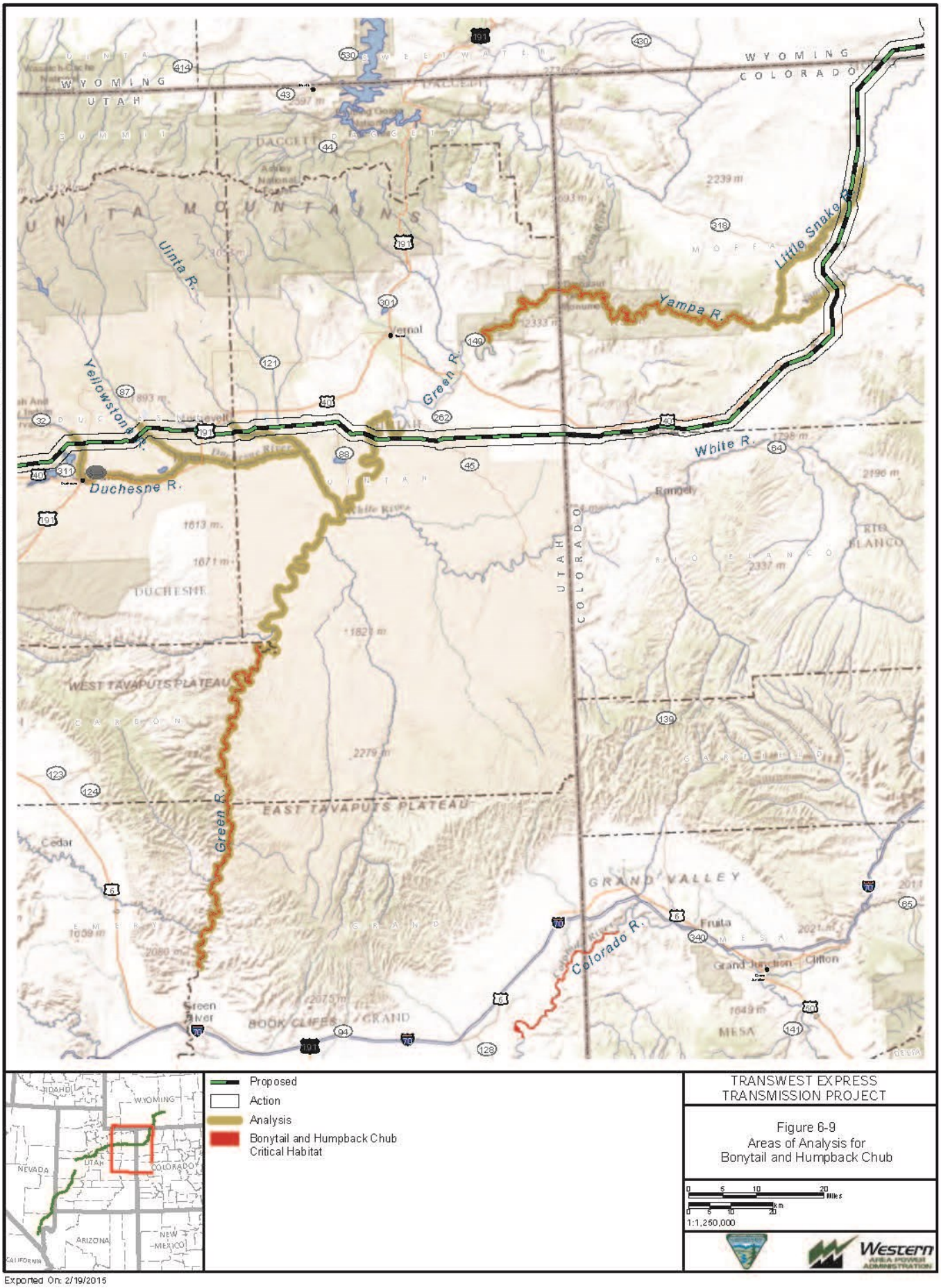
The analysis area for bonytail would include occupied and critical habitat located downstream of the potential points of water diversion to Lake Powell. The closest known critical habitat is located in the Yampa River and the Green River (Desolation and Gray canyons), which are approximately 19 and 22 miles, respectively, from the refined transmission corridor (**Figure 6-9**). The analysis area would exclude the refined transmission corridors and the potential disturbance area beyond the corridors, since there is no occupied or critical habitat that is crossed by the refined transmission corridor and the engineered alignment.

Conservation Measures

No additional protection measures are proposed for bonytail chub.

Direct and Indirect Effects

There would be no effects on bonytail chub or its critical habitat other than potential water depletions, since the closest occupied and critical habitat for this species are located approximately 19 and 22 miles downstream of the refined transmission corridors. There would be no alteration or loss of critical habitat for bonytail. In addition, any ground disturbance from construction or operation activities would not result in sediment or potential fuel spill effects on this species due to the considerable distance downstream to occupied or critical habitat.


WYOMING
COLORADO
UTAH
UINTA MOUNTAINS
Uinta R.
Yellowstone R.
Duchesne R.
Green R.
Yampa R.
Little Snake R.
White R.
Colorado R.
Vernal
Rangely
Fruita
Grand Junction
Clifton
Green River
DUCHESNE
WEST TAVAPUTS PLATEAU
EAST TAVAPUTS PLATEAU
BOOK CLIFFS
GRAND VALLEY
MESA
RIO BLANCO
Proposed
Action
Analysis
Bonytail and Humpback Chub Critical Habitat
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 6-9
Areas of Analysis for
Bonytail and Humpback Chub
1:1,250,000
Western AREA POWER ADMINISTRATION
Exported On: 2/19/2015

There could be potential water depletions in the Upper Colorado Basin from construction water use for dust control and concrete preparation. Water use for this project would be obtained from municipal sources, commercial sources, or a temporary water use agreement with landowners holding existing water rights. Since specific water sources have not been identified at this time, the USFWS cannot determine if the water sources have been through Section 7 consultation. Therefore, the USFWS assumes that all of the construction water use would be new depletions. This action would represent a consumptive water use from the Upper Colorado Basin of 109 acre-feet for Region I and 110 acre-feet for Region II during a 3-year time frame when water would be used for construction purposes. The total estimated depletion for the Upper Colorado River Basin would be 219 acre-feet. This volume represents an average annual depletion of 73 acre-feet per year for the 3-year construction period. New depletions represent an adverse effect on endangered fish species in the Upper Colorado River.

An Applicant committed design feature, TWE-2, ensures that applicable environmental regulations would be followed including requirements for federally listed species under the ESA and Section 7 consultation (Chapter 3.0).

As part of flow requirements for the four endangered fish species in the Upper Colorado River Basin (Colorado pikeminnow, humpback chub, bonytail, and razorback sucker), water use for projects must comply with the *Recovery Implementation Program for Endangered Fish Species in the Upper Colorado Basin* (Recovery Plan) (USFWS 2013d). To ensure the survival and recovery of the four endangered fish species in the Upper Colorado River, water users with depletions are required to make a one-time payment to the Recovery Plan. In 1995, an intra-USFWS Opinion determined that the fee for depletions of less than 100 acre-feet (annual average) would no longer be required. The depletion fee is established each fiscal year after it has been determined that the Recovery Program is making sufficient progress toward recovery of the endangered fish species regarding ESA compliance for water withdrawals. In 2015, the fee for Colorado River Basin depletions is $20.54 per acre-foot.

The Recovery Plan would be effective in minimizing effects of potential water depletions on bonytail habitat. However, if new water sources are used that have connections to surface flows in the Upper Colorado River Basin and they have not been previously consulted on by the USFWS, there could be a small effect on bonytail habitat. It is not possible to quantify the net effect other than relative terms, since specific water sources have not been identified at this time.

Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the Project action area. However, it is reasonable to expect that future water depletions could occur in the Upper Colorado River as a result of non-federal actions such as agricultural or land development. The Recovery Plan was established to mitigate the effects of water depletions on federally endangered fish species in the Upper Colorado River Basin.

Determination

Effect on the Species: The Proposed Action *may affect, and is likely to adversely affect* the bonytail as a result of potential water depletions. Construction and operation activities would not directly affect bonytail, since there is no occupied habitat at the corridor crossings.

Effect on Critical Habitat: The Proposed Action *may affect, and is likely to adversely affect* designated critical habitat as a result of potential water depletions. Construction and operation activities would not directly affect bonytail, since there is no critical habitat within the corridor crossings.

Rationale: Any water depletions in the Upper Colorado River Basin may affect occupied and critical habitat for the four federally endangered fish species. However, the Recovery Program would provide funds to assist in reducing the effects of flow reductions on the four federally endangered fish species in the Upper Colorado River Basin. The magnitude of the water depletion would depend on the selected

water sources and whether they are connected to surface flows in the Upper Colorado River Basin and if they have been consulted on previously by the USFWS. Specific water sources will be determined at a later phase of the Project.

6.1.4.2 Colorado Pikeminnow (Endangered)

Environmental Baseline

Conservation Status

Colorado pikeminnow (originally named as Colorado squawfish) was listed as endangered on March 11, 1967 (32 FR 4001). With the passage of the ESA in 1973, this fish species retained its endangered status. On March 21, 1994, the USFWS designated six reaches of the Colorado River system as critical habitat for the species (59 FR 13374). In addition, two reintroduced Colorado pikeminnow populations have been designated as EXP/NE in the Verde and Salt rivers in Arizona under 10(j) of the ESA (50 FR 30188). A recovery plan was published for Colorado pikeminnow in 2002 (USFWS 2002c).

Abundance of Colorado pikeminnow varies in the three occupied subbasins of the Upper Colorado River Basin. Based on abundance information provided in the recovery goals document (USFWS 2002b), estimates for the three subbasins were 6,000 to 8,000 in the Green River, 600 to 900 in the Colorado River, and 19 to 50 in the San Juan River. The wild population in the San Juan River subbasin, which is isolated from the remainder of the upper Colorado River Basin by Lake Powell, is relatively small (Bestgen et al. 2010). Approximately 983 Colorado pikeminnow have been stocked in the San Juan River from 2004 through 2008. Recent estimates of Colorado pikeminnow in the Colorado River indicated an upward trend, with adult abundance in the 1992 to 2005 period increasing from about 200 to nearly 890 adult fish (Osmundson and White 2009; USFWS 2011b). In years when surveys were conducted, the population estimate was above 700 in 1993, 2000, and 2005.

Recent population modeling estimated a 50 percent increase in the abundance of the entire Green River population and a 70 percent increase compared to the 2003 population estimate (USFWS 2011b). The USFWS considers the Green River population to be self-sustaining. Since 2007 the population estimate has exceeded to minimum viable population level.

Life History and Habitat Association

The entire population of the Colorado pikeminnow has been reduced to three recovery subunits in the Upper Colorado River Basin: the Green River, the Upper Colorado River, and the San Juan River subbasins. Colorado pikeminnow occurs in the following rivers systems associated with these three subbasins: Green River subbasin (Green, Yampa, Little Snake, White, Price, and Duchesne), Upper Colorado subbasin (Upper Colorado River, Gunnison, and Dolores), and San Juan subbasin (San Juan River).

Habitat requirements of Colorado pikeminnow vary depending on the life stage and time of year. Young-of-the-year (YOY) and juveniles prefer shallow backwaters, while adults use pools, eddies, and deep runs that are maintained by high spring flows (USFWS 2002c). Habitat that was the focus of sampling efforts for Colorado pikeminnow in the Green River during low flow periods included small eddies and pools in nearshore areas and near sand and gravel bars in mid-channel areas (Bestgen et al. 2010). During peak runoff in the spring and early summer, fish usually move into backwater areas of flooded riparian zones to avoid swift velocities, feed, and prepare for the upcoming spawning period. Survey efforts for Colorado pikeminnow in the Green River during high flow periods consisted of nearshore areas, flooded tributary mouths, canyon washes, and large backwater areas (Bestgen et al. 2010). Adults are highly mobile during the spawning period, which occurs after peak runoff in mid-June to mid-August. Movements have been documented up to 400 miles and involved multiple rivers within the Upper Colorado River Basin (e.g., Green and Colorado rivers) (Osmundson and White 2009).

Six reaches have been designated as critical habitat for Colorado pikeminnow in the Colorado River system, including portions of the Colorado, Green, Yampa, White, and San Juan rivers in the Upper Basin and the Colorado River in the Lower Basin, with an overall total of 1,148 river miles (59 FR 13374-13400). Critical habitat consists of the 100-year floodplain in the 6 reaches listed above where constituent elements including water, physical habitat, and biological requirements are present.

Colorado pikeminnow is a warmwater species that requires relatively warm water (18º to 24ºC) for spawning, egg incubation, and survival of young (USFWS 2002c). This species is a broadcast spawner that scatters adhesive eggs over cobble substrate where incubation occurs in interstitial spaces. Newly hatched larvae develop in approximately 3 to 15 days and then drift as late-stage larvae at distances from 50 to 120 miles to nursery areas in backwaters. Subadult Colorado pikeminnow (age 4 and older) tend to move back upstream as they mature. Subadults and adults overwinter in backwater areas. Adult Colorado pikeminnow remain in their home ranges during the fall, winter, and spring. During the summer spawning period, adults can migrate considerable distances to spawning areas. Round-trip movements of up to 590 miles have been reported in the Upper Colorado River (Irving and Modde 2000, as cited in USFWS 2002b).

Threats

Threats to Colorado pikeminnow are identified in the recovery goals document (USFWS 2002c). Threats to Colorado pikeminnow are the same as discussed for the bonytail in Section 6.1.4.1.

Recovery

A recovery plan for this species was published in 2002 (USFWS 2002c). As part of the recovery process, 5-year reviews have been conducted for this species to evaluate whether the status of the species has changed since its original listing in 1967. The most recent recovery review in 2011 indicated a recovery priority of 8C. The numerical part of the priority rating means that there is a moderate degree of threat and a high degree of recovery potential at the species level taxonomically (USFWS 2011b). The “C” identifies the potential for conflicts between recovery actions and economic activities. Recovery of the species is considered necessary only in the Upper Colorado Basin; historic populations for this species in the Lower Colorado Basin are extirpated and the only extant population is the EXP/NE in the Salt and Verde rivers.

Colorado pikeminnow will be considered eligible for downlisting from “endangered” to “threatened” and removal from ESA protection when all of the following conditions are met:

- Self-sustaining fish populations reach the required numbers in the areas of the Green, Upper Colorado River, and San Juan River subbasins;
- Essential habitats, including required instream flows, are legally protected; and
- Other identifiable threats that could significantly affect the population are removed.

The criteria for downlisting and delisting are listed in **Table 6-4**.

Table 6-4 Criteria for Colorado Pikeminnow Downlisting and Delisting

Downlisting	Delisting
Over a 5-year period: • A genetically and demographically viable, self-sustaining population is maintained in the Green River subbasin with a population point estimate exceeding 2,600 adults; • A self-sustaining population of at least 700 adults in the Upper Colorado River subbasin;	For 7 years after downlisting: • A genetically and demographically viable, self-sustaining population is maintained in the Green River subbasin with a population point estimate exceeding 2,600 adults; • A self-sustaining population of at least 1,000 adults in the Green River subbasin, 700 adults in the

Table 6-4 Criteria for Colorado Pikeminnow Downlisting and Delisting

Downlisting	Delisting
• A target number of 1,000 age-5^{+} fish is achieved in the San Juan River subbasin; and • Certain site-specific management tasks to minimize or remove threats have been identified, developed, and implemented.	Upper Colorado River subbasin, or 800 adults in the San Juan River subbasin; and • Certain site-specific management tasks to minimize or remove threats have been identified, developed, and implemented.

Assessment of Effects

Area of Analysis

The analysis area for Colorado pikeminnow would include occupied and critical habitat crossed by the refined transmission corridors and the potential disturbance area beyond the refined transmission corridors plus an approximate 1-mile downstream segment from the ROW crossings to address direct and indirect effects of the Proposed Action (**Figure 6-10**). The refined transmission corridors and engineered alignments cross occupied habitat for Colorado pikeminnow in the Yampa and Little Snake rivers. Occupied habitat also is located downstream of the transmission line corridor and engineered alignment in the Colorado River and tributaries near the confluence with the Colorado, Price, and White rivers. The only two known spawning sites for the species are located downstream of the refined transmission corridor and engineered alignment at Three Fords Canyon in the Gray Canyon area of the Green River (Carbon and Uintah counties, Utah) and the lower 20 miles of the Yampa River (Moffatt County, Colorado).

Critical habitat for Colorado pikeminnow is crossed by the refined transmission corridor and engineered alignment in the Green and Yampa rivers. The critical habitat reaches that are crossed as described as follows (59 FR 13398):

- Colorado (Moffat County) – The Yampa River and its 100-year floodplain from SH-394 to the confluence with the Green River.
- Utah (Uintah County) and Colorado (Moffatt County) – The Green River and its 100-year floodplain from the confluence with the Yampa River to the confluence with the Colorado River.

The analysis area for Colorado pikeminnow also would include occupied and critical habitat located downstream of the potential points of water diversion to Lake Powell.

Conservation Measures

Impacts to Colorado pikeminnow would be minimized through implementation of the BMPs, design features, and conservation measures referenced or described in Chapter 3.0:

- Applicable BMPs ECO-1 and ECO-4.
- Applicant-committed conservation measures and design features: TWE-2, TWE-29, and TWE-31.
- Conservation measures: **SSS-1** and **WR-3**.

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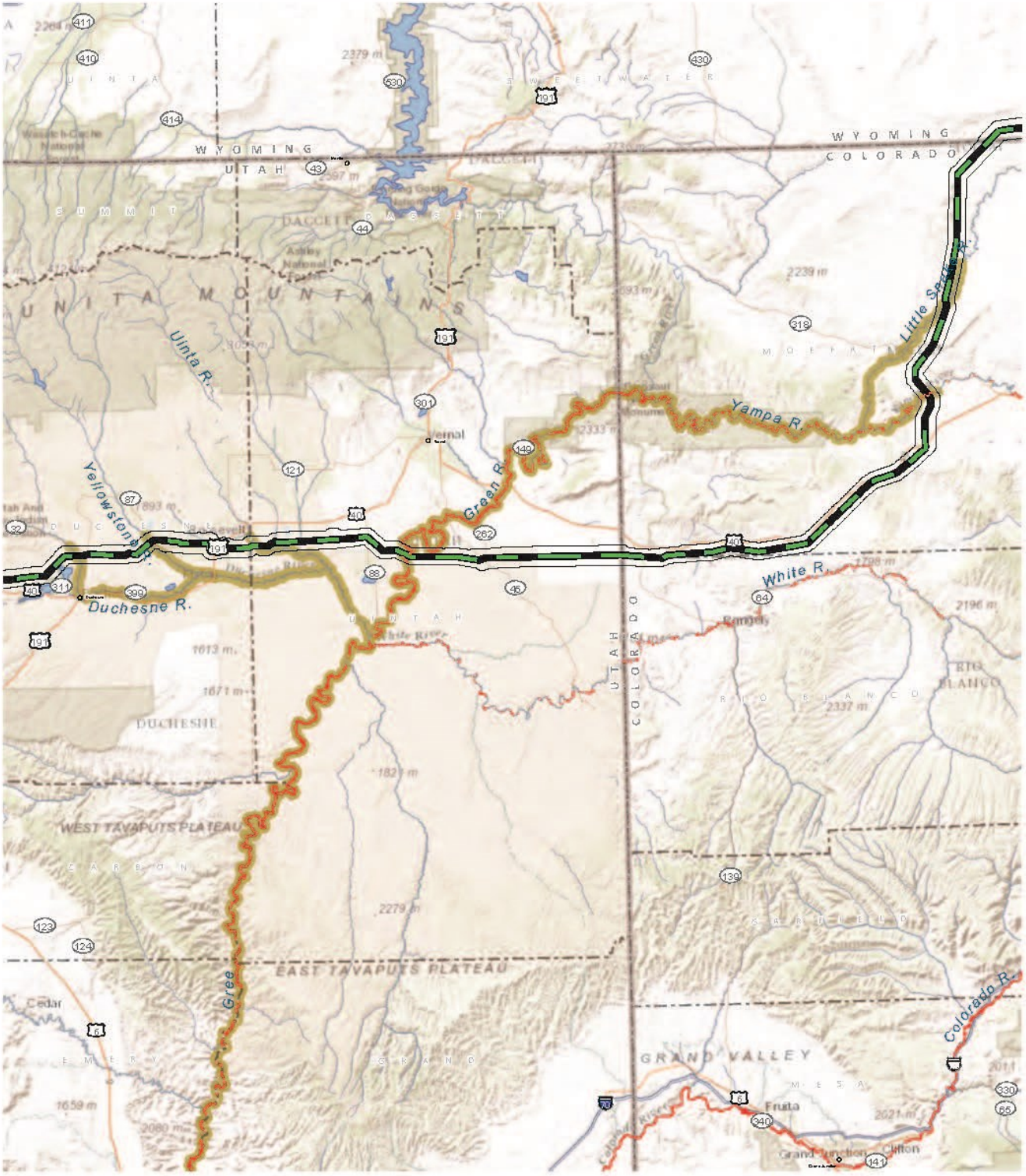

- Proposed Action
- Action Area
- Analysis Area
- Colorado Pikeminnow Critical Habitat

TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure 6-10
Area of Analysis for
Colorado Pikeminnow

0 5 10 20 Miles
0 5 10 20 km
1:1,250,000

Western Area Power Administration

Exported On: 2/19/2015

The following additional conservation measures are proposed to avoid or reduce effects of the Proposed Action on Colorado pikeminnow:

SSS-2 (Avoidance of Water Withdrawal and Entrainment/Impingement Effects for Federally Listed Fish Species): Where critical habitat for the Colorado River federally endangered fish species cannot be avoided as water sources for construction purposes, TransWest would be required to obtain approval from the USFWS and state or federal agencies responsible for managing the land and critical habitat areas. Agency approval would ensure that water withdrawal methods would avoid or minimize entrainment or impingement effects to early life stages of endangered fish species. Requirements for water pumping in critical habitat areas would include: 1) avoidance of pumping between approximately April 1 through August 31, with specific dates dependent upon the water year; 2) intake hoses would be screened with 3/32-inch mesh size; 3) intake velocity would not exceed 0.33 feet/second in an area where larval stages of the federally endangered fish may be present; and 4) pumping from off-channel locations (i.e., no connection to the river during high spring flows) would use an infiltration gallery constructed in a USFWS-approved location. Additional guidance on pumping methodology is provided in the NMFS's (1997) document entitled Fish Screening Criteria for Anadromous Salmonids.

SSS-4 (No Permanent Structures or New Roads in Critical Habitat for Federally Listed Fish Species): No permanent structures or new roads would be constructed in critical habitat for federally endangered fish species. Any temporary disturbance to soils in the 100-year floodplain within critical habitat would be minimized to the extent possible and restoration would be completed to maintain existing conditions. TransWest would avoid siting temporary facilities such as staging areas and helicopter pads in the 100-year floodplain that is designated critical habitat. Additionally, TransWest would avoid temporary river crossings by vehicles within designated critical habitat.

Direct and Indirect Effects

The 250-foot-wide transmission line ROW would cross occupied and critical habitat for Colorado pikeminnow in the Yampa and Green rivers. Critical habitat for Colorado pikeminnow consists of the 100-year floodplain in these rivers. The counties associated by these ROW crossings include Moffat County, Colorado for the Yampa River; and Uintah County, Utah, for the Green River. In total, 2 acres of Colorado pikeminnow critical habitat would be crossed, which consists of 1 acre in the Yampa River and 1 acre in the Green River. Implementation of conservation measure **SSS-4** described above would minimize impacts to Colorado pikeminnow associated with the loss or alteration of critical habitat due placement of Project facilities and/or roads in these areas.

The 250-foot-wide transmission line ROW also would cross one other stream that contains Colorado pikeminnow: Little Snake River (noncritical habitat). The pikeminnow occurrence in the Little Snake River is located in the lower 1-mile section near the confluence with the Yampa River. Potential effects on Colorado pikeminnow could include loss or alteration of noncritical habitat, if ground disturbance occurs within the floodplain at the Little Snake River ROW crossing.

Implementation of conservation measure **SSS-2** would avoid impacts associated with potential entrainment or impingement of early life stages of Colorado pikeminnow, if water is withdrawn for construction purposes (i.e., dust control or concrete foundations) from critical habitat that supports spawning or nursery areas.

Indirect effects on Colorado pikeminnow could include sedimentation, riparian removal, and potential fuel spill risks. These effects could occur within the 250-foot-wide transmission line ROW and the potential disturbance area beyond the refined transmission corridor that could be disturbed by access roads and temporary work areas. Sediment input and potential fuel spills would result in adverse water quality conditions where the disturbance areas drain into the Yampa, Green, and White rivers. The downstream extent would depend on flow conditions, channel morphology, stream gradient, and the presence of pools or channel structures that could trap sediment. Any riparian vegetation removal would be limited to

a relatively small section of the river crossed by the 250-foot-wide transmission line ROW. These potential impacts would be avoided or minimized through implementation of BMPs, Applicant-committed mitigation measures and design features and the conservation measures described above.

There could be potential water depletions in the Upper Colorado Basin from construction water use for dust control and concrete preparation. Water use for this project would be obtained from municipal sources, commercial sources, or a temporary water use agreement with landowners holding existing water rights. Since specific water sources have not been identified at this time, the USFWS cannot determine if the water sources have been through Section 7 consultation. Therefore, the USFWS assumes that all of the construction water use would be new depletions. This action would represent a consumptive water use from the Upper Colorado Basin of 109 acre-feet for Region I and 110 acre-feet for Region II during a 3-year time frame when water would be used for construction purposes. The total estimated depletion for the Upper Colorado River Basin would be 219 acre-feet. This volume represents an average annual depletion of 73 acre-feet per year for the 3-year construction period. New depletions represent an adverse effect on endangered fish species in the Upper Colorado River.

As part of flow requirements for the four endangered fish species in the Upper Colorado River Basin (Colorado pikeminnow, humpback chub, bonytail, and razorback sucker), water use for projects must comply with the Recovery Plan (USFWS 2013d). Details on how the Recovery plan would be applied to water depletions are discussed in Section 6.1.4.1. The Recovery Plan would be effective in minimizing effects of potential water depletions on Colorado pikeminnow habitat. However, if new water sources are used that have connections to surface flows in the Upper Colorado River Basin and they have not been previously consulted on by the USFWS, there could be a small residual effect on Colorado pikeminnow habitat. It is not possible to quantify the net effect other than relative terms, since specific water sources have not been identified at this time.

Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the Project action area. However, it is reasonable to expect that future water depletions could occur in the Upper Colorado River as a result of non-federal actions such as agricultural or land development. The Recovery Plan was established to mitigate the effects of water depletions on federally endangered fish species in the Upper Colorado River Basin.

Determination

Effect on the Species: The Proposed Action *may affect, and is likely to adversely affect* the Colorado pikeminnow as a result of potential water depletions. Construction and operation activities would not directly affect Colorado pikeminnow, since there is a BLM management requirement and an additional conservation measure that would minimize ground disturbance within the 100-year floodplain. The Herbicide Use Plan would minimize potential effects of maintenance activities on Colorado pikeminnow.

Effect on Critical Habitat: The Proposed Action *may affect, and is likely to adversely affect* designated critical habitat as a result of potential water depletions. Construction and operation activities would not directly affect Colorado pikeminnow, since there would be no ground disturbance allowed in the 100-year floodplain.

Rationale: Any water depletions in the Upper Colorado River Basin may affect occupied and critical habitat for the four federally endangered fish species. However, the Recovery Program would provide funds to assist in reducing the effects of flow reductions on the four federally endangered fish species in the Upper Colorado River Basin. The magnitude of the water depletion would depend on the selected water sources and whether they are connected to surface flows in the Upper Colorado River Basin and if they have been consulted on previously by the USFWS. Specific water sources will be determined at a later phase of the Project.

6.1.4.3 Humpback Chub (Endangered)

Environmental Baseline

Conservation Status

The date (March 11, 1967) and listing status (endangered) for listing humpback chub is the same as discussed for Colorado pikeminnow. On March 21, 1994, the USFWS designated seven reaches of the Colorado River system as critical habitat for humpback chub (59 FR 13374). The initial recovery plan for humpback chub was published in 1990 and amended in 2002 (USFWS 2002d).

The historic abundance of humpback chub is unknown, but it is estimated that the species currently occupies approximately 68 percent of its historic habitat (USFWS 2011c). Currently, six populations of humpback chub are known to exist: 1) Black Rocks, Colorado River, Colorado; 2) Westwater Canyon, Colorado River, Utah; 3) Yampa Canyon, Colorado; 4) Desolation/Gray Canyons, Green River, Utah; 5) Cataract Canyon, Colorado River, Colorado; and 6) mainstem Colorado River in Marble and Grand canyons. A significant population decline has been reported for Black Rocks, Westwater Canyon, and Desolation/Gray Canyons since 1996, with the estimated number of adults less than 500 in Black Rocks, less than 2,000 in Westwater Canyon, and less than 10 in Desolation/Gray Canyons (USFWS 2011c). Populations in the Yampa River and Cataract Canyon are too small to monitor through mark-recapture analysis. The Upper Colorado River populations are not self-sustaining at this time. The population trend has shown a decrease in the past 10 to 15 years.

The largest known population occurs in the Lower Colorado River Basin in the Grand Canyon, with the highest abundance in the Little Colorado River confluence with the Colorado River. The abundance of this population is estimated to range from approximately 6,000 to 10,000. This population is regarded as self-sustaining and it has shown an increasing trend from 2001 through 2008 (USFWS 2011c).

Life History and Habitat Association

Currently, there are six self-sustaining populations of humpback chub. Five occur in the Upper Colorado RU and one in the Lower Colorado RU. The Upper Colorado RU consists of populations in the Colorado River (Black Rocks and Westwater Canyon in Utah and Cataract Canyon in Colorado), one population in the Yampa River (Yampa Canyon in Colorado), and in the Green River (Desolation/Gray Canyons in Utah). The only population in the Lower Basin RU occurs in the mainstem portion of the Colorado River in Marble and Grand Canyons and the Little Colorado River. Each of these populations consists of a discrete reproducing group of fish, with independent stock-recruitment dynamics and separate geographic areas (USFWS 2002d).

Humpback chub mainly occur in river canyons where they utilize a variety of habitats including deep pools, eddies, upwells near boulders, and areas near steep cliff faces. As young humpback chub mature, they shift toward deeper and swifter offshore habitats (USFWS 2002d). In Westwater Canyon, small fish less than 40 millimeters (mm) in total length (TL) used low-velocity areas such as backwaters and shorelines. Later in the summer and fall when fish were 40 to 50 mm TL, their habitat use shifted towards higher-velocity habitats. In the Yampa and Green rivers, juvenile and adults used habitats consisting of rocky shoreline runs and small shoreline eddies.

Seven reaches have been designated as critical habitat for humpback chub in the Colorado River system, including portions of the Colorado, Green, and Yampa rivers in the Upper Basin and portions of the Colorado River and Little Colorado River in the Lower Basin, with an overall total of 379 river miles (59 FR 13374-13400). Critical habitat consists of the 100-year floodplain in the seven reaches where constituent elements including water, physical habitat, and biological requirements are present.

Humpback chub are broadcast spawners with a relatively low fecundity rate compared to other minnow species of similar size (USFWS 2002d). Spawning primarily occurs in March through May in the lower basin and during April through June in the upper basin. Spawning temperatures typically range from

16ºC to 22ºC. The presence of juveniles with a range of sizes indicates that successful spawning occurs in all or at least portions of all six populations (USFWS 2002d). Humpback chub moves substantially less than other native Colorado River fishes.

Threats

Threats to humpback chub include streamflow regulation, habitat modification, predation by nonnative fish species, parasitism, hybridization with other *Gila* species, and pesticides and pollutants (USFWS 2002d). Most of these factors were threat topics would be the same as discussed for bonytail. Information specific to humpback chub is summarized below from USFWS (2002d).

- Parasitism – Diseases and parasitism have been evaluated for the humpback chub in the upper and lower basins. Diseases and parasitism are not considered threats in the upper basin. However, declines in the humpback population in the lower basin have been identified as a result of infestation by the Asian tapeworm.
- Hybridization – Humpback cub, bonytail, and roundtail chub are sympatric species in the Colorado River mainstem, with substantial evidence of introgressive hybridization. Hybridization is evident in all of the upper basin populations, with the highest levels shown in Desolation/Gray canyons.
- Pesticides and Pollutants – Pollutants of concern for humpback chub include pesticides from agricultural applications, petroleum products, heavy metals, nonmetalics such as selenium, and radionuclides. Threats have been identified in in the following populations: Black Rocks and Westwater Canyon (spills from the Denver and Rio Grande Railroad), Yampa Canyon (pipeline crossings and agricultural runoff), and the Little Colorado River (road crossings/truck traffic).

Recovery

A recovery plan for humpback chub was first published in 1990 and then amended in 2002 (USFWS 2002d). Five-year reviews of the recovery goals were initiated in 2007 for the humpback chub and the other three Colorado River system endangered fish species (72 FR 19549-19551). The results of the first 5-year review for humpback chub are not yet available.

Seven populations are identified in the recovery plan for humpback chub: 1) Black Rocks, Colorado River, Colorado; 2) Westwater Canyon, Colorado River, Utah; 3) Yampa Canyon, Colorado; 4) Desolation/Gray canyons, Green River, Utah; 5) Cataract Canyon, Colorado River, Utah; 6) the lower Colorado River, Arizona; and 7) the Little Colorado River, Arizona (USFWS 2002d). For the purposes of recovery goals for humpback chub, the upper and lower basins are divided at the Glen Canyon Dam in Arizona. Separate objective, measurable recovery criteria were developed for each of the RUs (i.e., the upper basin including the Green and upper Colorado River subbasins; and the lower basin including the mainstem of the Colorado River and its tributaries downstream to the Lake Mead National Recreation Area) for the purpose of addressing the unique threats and using site-specific management actions necessary to minimize or remove these threats. The RUs encompass three management areas under three separate recovery or conservation programs: Upper Colorado River Endangered Fish Recovery Program, the Glen Canyon Dam Adaptive Management Program, and the Lower Colorado River Multi-Species Conservation Program.

Humpback chub will be considered eligible for downlisting from “endangered” to “threatened” and from removal from ESA protection when all of the following conditions are met:

- Maintain six self-sustaining populations;
- Essential habitats, including required instream flows, are legally protected; and
- Other identifiable threats that could significantly affect the population are removed.

The criteria for downlisting and delisting are listed in **Table 6-5**.

Table 6-5 Criteria for Humpback Chub Downlisting and Delisting

Downlisting	Delisting
Over a 5-year monitoring period: • Maintain six populations with no net loss • Establish one core population in the Upper Colorado River Basin with >2,100 adults • Establish one core population in the Lower Colorado River Basin with >2,100 adults	For 3 years after downlisting: • Maintain six populations with no net loss • Establish one core population in the Upper Colorado River Basin with >2,100 adults • Establish one core population in the Lower Colorado River Basin with >2,100 adults

Assessment of Effects

Area of Analysis

The analysis area for humpback chub would include occupied and critical habitat located downstream of the potential points of water diversion to Lake Powell. The closest known critical habitat is located in the Yampa and Green rivers, which are approximately 19 and 22 miles, respectively, from the closest refined transmission corridor (**Figure 6-9**). Occupied and critical habitat exists downstream of the refined transmission corridor and engineered alignment in the Colorado, Yampa, and Green rivers. The analysis area would exclude the refined transmission corridors and the potential disturbance area beyond the corridors, since there is no occupied or critical habitat that is crossed by the refined transmission corridor and the engineered alignment.

Conservation Measures

An Applicant committed design feature, TWE-2, ensures that applicable environmental regulations would be followed including requirements for federally listed species under the ESA and Section 7 consultation (Chapter 3.0). No additional protection measures are proposed for humpback chub.

Direct and Indirect Effects

There would be no effects on humpback chub or its critical habitat other than potential water depletions, since the closest occupied and critical habitat for this species are located approximately 19 and 22 miles downstream of the refined transmission corridors. There would be no alteration or loss of critical habitat for humpback chub. In addition, any ground disturbance by construction or operation activities would not result in sediment or potential fuel spill effects on this species due to the considerable distance downstream to occupied or critical habitat.

There could be potential water depletions in the Upper Colorado Basin from construction water use for dust control and concrete preparation. Water use for this project would be obtained from municipal sources, commercial sources, or a temporary water use agreement with landowners holding existing water rights. Since specific water sources have not been identified at this time, the USFWS cannot determine if the water sources have been through Section 7 consultation. Therefore, the USFWS assumes that all of the construction water use would be new depletions. This action would represent a consumptive water use from the Upper Colorado Basin of 109 acre-feet for Region I and 110 acre-feet for Region II during a 3-year time frame when water would be used for construction purposes. The total estimated depletion for the Upper Colorado River Basin would be 219 acre-feet. This volume represents an average annual depletion of 73 acre-feet per year for the 3-year construction period. New depletions represent an adverse effect on endangered fish species in the Upper Colorado River.

As part of flow requirements for the four endangered fish species in the Upper Colorado River Basin (Colorado pikeminnow, humpback chub, bonytail, and razorback sucker), water use for projects must comply with the Recovery Plan (USFWS 2013d). Details on how the Recovery plan would be applied to

water depletions are discussed in Section 6.1.4.1. The Recovery Plan would be effective in minimizing effects of potential water depletions on humpback chub habitat. However, if new water sources are used that have connections to surface flows in the Upper Colorado River Basin and they have not been previously consulted on by the USFWS, there could be a small net residual effect on humpback chub habitat. It is not possible to quantify the net effect other than relative terms, since specific water sources have not been identified at this time.

Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the Project action area. However, it is reasonable to expect that future water depletions could occur in the Upper Colorado River as a result of non-federal actions such as agricultural or land development. The Recovery Plan was established to mitigate the effects of water depletions on federally endangered fish species in the Upper Colorado River Basin.

Determination

Effect on the Species: The Proposed Action *may affect, and is likely to adversely affect* the humpback chub as a result of potential water depletions. Construction and operation activities would not directly affect humpback chub, since there is no occupied habitat at the refined transmission corridor crossings.

Effect on Critical Habitat: The Proposed Action *may affect, and is likely to adversely affect* designated critical habitat as a result of potential water depletions. Construction and operation activities would not directly affect humpback chub critical habitat, since none is located within the corridor crossings.

Rationale: Any water depletions in the Upper Colorado River Basin may affect occupied and critical habitat for the four federally endangered fish species. However, the Recovery Program would provide funds to assist in reducing the effects of flow reductions on the four federally endangered fish species in the Upper Colorado River Basin. The magnitude of the water depletion would depend on the selected water sources and whether they are connected to surface flows in the Upper Colorado River Basin and if they have been consulted on previously by the USFWS. Specific water sources will be determined at a later phase of the Project.

6.1.4.4 June Sucker (Endangered)

Environmental Baseline

Conservation Status

The June sucker was federally listed in 1986 (51 FR 10851-10857). Critical habitat was designated for June sucker in the lower portion of the Provo River above its confluence with Utah Lake on March 31, 1986 (51 FR 10851-10857). A recovery plan was finalized for the species in 1999, with actions being implemented from 1995 through 2007 (June Sucker Recovery Implementation Team 2012a, 1999).

The population trend for wild June sucker has been in decline. Historically, it is estimated that that June sucker numbers in Utah Lake may have been in the millions. At the time of its listing in 1986, the wild population number for June sucker was estimated to be less than 1,000 (Andersen et al. 2006). More recent estimates of wild June sucker in the late 1990s were close to 300 individuals (NatureServe 2013b). The current population is estimated to be fewer than 1,000 individuals with exact numbers unknown (June Sucker Recovery Implementation Program 2014). As part of the efforts to recover the species, June sucker is reared in hatcheries for release into Utah Lake. As of 2012, approximately 440,012 hatchery reared June sucker have been stocked in Utah Lake (UDWR 2013). Although June sucker numbers have increased due to stocking, larvae and juvenile life stages are not successfully surviving as desired due to a lack of suitable nursery habitat and predation by nonnative fish species.

Life History and Habitat Association

June sucker is endemic to Utah Lake in Utah. The lake is a relatively large and shallow lake with slightly saline, turbid, and eutrophic conditions. In general, June sucker uses all areas of the lake (June Sucker Recovery Implementation Team 1999). However, survey efforts have captured most of the suckers in Provo Bay and shoreline areas in Utah Lake. Riverine habitat used by spawning June suckers is described below in the *Life History* subsection.

The lower 4.9 miles of the Provo River was designated as critical habitat for the June sucker in 1986 (51 FR 10851-10857). The upper limit of the critical habitat area is defined as the Columbia Lane (Tanner Race) diversion with the lower end being the confluence with Utah Lake. Known constituent elements of June sucker critical habitat include 1 to 3 feet of high quality water constantly flowing over a clean, unsilted gravel substrate. The Spanish Fork River is not included as part of the critical habitat designation.

June sucker uses the lower portion of the Provo River for spawning and early life stage development. June sucker also spawns intermittently in the lower portion of the Spanish Fork River, a tributary to Utah Lake (Defreese 2014). June sucker adults leave Utah Lake and swim up the Provo River in April through June of each year (UDWR 2014). The area for spawning in the Provo River is limited to the lower three miles in most years due to an impassable irrigation diversion (June Sucker Recovery Implementation Program 2014). In very wet years, fish can migrate above the irrigation diversion and have access to an additional 1.9 miles of the river. Spawning occurs in shallow riffles over gravel or rock substrate at depths ranging from approximately 1 to 3 feet and velocities from 0.2 to 3.2 feet/second (June Sucker Recovery Implementation Program 2014; USFWS 1999). In the Provo River, June sucker larvae emerge from the gravel soon after hatching and drift downstream. Adult June sucker return to Utah Lake soon after spawning.

Threats

Threats to June sucker include habitat modification, water quality changes, and predation competition by nonnative fish species (USFWS 1999; 51 FR: 10851-10857), as summarized below.

- Habitat Modification – The main threats to habitat alteration have resulted from water diversion for irrigation, municipal, and industrial purposes. In addition, habitat has been modified from the operation of upstream impoundments such as the Central Utah Project.
- Water Quality – Human development in the drainage area surrounding Utah Lake has increased inflow of warm water, sediment input, nutrients, and industrial residues.
- Predation and Competition from Nonnative Fish – The introduction of nonnative fish species such as white bass, carp, channel catfish, and walleye has resulted in predation and completion with June sucker. These factors are considered a threat to the survival of June sucker.

Recovery

A recovery plan was finalized for this species in 1999 (June Sucker Recovery Implementation Program 2014; June Sucker Implementation Team 1999). The Recovery Program is a multi-agency cooperative effort to coordinate and implement recovery actions for this species. The Program takes an adaptive management approach where biological information is gathered, reviewed, and incorporated into the Program on a continual basis. While the priority is on June sucker, the Program also provides a mechanism to promote the recovery of other federally listed species, and prevent the need for further listings in Utah Lake drainage basin.

The goals of the Recovery Program for June sucker include: 1) recover the species to the extent that it no longer requires protection under the ESA; and 2) allow for the continued operation of existing water facilities and future water development of water resources for human use. The USFWS has designated June sucker as a 5C recovery priority, which means that the species has a high degree of threat of

extinction and a low recovery potential and presence of conflict. To conserve and recover the species, priority is given to monitoring the spawning run, restricting nonnative fish from entering the Provo River, establishing a hatchery for June sucker, enhancing Provo River flows necessary for spawning and early life stage development, restoring habitat, and establishing a self-sustaining spawning run for the species (June Sucker Implementation Team 1999).

Assessment of Effects

Area of Analysis

The analysis area for June sucker would focus on potential points of water diversion in the Provo River and Utah Lake drainage basin that includes occupied or critical habitat for the species. The closest known critical habitat is located approximately 16 miles from the refined transmission corridor (**Figure 6-11**). The analysis area would exclude the transmission line corridors and the potential disturbance area beyond the corridors, since there is no occupied or critical habitat that is crossed by the transmission line corridor and the engineered alignment.

Conservation Measures

The following conservation measure is proposed to avoid water depletion effects on June sucker.

> **SSS-6**: (Approval of Water Use from June Sucker Habitat Areas): Any potential water use from Utah Lake, Provo River, and the Spanish Fork River that would represent a new depletion must be approved by UDWR and the Utah State Engineer, Utah Division of Water Rights.

Direct and Indirect Effects

June sucker habitat in Utah Lake and the Provo River is located approximately 25 miles downstream from the refined transmission corridor in Utah. There would be no direct disturbance to habitat due to the considerable distance from the refined transmission corridor and the potential disturbance area beyond the refined transmission corridor.

Since water sources have not been identified at this time, potential construction water use from Utah Lake, Provo River, or the Spanish Fork River could adversely affect habitat from reductions in river flow or lake water levels. Implementation of conservation measure **SSS-6** would ensure that such water use, if needed, would not result in adverse effects to June sucker habitat.

Cumulative Effects

Foreseeable non-federal future actions have been identified within the vicinity of June sucker critical habitat in the lower Provo River include UDWR Rangeland and Riparian Watershed Restoration Focus Areas, the 1250 West Sidewalk Project, and the Provo Westside Connector. The watershed restoration projects would result in beneficial effects to the Provo River. The sidewalk and connector projects could result in temporary surface disturbance near the Provo River, although erosion control measures would be followed to minimize sediment effects on the river. It is possible that future water depletions could occur in the Provo River and drainages entering Utah Lake as a result of non-federal actions such as land development. The Recovery Program for June sucker allows for the continued operation of existing water facilities and future water development of water resources for human use as long as the water use does not adversely affect June sucker.

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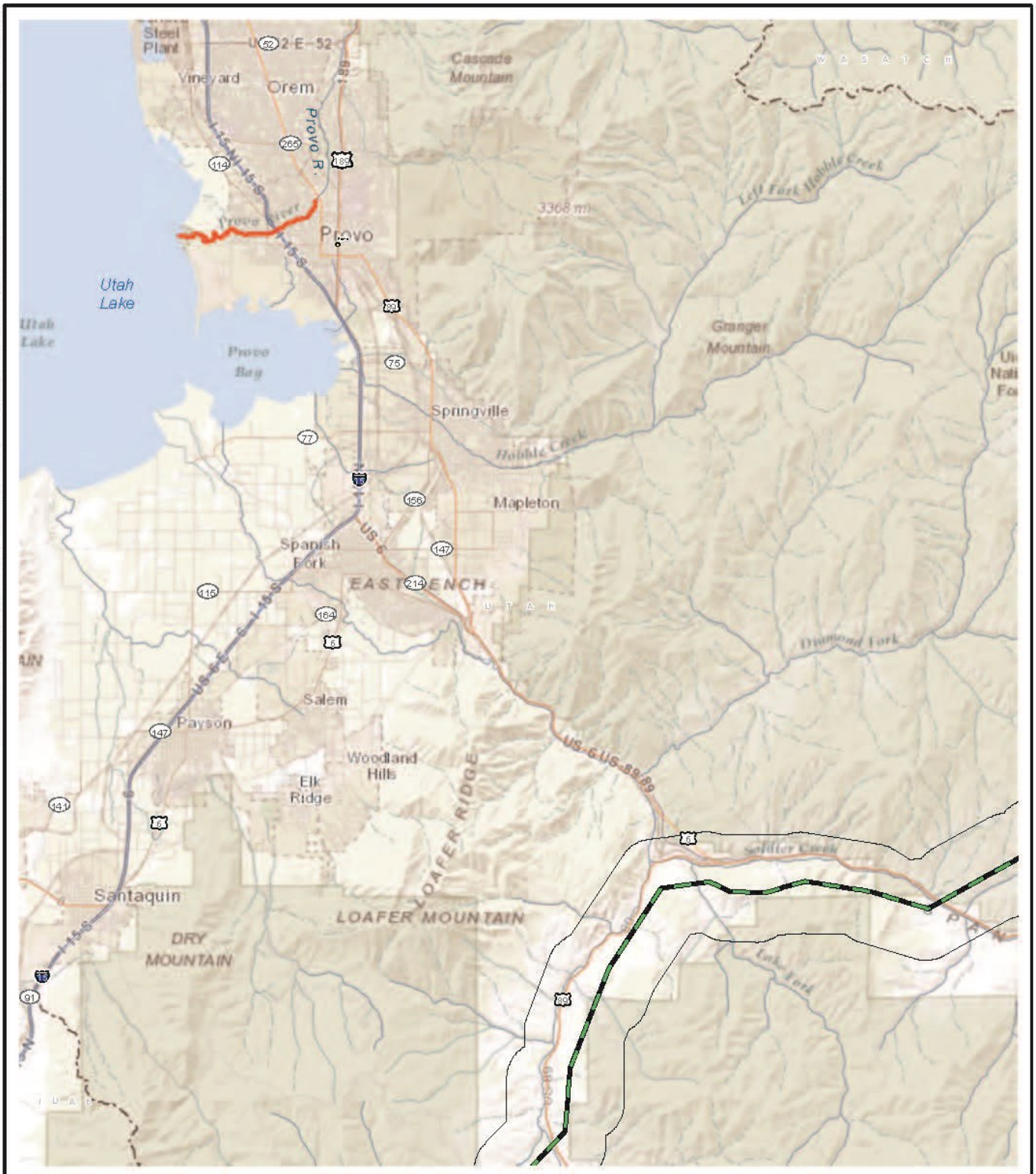


Proposed Action
Action Area
June Sucker Critical Habitat

TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure 6-11
Area of Analysis for
June Sucker

0 1 2 4 Miles
0 1 2 4 km
1:250,000

Western Area Power Administration

Exported On: 2/19/2015

Determination

Effect on the Species: The Proposed Action *may affect, but is not likely to adversely affect* June sucker from potential construction use or water depletion effects on June sucker habitat. The occurrence of June sucker is approximately 25 miles from the corridor and the potential disturbance area beyond the corridor. Therefore, the June sucker would not be directly affected by construction and/or operation/maintenance activities.

If water use is proposed for Utah Lake, Provo River, or the Spanish Fork River, conservation measure **SSS-6** would require approval by UDWR and the Utah State Engineer prior to possible water use.

Effect on Critical Habitat: The Proposed Action *may affect, but is not likely to adversely affect* designated critical habitat, if water use from the Provo River is proposed. Construction and operation activities would not directly affect June sucker critical habitat, since it is located over 25 miles downstream from the action area.

Rationale: June sucker would not be directly affected by construction and operation activities due to the distance from the ground disturbance area to June sucker occupied and critical habitat. Any proposed use of water from Utah Lake, Provo River, or the Spanish Fork River would require approval by UDWR and the Utah State Engineer, which would provide a process for protecting June sucker critical habitat.

6.1.4.5 Razorback Sucker (Endangered)

Environmental Baseline

Conservation Status

The razorback sucker was first proposed for listing as a threatened species under the ESA in 1978 (43 FR 17375). In 1980, the USFWS withdrew the proposal because it was not finalized within the 2-year time limit from the initial publication in the Federal register (45 FR 35410). In 1989, the USFWS received a petition requesting that the razorback sucker be added to the list of endangered species. A positive finding was made and subsequently published by the USFWS in 1991 (56 FR 54957). In 1994, the USFWS designated 15 reaches of the Colorado River system as critical habitat (59 FR 13374). The initial recovery plan for the razorback sucker was published in 1998 and amended in 2002 (USFWS 2002e).

The largest population in the Upper Colorado River Basin exists in the middle Green River between the Duchesne and Yampa rivers, which is considered a single reproducing population (USFWS 2002e). The estimated numbers range from approximately 500 and 950 fish. Relatively low numbers are present in the Yampa, White, and Upper Colorado rivers. The razorback sucker is more widely distributed in the lower basin. In Lake Mead, the population is estimated at about 400 individuals. Approximately 1,000 individuals are believed to inhabit a 60-mile reach between Davis Dam and Lake Havasu.

The comparison of current population levels to historical population size for razorback sucker indicates a decreasing population trend (NatureServe 2013c; USFWS 2002e). However, a review of razorback sucker capture data between 1997 and 2008 indicates the possible benefit of reintroduction of stocked razorbacks, since numbers increased slightly in 2008 (USFWS 2012e). The addition of stocked razorback suckers in all three Colorado River subbasins is encouraging, but there are not sufficient numbers of wild produced juvenile razorback suckers to indicate that these population groups are self-sustaining.

In 1994, the USFWS designated 15 reaches of the Colorado River system, including portions of the Green, Yampa, Duchesne, Colorado, White, Gunnison, and San Juan rivers in the upper basin and portions of the Colorado, Gila, Salt, Verde rivers in the lower basin, totaling 1,724 miles as critical habitat for razorback sucker (59 FR 13374).

Life History and Habitat Association

Razorback sucker currently are present in the Green, upper Colorado, and San Juan river subbasins; lower Colorado River between Lake Havasu and Davis Dam; reservoirs of Lake Mead and Mohave; and in small tributaries of the Gila River subbasin (Verde and Salt rivers and Fossil Creek). In the Upper Colorado River Basin, razorback suckers are considered extant in four locations: Westwater and Cataract canyons and the Colorado-Utah state line on the Colorado River, Desolation/Gray canyons of the Green River, and a population in northeastern Colorado River on the Yampa River.

The types of habitat used by razorback sucker vary depending on the life stage and time of year. Adults use eddies, pools, and backwaters during the nonbreeding period from July through March (Maddux et al. 1993). Seasonal habitat use includes pools and eddies from November through April, runs and pools from July through October, runs and backwaters in May, and backwaters and backwaters and flooded gravel pits during June. Juveniles prefer shallow water with minimal flow in backwaters, tributary mouths, off-channel impoundments, and lateral canals (Maddux et al. 1993). In the upper basin, bottomlands, low-lying wetlands, and oxbow channels flooded and ephemerally connected to the main channel by high spring flows are important habitats for all life stages of razorback sucker. Flow recommendations have been developed that were designed to enhance habitat complexity and restore and maintain ecological processes. In the lower basin, adult razorback sucker utilize open-water areas except in the breeding season when they congregate in shallow, nearshore areas (USFWS 2002e). Juvenile razorback sucker in Lake Mohave occupied vegetated areas near the shore.

Spawning usually occurs in April through mid-June when river flows are relatively high and adult razorback sucker congregate in flooded bottomlands and gravel pits, backwaters, and impounded tributary mouths near spawning sites (USFWS 2002e). Thermal preference for spawning is 22ºC to 25ºC. Razorback sucker typically migrate a long distance in large numbers during the spawning period.

Threats

Threats to razorback sucker include streamflow regulation, habitat modification, competition with and predation by nonnative fish species, and pesticides and pollutants (USFWS 2002e). Most of these factors are similar to those discussed for bonytail. Information specific to razorback sucker is summarized below from USFWS (2002e).

- Habitat – Floodplain habitats were numerous prior to the construction of dams and levees and channelization in the Green and Colorado River systems. The loss of these habitats has been implicated in the decline of the species. However, gravel pits and other artificial, off-channel ponds have been used as a substitute for some of this habitat loss.
- Predation – Nonnative fish species in flooded bottomlands and other low-velocity shoreline habitats in the upper basin are considered to be a limiting factor for razorback sucker recruitment (USFWS 2002e). Adult red shiner is known to be a predator of larval native fishes. In the lower basin, nonnative flathead catfish, yellow bullhead, and largemouth bass prey on young razorback sucker.

Recovery

The upper basin RU is composed of the Green River, Upper Colorado River, and San Juan River subbasins and the lower basin RU includes the mainstem and tributaries of the Colorado River from Lake Mead downstream to the southerly International Boundary with Mexico.

Razorback sucker will be considered eligible for downlisting from “endangered” to “threatened” and removal from ESA protection when all of the following conditions are met:

- Maintain self-sustaining populations in the Green River subbasin and either the Upper Colorado River subbasin or the San Juan River subbasin in the upper basin RU;
- Maintain two genetically and demographically self-sustaining populations in the lower basin RU;
- Maintain a genetic refuge in Lake Mohave;
- Essential habitats, including required instream flows, are legally protected; and
- Other identifiable threats that could significantly affect the population are removed.

The criteria for downlisting and delisting are listed in **Table 6-6**.

Table 6-6 Criteria for Razorback Sucker Downlisting and Delisting

Downlisting	Delisting
Over a 5-year monitoring period: • Maintain self-sustaining populations in the Green River subbasin and either the Upper Colorado River subbasin or the San Juan River subbasin with point estimates that exceed 5,800 adults for each population • Maintain two self-sustaining populations in the lower basin RU with point estimates that exceed 5,800 adults for each population • Maintain a genetic refuge in Lake Mohave • Implement specific management tasks to remove or minimize threats	For 3 years after downlisting: • Maintain self-sustaining populations in the Green River subbasin and either the Upper Colorado River subbasin or the San Juan River subbasin with point estimates that exceed 5,800 adults for each population • Maintain two self-sustaining populations in the lower basin RU with point estimates that exceed 5,800 adults for each population • Maintain a genetic refuge in Lake Mohave • Implement specific management tasks to remove or minimize threats

In addition to management actions being taken to recover razorback sucker, the Recovery Program works to reestablish naturally self-sustaining populations for this species through propagation and stocking (USFWS 2013d). In the Upper Colorado River Basin, razorback sucker are raised at the Grand Valley Unit in Grand Junction and the Ouray Unit in Vernal, Utah. Razorback sucker raised at these two facilities are stocked in the Colorado, Green, and Gunnison rivers.

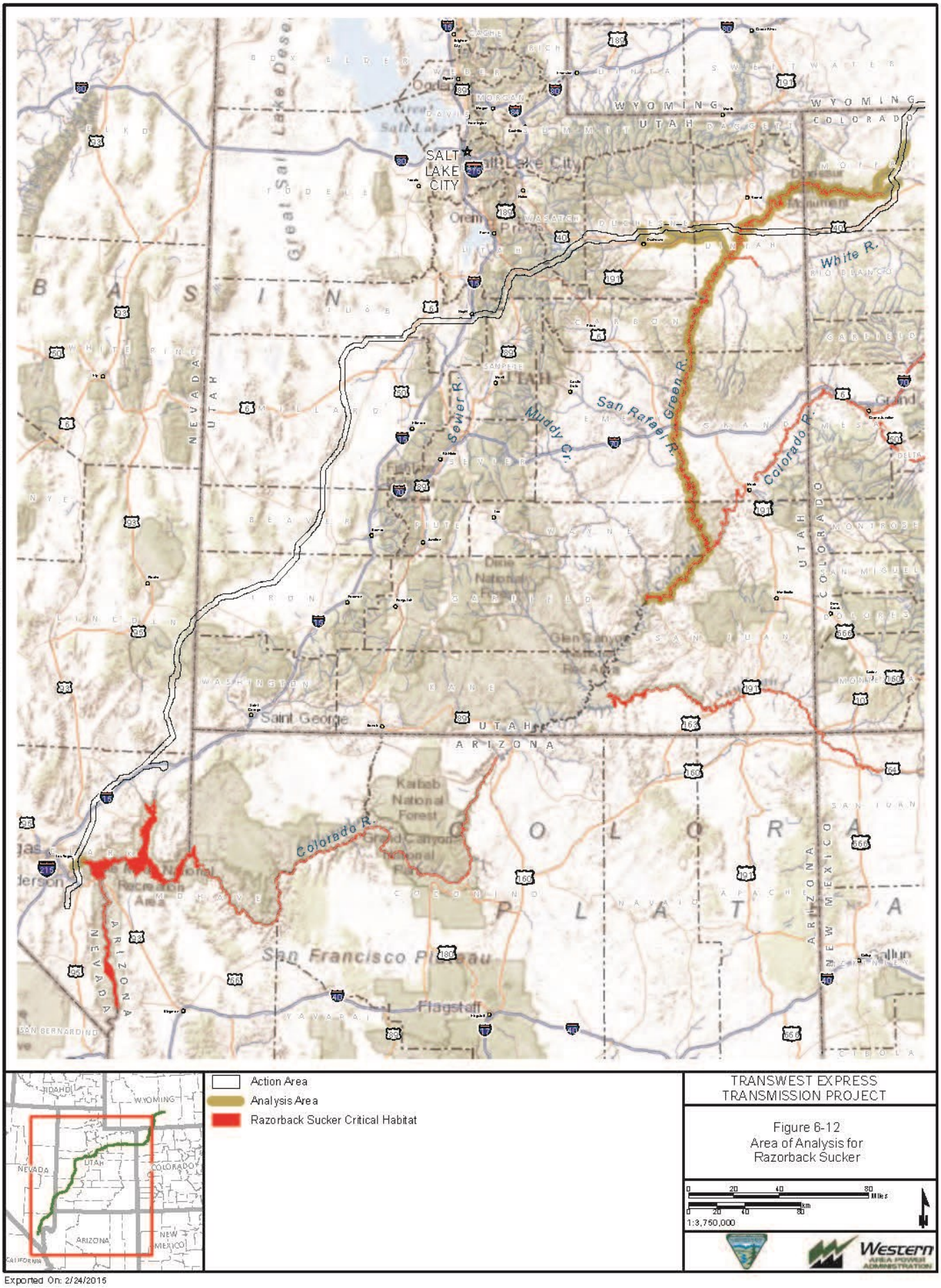
Assessment of Effects

Area of Analysis

The analysis area for razorback sucker also would include occupied and critical habitat located downstream of the potential points of water diversion to Lake Powell.

The refined transmission corridor and engineered alignment cross occupied habitat for razorback sucker in the Green River. Occupied habitat also is located downstream of the transmission line corridor and engineered alignment in the Little Snake River in Wyoming, the Colorado and White rivers in Colorado, and Las Vegas Wash in Nevada (**Figure 6-12**).

Critical habitat for razorback sucker is crossed by the refined transmission corridor and engineered alignment in the Green River. The critical habitat reach that is crossed as described as follows (59 FR 13399): Utah (Uintah County) – The Green River and its 100-year floodplain from the confluence with the Yampa River to the Sand Wash. Critical habitat reaches for razorback sucker also are located downstream of the transmission line corridor and engineered alignments in the Colorado, White, and Yampa rivers.



TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure 6-12
Area of Analysis for Razorback Sucker

0 20 40 80 Miles
0 20 40 80 km
1:3,760,000

Western Area Power Administration

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Conservation Measures

Impacts to Colorado pikeminnow would be minimized through implementation of the BMPs, design features, and conservation measures described in Chapter 3.0:

- Applicable BMPs ECO-1 and ECO-4.
- Applicant-committed conservation measures and design features: TWE-2, TWE-29, and TWE-31.
- Conservation measures: **SSS-1** and **WR-3**.

The following additional conservation measures are proposed to avoid or reduce effects of the Proposed Action on razorback sucker.

SSS-2 (Avoidance of Water Withdrawal and Entrainment/Impingement Effects for Federally Listed Fish Species): Where critical habitat for the Colorado River federally endangered fish species cannot be avoided as water sources for construction purposes, TransWest would be required to obtain approval from the USFWS and state or federal agencies responsible for managing the land and critical habitat areas. Agency approval would ensure that water withdrawal methods would avoid or minimize entrainment or impingement effects to early life stages of endangered fish species. Requirements for water pumping in critical habitat areas would include: 1) avoidance of pumping between approximately April 1 through August 31, with specific dates dependent upon the water year; 2) intake hoses would be screened with 3/32-inch mesh size; 3) intake velocity would not exceed 0.33 feet/second in an area where larval stages of the federally endangered fish may be present; and 4) pumping from off-channel locations (i.e., no connection to the river during high spring flows) would use an infiltration gallery constructed in a USFWS-approved location. Additional guidance on pumping methodology is provided in the NMFS's (1997) document entitled Fish Screening Criteria for Anadromous Salmonids.

SSS-4 (No Permanent Structures or New Roads in Critical Habitat for Federally Listed Fish Species): No permanent structures or new roads would be constructed in critical habitat for federally endangered fish species. Any temporary disturbance to soils in the 100-year floodplain within critical habitat would be minimized to the extent possible and restoration would be completed to maintain existing conditions. TransWest would avoid siting temporary facilities such as staging areas and helicopter pads in the 100-year floodplain that is designated critical habitat. Additionally, TransWest would avoid temporary river crossings by vehicles within designated critical habitat.

Direct and Indirect Effects

The 250-foot-wide transmission line ROW would cross occupied and 1 acre of critical habitat for razorback sucker in the Green River (Uintah County, Utah). Critical habitat for razorback sucker consists of the 100-year floodplain in the Green River. Implementation of conservation measure **SSS-4** would ensure that impacts to critical habitat would be minimized. The refined transmission corridors and 250-foot-wide transmission line ROWs do not cross other rivers that contain occupied or critical habitat for razorback sucker. Critical habitat is designated for the Las Vegas Wash arm of Lake Mead in Clark County, Nevada. However, construction and maintenance activities would not affect razorback sucker at the Las Vegas Wash crossing, since critical habitat is located at least 2 miles downstream of the Las Vegas Wash crossing. Furthermore, year-round flow does not occur in the section of Las Vegas Wash between the proposed crossing and the lower portion of the wash that represent an arm of Lake Mead.

Implementation of conservation measure **SSS-2** would avoid impacts associated with potential entrainment or impingement of early life stages of razorback sucker in the Green River, if water is withdrawn for construction purposes (i.e., dust control or concrete foundations) from critical habitat that supports spawning or nursery areas.

Implementation of BMPs, the Applicant-committed mitigation measures and design features, and general conservation measures described in Chapter 3.0 along with conservation measures **SSS-2** and **SSS-4** described above would avoid or minimize direct and indirect adverse effects on razorback sucker that could result from sedimentation, riparian removal, and potential fuel spill risks in the Green River. Any riparian vegetation removal would be limited to a relatively small section of the river crossed by the 250-foot-wide transmission line ROW.

There could be potential water depletions in the Upper Colorado Basin from construction water use for dust control and concrete preparation. Water use for this project would be obtained from municipal sources, commercial sources, or a temporary water use agreement with landowners holding existing water rights. Since specific water sources have not been identified at this time, the USFWS cannot determine if the water sources have been through Section 7 consultation. Therefore, the USFWS assumes that all of the construction water use would be new depletions. This action would represent a consumptive water use from the Upper Colorado Basin of 109 acre-feet for Region I and 110 acre-feet for Region II during a 3-year time frame when water would be used for construction purposes. The total estimated depletion for the Upper Colorado River Basin would be 219 acre-feet. This volume represents an average annual depletion of 73 acre-feet per year for the 3-year construction period. New depletions represent an adverse effect on endangered fish species in the Upper Colorado River.

As part of flow requirements for the four endangered fish species in the Upper Colorado River Basin (Colorado pikeminnow, humpback chub, bonytail, and razorback sucker), water use for projects must comply with the Recovery Plan (USFWS 2013d). Details on how the Recovery plan would be applied to water depletions are discussed in Section 6.1.4.1. The Recovery Plan would be effective in minimizing effects of potential water depletions on razorback sucker habitat. However, if new water sources are used that have connections to surface flows in the Upper Colorado River Basin and they have not been previously consulted on by the USFWS, there could be a small net residual effect on razorback sucker habitat. It is not possible to quantify the net effect other than relative terms, since specific water sources have not been identified at this time.

Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the Project action area. However, it is reasonable to expect that future water depletions could occur in the Upper Colorado River as a result of non-federal actions such as agricultural or land development. The Recovery Plan was established to mitigate the effects of water depletions on federally endangered fish species in the Upper Colorado River Basin.

Determination

Effect on the Species: The Proposed Action *may affect, and is likely to adversely affect* the razorback sucker as a result of potential water depletions. Construction and operation activities would not directly affect razorback sucker, since there is a BLM management requirement and an additional conservation measure that would minimize ground disturbance within the 100-year floodplain. The Herbicide Use Plan would minimize potential effects of maintenance activities on razorback sucker.

Effect on Critical Habitat: The Proposed Action *may affect, and is likely to adversely affect* designated critical habitat as a result of potential water depletions. Construction and operation activities would not directly affect razorback sucker, since there would be no ground disturbance allowed in the 100-year floodplain.

Rationale: Any water depletions in the Upper Colorado River Basin may affect occupied and critical habitat for the four federally endangered fish species. However, the Recovery Program would provide funds to assist in reducing the effects of flow reductions on the four federally endangered fish species in the Upper Colorado River Basin. The magnitude of the water depletion would depend on the selected water sources and whether they are connected to surface flows in the Upper Colorado River Basin and if

they have been consulted on previously by the USFWS. Specific water sources will be determined at a later phase of the Project.

6.1.4.6 Virgin River Chub (Endangered – Virgin River; Not Listed – Muddy River)

Environmental Baseline

Conservation Status

The Virgin River chub was officially listed as federally endangered in 1989, but designation of critical habitat was postponed (54 FR 35305). In 2000, 87.5 miles of the Virgin River in Utah, Arizona, and Nevada was designated as critical habitat (65 FR 4140). When the species was listed, the USFWS recognized that a closely related species was found in the Moapa (Muddy) River in Nevada, but it was affected by the listing in 1989. A recovery plan for the Virgin River chub was published in 1995 (USFWS 1995e).The Muddy River population is not considered part of the federal listing at this time. However, a proposed rule change regarding federal listing is under review by the USFWS.

The current distribution of Virgin River chub in the Muddy River primarily includes the middle reaches between the Warm Springs bridge and the Wells Siding diversion (NatureServe 2013d). Surveys in the Warms Springs area collected several individual chub in 2007. Virgin River chub numbers in the middle Muddy River continue to decline based on limited sampling (Desert Fishes Council meeting, as cited in NatureServe 2013c).

Life History and Habitat Association

Virgin River chub is endemic to the Virgin River system in southwestern Utah, southern Nevada, and northwestern Arizona, and the Muddy (Moapa) River in Nevada. The current range for this species includes the Muddy River and the Virgin River from near the Nevada-Arizona border to the southwestern corner of Utah (IUCN 2013). A captive population of the Virgin River chub also is currently maintained at the Dexter National Fish Hatchery and Technology Center as a refugium population and propagation studies (USFWS 1995c).

Adult and juvenile Virgin River chub prefer deep runs and pools with slow to moderate velocities containing boulders or instream cover over sand or gravel substrate (65 FR 4141; USFWS 2013e, 1995c). Generally, larger fish occur in deeper portions of the stream. This species seems to avoid shallow riffles (Cross 1976, as cited in USFWS 1996b). The species is very tolerant of high salinity and turbidity (USFWS 2013c)

In 2000, 87.5 miles of the Virgin River in Utah, Arizona, and Nevada including the mainstem and the 100-year floodplain was designated as critical habitat (65 FR: 4140-4156). A separate population of the Virgin River chub that occurs in the Muddy River is not considered to be part of the federal listing or critical habitat designation at this time. A separate listing determination or candidate assessment review for the Virgin River chub population in the Muddy River is considered to be warranted (USFWS 2008b).

Virgin River chub spawns during late spring and early summer over gravel and rock substrates (USFWS 2013e). No parental care is provided for the eggs, which usually hatch in one week or less. Long-term monitoring in the upper portion of the Virgin River, where red shiner does not occur, indicates that this species reproduces successfully in most years (USFWS 2008b). Some level of recruitment to the adult population appears to occur in most years, based on the presence of early age classes.

Threats

Threats to the Virgin River chub in the Virgin River are described in the Virgin River Fishes Recovery Plan (USFWS 1995c) and the Five-Year Review for Recovery (USFWS 2008b). Since the Virgin River is not crossed by the refined transmission corridor, threats to the Virgin River chub for this population are not described in this Biological Assessment. Threats to the Muddy River and its Virgin River chub population, which is crossed by the Project's transmission line corridor, include changes in flow and

water quality, habitat alteration, completion and predation by nonnative fishes, and parasitism (NatureServe 2013d; USFWS 1996b).

Recovery

A recovery plan has not been implemented for the Virgin River chub population in the Muddy River, since it is not federally listed at this time.

Assessment of Effects

Area of Analysis

The analysis area for Virgin River chub would include occupied habitat crossed by the refined transmission corridor and the potential disturbance area beyond the refined transmission corridors plus an approximate 1-mile downstream segment from the ROW crossing to address direct effects of the Project. The transmission line corridor and engineered alignment cross occupied habitat for Virgin River chub in the Muddy River (**Figure 6-13**). Occupied habitat also is located downstream of the refined transmission corridor and engineered alignment in the Colorado River and tributaries near the confluence with the Colorado, Price, and White rivers.

The refined transmission corridor and engineered alignment cross occupied habitat for Virgin River chub in the Muddy River. As previously mentioned, the Muddy River population is not federally listed at this time. The refined transmission corridor does not cross the Virgin River.

Conservation Measures

Impacts to Virgin River chub and its habitat would be minimized through implementation of the following BMPs, design features, and conservation measures referenced or described in Chapter 3.0:

- Applicable BMPs involving sediment control (WAT-9).
- Applicant-committed conservation measures and design features: TWE-8, TWE-12, TWE-13, TWE-19, TWE-22, and TWE-24.
- Conservation measures: **SSS-1** and **WR-3**.

The following additional conservation measure is proposed for Virgin River chub:

> **SSS-11** (No Vehicle Crossings or New Roads in the Muddy River): No vehicle crossings or new roads would be constructed for the Muddy River. This measure would protect habitat for Virgin River chub by avoiding habitat alteration or loss.

Direct and Indirect Effects

The 250-foot-wide transmission line ROW and transmission line would cross one stream, the Muddy River, in Clark County, Nevada, which contains Virgin River chub. Implementation of conservation measure **SSS-11**, described above, would prevent any direct disturbance to Virgin River chub habitat that could result from vehicle traffic and equipment disturbance in the river.

Indirect effects involving sedimentation could adversely affect water quality in the Muddy River from ground disturbance within or near the river. Vehicle and equipment use within or near the Muddy River also could pose a risk to aquatic biota from fuel or lubricant spills. The implementation of BMPs, Applicant-committed mitigation measures and design features and additional conservation measures listed above and described in Chapter 3.0, along with **SSS-11** described above, would avoid or minimize impacts to Virgin River chub habitat that could result from erosion and sedimentation or spillage of fuels and lubricants during construction.

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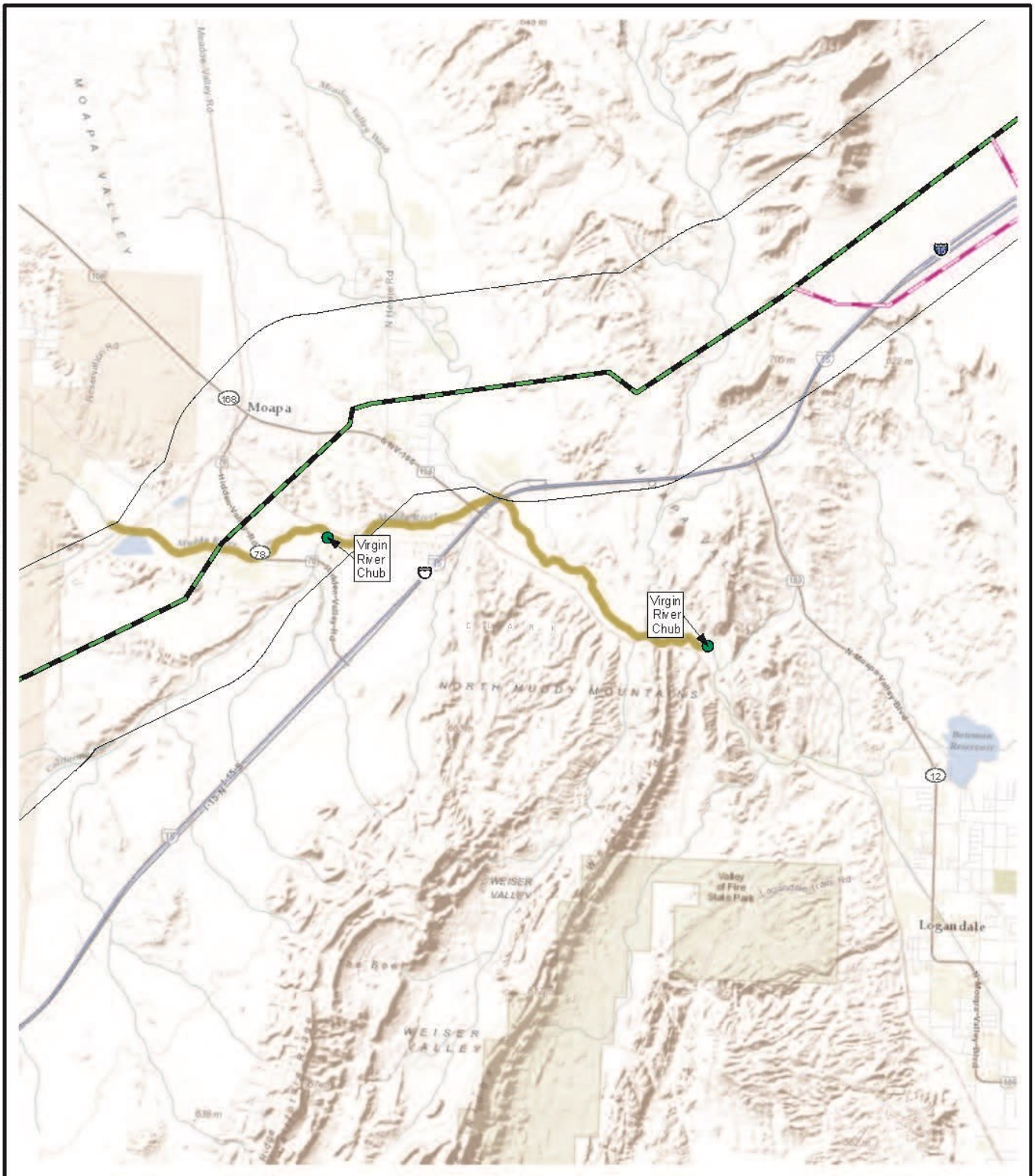

Proposed Action
Virgin River Chub Occurrence
Action Area
Analysis Area

TRANSWEST EXPRESS
TRANSMISSION PROJECT

Figure 6-13
Area of Analysis for
Virgin River Chub

0 0.5 1 2 Miles
0 0.5 1 2 km
1:100,000

Western
AREA POWER ADMINISTRATION

Exported On: 2/20/2015

Construction at stream crossings also could remove riparian vegetation. Vegetative cover along streambanks provides cover for fish, shading, bank stability, and increased food and nutrient supply as a result of deposition of insect and vegetative matter into the watercourse. Riparian vegetation also contributes woody material to streams that are used for fish cover and can be part of forming habitat features such as pools. Disturbance to the streambank areas at stream crossings would represent a relatively small width (portion of 250-foot-wide transmission line ROW on each streambank). Given the relatively small width of the disturbance area associated with an individual stream crossing, impacts would be considered low in relation to the entire stream system. These impacts could be easily avoided by spanning riparian habitat along the Muddy River.

If construction water use utilized water from the Muddy River, flow reductions could decrease the amount of Virgin River chub habitat. The magnitude of the habitat effect would depend on the volume of water withdrawn and life stages of Virgin River chub that may be present downstream of the withdrawal point.

Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the Project action area near the Muddy River.

Determination

Effect on the Species: For clarification, the Virgin River chub population in the Muddy River is not part of the federal listing or critical habitat designation for this species at this time. However, a determination is made because the Virgin River chub population in the Muddy River is considered to be warranted for future listing or candidate status.

The Proposed Action *may affect, is not likely to adversely affect* the Virgin River chub in the Muddy River.

Effect on Critical Habitat: The Proposed Action would have *no effect* on designated critical habitat for this species as no critical habitat has been designated for Virgin River chub in the Muddy River.

Rationale: The implementation of BMPs and additional conservation measures would be used to avoid direct loss or alteration of habitat and minimize indirect effects involving potential sediment input and fuel spill risks to the Muddy River. The Nevada State Engineer approval process would ensure that special status species such as the Virgin River chub would not be adversely affected by water use, if it is proposed for the Proposed Action.

6.1.5 Plants

6.1.5.1 Clay Phacelia (Endangered)

Environmental Baseline

Conservation Status

The clay phacelia (*Phacelia argillacea*) was listed as endangered under the ESA on June 28, 1978. No critical habitat has been proposed or designated for this species. A recovery plan was published on April 12, 1982.

The species occurs in two known locations in Spanish Fork Canyon in Utah County, Utah: one in the vicinity of Tucker, and one approximately 6 miles down-canyon near Mill Fork Canyon. The total population size has been estimated at approximately 200 individuals.

Critical habitat has not been designated for clay phacelia.

Life History and Habitat Association

Clay phacelia occupies sparsely populated pinyon-juniper woodland, montane shrub, and other barren and sparsely vegetated areas specifically found on steep slopes (up to 70 percent). The species is associated with skunkbush sumac (*Rhus trilobata*) and serviceberry (*Amelanchier alnifolia*) on shaley clay colluviums of the Green River Formation. Populations are found between 6,000 and 7,000 feet amsl (USFWS ECOS 2014b).

Clay phacelia has blue to violet flowers and stands 4 to 14 inches tall. It is a biennial species that flowers between late May and early June. Initial foliage leaves are small, but by early to mid-October, basal rosettes have formed and can be up to 2.8 inches wide. The rosettes grow slowly under the snow, and bolt only after the snow melts and air temperatures increase significantly (USFWS ECOS 2014b). Clay phacelia was formerly considered a winter annual but new data indicates that it is actually a true biennial. The life history of a biennial includes seedling emergence in the spring, growth of a rosette in the summer, vernalization during the following winter, and flowering, seed set, and death the second summer (USFWS ECOS 2014b).

As the plant grows, the number of flowers displayed becomes greater. Spring and summer precipitation is necessary to allow plants to continue flowering into autumn, with the last of the season's flowers observed typically in mid-October. Plant size appears to be a function of available soil moisture. Clay phacelia is dependent on a few rain events to release seedlings; therefore, alterations to the timing and frequency of rainfall and snow may greatly affect species recruitment (USFWS 2013f). Clay phacelia has the capacity to develop four mature seeds per fruit and thus can be a prolific seeder (USFWS ECOS 2014b). Pollination studies suggest they require insect pollinators (USFWS ECOS 2014b) and observations have shown the likelihood of more than one pollinator. Several species of small to medium-sized mostly solitary bee species have been seen in the vicinity of clay phacelia (USFWS ECOS 2014b). It also has been speculated that wind could prove to be a major pollinator of the species in addition to bees (NatureServe 2014).

Threats

Current threats to the species include climatic changes, edaphic factors, as well as its small population size. Additional threats include declining population trends as a result of trampling, livestock and wildlife herbivory, noxious and invasive weed species, railroad maintenance, and destruction of habitat for transportation, transmission line, railroad, and oil and gas development (Tilley et al. 2010a; USFWS 2013f; USFWS ECOS 2014b).

Recovery

A recovery plan was published for clay phacelia in 1982 and in August 2013, the findings of the *Clay Phacelia 5-Year Review: Summary and Evaluation* was completed. This review summarizes and evaluates current research, surveys related to the species and information provided in the recovery plan. The review determined that clay phacelia has benefited from successful collaborations and partnerships with federal, state, and private conservation groups. In addition, the USFWS *Preventing Extinction* grant provided funding to study previously unknown life history factors and to establish a seed library and support seed propagation efforts.

The goal of the recovery effort is to establish new populations on publically owned lands that receive a higher level of protection relative to privately owned lands. The objective of the recovery plan is to establish a self-sustaining population of 2,000 to 3,000 individuals on 120 acres of protected habitat and to possibly establish at least one new population (Tilley et al. 2010a; USFWS 2013f, 1982). In 2005, seed collections and germination studies yielded 53 potted plants, which subsequently produced 11,000 seeds towards recovery of this species.

The recovery criteria of 2,000 to 3,000 individuals and the establishment of additional populations have not been met at this time; however, efforts are ongoing. Further, the understanding of the species has

increased considerably and several of the threats identified in the recovery plan have been reduced. The USFWS concluded that no change to the species classification is needed. The 5-year review (USFWS 2013f) recommended the following survey, monitoring, and research practices:

- Continue to monitor population size of this species through time.
- Monitor seed bank viability, seedling recruitment, and seedling survivorship.
- Document and quantify herbivory from free-ranging herbivores.
- Revisit occupied sites, create GPS coordinates for each plant location, and identify areas to survey where the plant could occur.
- Monitor invasive, exotic species distribution and abundance in suitable habitat.
- Complete a population viability analysis for this species and reevaluate the number of individuals needed for a healthy population.
- Continue collecting and maintaining a genetically representative ex-situ seed collection for the species.
- Augment introduced sites to ensure genetic representation of the species on federal lands.
- Study the effects of climate change on this species including how altered precipitation, water volume, availability, and timing of rain events could affect the species.
- Determine the environmental conditions and tolerances necessary for each life stage of the species.
- Determine if and how road and railway traffic volume influences this species, and its community associates such as pollinators.
- Determine the extent to which the plants and their pollinators are being affected by road and railroad maintenance activities.
- Re-examine the genetic diversity of this species in the future to determine if genetic diversity has been maintained or been reduced through time, using samples from multiple years.
- Study the plants' pollinators and the pollinators' habitats.
- Determine the effects of erosion on the species and identify actions that could restore soil conditions.
- Examine conditions surrounding seedling emergence, the dynamics and characteristics of the seed bank including seed dormancy and germination (USFWS 2013f).

Assessment of Effects

Area of Analysis

In keeping with the Clay Phacelia Conservation Measures provided by the USFWS (USFWS 2013g), the clay phacelia analysis area is defined by the type of activity within suitable habitat. In areas where temporary ground disturbance would occur, a buffer distance of 650 feet would be applied to suitable habitat. In areas where herbicides would be used, a buffer distance of 2,500 feet from the edge of suitable habitat would be applied. For the purpose of this document, the analysis area for clay phacelia is defined as the spatial extent of potential habitat within the project disturbance areas, plus a 650-foot buffer. Project disturbance areas are defined in Section 2.2. This analysis area is based on the following assumptions:

- Pre-construction surveys have not been conducted to verify the extent of suitable habitat; therefore, the use of model-generated potential habitat would be applied as a conservative estimate.

- Site-specific locations of access roads have not been defined; therefore, it is assumed that ground disturbance could occur anywhere within the analysis area.
- TransWest has committed to prohibiting herbicide use within 2,500 feet of occupied or suitable clay phacelia habitat.

Within the analysis area, the species has been identified in two distinct clusters. The first cluster is located within the refined transmission corridor, approximately 2,200 feet southwest of the preliminary engineered alignment and extending approximately 0.5 mile within the refined transmission corridor. The second cluster is located within the analysis area (adjacent to the refined transmission corridor) approximately 1 mile southwest of the preliminary engineered alignment. In addition to these two naturally occurring clusters, there are a number of reintroduction sites within the refined transmission corridor and analysis area. Based on the current alignment of the Proposed Action and the nominal span distance of the transmission line, direct impacts to the species (including the reintroduction sites) are not anticipated. Indirect impacts could occur due to the populations' proximity to the engineered centerline. Additionally, these known occurrences are found on steep slopes with fine textured soil and fragmented shale derived from the Green River Formation. As the species grows on barren, precipitous hillsides and fine textured soil, it is extremely susceptible to erosion and sedimentation, and its habitat would be difficult to reclaim.

Conservation Measures

Impacts to clay phacelia habitat would be minimized through implementation of the following design features and conservation measures described in Chapter 3.0:

- Applicant-committed conservation measures and design features: TWE-1 – TWE-7, TWE-9 – TWE-13, TWE-19, TWE-22–TWE-23, TWE-26 – TWE-27, TWE-29, TWE-31, TWE-33 – TWE-34, TWE-47, TWE-57 – TWE-62, and TWE-64.
- Conservation measures **NX-1**, **SS-1**, **SS-3**, **SS-4**, **SS-5**, **SS-6**, and **SS-9**.

In addition, the following species-specific conservation measures would be implemented for clay phacelia:

SS-8: (Avoidance and Minimization of Impacts to Clay Phacelia).

1. 100 percent clearance surveys (within 650 feet of the centerline through all modeled suitable habitat) would establish the extent of occupied habitat that occurs in the area and any Project constraints. These surveys should occur between late May and early July.
2. All occupied sites would be avoided by development within the 250-foot-wide Project transmission line ROW (including structures, facilities, and new roads) by at least 650 feet. The distance could be adjusted in coordination with the authorizing agency and the USFWS in order to properly protect the plants from all disturbances. (Example: May be a larger distance if there is a higher risk of erosion or shorter distance if there is a lower risk chance of erosion).
3. Appropriate erosion (i.e., silt fence, straw waddles) control measures would be constructed if disturbance is allowed within 650 feet of occupied habitat or if such measures are needed to prevent sedimentation or dust deposition.
4. A qualified botanist would be on-site to monitor surface-disturbing activities when clay phacelia is within 650 feet of those surface disturbing activities.
5. Only water (no chemicals, reclaimed production water or other) would be used for dust abatement measures within occupied clay phacelia habitat.

6. Dust abatement would be employed during maintenance activities in modeled suitable clay phacelia habitat over the life of the project during the time of the year when the plant is most vulnerable to dust-related impacts (March through August).
7. No herbicide treatments within 2,500 feet of occupied clay phacelia habitat and no aerial herbicide treatments within modeled suitable habitat.
8. Limit upgrades to existing access roads within 650 feet of occupied clay phacelia habitat to those that eliminate the need to construct a new road, or are necessary for safety. Upgrades also would be designed to limit impacts to clay phacelia.

Direct and Indirect Effects

Construction and operation of the Proposed Action would have no impact on known populations of clay phacelia, which are located over 2.3 miles away and upgradient from the edge of the action area, and no impact on clay phacelia reintroduction sites, the nearest of which are approximately 1.2 miles away and upgradient from the edge of the action area. However, the action area does traverse modeled clay phacelia habitat and Project construction and maintenance activities have potential to adversely affect this habitat and any unknown occurrence of clay phacelia which could occur within it. Habitat suitability modeling completed by the USFS in 2013 identified approximately 1,353 acres of potentially suitable clay phacelia habitat, of which a maximum of 11 acres (0.8%) would have potential to be impacted within the analysis area (**Figure 6-14**).

Within the 250-foot-wide transmission line ROW and refined transmission corridor, surface disturbances would consist of ROW clearing in preparation for transmission structure installation, as well as vegetation removal and blading to facilitate the construction of temporary and permanent aboveground and belowground ancillary facilities. Surface-disturbing activities outside of the refined transmission corridors would be limited to development and maintenance of access roads and temporary work areas.

Implementation of the Applicant-committed measures and design features and general conservation measures listed above and described in Chapter 3.0 along with conservation measure **SS-8** described above would avoid Project-related impacts to clay phacelia and field-verified suitable habitat.

Possible indirect impacts to the clay phacelia could result from construction-related erosion and sedimentation, generation of fugitive dust, the spread and establishment of noxious and invasive weed species, habitat fragmentation, the potential loss of pollinators, and increased opportunities for illegal collection of individual plants. These impacts would be avoided by implementation of conservation measure **SS-8**.

Linear surface disturbances such as those associated with transmission lines and roads provide pathways (Gelbard and Belnap 2003; Watkins et al. 2003) and serve as sources of propagules (D'Antonio et al. 2001) for noxious weeds and other invasive plant species to infest adjacent undisturbed areas. Localized surface disturbances are known to facilitate the invasion of noxious and invasive species by removing native vegetative cover, creating areas of bare ground (Burke and Grime 1996; Watkins et al. 2003), and increasing light and nutrient availability (Stohlgren et al. 2003, 1999). Noxious and invasive species compete with native plants, can degrade and modify native communities, and reduce resources (e.g., moisture, soil nutrients, light) for native species. Impacts to clay phacelia and suitable clay phacelia habitat from noxious weeds and other invasive plants would be avoided or minimized through implementation of conservation measure **NX-1**.

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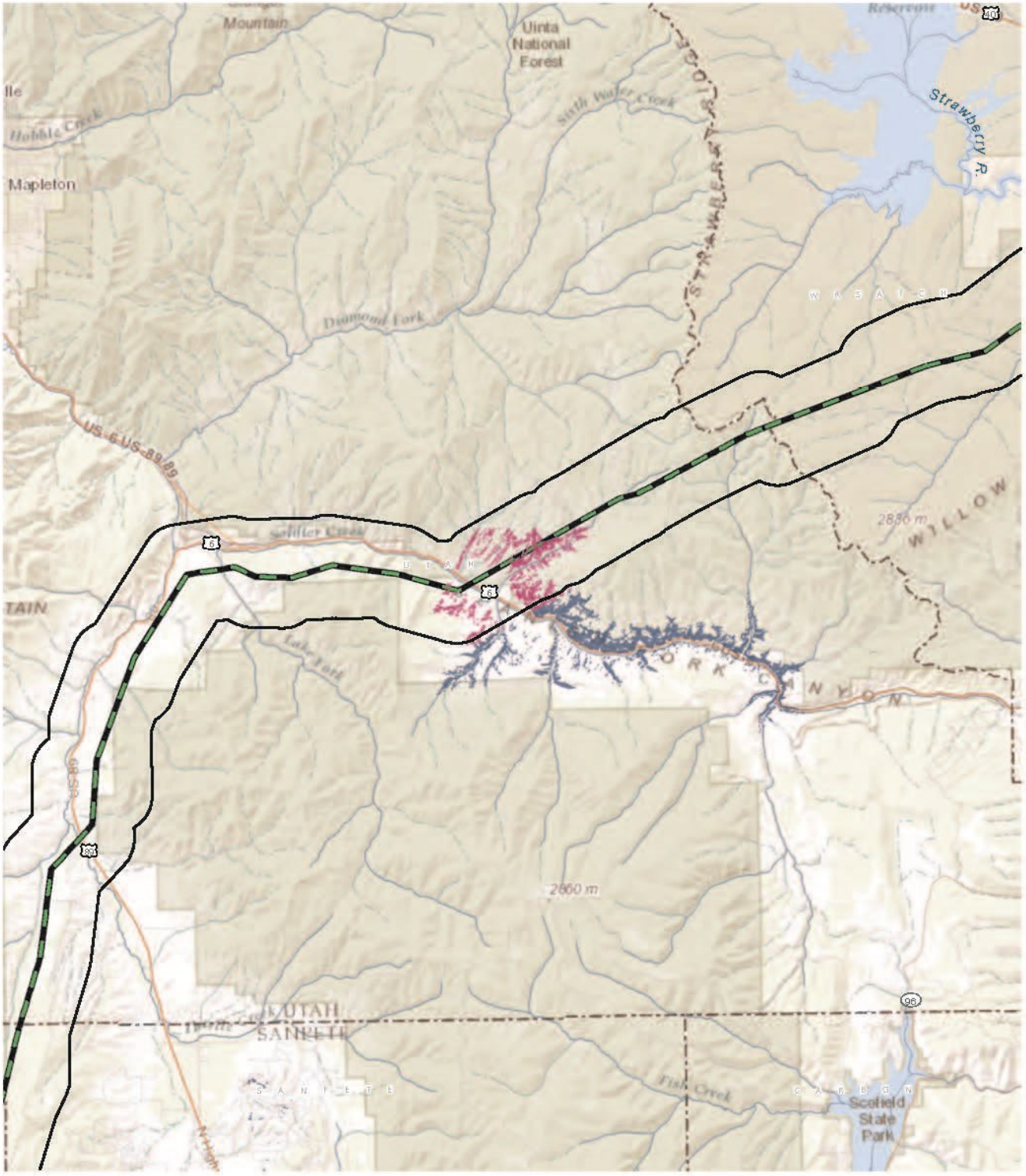

Proposed Action
Action Area
Analysis Area for Clay Phacelia
Modeled Suitable Habitat for Clay Phacelia (USFS 2013)

Action Area Buffer for Analysis Areas:
Clay phacelia - 650 feet

TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure 6-14
Areas of Analysis for Clay Phacelia

0 1 2 4 Miles
0 1 2 4 km
1:250,000

Western Area Power Administration

Exported On: 2/24/2015

Operation impacts include the effects of future maintenance activities for the transmission line and its ROW. Potential direct impacts to clay phacelia resulting from operation activities would be related to access road and ROW maintenance and vegetation management activities. These impacts would be avoided through implementation of the above design features and conservation measures.

Direct and indirect impacts to the species associated with decommissioning and reclamation of the Project and ROW are anticipated to be similar to those presented for construction impacts.

Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the Project action area.

Monitoring

There are currently no known short- or long-term monitoring and reporting plans for clay phacelia in the Project analysis area.

Determination

Effect on the Species: The Proposed Action *may affect, but is not likely to adversely affect* clay phacelia.

Effect on Critical Habitat: No critical habitat has been proposed or designated for this species; thus, the Proposed Action would have *no effect* on critical habitat for clay phacelia.

*Rationale: The GIS-based assessment of Project impacts to modeled potential habitat for clay phacelia provides a conservative, worst-case scenario of potential impacts to this species and still results in a relatively small portion (0.8%) of modeled habitat affected. In reality, given that modeled habitat occurs on steep side hills and drainages, it is anticipated that this habitat would be avoided during the next phase of engineering design by locating potential tower sites and access roads alignments outside of the modeled habitat polygons and avoiding any other impacts to potential habitat along the ROW by spanning these areas. Avoidance of impacts would be further ensured by conducting a habitat assessment prior to final engineering design. Though unlikely based on the distribution of modeled habitat, if field-verified suitable habitat could not be avoided by Project facilities, this habitat would be surveyed for clay phacelia in accordance with USFWS-approved survey protocols. Should any clay phacelia individuals or populations be found within 650 feet of areas of planned surface disturbance, impacts to these individuals would be avoided through facility micro-siting and other activities identified in conservation measure **SS-8** as well as through the use of, if necessary, special construction practices.*

6.1.5.2 Deseret Milkvetch (Threatened)

Environmental Baseline

Conservation Status

The Deseret milkvetch (*Astragalus desereticus*) was listed as threatened under the ESA on October 20, 1999. No critical habitat has been proposed or designated for this species and no recovery plan has been published to date.

The species is an endemic occurring only on the sandy-gravelly hillsides of the Moroni Formation in the Thistle Creek watershed near the community of Birdseye in Utah County, Utah. The known spatial extent of the species is small, covering approximately 278 acres, mostly on lower slopes along the east side of US-89. The population size in this single area ranges from 500 to 10,000 individuals. Surveys conducted in 2006 indicated that the known population has increased by 31 percent since the time of listing.

Life History and Habitat Association

Deseret milkvetch occupies montane shrub, desert shrub, pinyon–juniper woodland, and other sparsely vegetated communities. It is specifically adapted to sparse juniper-sagebrush (*Artemisia* spp.) communities on steep, naturally disturbed south and west (rarely north) facing slopes. Populations are found between 5,400 and 5,700 feet amsl (USFWS 2011e; USFWS ECOS 2014b). Where the species is located, upper slopes are steep and dominated by outcrops of poorly consolidated bedrock. Here, it occurs very sparsely, as the erosion rate generally exceeds the rate of soil formation; hence, there is little available rooting substrate. Middle slopes are moderately steep and have a thin mantle of loose, sandy soil overlying the parent material. Although the plant is more abundant on middle slopes than it is on upper slopes, high erosion rates create habitat instability which appears to limit the size (and probably the life span) of individual plants. Lower slopes (those closest to US-89) are more gradual and have deeper soils. In these areas, Deseret milkvetch cover is at its maximum, and the plants are generally much larger (and probably longer-lived) than on mid-slopes. Large and vigorous plants also are found on the adjoining west-facing road cuts above the highway (NatureServe 2014).

Deseret milkvetch is a perennial, herbaceous, almost stemless member of the bean family. Individual plants are 2 to 6 inches tall and arise from the base of an herbaceous stem. The pinnately compound leaves are 2 to 4 inches long with 11 to 17 leaflets. Leaflets are elliptical to ovate, with dense, silvery gray pubescence on both sides. Seed pods are 0.4 to 0.8 inch long and densely covered with hairs. The flower petals can be either completely white or off-white with pinkish wings and a lilac keel-tip (USFWS ECOS 2014b).

Deseret milkvetch likely reproduces sexually with flowering and seed set occurring in May and June. Based on the characteristics of the flower, it's believed that bees pollinate this species. Fruiting occurs after pollination between June and July and mature plants, defined as those greater than 4 inches in diameter, produce the most fruits. Once the seed pods are mature, they fall off the plant, crack open at the tip, and release seeds. For many *Astragalus* spp., seeds can remain dormant for a considerable amount of time (USFWS ECOS 2014b). This adaptation serves two functions: optimizing seedling survival and spreading germination over time so that a catastrophic event (such as drought or fire) does not kill all the seedlings. Pre-dispersal predation of *Astragalus* seeds by several types of insect larvae has been reported (NatureServe 2014) but field observations indicated that seed predation occurs infrequently. However, these observations could be influenced by fluctuating insect populations in relation to climatic and other factors (USFWS ECOS 2014b).

Plants begin the active growing season shortly after snow melt during mid-April. When temperatures are hot and dry at the end of summer, the leaves closest to the ground die back and new buds form at the soil level. These buds generally survive the winter because they are protected from severe cold by snow cover (USFWS ECOS 2014b).

Many species of *Astragalus* in the Intermountain region are poisonous to livestock (NatureServe 2014). Many synthesize nitrotoxins to which cattle and sheep are particularly susceptible. In addition, a few species produce an alkaloid compound causing the disease "locoism" found primarily in horses.

The apparent population restriction of Deseret milkvetch to a single locality raises the question of whether it is a relatively "new" species in geologic time or a relict population of an older species that was once more widely distributed. Many endemics in *Astragalus* are restricted to inhospitable substrate conditions or limited by the abundance or absence of some particular soil mineral such as selenium, gypsum, or lime (NatureServe 2014). It is unknown if Deseret milkvetch is restricted to some confining ecological niche or whether it is unable (or perhaps has not had sufficient time) to expand into other areas of potentially suitable habitat. Franklin (1990) reports that Deseret milkvetch is specific to its current location and that soils on other outcrops in the vicinity are less sandy and possibly too clay-rich to support the species.

Intolerance of shade is very common within this genus (NatureServe 2014) and Deseret milkvetch is seemingly excluded from the denser pinyon-juniper woodland communities characteristic of slopes in the vicinity of its current population. However, there appears to be little likelihood that this single population would ever decline significantly via competitive exclusion by woodland dominants given that the high soil erosion rates associated with its steep-slope habitat.

Threats

Current threats to the species include residential development, highway widening, wildlife management, and livestock grazing and trampling. Its restricted distribution and single, small population size is another threat especially when considered in combination with the previously mentioned impacts (USFWS 2011e; USFWS ECOS 2014b).

Recovery

In 2011, the findings of the *Deseret Milkvetch 5-Year Review: Summary and Evaluation* were completed. The review determined that many of the previously identified threats were not as significant as expected or had failed to develop all together. Also, the species' known range and population size is greater than previously thought. Due to these factors, the USFWS concluded that the species should be delisted due to absence of threats (USFWS 2011e). Implementation of the Proposed Action, particularly when considered in combination with other high voltage transmission lines that have been proposed to traverse the same area, could introduce a new threat that could result in a USFWS determination not to delist the species (USFWS 2012f).

In addition to the recommendation to remove the species from the threatened species list, the 5-year review recommended the following survey, monitoring, and threat abatement practices as future actions:

- Habitat and soil monitoring should be considered to determine the full extent of potential habitat and facilitate post-delisting monitoring.
- The post-delisting monitoring plan should include annual monitoring geared toward assessing the impacts of livestock grazing on the plants and habitat. Should unauthorized livestock begin to degrade the habitat, fencing should be installed between the UDWR and private lands.
- Should monitoring show that unauthorized livestock are beginning to degrade the habitat, fencing should be installed between the UDWR and private lands (USFWS 2011e).

Assessment of Effects

Area of Analysis

There is currently no accepted habitat model for Deseret milkvetch. The model previously used by the USFWS was determined to be inadequate when populations of the plant were found outside of the modeled habitat area. Consequently, until a new habitat model can be developed and vetted by the USFWS, the agency is using a 2-mile buffer around known occurrences to define a general habitat area for this species (**Figure 6-15**). The north and south boundaries of the analysis area are therefore based on this general habitat area. Within this area, which extends approximately 7 miles along the length of the proposed ROW, the lateral extent of the Deseret milkvetch analysis area is defined by the type of construction and maintenance activity that could occur there. For areas in which only temporary ground disturbance would occur, the analysis area consists of the proposed facility footprint with a 50-foot buffer. In areas where temporary or permanent ground disturbance (including mechanical vegetation treatments) would occur, a buffer of 300 feet would be applied to the direct disturbance footprint. In areas where permanent ground disturbance would take place upslope of suitable or occupied habitat, the buffer is extended to 400 feet from the edge of ground disturbance. Were herbicides to be used following initial vegetation clearing or during the operations and maintenance phase of the project, a buffer distance of 2,500 feet from the edge of disturbance would be applied.

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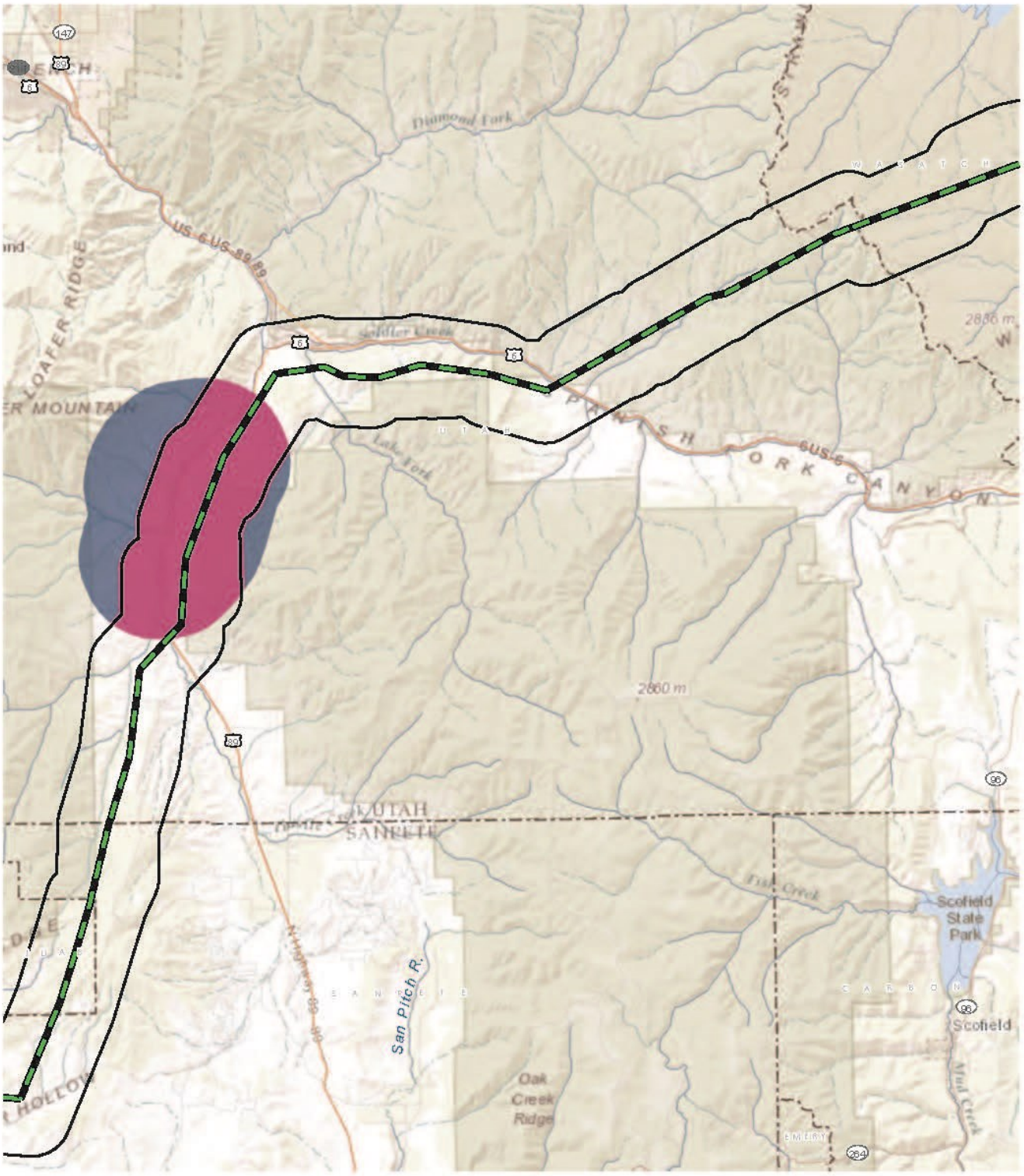


Proposed

Action

Analysis Area for Deseret Milkvetch

Potential Habitat for Deseret Milkvetch

Action Area Buffer for Analysis Areas:
Deseret milkvetch - 400 feet

TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure 6-15
Areas of Analysis for Deseret Milkvetch

0 1 2 4 Miles
0 1 2 4 km
1:250,000

Western AREA POWER ADMINISTRATION

Exported On: 2/24/2015

The analysis area for Deseret milkvetch is defined as the spatial extent of the general habitat polygon within the Project disturbance areas, plus a 400-foot buffer. This analysis area is based on the following assumptions:

- Field surveys have not been conducted to verify the extent of suitable habitat; therefore, the use of the USFWS-delineated general habitat polygon has been applied as a conservative estimate of the extent of potentially suitable habitat.
- Site-specific locations of access roads have not been defined; therefore, it is assumed that ground disturbance could occur anywhere within the analysis area.
- TransWest has committed to avoiding herbicide use within 2,500 feet of occupied or suitable Deseret milkvetch habitat.

Within the analysis area, the species has been documented within the refined transmission corridor along US-89 near Birdseye, Utah. Currently, the species is not known to occur outside of this area. The nearest known plant to the preliminary engineered alignment is located approximately 1,700 feet west and downslope of the proposed line. Another record of occurrence is located approximately 130 feet from and downslope of Blind Canyon Road, the most likely route by which the transmission line ROW would be accessed in this area.

Conservation Measures

Impacts to Deseret milkvetch potential habitat would be minimized through implementation of the following design features and conservation measures described in Chapter 3.0:

- Applicant-committed mitigation measures and design features: TWE-1 – TWE-7, TWE-9 – TWE-13, TWE-19, TWE-22 – TWE-23, TWE-26 – TWE-27, TWE-29, TWE-31, TWE-33 – TWE-34, TWE-47, TWE-57 – TWE-62, and TWE-64.
- Conservation measures **NX-1, SS-1**, **SS-3**, **SS-4**, **SS-5**, **SS-6**, and **SS-9.**

In addition to these measures, the following species-specific conservation measure is proposed:

SS-7: To avoid and minimize impacts to the Deseret milkvetch, TransWest would coordinate with the BLM, USFS, and USFWS to implement appropriate mitigation measures during construction, including but not limited to:

1. If the Project can avoid all suitable habitat (as modeled) and occupied habitat (as documented) with a 300-foot buffer, no surveys are necessary. If avoidance of suitable habitat is not possible, surveys would be performed within 300 feet of the Project area to determine occupancy prior to construction or 400 feet if upslope of suitable or occupied habitat.
2. If surveys are necessary, they must be performed by qualified individual(s) and according to Service accepted survey protocols. Surveys would be conducted during the flowering and/or fruiting period when the plant can be detected and correctly identified. Surveys would be valid for one calendar year.
3. No new development or permanent ground disturbance, including but not limited to poles, pads, towers, etc., would occur within a 300 foot buffer of suitable or occupied Deseret milkvetch habitat. If construction activities occur upslope of suitable or occupied habitat, the buffer may be increased to 400 feet to prevent additional erosion within the habitat.
4. Wire would be strung between towers aerially with no ground disturbance in suitable or occupied Deseret milkvetch habitat.

5. No new roads would be established within a 300-foot buffer of suitable or occupied Deseret milkvetch habitat. If construction activities occur upslope of suitable or occupied habitat, the buffer may be increased to 400 feet to prevent additional erosion within the habitat.
6. Existing access roads would be utilized to the extent practicable to limit additional fragmentation within the species' habitat from new road development.
7. The existing access road to the north of Birdseye that connects to Blind Canyon Road contains plants alongside the road and within 300 feet of the road edge. If this road would be used, formal consultation that incorporates the following conservation measures is recommended:
    a. Existing road sections where the plants occur would not be bladed or widened.
    b. A 300-foot buffer would be maintained between the edge of disturbance from blading or widening activities and individual plants. Widening of existing roads would not occur if occupied habitat is immediately upslope or downslope of the existing road.
    c. This road would not be used during the flowering period of Deseret milkvetch, between May 1 and June 30 to minimize the impact of dust on pollination and reproduction.
    d. This road may be used during the active growing season, outside the flowering period: March 1 - April 30 and July 1 - August 31. During these time periods, dust abatement would be employed during all phases of construction, maintenance, and operation.
8. For the existing road to the south of Birdseye, if plants are found within 300 feet of the road edge, formal consultation that incorporates the conservation measures identified in #7 is recommended.
9. Occupied Deseret milkvetch habitats within 300 feet of the edge of newly installed roads, poles, pads, towers, etc. shall be monitored for a period of 3 years after ground disturbing activities. Monitoring would include annual plant surveys to determine plant and habitat impacts relative to project facilities. Annual reports shall be provided to the Service and the UNHP.
10. All Project employees, including contractors, brought onsite for the duration of the construction project and ongoing maintenance activities would be informed of the occurrence of Deseret milkvetch in the project area and of the threatened status of the species. Maps with areas of avoidance, including buffers, would be provided to all employees accessing the project area. A qualified biologist or botanist is required to perform this instruction and update maps as necessary.
11. A qualified biologist or botanist must be on-site pre-construction to clearly mark or flag avoidance areas so they are visible during construction. The same qualified personnel would be present during construction to monitor avoidance of these areas. A post-construction report documenting compliance and non-compliance with these measures would be prepared by the qualified personnel and submitted to USFWS no later than 1 month post-construction.
12. All equipment would be cleaned and inspected for presence of invasive, non-native plants and seeds before being brought in suitable habitat.
13. Post-construction, the project would provide a GIS-shapefile or documentation of new and upgraded access routes to the appropriate emergency fire operations personnel with the State of Utah, the BLM, the USFS, and USFWS, as well as notification statement that there is a federally listed plant species within the area of Birdseye, Utah. This information would be provided no later than 1 year post-construction of this specific transmission line segment.
14. No vegetation treatments would be performed in suitable or occupied Deseret milkvetch habitat. In addition, the following buffers would be applied—300 feet buffer for mechanical vegetation treatments, 2,500 feet for herbicide treatments, and no aerial herbicide treatments.
15. Project disturbance within suitable habitat would not exceed 10 percent cumulatively.

Direct and Indirect Effects

The types of direct and indirect effects to Deseret milkvetch and its associated habitat resulting from construction, operation, and decommissioning of the Proposed Action would be similar to those presented above for clay phacelia.

Based on the current preliminary engineered alignment and the locations of known occurrences, temporary and permanent ground disturbances within the proposed ROW are not expected to affect this species. However, direct and indirect impacts to Deseret milkvetch could occur as a result of the populations' proximity to access roads. Should Blind Canyon Road be used to access the proposed ROW, there is potential for improvements to and use of this road to result in adverse effects on individual plants due to erosion/sedimentation and the generation of fugitive dust. Implementation of the Applicant-committed mitigation measures, design features, and general conservation measures listed above and conservation measure **SS-7** described above would result in the Project having no impact on Deseret milkvetch individuals. These measures also would result in the avoidance of impacts to potential Deseret milkvetch habitat outside of the ROW and the minimization of impacts to potential Deseret milkvetch habitat within the ROW.

Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the Deseret milkvetch area of analysis.

Determination

Effect on the Species: The Proposed Action *may affect, but is not likely to adversely affect* Deseret milkvetch.

Effect on Critical Habitat: No critical habitat has been proposed or designated for Deseret milkvetch; thus, there would be *no effect* to critical habitat for this species.

*Rationale: Construction and operation of the Proposed Action would affect a relatively small portion of the Deseret milkvetch area of analysis. Prior to final engineering surveys, a habitat assessment would be conducted to determine whether suitable habitat occurs within the analysis area. If suitable habitat is found, and should it be necessary to site project facilities within that habitat, species-specific surveys using USFWS-approved protocols would be conducted. All occurrences of the species identified during this survey effort would be avoided by surface-disturbing activities. In addition, access roads and other Project facilities would be sited a minimum of 300 feet away from observed species locations. Implementation of the listed design features, general conservation measures, and conservation measure **SS-7**, would result in avoidance of Project-related impacts to Deseret milkvetch and minimization of or compensation for impacts to its habitat.*

6.1.5.3 Ute Ladies'-tresses Orchid (Threatened)

Environmental Baseline

Conservation Status

The Ute ladies'-tresses orchid (*Spiranthes diluvialis*) was listed as threatened pursuant to the ESA on January 17, 1992. No critical habitat has been proposed or designated for this species. A draft recovery plan for Ute ladies'-tresses was developed by the USFWS in 1995 but it has not been finalized. In 2005, a rangewide status review of the species was prepared by contractors on behalf of the USFWS and Central Utah Water Conservancy District.

Populations of Ute ladies'-tresses orchid are known from three broad general areas of the interior western U.S.: 1) near the base of the eastern slope of the Rocky Mountains in southeastern Wyoming and adjacent Nebraska as well as north central and central Colorado; 2) in the upper Colorado River

Basin, particularly the Uinta Basin; and 3) in the Bonneville Basin along the Wasatch Front and westward into the eastern Great Basin, north-central and western Utah, and extreme eastern Nevada and southeastern Idaho. The species also has been documented in southwestern Montana and in the Okanogan area and along the Columbia River in north-central Washington. During the 2004 status review, it was determined that there were 61 Ute ladies'-tresses populations recognized rangewide, 52 of which were extant at that time. Many populations have less than 100 individuals, though contain between 100 and 1,000 plants and a few populations have been estimated to contain between 1,000 and 30,000 plants (Fertig et al. 2005). The highest number of plants recorded in any 1 year was 38,438 in 1998, based on sampling 23 of the 55 populations known at that time. Because the sampled populations were not selected randomly, no useful extrapolations to estimate rangewide numbers from annual counts can be made (Fertig et al. 2005). Status and trends for individual populations can be found in the rangewide status review (Fertig et al. 2005).

Life History and Habitat Association

The species is riparian or wetland-dependent and typically occupies moist to very wet, somewhat alkaline or calcareous native meadows near streams, springs, seeps, lake shores, or abandoned streams that still retain ample groundwater. Elevations range from 4,200 to 7,000 feet amsl over the entire range of the species; however, in each state, the species is found at more specific elevation ranges (Fertig 2000; USFWS ECOS 2014b). Since its listing, Ute ladies'-tresses was known to exist primarily in moist meadows associated with perennial stream terraces, floodplains, and oxbows. In 1992, surveys determined that Ute ladies'-tresses also occupy seasonally flooded river terraces, sub-irrigated or spring-fed abandoned stream channels and valleys, and lakeshores. In addition, 26 populations have been discovered along irrigation canals, berms, levees, irrigated meadows, excavated gravel pits, roadside barrow pits, reservoirs, and other human-modified wetlands. Over one-third of all known Ute ladies'-tresses populations are found on alluvial banks, point bars, floodplains, or ox-bows associated with perennial streams. More than half of documented populations occur in sites where natural hydrology has been influenced by dams, reservoirs, or supplemental irrigation. Many populations occur within agricultural or urban settings (Fertig et al. 2005; USFWS ECOS 2014b).

Ute ladies'-tresses is a perennial herb with usually one erect, glandular-pubescent stem 4.5 to 24 inches tall arising from tuberous-thickened roots. Basal leaves are narrow, up to 0.4 inch wide and 11 inches long, and persist at the time of flowering. Leaves are arranged alternately and become progressively smaller moving up the stem. The inflorescence is sparsely pubescent spikes of numerous small white or ivory-colored flowers arranged in a gradual spiral. Individual flowers are 0.3 to 0.6 inch long and faintly fragrant. The lip petal is oval to lance-shaped, narrowed at the middle, and has wavy margins. Fruits are cylindric capsules with numerous seeds (USFWS ECOS 2014b).

The orchid appears to require moisture in the rooting zone, typically provided by a high groundwater table through the growing season and into late summer or early autumn. Ute ladies'-tresses orchid typically flowers from July to August, but can vary from late June to late September depending on the state/region (Fertig 2000; USFWS ECOS 2014b). Plants usually occur as small scattered groups and occupy relatively small areas within the riparian system.

Ute ladies'-tresses orchid most likely reproduces exclusively by seed; however, the presence of clustered plants could be the result of asexual reproduction from a single root mass or broken root segment. Such clusters also could be from seed caches or germination of seed from an entire buried fruiting capsule. The life cycle of the species consists of four main stages: seedling, dormant, vegetative, and reproductive (flowering or fruiting). Fruits are produced in late August or September with seeds shed shortly thereafter. As with other orchid species, Ute ladies'-tresses seeds are microscopic and readily dispersed by wind or water. Because of their minute size, the seeds contain little stored food to sustain embryos and are probably short-lived in the soil. Recent attempts to germinate seeds in a lab demonstrated it took up to 1.5 years for germination to occur. It is hypothesized that germinated seedlings must quickly establish a symbiotic relationship with mycorrhizal soil fungi in order to survive.

The absence or rarity of appropriate fungal symbionts in the soil could be a major factor limiting the establishment of new Ute ladies'- tresses populations (USFWS ECOS 2014b).

New vegetative shoots are produced in October and persist through the winter as small rosettes. These resume growth in the spring and develop into short-stemmed, leafy plants. Depending on site productivity and conditions, vegetative shoots can remain in this state all summer. Vegetative individuals die back in the winter to subterranean roots or persist as winter rosettes. Ute ladies'-tresses blooms from early July to late October and flowering typically occurs earlier where there is an open canopy (USFWS ECOS 2014b).

Bees are the primary pollinators of Ute ladies'-tresses, particularly solitary bees in the genus *Anthophora*, bumblebees (genus *Bombus*), and occasionally non-native honeybees (*Apis mellifera*). Of these species, *Anthophora terminalis* is apparently the most effective pollinator, with studies showing orchids pollinated by *A. terminalis* produce three times as many fruits as plants pollinated only by *Bombus* species (USFWS ECOS 2014b). Long-term monitoring studies indicate that the abundance and composition of the bee fauna varies from year-to-year, thus impacting overall fruit production. Other insects such as Syrphid flies, skippers, and members of the *hymenopteran* genera have been observed visiting the orchid for nectar. However, they are too small or improperly shaped to function as effective pollen vectors (USFWS ECOS 2014b).

Threats

Current threats to the species include grazing, loss of wetland and riparian habitat, fragmentation as a result of noxious weed species invasion, and shifts in hydrologic regimes. Additional threats to the species include habitat modification; over-collection; herbicide drift; recreational activities; mowing; herbivory; loss of pollinators; drought; and loss of mycorrhizal symbionts.

When Ute ladies'-tresses orchid was listed, the USFWS identified habitat loss and modification (through urbanization, water development, and conversion of wetlands to agriculture), over-collection, competition from exotic weeds, and herbicide application as the main threats to the survival of Ute ladies'-tresses. Since listing in 1992, other threats have been identified including impacts from recreation; mowing for hay production; grazing by cattle or horses; herbivory by native wildlife (particularly voles); reduction in the number and diversity of insect pollinators; drought; absence or rarity of mycorrhizal symbionts; and conflicting management with other rare species (USFWS ECOS 2014b). It has been demonstrated that mowing in conjunction with winter grazing can actually have a positive effect on Ute ladies'-tresses by reducing competing vegetative cover and protective cover for voles (USFWS ECOS 2014b).

Recovery

In 1995, the USFWS published the *Draft Ute Ladies-Tresses Agency Review Draft Recovery Plan*. As stated above, this recovery plan has not been finalized. The *Rangewide Status Review of Ute Ladies'-Tresses* (*Spiranthes diluvialis*) was published in September 2005 (Fertig et al. 2005).

Assessment of Effects

Area of Analysis

The analysis area for Ute ladies'-tresses orchid is defined as the spatial extent of potential habitat within the Project disturbance areas, plus a 300-foot lateral and upstream buffer and a 1,320-foot (0.25-mile) downstream buffer. This analysis area is based on the following assumptions:

- Field surveys have not been conducted to verify the extent of suitable habitat; therefore, modeled potential habitat has been used to conduct the effects analysis in this BA under the conservative assumption that all modeled habitat is occupied.
- Site-specific locations of access roads have not been defined; therefore, it is assumed that ground disturbance could occur anywhere within the analysis area.

Although the Project traverses modeled Ute ladies'-tresses habitat in multiple locations, the only known population of the species in the vicinity of the analysis area is located in Uintah County, Utah, where a population has been documented approximately 2,000 feet north (and upstream) of the analysis area.

Conservation Measures

Impacts to Ute ladies'-tresses orchid potential habitat would be minimized through implementation of the following design features and conservation measures described in Chapter 3.0:

- Applicant-committed conservation measures and design features: TWE-1 – TWE-7, TWE-9 – TWE-13, TWE-19, TWE-22, TWE-23, TWE-26–TWE-27, TWE-29, TWE-31, TWE-33 – TWE-34, TWE-47, TWE-57 – TWE-62, and TWE-64.
- Conservation measures: **NX-1, SS-1**, **SS-3**, **SS-4**, **SS-5**, **SS-6**, and **SS-9.**

In addition to these measures, the following species-specific conservation measure would be implemented:

- **SS-2**: (Avoidance of Ute ladies'-tresses orchid species and habitat) – Known individuals and populations and areas identified as suitable habitat through consultation with the USFWS would be spanned by the transmission line. Surface disturbance associated with facilities, access roads, and other Project-related construction activities would not occur within the areas identified as suitable habitat or as having known occurrences. A minimum 300-foot lateral and upstream buffer distance and a 1,320-foot downstream buffer would be observed between areas of surface disturbance and known occurrences. Presence of species in modeled habitat is assumed for ESA Section 7 consultation purposes. If potential habitat cannot be avoided, 3 years of surveys in potential habitat would be required and formal consultation may be necessary.

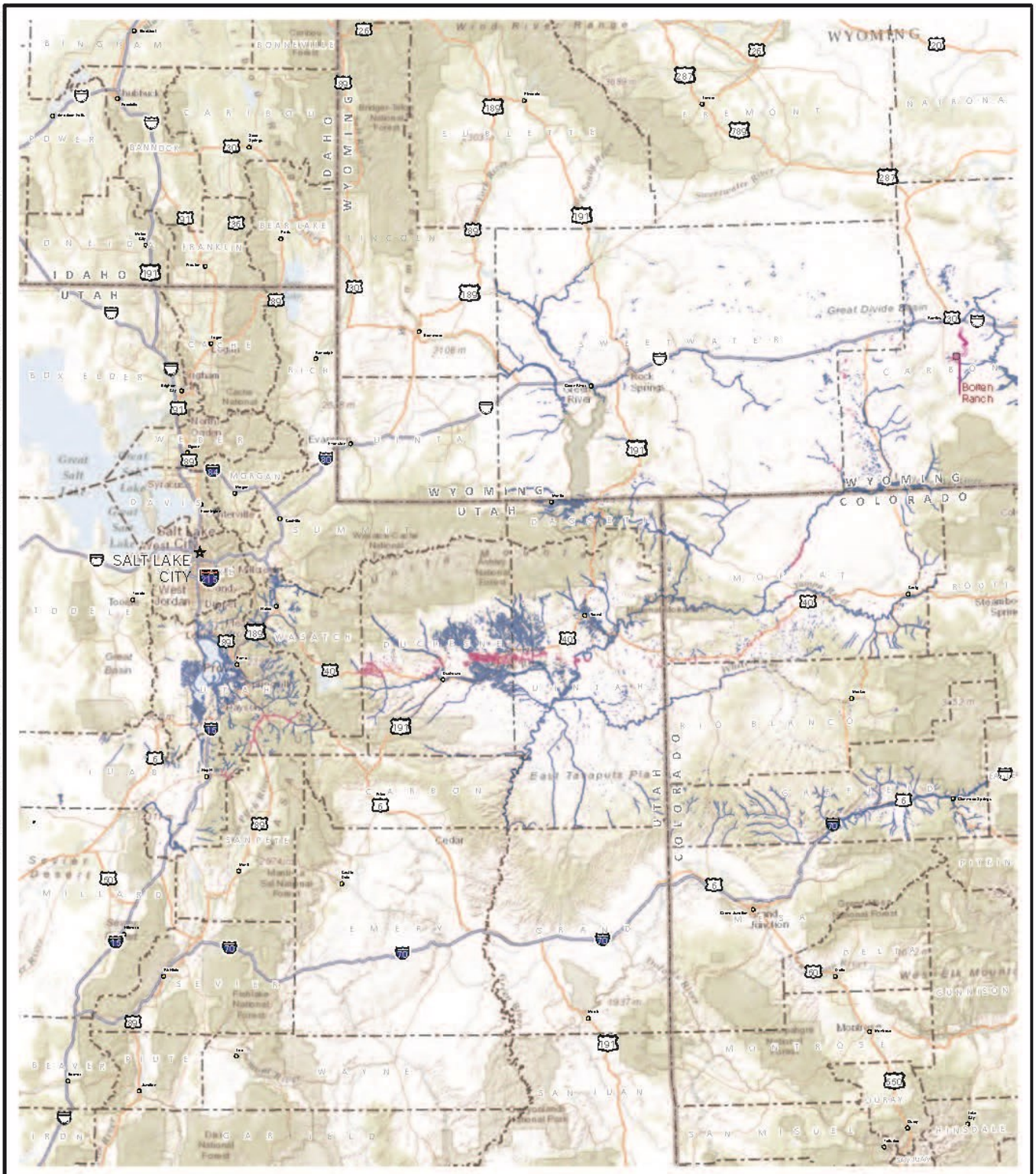
Direct and Indirect Effects

Habitat modeling indicates that approximately 5,619 acres of potential habitat have been identified within the analysis area (**Figures 6-16** and **6-17**). Based on the preliminary engineered alignment, the nominal span distance of the transmission line, and the estimation of transmission line structures required in this area, approximately 81 acres (1.4 percent) of potential habitat within the analysis area could be directly impacted by the Proposed Action. Site- and species-specific surveys within potential habitat would further refine this value and potentially reduce the estimated acreage of impacts to habitat. Whereas the Proposed action would affect modeled Ute ladies'-tresses habitat, it would have no effect on any known populations of the species.

Site-specific locations of access roads within the analysis area have not been defined; therefore, it is assumed that ground disturbance could occur anywhere within the analysis area and the area of potential impact accounts for estimated road disturbance. In reality, TransWest would use existing roads to access either side of large streams and wetlands, minimizing disturbance to potential Ute ladies'-tresses habitat.

With implementation of the Applicant-committed mitigation measures and design features and the general and species-specific conservation measures listed above, impacts to Ute ladies'-tresses and its habitat are expected to be avoided. Pre-construction surveys would identify extant plants and occupied habitats and allow TransWest to micro-site facilities and/or use special construction practices (as defined in Section 5.7 of the POD (Final EIS Appendix D)) to avoid direct impacts to this species and its habitat.

No critical habitat has been proposed or designated for this species; therefore, no impacts to critical habitat would occur.



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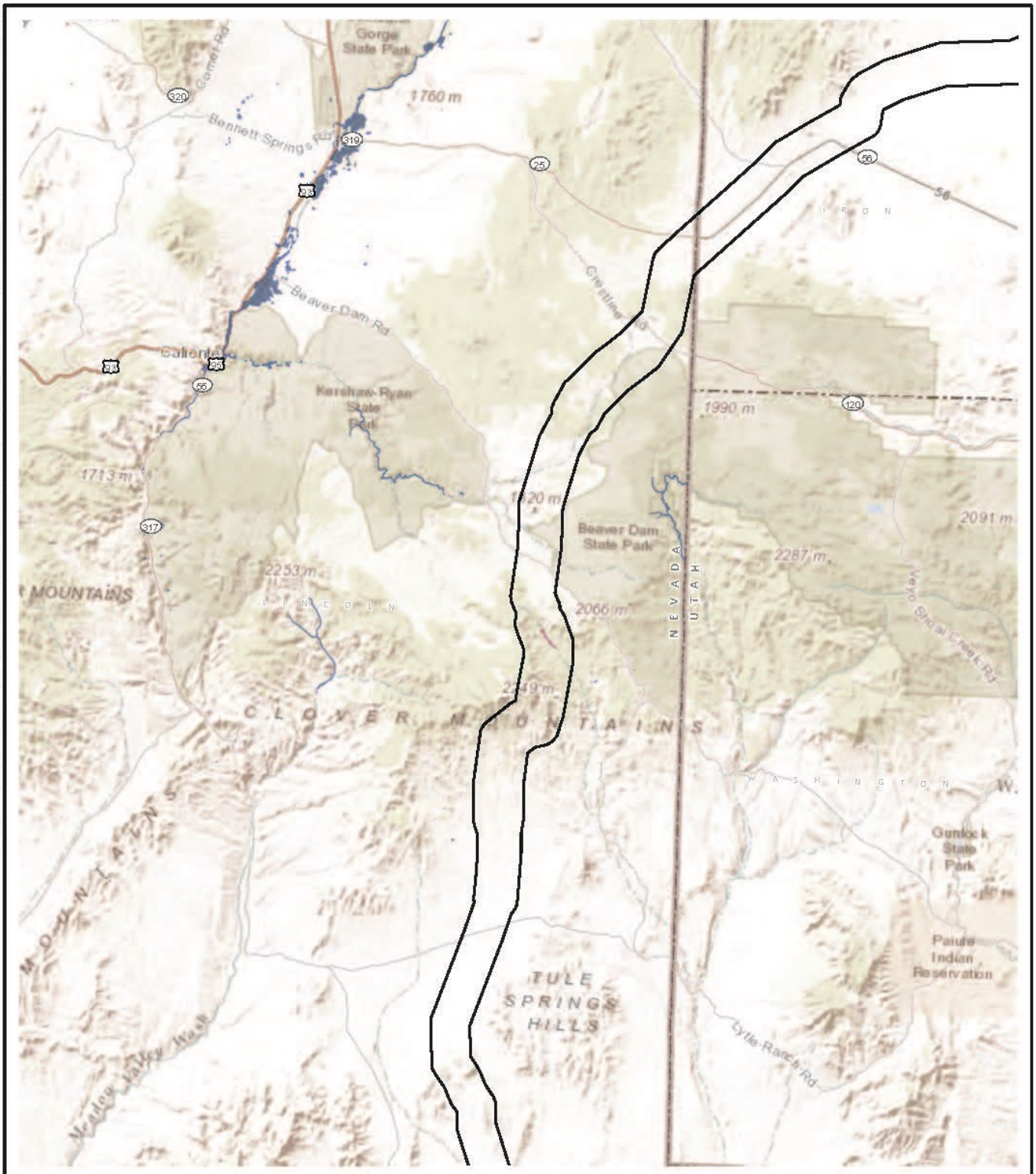
Gorge State Park
Comet Rd
320
Bennett Springs Rd
319
1760 m
25
93
56
Beaver Dam Rd
Caliente
55
Kershaw-Ryan State Park
1990 m
120
1713 m
317
2253 m
MOUNTAINS
Beaver Dam State Park
2287 m
2091 m
2066 m
NEVADA
UTAH
Meadow Valley Wash
CLOVER MOUNTAINS
WASHINGTON
Gunlock State Park
Paiute Indian Reservation
TULE SPRINGS HILLS
Lytle Ranch Rd
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
CALIFORNIA
Action Area
Potential Habitat for Ute Ladies'-Tresses Orchid
Analysis Area
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 6-17
Region III
Area of Analysis for
Ute Ladies'-Tresses Orchid
0 2 4 8 Miles
0 2 4 8 km
1:500,000
Western AREA POWER ADMINISTRATION
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Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the Project action area.

Determination

Effect on the Species: The Proposed Action *may affect, but is not likely to adversely affect* Ute ladies'-tresses orchid.

Effect on Critical Habitat: No critical habitat has been proposed or designated for this species; thus, the Proposed Acton would have no effect on critical habitat for Ute ladies'-tresses.

Rationale: Construction and operation of the Proposed Action would affect a relatively small portion of potentially suitable Ute ladies'-tresses habitat within the analysis area. This habitat would be surveyed for Ute ladies'-tresses prior to final engineering and construction and the proposed facility locations would be micro-sited to avoid field-verified suitable habitat. Suitable habitat would then be spanned by the transmission line, avoiding any ground disturbance through the use of special construction practices, if needed. Although unlikely, if the planned locations of tower structures, access roads, or other project facilities cannot be sited to avoid suitable habitat, then species-specific surveys would be conducted around areas proposed for surface disturbance using USFWS-approved survey protocols. Any Ute ladies'-tresses individuals found during this survey effort would be avoided by 300 feet where they occur upstream and to the sides of the crossing and by 1,320 feet downstream of the crossing. If these buffer distances could not be maintained, then formal consultation would be initiated with the USFWS.

6.1.5.4 Barneby Ridgecress (Endangered)

Environmental Baseline

Conservation Status

The Barneby ridgecress, was listed as endangered under the ESA on September 28, 1990 (55 FR 39860). Critical habitat has not been designated for this species. The USFWS initiated a 5-year review of the species on October 6, 2008 (73 FR 58261).Critical habitat has not been designated for this species.

Life History and Habitat Association

The species is a perennial herb found within pinyon-juniper communities on poorly developed soils derived from the marly shale outcrops in a zone of interbedding geologic stratas from the Uinta and Green River formations. Populations are found between 6,200 and 6,500 feet amsl and flowering occurs in early May (USFWS 1993). Barneby ridgecress is an herbaceous perennial in the mustard family. It grows between 2 and 6 inches tall and up to 8 inches wide (USFWS 2012). The stems are smooth with narrow leaves clustering at the base of the plant. The Barneby ridgecress blooms in May with cream-colored flowers that are about 0.25 inch across. Barneby ridgecress is endemic to the Indian Canyon drainage, which is mainly on Ute Tribal lands, and grows with other mound-forming species in pinyon-juniper communities.

Threats

Threats to the species include oil and gas activities, off-road vehicles, and trampling from livestock grazing. Other factors that may have negatively impacted the species included low rates of seed maturity and its restricted range (USFWS 2012). The species' reproductive fitness and ability to adapt to environmental changes remain a concern. Because of its restricted range, this species is remains vulnerable to stochastic events. Invasive weeds that occur within Barneby ridgecress habitat or have potential to become established within the species restricted range may become a threat to this species.

Recovery

In July 1993, the USFWS published a recovery plan that lists necessary actions to recover the species, although no delisting criteria were designated at the time, criteria for down listing of the species was specified. Recovery Plan down-listing criteria include achieving:

- Discovery of additional stands through additional surveys or through the introduction of additional stands within suitable habitat proximal to the known species range.
- A population consisting of a total of 5 separate stands of at least 2,000 individuals each and an overall total of 20,000 individuals.
- Develop and apply formal land conservation designations to protect the species and its habitat.

In July 2011, The USFWS published a 5-year review to evaluate whether or not the species' status has changed since it was listed and to determine if down listing criteria had been met. This 5-year review was drafted by the species' lead botanist in the Utah Ecological Services FO and provides a summary and analysis of information provided in the 1993 Barneby Ridge-cress Recovery Plan (USFWS 1993), current scientific research, and surveys related to the species. The 5-year review concluded that none of the down listing criteria had been met. The primary objective of the 1993 Recovery Plan was to maintain a viable population of Barneby ridge-cress at its only known location. The 5-year review found that maintaining a viable population could be accomplished by ensuring the following:

- Protection of the species' current known population and occupied habitat in all three of its known stands by enforcing the conservation provisions of Sections 7 and 9 of the ESA;
- Establishing formal land designations to conserve and protect the habitats at each of the three stands to ensure their long term protection primarily from oil and gas development actions and OHV activities; and
- Initiate conservation measures which may lead to down listing of the species to threatened status.

The 5-year review also recommended the following future actions be conducted in coordination with Ute Tribal representatives and the Bureau of Indian Affairs:

- Conduct population surveys within the species' known range and potential habitat in the general region (Uinta Basin of northeastern Utah) to better understand the species' range, abundance and potential threats. Comprehensive surveys conducted in 2010 and 2011 identified 4,082 plants. This is population level is below the 20,000 plants needed to meet down listing criterion;
- Conduct populations monitoring to determine natural population dynamics and trends and avoid impacts to the species' habitat from oil and gas development and other possible threats;
- Conduct research of the species' life history including reproduction;
- Ensure that the Section 7(a)(2) process addresses threats posed by invasive plants, dust, habitat fragmentation from road development and other indirect impacts from oil and gas development;
- Evaluate the potential to establish a conservation area or a management plan to protect the species in perpetuity; and
- Investigate the species' response to climate factors by collecting the appropriate data during monitoring and by compiling relevant information from surrogate species.

Assessment of Effects

Area of Analysis

The analysis area consists of a 300-foot buffer applied to the Project action area where it traverses modeled potential habitat for Barneby ridgecress northeast of Starvation Reservoir in Duchesne County, Utah (**Figure 6-18**). The analysis area is located on private land and has been highly fragmented by oil and gas development and associated well pads, access roads, and pipeline routes. The only known occurrences of this species are from three ridges near Indian Canyon on the Uintah and Ouray Reservations of the Ute Indian Tribe, approximately 4.5 miles south of the analysis area (USFWS 1993).

Conservation Measures

Impacts to Barneby ridgecress potential habitat would be minimized through implementation of the following design features and conservation measures described in Chapter 3.0:

- Applicant-committed conservation measures and design features: TWE-1 – TWE-7, TWE-9 – TWE-13, TWE-19, TWE-22, TWE-23, TWE-26–TWE-27, TWE-29, TWE-31, TWE-33 – TWE-34, TWE-47, TWE-57 – TWE-62, and TWE-64.

Conservation measures: **NX-1**, **SS-1**, **SS-3**, **SS-4**, **SS-5**, **SS-6**, and **SS-9.**

Direct and Indirect Effects

Habitat modeling indicates that approximately 106 acres of potential habitat have been identified within the analysis area (**Figure 6-18**). Based on the preliminary engineered alignment, the nominal span distance of the transmission line, and the estimation of transmission line structures required in this area, approximately 76 acres of potential habitat within the analysis area would be directly impacted by the Proposed Action. Site- and species-specific surveys within potential habitat would further refine this value and potentially reduce the estimated acreage of impacts to habitat. The Project would affect modeled habitat but would have no effect on any known populations.

Site-specific locations of access roads within the analysis area have not been defined; therefore, it is assumed that ground disturbance could occur anywhere within the analysis area and the area of potential impact accounts for estimated road disturbance. In reality, TransWest would use existing roads to access the ROW through this area and these roads are plentiful due to the level of oil and gas development within and immediately adjacent to the Barneby ridgecress analysis area.

With implementation of the Applicant-committed mitigation measures and design features and the general conservation measures listed above, impacts to Barneby ridgecress and its habitat are expected to be avoided. A habitat assessment conducted prior to final engineering design would allow for planned tower locations, access roads, and temporary work areas to be sited outside of field-verified suitable habitat where possible. If planned impacts to suitable habitat are unavoidable, species-specific surveys would be conducted in accordance with USFWS-approved protocols. If plants are found in the area facility locations would be moved to avoid surface disturbance within 300 feet of documented species occurrences and special construction practices would be used, if necessary, to further ensure that impacts to extant individuals and suitable habitat are avoided.

Cumulative Effects

The Barneby ridgecress analysis area is located on private land upon which there is a high degree of existing oil and gas development. To the extent that additional in-fill development occurs in the future, there is potential for cumulative effects to Barneby ridgecress. No other reasonably foreseeable non-federal actions have been identified within the vicinity of the Barneby ridgecress analysis area.

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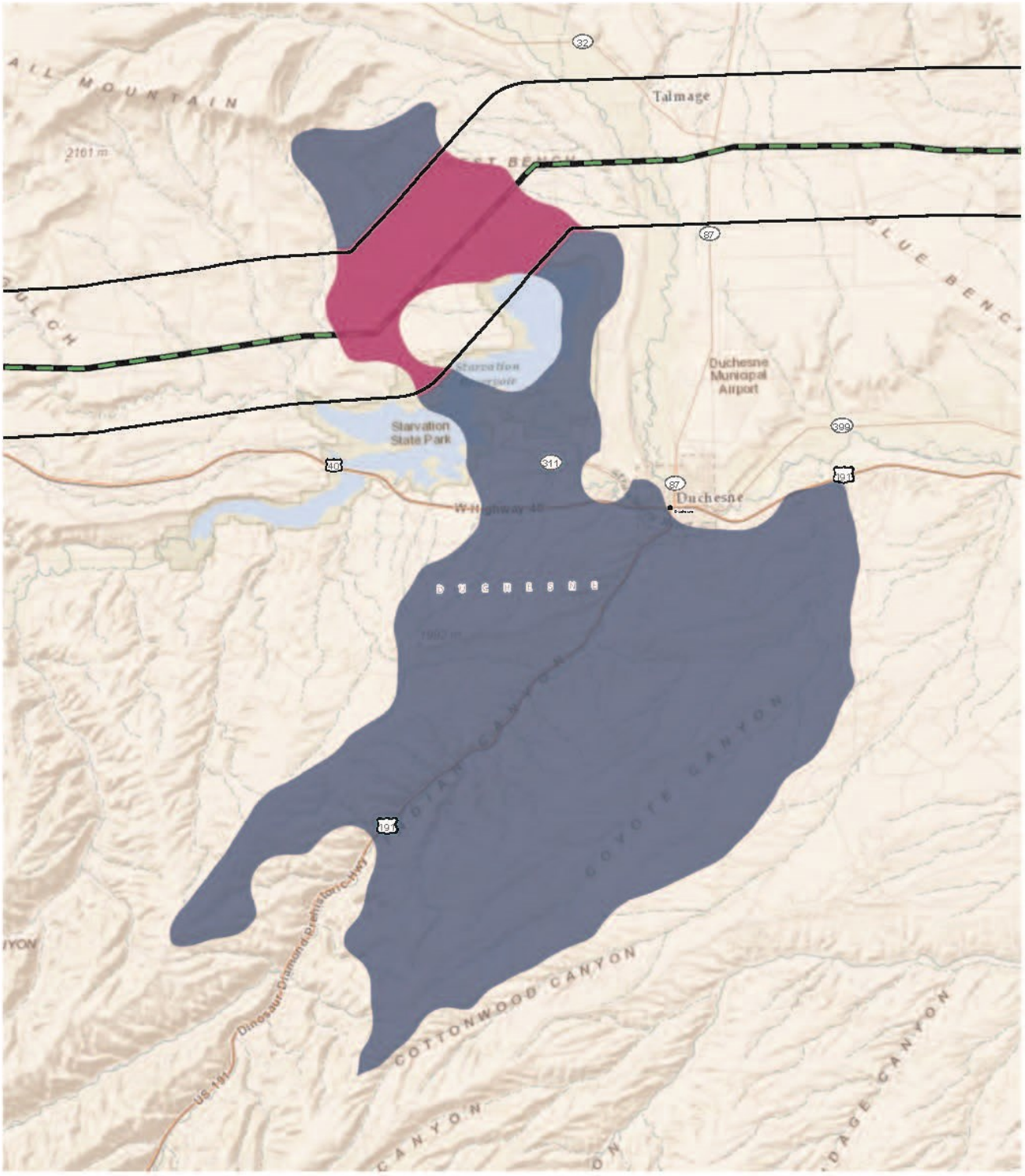

Proposed Action
Action Area
Analysis Area for Barneby Ridgecress
Potential Habitat for Barneby Ridgecress

Action Area Buffer for Analysis Areas:
Barneby Ridgecress - 300 feet

TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure 6-18
Area of Analysis for Barneby Ridgecress

0 0.5 1 2 Miles
0 0.5 1 2 km
1:150,000

Western Area Power Administration

Exported On: 3/2/2015

Determination

Effect on the Species: The Proposed Action *may affect, but is not likely to adversely affect* Barneby ridgecress.

Effect on Critical Habitat: No critical habitat has been proposed or designated for this species; thus, the Proposed Action would have *no effect* on critical habitat for this species.

Rationale: Construction and operation of the Proposed Action would affect a relatively small portion of potentially suitable Barneby ridgecress habitat within the analysis area. This habitat would be surveyed for Barneby ridgecress habitat and, if necessary, individuals prior to final engineering and construction. Any plants found within 300 feet of the proposed facility locations would be avoided through facility micro-siting and, if necessary, the use of special construction practices.

6.2 Species Proposed for Listing (Including EXP/NE)

6.2.1 Mammals

6.2.1.1 Black-footed Ferret (Endangered; EXP/NE)

Environmental Baseline

Conservation Status

The black-footed ferret was listed as endangered under the ESA on June 2, 1970 (35 FR 8491). The USFWS initiated a 5-year species status review for the black-footed ferret on July 7, 2005 (70 FR 39326). In the 2008 status review summary, the USFWS recommended no change in status and a Recovery Priority Number of 2C (USFWS 2008c). Any black-footed ferrets that could occur along the proposed Project would be considered part of a 10j population. No self-sustaining ferret populations (endangered status) would be expected in the Project disturbance areas. No critical habitat is designated for proposed species. The initial Black-footed Ferret Recovery Plan was approved in 1978 and revised in 1988 (USFWS 1988a). The 1998 Revised Recovery Plan was drafted when no extant, wild black-footed ferrets were known to exist (USFWS 1988a). The current version of the Recovery Plan was issued in April 2013 (USFWS 2013h).

The black-footed ferret is endemic to North America. Historically, this species was probably common; however, its inconspicuous habits (nocturnal and fossorial) probably made it difficult to observe (USFWS 2013h). With no documentation of breeding outside of prairie dog colonies, it is believed that historical distribution of the black-footed ferret coincided with the ranges of the black-tailed prairie dog, Gunnison's prairie dog, and white-tailed prairie dog. These species collectively occupied approximately 100 million acres throughout the Great Plains, mountain basins, and semi-arid grasslands of North America, extending across 12 states (Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming) and the Canadian provinces of Alberta and Saskatchewan (Anderson et al. 1986; Hillman and Clark 1980).

Approximately 562 million acres of potential black-footed ferret habitat once existed in the U.S. Ferrets might have been distributed with 85 percent in black-tailed prairie dog habitat, 8 percent in Gunnison's prairie dog habitat, and 7 percent in white-tailed prairie dog habitat (USFWS 2013h).

From the late 1800s to approximately 1960, both prairie dog occupied habitat and prairie dog numbers were reduced due to habitat destruction from conversion of native prairie to cropland, poisoning, and disease. Because the black-footed ferret is closely associated with prairie dog colonies, the reduction in prairie dog numbers has been an important factor in the precipitous decline of the species (Biggins et al. 2006). The population of wild black-footed ferrets was so decimated by the 1960s that it was considered to be extinct before a small population was located in South Dakota, in 1964 (USFWS 2008c). Failed captive breeding attempts subsequently led to the species' presumed extinction in 1979, when the last captive animal died. However, a remnant population was discovered in Meeteetse, Wyoming, in 1981.

These ferrets were removed from the wild between 1985 and 1987, and used to initiate a captive breeding program. Of the 18 remaining ferrets captured from Meeteetse, seven produced a captive population lineage that is the foundation of present recovery efforts. Extant populations, both captive and reintroduced, descend from these "founder" animals (USFWS 2013h).

USFWS estimates that the average minimum number of breeding adult ferrets currently in the wild is approximately 364 animals, with a minimum of 270 of those animals at self-sustaining sites. Four reintroduction sites (Aubrey Valley, Arizona; Cheyenne River Reservation, South Dakota; Conata Basin, South Dakota; and Shirley Basin, Wyoming) are currently considered to contain self-sustaining black-footed ferret populations.

Critical habitat has not been designated for the black-footed ferret.

Life History and Habitat Association

Black-footed ferrets are prairie dog obligates and prairie dog colonies are the only known habitat that sustains black-footed ferret populations (Biggins et al. 2006). Prairie dog colonies are typically found in short and mid-grass prairies, and semi-desert areas with mosaics of grass and shrubs (Esch et al. 2005). Ferret occupied prairie dog colonies are typically on level ground or rolling hills. Suitable soils include clay-loam to unconsolidated gravelly soils, which are more stable for burrow construction by prairie dogs and provide good drainage (Esch et al. 2005). Vegetation is typically a type of wheatgrass-needlegrass, including buffalo grass, blue grama, western wheatgrass, green needlegrass, and patches of forbs and mixed shrubs such as sagebrush and rabbit brush (Esch et al. 2005).

Ferrets prey on prairie dogs almost exclusively, and depend on prairie dog burrows for thermal cover, predator escape, hunting sites, parturition sites, and rearing of young (Esch et al. 2005). One study found that prairie dog remains constituted 91 percent of analyzed ferret scat (Hillman and Clark 1980). Other prey animals include ground squirrels, cottontail rabbits, deer mice, and possibly birds (NatureServe 2012). It has been estimated that approximately 100 to 150 acres of prairie dog colony are needed to support 1 ferret (Esch et al. 2005). The minimum area required to sustain a ferret is 91 to 235 acres in black-tailed prairie dog habitat (38 prairie dogs/acre), and 413 to 877 acres in white-tailed prairie dog habitat (10 prairie dogs/acre) (Esch et al. 2005), indicating a rather strong and predictable relationship between ferret area requirements and prairie dog density.

Black-footed ferrets typically begin breeding at 1 year of age and breeding occurs from mid-March through early April. Dens are located in prairie dog burrows. Gestation is approximately 42 to 45 days, and litter size is typically three to four kits (Hillman and Clark 1980). Young approach adult size and typically appear aboveground in July and disperse in September or October. Longer movements (0.6 to 4.3 miles) are traversed by males, whereas females typically remain on their natal colony (Miller et al. 1996). The fall dispersal of young ferrets suggests that some movements could be extensive. Ferrets are less active in winter, and are solitary animals except during the breeding season and in early spring (Hillman and Clark 1980).

There is little information on ferret life expectancy. Mustelids typically have short life expectancies and high (50 percent or greater) juvenile mortality (USFWS 2013h). The high mortality rate among young ferrets might occur during fall dispersal if they were to travel long distances before relocating in other prairie dog colonies (Hillman and Clark 1980). Many avian and mammalian predators are attracted to prairie dog colonies where ferrets could be encountered. Studies suggest that coyote, golden eagle, and great horned owls (as well domestic cats and dogs) opportunistically prey on black-footed ferrets (Hillman and Clark 1980). Ferrets also are susceptible to parasites and disease. Sylvatic plague and canine distemper could pose a serious threat to ferret populations in areas where outbreaks occur among other wild and domestic animals (Hillman and Clark 1980).

Threats

Black-footed ferret populations have declined for three principal reasons. In the late 1800s, a major conversion of native range to cropland began, particularly in the eastern portion of the species' range. In the early 1900s, farmers and ranchers began to poison prairie dogs as a means of reducing competition with domestic livestock for forage. Sylvatic plague, a non-native disease, first impacted prairie dogs in the 1930s. Each of these threats resulted in a substantial loss of prairie dogs, which in turn led to an even greater decline in ferret populations. Even a temporary loss of prairie dog habitat can result in a decline in ferret populations (USFWS 2013h).

While prairie dog occupied habitat declined (approximately 96 percent of historic occupancy) due to conversions of native prairie to cropland, poisoning, and disease during the 19th and first half of the 20th Century, prairie dog habitat has increased approximately 250 percent since mid-century. However, ferrets have been largely unable to successfully repopulate expanding prairie dog habitat. Therefore, current threats that hinder the recovery of black-footed ferrets are primary disease (sylvatic plague and canine distemper); poisoning (primarily anticoagulant rodenticides such as chlorophacinone [Rozol] and diphacinone [Kaput]); recreational prairie dog shooting; inadequate management of prairie dogs; and genetic fitness (USFWS 2013h).

Recovery

The USFWS assigned the black-footed ferret a recovery priority number of 2C on a scale of 1C-18, with 1C equaling the highest priority. This number indicates that the species faces a high degree of threat due to potential economic conflicts regarding the ferret's obligatory dependence on prairie dogs, which are viewed as pests by some parties (USFWS 2008c). The high degree of threat is largely due to inadequate management and conservation of prairie dogs.

According to USFWS the recovery of black-footed ferrets will depend upon: 1) the continued efforts of captive breeding facilities to provide animals of suitable quality and quantity for release into the wild, 2) the conservation of prairie dog habitat adequate to sustain ferrets in several populations distributed throughout their historical range, and 3) the management of sylvatic plague to minimize impacts to ferrets at reintroduction sites (USFWS 2013h).

- Conserve and manage a captive breeding population of black-footed ferrets with a minimum of 280 adults (105 males and 175 females) distributed among multiple facilities (minimum of 3);
- Establish free-ranging black-footed ferret populations totaling at least 1,500 breeding adults, in 10 or more populations in at least 6 of 12 states within the historic range of the species, with no fewer than 30 breeding adults in any population, and at least 3 populations within Gunnison's and white-tailed prairie dog colonies;
- Maintain these population objectives for at least three years prior to downlisting; and
- Maintain approximately 247,000 acres of occupied prairie dog habitat at reintroduction sites by planning and implementing actions to manage plague and conserve prairie dog populations.

Delisting criteria have been updated since the 1988 Black-footed Ferret Recovery Plan. Delisting could occur when the following recovery criteria are met:

- Conserve and manage a captive breeding population of black-footed ferrets with a minimum of 280 adults (105 males and 175 females) distributed among multiple facilities (minimum of 3);
- Establish free-ranging black-footed ferret populations totaling at least 3,000 breeding adults, in 30 or more populations; with at least 1 population in each of at least 9 of 12 states within the historical range of the species; with no fewer than 30 breeding adults in any population; at least 10 populations with 100 or more breeding adults; and at least 5 populations within Gunnison's or white-tailed prairie dog colonies;

- Maintain these population objectives for at least 3 years prior to delisting;
- Maintain approximately 494,000 acres of occupied prairie dog habitat at reintroduction sites by planning and implementing actions to manage plague and conserve prairie dog populations; and
- Complete and implement a post-delisting monitoring plan, in cooperation with the states and tribes, to ensure recovery goals are maintained.

The ultimate goal of the 2013 Recovery Plan is to recover the black-footed ferret such that it no longer meets the ESA definition of threatened and can be removed from the Federal List of Endangered and Threatened Wildlife (i.e., delisted). The USFWS believes that downlisting of the black-footed ferret could be accomplished in approximately 10 years if conservation actions continue at existing reintroduction sites and if additional reintroduction sites are established. The USFWSs downlisting goal of establishing 1,500 breeding adult black-footed ferrets by 2020 will require significant population expansion at existing sites where habitat is unfilled and/or reintroduction into new sites. The addition of approximately 1,300 breeding adult ferrets in populations with 30 or more breeding adults would require large population increases at most existing sites (USFWS 2013h).

Assessment of Effects

Area of Analysis

The black-footed ferret analysis area is defined as white-tailed prairie dog colonies within the 250-foot ROW, plus a 0.5-mile buffer around the action area. The action area is defined in Section 2.2. These areas represent approximately 24,275 acres of potential black-footed ferret habitat and are depicted in **Figure 6-19**.

The black-footed ferret is directly associated with prairie dog colonies and requires active prairie dog colonies of suitable size and density to maintain viable population levels. No wild black-footed ferret populations are known to occur within the black-footed ferret analysis area in Wyoming. Although the Shirley Basin supports the only known extant population of wild black-footed ferrets in Wyoming, there are numerous white-tailed prairie dog complexes within the black-footed ferret analysis area for both the Rawlins and Rock Springs BLM FOs that constitute suitable habitat for the black-footed ferret. Many of these complexes have not been surveyed for black-footed ferrets. However, on March 6, 2013, the USFWS issued a letter acknowledging “block clearance” for the State of Wyoming in response to a request from the WGFD. This letter provided acknowledgment that the likelihood of identifying wild ferrets in Wyoming, outside of those resulting from reintroductions, is minimal (USFWS 2013h).

In addition to the Shirley Basin reintroduction site in south-central Wyoming, there is only one other reintroduction site within the black-footed ferret analysis area: the Northwestern Colorado/Northeastern Utah Black-footed Ferret Experimental Population Area (EXPA). Portions of the proposed Project alignment are located within a USFWS designated EXPA (USFWS 1998). This area encompasses portions of Sweetwater County, Wyoming and Rio Blanco County, Colorado; all of Moffat County, Colorado; and Uintah County, Utah.

An EXP/NE designation allows the USFWS considerable flexibility in managing reintroduced populations of endangered species. The ESA allows for treating an EXP/NE as a “proposed species” under the Act (USFWS 1998). However, according to the ESA Consultation Handbook (USFWS and NMFS 1998), “*a “non-essential experimental population” (EXP/NE) is not essential to the continued existence of the species*.” Areas designated as EXP/NE areas do not require black-footed ferret surveys, although the USFWS encourages project applicants to protect all white-tailed prairie dog towns for their value to the

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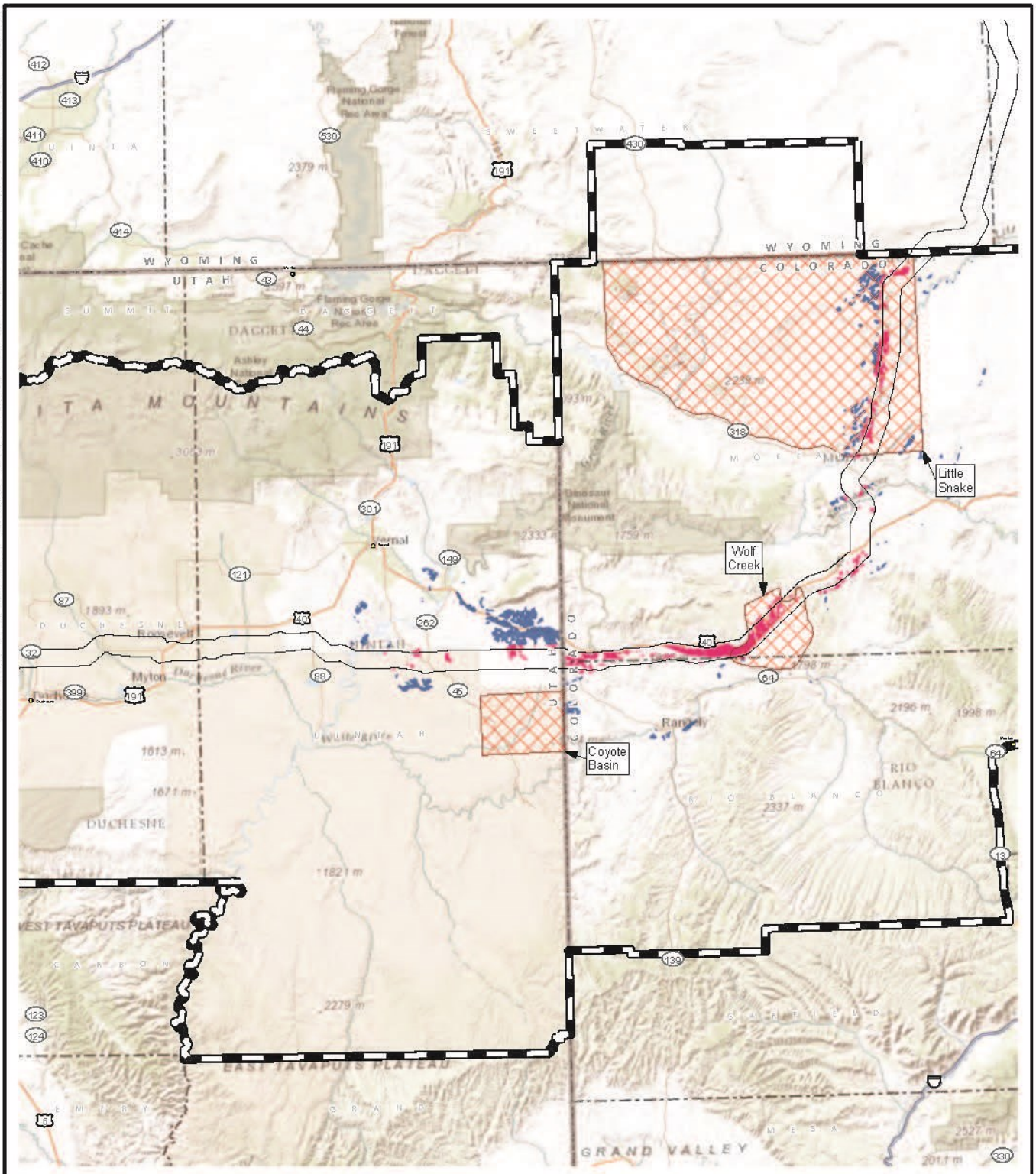


- Action Area
- Analysis Area
- Black-footed Ferret Potential Habitat
- 10(j) Experimental/Non-Essential Range
- Ferret Management Area

Action Area Buffer for Analysis Area: 0.5 Mile

TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure 6-19
Area of Analysis for
Black-footed Ferret

0 5 10 20 Miles
0 5 10 20 km
1:1,250,000

Western Area Power Administration

Exported On: 3/31/2015

prairie ecosystem and the myriad of species that rely on them. The EXPA encompasses portions of Rio Blanco and Moffat counties in Colorado, Sweetwater County, Wyoming, and Uintah and Duchesne counties, Utah. The EXPA has been separated into the Northwestern Colorado Experimental Population Sub-Area and the Northeastern Utah Experimental Population Sub-Area. Within the Northwestern Colorado Sub-Area, the Little Snake Black-footed Ferret Management Area was established as a specific reintroduction site. The Little Snake area is located in northwestern Moffat County, Colorado, along the Colorado-Wyoming border. However, no ferrets have ever been released in the Little Snake Management Area. Within the Northeastern Utah Sub-Area, the Coyote Basin Black-footed Ferret Management Area was established as a specific reintroduction site. The Coyote Basin area is located in Uintah County, Utah, along the Utah-Colorado state border.

A total of 255 black-footed ferrets have been released into the Coyote Basin Area since 1999. Reproduction was confirmed in Coyote Basin in 2000, and the population is currently estimated at 25 individuals (USFWS 2008c). Limited areas of suitable black-footed ferret habitat that are located within the refined transmission corridor east of the Green River may support individuals or offspring remaining from the 2000 Coyote Basin reintroduction. Impacts to black-footed ferrets in this area are anticipated to be avoided and minimized by TransWest's ability to span areas of suitable habitat.

Ferret releases at the Wolf Creek site northeast of Rangely, Colorado, were initiated in 2001, and to date a total of 217 individuals have been released at this location. The Wolf Creek population is currently estimated at 0 individuals. Plague has impacted the Wolf Creek population of white-tailed prairie dogs and black-footed ferrets in recent years and no black-footed ferrets have been documented during surveys in 2009, 2010, or 2011. Prior to the population crash, the highest population estimate was 16 individuals. The USFWS classifies both re-introduced populations as "marginal" (USFWS 2008c). The only non-EXP/NE areas found within the black-footed ferret analysis area are located in Grand, Emery, or Carbon counties, Utah, and portions of Sweetwater and Carbon counties, Wyoming. The black-footed ferret analysis area includes the EXPA in Utah and Colorado, and the Continental Divide (2), Dad, and Desolation Flats non-block cleared areas in Wyoming.

The nearest re-introduced population of black-footed ferrets in Wyoming is approximately 65 miles northeast of the Northern Terminal siting area in the Shirley Basin, Wyoming. Due to the distance from the Northern Terminal siting area to the nearest known black-footed ferret population there is an extremely low likelihood of black-footed ferrets occurring at the Northern Terminal siting area. Consequently, no impacts to black-footed ferrets are anticipated from construction and operation of the Northern Terminal.

Conservation Measures

Impacts to the black-footed ferret would be minimized through implementation of the following design features as described in Chapter 3.0:

- Applicant-committed conservation measures and design features: TWE-31, TWE-33, and TWE-34.
- General conservation measure **WLF-10**.

Implementation of the following species-specific conservation measure would avoid or reduce effects of the proposed Project on the black-footed ferret.

SSWS-9: Prior to final engineering design, TransWest would conduct a habitat assessment and, if necessary, species-specific surveys for black-footed ferrets using a USFWS-approved survey protocol. Survey results would be used to avoid siting project infrastructure (e.g., towers and access roads) within suitable black-footed ferret habitat (i.e., active white-tailed prairie dog colonies that are greater than 200 acres in area) the black-footed ferret analysis area.

To limit potential project-related increases in raptor predation on black-footed ferrets and associated prey populations, TransWest would be required, subject to consultation with the BLM, USFWS, Western, and applicable state wildlife agencies, to use alternative structure types (e.g., tubular monopoles) with perch discouragers on segments of the proposed Project located within the black-footed ferret analysis area.

Effectiveness: Conducting a habitat assessment and black-footed ferret surveys (if suitable habitat is found along the proposed ROW) and avoiding impacts to suitable/occupied habitat would be highly effective in preventing Project-related impacts to the black-footed ferret.

Although no direct evidence of the effects of structure type upon predator abundance or predation rates of black-footed ferrets has been identified in the current scientific literature, the BLM and Western have identified this type of mitigation as having the potential to reduce the impacts of predation upon black-footed ferrets. This conservation measure is intended to minimize the potential for increased predation on black-footed ferret by limiting raptor perching locations on transmission towers. Black-footed ferrets also may benefit from alternative structure types and perch deterrents through reduction of predation on white-tailed prairie dogs, the main prey species of the Black-footed ferret. While transmission lines fitted with anti-perching devices do not necessarily eliminate perching entirely (APLIC 2006; Lammers and Collopy 2007), they are designed to discourage use of the transmission line as a hunting perch which could in turn decrease the potential for predation by raptors on black-footed ferrets.

Direct and Indirect Effects

Potential impacts to potentially suitable black-footed ferret habitat would include the construction and operation disturbance of approximately 432 acres (1.8 percent) and 83 acres (0.3 percent), respectively, of known white-tailed prairie dog colonies within the analysis area. These acreages present a conservative estimate of impacts as they do not account for implementation of the conservation measures described above. In reality, direct impacts to black-footed ferrets as a result of project implementation are expected to be minimal as surface disturbance to active white-tailed prairie dog colonies would be avoided through implementation of conservation measure **SSWS-9**.

Indirect impacts that could occur as a result of increased human activity and public access and associated increases in domestic dogs and raccoons, which have potential to expose ferrets to canine distemper and sylvatic plague, would be avoided or minimized through the implementation of general conservation measure **WLF-10**.

It should be noted that certain surface-disturbing activities (e.g., blading/grading vegetation for pads, roads, ancillary facilities) could actually improve white-tailed prairie dog habitat and therefore possibly benefit black-footed ferrets. Decreasing vegetation cover creates open areas suitable for white-tailed prairie dog colonization, while subsequent re-vegetation increases forage for white-tailed prairie dogs. As prairie dogs increase the colony size, black-footed ferret potential habitat is increased.

Cumulative Effects

No reasonably foreseeable non-federal actions have been identified within the vicinity of the proposed Project action area for the black-footed ferret.

Monitoring

There are currently no known short- or long-term monitoring and reporting plans for black-footed ferret in the Project analysis area.

Determination

Effect on the Species: The Proposed Action *may affect but is not likely to jeopardize* the black-footed ferret as a result of the proposed Project construction and operation.

Effect on Critical Habitat: Critical habitat has not been designated for the black-footed ferret; thus the Proposed Action would have *no effect* on critical habitat for this species.

*Rationale: Implementation of conservation measures **WLF-10** and **SSWS-9** would result in the avoidance of adverse impacts to black-footed ferrets within the action area. To the extent that surface disturbance and interim reclamation activities enhance habitat for white-tailed prairie dogs, black-footed ferret habitat would benefit as well.*

6.3 Candidate Species

6.3.1 Birds

6.3.1.1 Greater Sage-grouse (Candidate)

Environmental Baseline

Conservation Status

On February 26, 2008, the USFWS initiated a status review to determine whether the greater sage-grouse warranted protection under the ESA (73 FR 10218). On March 5, 2010, the USFWS determined that the greater sage-grouse warrants protection under the ESA; however, listing was precluded by the need to take action on the other species facing more immediate and severe extinction threats. The USFWS concluded that the greater sage-grouse would be added to the candidate species list. Therefore, greater sage-grouse in Wyoming, Colorado, and Utah continue to be managed by WGFD, CPW, and UDWR, respectively. They receive no statutory protection under the ESA and because the greater sage-grouse is currently a candidate species for listing under the ESA; no critical habitat has been designated at this time.

Prior to the 19th Century, sage-grouse inhabited 13 western states and 3 Canadian provinces, and their potential habitat covered over 460,000 square miles (Schroeder et al. 2004). Sage-grouse have declined across their range due to a variety of causes and now occupy approximately 257,000 square miles, or 56 percent of their historic range (Schroeder et al. 2004). They currently occur in 11 states and 2 Canadian provinces (Knick and Connelly 2011).

Estimates of greater sage-grouse abundance were mostly anecdotal prior to the implementation of systematic surveys in the 1950s. Early reports suggested the birds were abundant throughout their range, with estimates of historical populations ranging from 1,600,000 to 16,000,000 birds (65 FR 51580). In 2000, the USFWS estimated the range wide abundance of sage-grouse to be between a minimum of 100,000 (taken from Braun 1998) up to 500,000 birds (65 FR 51578).

Neither historic nor current numbers of sage-grouse are accurately known, thus the actual rate and scale of the decline is uncertain. However, three groups of researchers using different statistical methods (but the same lek count data) concluded that range-wide greater sage-grouse have experienced long-term population declines in the past 43 years, with that decline lessening in the past 22 years (USFWS 2010). Generally, the proportion of small leks has increased between 1965 and 2003 for most states and provinces while the proportion of large leks has decreased (Connelly et al. 2004).

Life History and Habitat Association

Greater sage-grouse distribution is highly correlated with the distribution of sagebrush (*Artemisia* spp.), and in particular, big sagebrush (*Artemisia tridentata*) (Schroeder et al. 2004). This species requires large, interconnected expanses of sagebrush with healthy, native understories. Greater sage-grouse are considered a sagebrush ecosystem obligate species. Obligate species are those species that are restricted to certain habitats or to limited conditions during one or more seasons of the year to fulfill their life requirements. Sagebrush species provide nesting, brooding, and fall and winter cover, as well as forage throughout the year (CGSGC 2008).

Sage-grouse exhibit strong site fidelity (loyalty to a particular area) to seasonal habitats (i.e., breeding, nesting, brood rearing, and wintering areas) (Connelly et al. 2011, 2004). Adult sage-grouse rarely switch from these habitats once they have been selected, limiting their ability to respond to changes in their local environments (Schroeder et al. 1999).

Lekking/Breeding/Nesting Habitat:

The center of breeding activity for the greater sage-grouse is referred to as a strutting ground or lek. Leks are characterized as flat, sparsely vegetated areas within large tracts of sagebrush, where a few to 100 or more male sage-grouse will perform a breeding behavior known as strutting (Connelly et al. 2004; Crawford et al. 2004). Males begin to appear on leks in March, with peak attendance of Utah leks occurring in late-March and peak attendance in Colorado and Wyoming leks occurring in April (CGSSC 2008; UDWR 2009a; WGFD 2003). Habitat during the 5-week period preceding egg-laying centers on low sagebrush, black sagebrush, and Wyoming big sagebrush communities. During this period, 50 to 90 percent of the hen's diet is sagebrush with the remainder being mostly forbs (Crawford et al. 2004). Nesting generally commences 1 to 2 weeks after mating and may continue as late as early June (UDWR 2009a). Greater sage-grouse nesting habitat typically is centered on active leks and consists of medium to tall sagebrush with a perennial grass understory (Connelly et al. 2000). Nests are usually located near leks, but hens may move long distances from leks to nests (Crawford et al. 2004). Wakkinen et al. (1992) noted that 55 percent of nests, in Idaho, were within 3 km of the lek were copulation occurred. Studies have shown that taller sagebrush with larger canopies and more residual understory cover usually lead to higher nesting success for this species (Connelly et al. 2004, 2000).

Brood-Rearing Habitat:

During late spring and summer, hens and broods are typically found in more lush habitats consisting of a high diversity of grasses and forbs that attract an important component of sage-grouse chick diet: insects. Forbs and insects comprise the bulk of sage-grouse chick diets until they are approximately 12 weeks old, at which time sagebrush becomes a common component. Sage-grouse chicks forage on diverse taxa including invertebrates, forbs, shrubs, and grass (Crawford et al. 2004).

Important brood-rearing habitats include wet meadows, riparian areas, and irrigated farmland within or near sagebrush. Hens with broods utilize these habitats until forbs desiccate and insect abundance decreases. Habitat use during the brood-rearing period is related to changes in food availability and hens with broods are typically found where forb abundance is greatest (Crawford et al. 2004). Unsuccessful hens and cocks also will utilize these same habitats; however, due to their nutritional flexibility, they are able to occupy a wider variety of habitats during the spring and summer months (Connelly et al. 2004). In many greater sage-grouse populations, limited availability of high quality brood-rearing habitat often negatively impacts recruitment. Factors affecting the availability of brood-rearing habitat include drought, non-native grass and weed invasions, overgrazing associated with historic improper range management strategies (Klebenow 1985, 1982; Oakleaf 1971), and sagebrush removal.

Wintering Habitat:

During winter, sage-grouse utilize medium to tall sagebrush communities and primarily feed on sagebrush leaves (Crawford et al. 2004). Depending on the severity of the winter, greater sage-grouse move to south- and west-facing slopes that maintain exposed sagebrush. Studies have shown that south-facing slopes with sagebrush at least 10 to 12 inches above the snow level are required for both food and cover. Windswept ridges, draws, and swales also may be used, especially if these areas are in close proximity to exposed sagebrush (Connelly et al. 2004). In years with severe winter conditions (i.e., deep snow), greater sage-grouse often gather in large flocks in areas with the highest quality winter habitat. Home range for winter migratory and non-migratory populations has been reported as >140 square km and 11 to 31 km (Crawford et al. 2004). It is suggested that high quality winter habitat is

limited in portions of the greater sage-grouse's range (Connelly et al. 2000). Wintering habitat for greater sage-grouse has been defined for populations in Colorado and Utah, and is currently being defined for populations in Wyoming (WGFD 2012).

The greater sage-grouse is currently a candidate species for listing under the ESA, and no critical habitat has been designated at this time.

Threats

The loss and fragmentation of sagebrush habitats is a primary cause of the decline of sage-grouse populations. Habitat fragmentation, largely a result of human activities, can result in reductions in lek persistence, lek attendance, population recruitment, yearling and adult annual survival, female nest site selection, nest initiation, and complete loss of leks and winter habitat (USFWS 2013m). Other factors associated with habitat loss and fragmentation are summarized by Knick and Connelly (2011) and include conversion of sagebrush habitats for agriculture, the expanding human populations in the western U.S. and the resulting urban development in sagebrush habitats, vegetation treatments resulting in the alteration or removal of sagebrush to enhance grazing for livestock, and impacts from wild ungulates and free-roaming horses and burros.

An expert panel convened by the USFWS for evaluation of listing factors identified the threats they considered as having the most influence on greater sage-grouse populations across its range and then ranked their relative importance of each threat to greater sage-grouse (70 FR 24870). The threats considered to have the greatest impact to greater sage-grouse range-wide included, in order: invasive species, infrastructure as related to energy development and urbanization, wildfire, agriculture, grazing, energy development, urbanization, strip/coal mining, weather, and pinyon-juniper woodland expansion.

The lack of sufficient regulatory mechanism aimed at conserving sage-grouse and their habitats was identified as a primary threat leading to the USFWS's warranted but precluded finding in 2010 (75 FR 13910). However, many state and local governments across the range of the greater sage-grouse are working to develop adequate mechanisms to address this particular threat.

Recovery

As a candidate species, greater sage-grouse receive no statutory protection under the ESA nor is there a USFWS Recovery Plan. Greater sage-grouse are currently managed by state wildlife agencies. Wyoming, Utah, Colorado, and Nevada have developed Greater Sage-grouse Management/ Conservation Plans that outline goals and objectives for managing the species (Colorado Greater Sage-Grouse Steering Committee [CGSSC] 2008; South Central Sage-grouse Working Group 2007; Southwest Wyoming Local Sage-grouse Working Group 2007; UDWR 2009a). While the approach and objectives of each Management/Conservation Plan can vary, all are aimed at increasing the numbers of sage-grouse, conserving sagebrush habitat, and precluding the need for listing under the ESA.

In an effort to prevent federal listing of the greater sage-grouse, Wyoming, Utah, Colorado, and Nevada have developed Greater Sage-grouse Management/Conservation Plans that outline goals and objectives for managing the species (CGSSC 2008; South Central Sage-grouse Working Group 2007; Southwest Wyoming Local Sage-grouse Working Group 2007; State of Nevada 2012; UDWR 2009a). In addition, the Wyoming BLM and the State of Wyoming have issued several regulations regarding management of the greater sage-grouse in Wyoming. BLM Instruction Memoranda (IM) 2010-012, 2012-043, 2012-044, 2012-019, and State of Wyoming EO 2011-5 include specific protection measures guiding development in greater sage-grouse habitat, specifically in core population areas. The WGFD has developed a map of greater sage-grouse core population areas in Wyoming. Greater sage-grouse core population areas include areas with the highest densities of breeding greater sage-grouse in the state, as well as areas important for connectivity between populations. The core population areas include roughly 25 percent of the state but contain 83.1 percent of the greater sage-grouse population in Wyoming.

BLM IM 2012-043 and BLM WY IM 2012-019 provide direction to field managers to ensure that interim conservation procedures are implemented when FOs authorize or carry out activities on public land while the BLM reviews how to best incorporate long-term conservation measures for greater sage-grouse into applicable Land Use Plans. These interim conservation measures are consistent with the BLM's National Strategy for protecting and managing greater sage-grouse and incorporate the following principles:

1. Protection of un-fragmented habitats;
2. Minimization of habitat loss and fragmentation; and
3. Management of habitats to maintain, enhance, or restore conditions that meet greater sage-grouse life history needs.

BLM IM 2012-043 identifies policies and procedures that are to be applied to on-going and proposed BLM activities within areas identified as PPH and PGH. PPH consists of areas that have been identified as having the highest conservation value for maintaining sustainable greater sage-grouse populations. These areas include breeding, nesting, brood-rearing, and wintering habitats. PGH is identified as all other areas occupied either seasonally or year-round by greater sage-grouse. Among the conservation policies and procedures presented in BLM IM 2012-043, those that apply to the Project direct the BLM to:

1. Provide documentation of reasoning for ROW determinations and to require the ROW holder to implement measures to minimize impacts to greater sage-grouse habitat;
2. In cooperation with respective state wildlife agencies, consider the opportunities for both on-site and off-site conservation measures to avoid or minimize habitat and population level impacts; and
3. In cooperation with respective state wildlife agencies, determine that the proposed ROW would cumulatively maintain or enhance greater sage-grouse habitat.

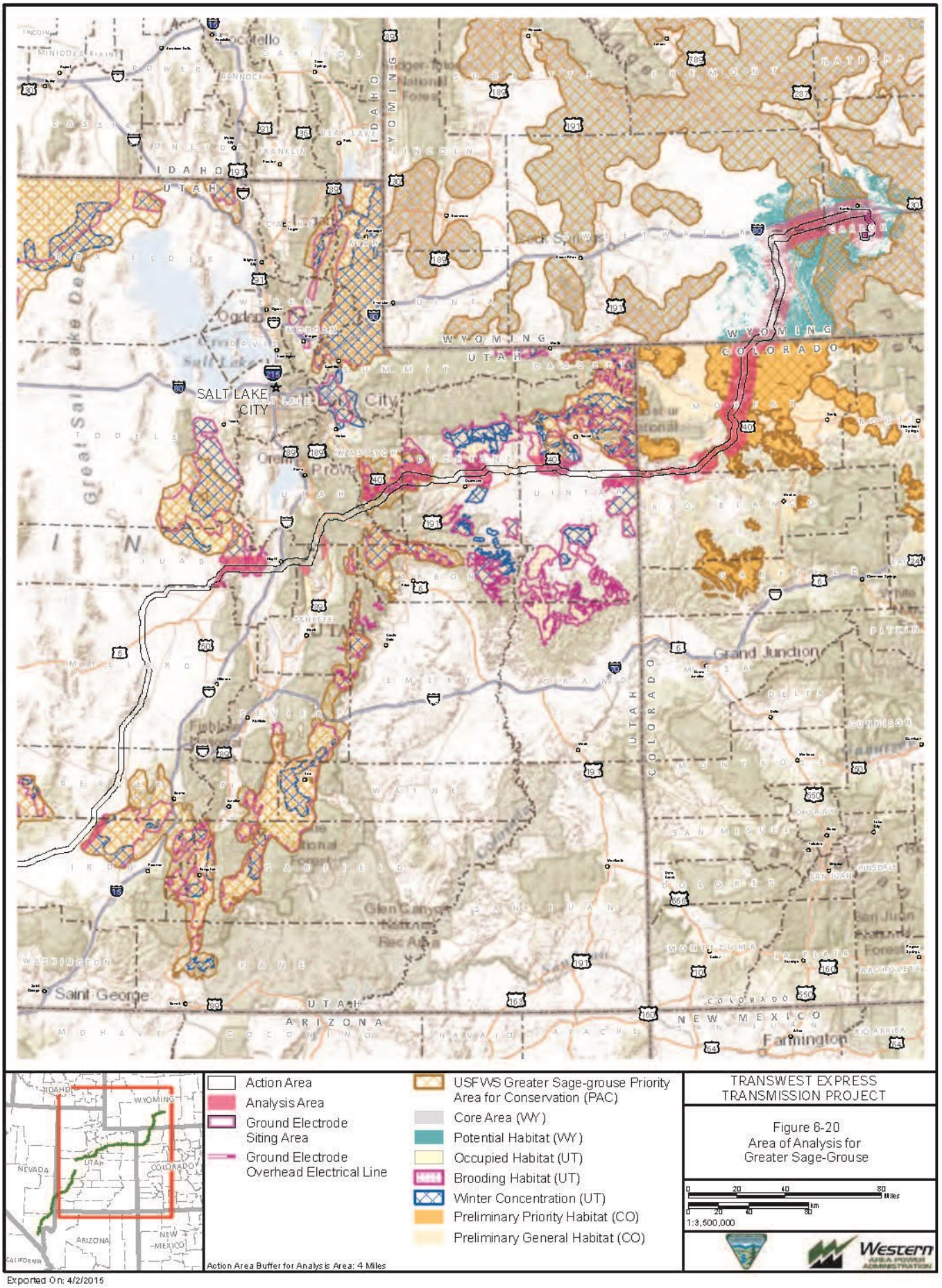
BLM IM 2012-044 provides the BLM direction to incorporate conservation measures identified in the 2011 report on national greater sage-grouse conservation measures published by the Sage-grouse National Technical Team (NTT 2011). NTT conservation measures relating to ROWs include:

1. Designating priority greater sage-grouse habitat areas as exclusion areas for new ROW permits;
2. Evaluating the feasibility of removing, burying, or modifying existing power lines within priority greater sage-grouse habitat; and
3. Designating greater sage-grouse general habitat areas as avoidance areas for new ROW permits.

Assessment of Effects

Area of Analysis

The greater sage-grouse analysis area is defined as potential habitat (sagebrush shrubland) within the action area, plus a 4-mile buffer centered on the ROW. The action area is defined in Section 2.2. These areas represent 440,498 acres of potential greater sage-grouse habitat and are depicted in **Figure 6-20**. This total includes 105,448 acres in Wyoming, 108,551 acres in Colorado, 209,888 acres in Utah, and 16,611 acres in Nevada.


SALT LAKE CITY
Grand Junction
Saint George
Farmington
Great Salt Lake Desert
Glen Canyon National Rec Area
San Juan National Forest
Action Area
Analysis Area
Ground Electrode Siting Area
Ground Electrode Overhead Electrical Line
USFWS Greater Sage-grouse Priority Area for Conservation (PAC)
Core Area (WY)
Potential Habitat (WY)
Occupied Habitat (UT)
Brooding Habitat (UT)
Winter Concentration (UT)
Preliminary Priority Habitat (CO)
Preliminary General Habitat (CO)
Action Area Buffer for Analysis Area: 4 Miles
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 6-20
Area of Analysis for
Greater Sage-Grouse
0 20 40 80 Miles
0 20 40 80 km
1:3,500,000
Western AREA POWER ADMINISTRATION
Exported On: 4/2/2015
K:\Projects_4\TransWestExpress\12907_003_TranswestExpress\Figures\Document\Figures\2015_EA_v2\SWildlife\Fig_6_20_GreaterSageGrouse.mxd

Wyoming

Greater sage-grouse populations and habitats within the refined transmission corridor in Wyoming are located entirely within the South Central Wyoming Conservation Area (SCCA) as designated by the local greater sage-grouse local working group (South Central Sage-Grouse Working Group [SCSGWG] 2007). The majority of greater sage-grouse within the SCCA are primarily found within the sagebrush grassland habitats, with some birds occupying areas of mountain mixed shrub and salt desert shrub habitats. Lek survey data from 1986 to 2004 indicate that the SCCA population remained steady until 2004. In 2005 and 2006 lek survey data indicated that local populations were increasing to the highest level observed since 1986 (SCSGWG 2007). This population is considered stable to increasing and important threats include energy and infrastructure development, grazing, and recreational activities (USFWS 2013m). The refined transmission corridor would cross the Greater South Pass Core Population Area within the designated existing transmission infrastructure corridor that exists parallel to Interstate 80. The Greater South Pass Core Population Area also is designated by the USFWS as part of the Wyoming Basin Priority Area for Conservation (PAC) (USFWS 2013m). The Wyoming Basin PAC is considered by the USFWS to be at low risk due to its large population size, the availability of large areas of contiguous habitats, and regulatory measures ensuring habitat protection.

Greater sage-grouse habitat within the refined transmission corridor in Colorado consists of a relatively small appendage to the southern edge of the overall species' range in the intermountain west. In Colorado, greater sage-grouse historically occurred in at least 13 counties (Braun 1995). Currently, greater sage-grouse are found in nine Colorado counties and six populations of greater sage-grouse are currently recognized including; Northwest Colorado, North Park, Middle Park, Parachute-Piceance-Roan, Eagle-South Routt, and Meeker/White River. Of these populations, only the Northwest Colorado population would be impacted by the proposed Project corridor.

Colorado

The Northwest Colorado population represents Colorado's largest greater sage-grouse population and is considered to have a low risk of extirpation due to existing areas of connectivity habitat that link to the Wyoming Basin PAC (USFWS 2013m). Lek count data indicates that the long-term population trend is stable despite substantial fluctuations over time. Current threats to the Northwest Colorado population include: conversion of habitat to agriculture, wildfire, noxious weed invasion, energy and mining infrastructure development, grazing, and recreational activities (USFWS 2013m). The BLM/USFS identify 21 separate Management Zones (MZs) within the Colorado (BLM 2013x); of these, proposed Project alternatives would cross occupied greater sage-grouse habitat within the following MZs: 3, 4, 5, 6, 8, 9, and 10.

Utah

In Utah, greater sage-grouse are thought to have been historically distributed in all 29 counties, based on sagebrush distribution, but are now found in 26 counties (UDWR 2009a). They are estimated to occupy only 41 percent of their historic habitats in Utah and are half as abundant as they were prior to 1850 (Beck and Mitchell 1997). Currently, the largest populations of greater sage-grouse in Utah are found in western Box Elder County, in Uintah County on Blue and Diamond mountains, in Rich County, and in central Utah on Parker Mountain, which contains portions of Sevier, Piute, Wayne, and Garfield counties (Final EIS Figure 3.8-3). Smaller populations are found scattered in the central and southern parts of the state (Final EIS Figure 3.8-5). Populations in the early 1970s were approximately twice the size of current populations. Populations reached a low in the mid-1990s and have since increased, but not to previous levels. UDWR, other agencies, and university researchers have identified 11,864 square miles of current greater sage-grouse habitat in Utah, 11,594 square miles of which is considered brood-rearing habitat and 7,323 square miles of which is crucial winter habitat (UDWR 2009a). Presently, the Rich, Strawberry, Emery, and Sheeprocks population area trends are considered to be increasing. The Panguitch, Bald Hills, and Hamlin Valley population area trends are considered to be stable to

increasing. The Uintah, Parker, Box Elder, and Carbon population area trends are considered to be stable. The proposed Project refined transmission corridor would cross occupied greater sage-grouse habitat for the following populations: Deadman's Bench, Halfway Hollow, South Slope Uinta, Strawberry/Fruitland, and Sheeprocks.

Deadman's Bench

The Deadman's Bench population area has 2 leks that have had less than 10 birds observed annually since 1989. While the last 10 years of lek counts estimate a population ranging between 0 and 28 birds (0 to 7 males), the low number of birds suggest this population is connected to other populations because such a low population cannot persist for over 20 years at this level. This area occurs in eastern Utah in Uintah County, south of the Blue Mountain area and is part of Western Association of Fish and Wildlife Agencies (WAFWA) MZ II (Wyoming Basin) (Stiver et al. 2006). This area has a history of anthropogenic disturbances, including oil development and associated infrastructure. While Wyoming big sagebrush is present, the degraded understory does not provide good nesting and brood-rearing habitat but does provide adequate winter habitat. It is difficult to evaluate a population trend for this local population since it extends into Colorado and the lek counts fluctuate to a degree that suggest bird movements extend outside the area. Deadman's Bench is a dry, low-elevation area with even-aged Wyoming big sagebrush and low understory vegetation cover but diverse forbs. Nonnative weeds are common; in particular, cheatgrass is abundant and is a management concern. The COT Report does not include this area in its assessment.

Halfway Hollow

The Halfway Hollow area supports a small-to-medium-sized greater sage-grouse (GRSG) population in a moderately sized and impacted landscape. The population has been directly and indirectly impacted by various anthropogenic disturbances but is somewhat contiguous with other medium to large populations in the region. This population is relatively more resilient to threats due to its proximity and potential connectivity with the adjacent populations. The COT Report (USFWS 2013m) considers these populations "low risk." Based on the last 10 years of lek counts (2003 to 2012), the Halfway Hollow population is estimated to range between 120 and 332 birds (30 to 83 males counted on 10 leks). This population occurs west of Vernal in northeastern Utah and is part of the WAFWA MZ II (Wyoming Basin) (Stiver et al. 2006). The population area is characterized by relatively contiguous habitat in the northern portion, with on-going energy and human-related fragmentation in the southern portion. While anthropogenic habitat disturbances in this area have increased at a relatively slow rate, future interest in the area is growing. The western half of the area is dominated with and fragmented by agricultural fields and rural human developments. Primarily in the southern half of the area are roads, power lines, oil development (290 wells), and proposed oil sands development. The area is characterized by Wyoming sagebrush in the low elevations and mountain sagebrush in the upper elevations. Pinyon-juniper woodland encroachment is particularly problematic in the mid-section of the area. The area has contiguous habitat that ranges in condition from degraded understory vegetation with some cheatgrass at lower elevations, increasing understory diversity at mid-elevations, and intact, diverse understory vegetation at the upper elevations.

South Slope Uinta

The South Slope Uinta population is a small-to-medium-sized GRSG population in a moderately sized area with anthropogenic and natural fragmentation. The population is not well understood, but it appears that the lower two-thirds of the population area has been directly and indirectly impacted by various natural and anthropogenic disturbances and birds are congregating on less-disturbed, high-elevation tribal lands. This population is not included in the COT Report (USFWS 2013a). Based on 6 years of lek counts (2003 to 2012), the South Slope Uinta population is estimated to range between 56 and 340 birds (14 to 85 males counted on 13 leks). This population area occurs in the northeastern portion of Utah in Duchesne County and is part of the Northeast Interior Utah population of WAFWA MZ III

(Stiver et al. 2006). This southern half of the population area (primary private lands) is fragmented and degraded habitat from anthropogenic activities (Ellis 1985). The majority of the birds are found in the northern half of the area, on upper elevation tribal lands where little is known about the habitat use but oil development and pinyon-juniper woodland encroachment are present.

Strawberry/Fruitland

Based on the last 10 years of lek counts (2003 to 2012), the Strawberry Population Area is estimated to range between 135 and 630 birds (34 to 158 males counted on 6 leks). This population area occurs in central Utah in Wasatch and Duchesne counties, and is in the WAFWA Southern Great Basin MZ III (Stiver et al. 2006). The population area encompasses 180,000 acres in Strawberry Valley down to the Fruitland area and ranges in elevation between 6,500 and 10,000 feet. The population area has a history of human-related impacts decreasing the habitat quantity and quality and altering the native wildlife populations. In 1970, when regular lek counts began, the population was estimated to be 600 birds, and by 1999 the estimates were 150 to 200 birds. From 1939 to 1999, the population is estimated to have decreased 95 percent (Bunnell 2000). The decline has been primarily attributed to reservoir expansion, cultivation, sagebrush removal, road and cabin construction, human-associated facilities, and resulting high native and non-native predation.

Sheeprocks

From lek counts conducted the last 10 years (2003 to 2012) on both North (7 leks) and South Sheeprocks (3 leks; also known as the Tintic area) GRSG populations, the estimated population ranges between 200 and 760 birds (50 to 190 males). This population area is on the eastern edge of Tooele and Juab counties and falls within WAFWA MZ III (Stiver et al. 2006). The Sheeprocks (North and South) population area (835,000 acres) is a relatively isolated population and may encompass two lek complexes that have distinct home ranges (Robinson 2007). This population's primary threats are cheatgrass invasion and associated fire intervals that threaten wintering habitat, pinyon-juniper woodland encroachment, localized recreational impacts, predation, and localized wild horse impacts. The Sheeprocks Population Area is a small, isolated area with natural as well as anthropogenic fragmentation. Upper elevation habitats are small but currently intact and lower-elevation wintering habitats are small and degraded areas that are susceptible to fire. The primary threats to this population are fire in wintering habitat, corvid predation, pinyon-juniper woodland encroachment, and localized recreational impacts. The COT Report (USFWS 2013m) considers the northern portion of this population "at-risk," but does not include the southern portion.

Nevada

In Nevada, the proposed Project route crosses the southern boundary of the Lincoln Sage Grouse Population Management Unit but does not cross any occupied greater sage-grouse habitat. The nearest occupied habitat in this PMU is located approximately 15 miles to the north of the transmission line ROW.

Conservation Measures

Project-related impacts to the greater sage-grouse would be minimized through implementation of the following design features and conservation measures as described in Chapter 3.0:

- Applicant-committed conservation measures and design features: TWE-26, TWE-31, TWE-32, TWE-33, and TWE-34.
- Conservation measures: **WLF-1**, **WLF-4**, **WLF-5**, **WLF-6**, **WLF-7**, **WLF-8**, and **SSWS-15**.

In addition, the following species-specific conservation measures would be implemented to avoid or minimize effects of the Proposed Action on the greater sage-grouse:

SSWS–5 – To avoid or minimize Project-related impacts to greater sage-grouse and its habitat, the BLM and Western have coordinated with applicable federal and state land and wildlife management agencies and other stakeholders to develop a suite of mitigation measures for this species. In addition, TransWest has developed a Habitat Equivalency Analysis (HEA) to quantitatively determine an appropriate level of compensatory mitigation that would be implemented to offset unavoidable impacts to sage-grouse habitat. Applicant-committed measures proposed as part of the HEA process are further discussed in Section 3.8.6.3. The BLM and Western support the implementation of the applicant's HEA process and compensatory mitigation measures in conjunction with the following impact avoidance and minimization measures developed through the NEPA process.

General Measures: *To reduce impacts to greater sage-grouse from construction and operation of the proposed Project, TransWest, in consultation with the BLM, Western, and applicable federal and state land and wildlife management agencies, would be required to implement the following general design features:*

1. Placement of Project structures and access roads would maximize use of topographic features to visually screen Project facilities from high quality greater sage-grouse habitat (i.e., Wyoming – within sage-grouse core habitat and within 4 miles of active leks; Colorado – within preliminary priority habitat; Utah – within occupied habitat and within 4 miles of active leks.

   Effectiveness: Visual screening of Project facilities from lekking and nesting greater sage-grouse would reduce both direct and indirect impacts resulting from construction and operation activities.

2. To minimize fragmentation of suitable sage-grouse breeding, brood-rearing, and wintering habitats, the approved transmission line ROW would use existing roads, create no new permanent roads, be accessed via drive and crush wherever possible, and be micro-sited in coordination with applicable state and federal wildlife management.

   Effectiveness: Limiting the construction of new access roads and clearing of existing native vegetation would reduce both direct and indirect impacts from construction and operation by avoiding removal and degradation of otherwise suitable habitat.

3. To limit corvid predation on greater sage-grouse, TransWest would develop a Raven Management Plan that outlines active adaptive management strategies for controlling raven predation and nesting within the Project ROW and includes post–construction monitoring for ravens and removal of raven nests.

   Effectiveness: Development and implementation of a Raven Management Plan is anticipated to reduce predation pressure on greater sage-grouse eggs and chicks through direct removal of raven nests within the ROW and control of raven abundance within the ROW.

4. To limit disturbance to lekking and nesting activity, disruptive construction and maintenance activities within 4 miles of occupied/active leks would be prohibited between March 1 and June 30. Activities determined to be non-disruptive by the BLM, Western, and applicable federal and state land and wildlife management agencies would be permitted between March 1 and June 30.

   Effectiveness: Recent studies have observed impacts of increased noise levels on male greater sage-grouse activity at lekking sites during the breeding season (Blickley et al. 2012). The impacts of increased anthropogenic noise levels on nesting greater sage-grouse have not been determined through direct investigation. Although information on greater sage-grouse communication is lacking in the scientific literature, the species may be particularly vulnerable to noise impacts during the breeding season because their low-frequency vocalizations can be masked by most sources of anthropogenic noise (Blickely et al. 2012). Seasonal restrictions of disruptive construction and maintenance activities is anticipated to be effective in reducing adverse noise impacts to breeding and nesting greater sage-grouse within the Project area.

5. To limit the potential for adverse impacts resulting from contact with construction equipment, vehicles, and personnel, TransWest would implement a vehicle speed limit of 15 mph on roads without posted speed limits in areas of occupied sage-grouse habitat.

   *Effectiveness***:** Reductions in vehicle speed have been shown to be effective in reducing wildlife mortality within active construction areas and during maintenance activities (Danks & Porter 2010; Meisingset 2014; Neumann et al. 2012; Seiler 2005).

6. Under Applicant Committed Design Feature TWE-26, TransWest has committed to developing a Noxious Weed Management Plan in accordance with existing BLM Pesticide Use Plan requirements. Control of noxious weeds would minimize the potential for weed-related degradation of occupied sage-grouse habitat. Prior to the use of chemical weed control agents, herbicide applications would be reviewed by agency wildlife biologists to ensure consistency with state and local greater sage-grouse conservation goals.

   *Effectiveness***:** Development and implementation of a Noxious Weed Management Plan is anticipated to reduce adverse impacts to greater sage-grouse habitat suitability by reducing the frequency of noxious weed invasions within the Project area. Conformance with BLM Pesticide Use Plan requirements would ensure that chemical weed treatments do not harm greater sage-grouse individuals or native habitats.

Site-specific Measures*:* In addition to requiring implementation of the general mitigation measures discussed above, the BLM and Western would consider requiring additional impact avoidance and minimization measures on a site-specific basis in areas of greater sage-grouse habitat located within areas that meet all of the following state-specific criteria:

- Areas within 4 miles of active leks and within Wyoming Core Areas designated under EO 2011-05;
- Areas within 4 miles of active leks and within areas of PPH in Colorado; and
- Areas within 4 miles of active leks and within areas of designated brood-rearing habitats and winter concentration areas in Utah.

Identification of additional greater sage-grouse mitigation measures to be implemented in local areas would be completed prior to finalization of the POD in coordination with the Applicant, BLM, Western, and local interdisciplinary teams comprised of applicable federal and state land and wildlife management agency staff. Criteria for determining site-specific measures could include, but would not be limited to: existing vegetation communities, existing fragmentation, proximity to active leks, visibility of the proposed transmission line and towers from active lek locations, presence of noxious and invasive weed species, topography, proximity to USFWS PACs, proximity to designated winter concentration areas, proximity to nesting habitat, proximity to brood rearing habitat, proximity to available water sources, proximity to other anthropogenic sources of disturbance, and co-location with existing transmission infrastructure.

Additional measures identified by the BLM and Western for consideration on a site-specific basis in coordination with appropriate federal and state agencies would include:

1. Installation of alternative structure types consisting of self-supporting tubular steel monopole structures to reduce the potential for perching and nest construction by avian predators of greater sage-grouse.

   *Effectiveness***:** Although no direct evidence of the effects of structure type upon predator abundance or predation rates of greater sage-grouse has been identified in the current scientific literature, the BLM and Western have identified this type of mitigation as having the potential to reduce the impacts of predation upon greater sage-grouse populations. Following construction, specific locations identified as requiring this mitigation would be monitored to identify the

effectiveness of self-supporting monopoles in reducing predation pressure on greater sage-grouse from increased raven and raptor abundance along the transmission line corridor.

Installation of self-supporting tubular monopole structures are anticipated to result in additional impacts to greater sage-grouse during construction and operation as these structures require a larger area to install structure foundations, increased vehicle traffic to deliver foundation materials to each tower location, increased vehicle traffic to remove excavated spoils from foundation installations, and approximately 20 to 30 percent more transmission towers per mile of transmission line due to reduced span lengths.

2. Installation of perch deterrents on transmission structures to reduce the potential for perching by avian predators of greater sage-grouse.

   Effectiveness: Perch deterrents were initially designed to reduce electrocution risks by discouraging birds from perching on smaller distribution power poles and transmission towers in locations were the separation distance between charged and grounded components was less than the average wingspan of common bird species. They were not intended to remove all perching opportunities along a transmission line (APLIC 2006). Research into the use of perch deterrents has shown that the effectiveness of specific deterrents is limited and can vary by deterrent type and transmission structure configuration. Lammers and Collopy (2007) concluded that the use of perch deterrents were ineffective in completely eliminating perching by avian predators within occupied greater sage-grouse habitat in Nevada, but they were shown to result in reduced perching duration by predators upon transmission structures. In some cases, deterrents also may be useful in decreasing avian predation on sensitive prey species by reducing avian use of power lines. Other studies have observed the ability of avian predators to defeat perch deterrents and use the deterrents themselves as substrate for nest materials. To the extent that perch deterrents could result in increased predator nesting success and recruitment, their use would have potential to result in the unintended consequence of increased predation on greater sage-grouse (APLIC 2012, 2006). Although no direct evidence of the effects of perch deterrents upon predator abundance or predation rates of greater sage-grouse has been identified in the current scientific literature, the BLM and Western, in coordination with the USFWS, have identified this type of mitigation as having the potential to reduce the impacts of predation upon greater sage-grouse populations. The effectiveness of perch deterrents/discouragers is based on appropriate design, proper siting and a commitment for long-term maintenance. Following construction, locations in which perch deterrents are installed would be monitored to identify the effectiveness of these measures in reducing raven and raptor predation pressure on greater sage-grouse.

3. In areas determined to be unsuitable for the installation of self-supporting tubular steel monopoles, applicants may be required to install agency-approved guy wire marking devices on all transmission tower guy lines to increase the visibility of each wire and reduce the risk of collision by flying greater sage-grouse.

   Effectiveness: Although research into the use of wire marking devices on guy wires associated with large communication towers has indicated that wire marking can be effective in reducing avian collision mortality (Gehring et al. 2011, 2009), current literature supporting the effectiveness of marking transmission tower guy wires is lacking. Furthermore, APLIC 2012 found that there is no published information suggesting that guyed power line structures pose a significant collision risk for birds. Although no direct evidence of the effects of guy wire marking upon collision rates of greater sage-grouse has been identified in the current scientific literature, the BLM and Western have identified this type of mitigation as having the potential to reduce the impacts of collision with guy wires upon greater sage-grouse populations. Following construction, locations identified as requiring this mitigation would be monitored to identify the effectiveness of guy wire marking in concert with other site-specific conservation measures within the transmission line corridor.

4. Outfit all newly constructed fencing with agency–approved bird diverters/wire markers.

Effectiveness: Research into the effectiveness of fence marking has shown that marking fences within close proximity to active lek locations has been found to reduce collisions by greater sage-grouse by up to 83 percent (Christiansen et al. 2009; Steven et al. 2012).

For site-specific locations where it is determined that alternative structure types, perch deterrents, and guy wire marking are not feasible due to other resource issues or physical constraints, the BLM and Western will consider alternative mitigation approaches proposed by the Applicant, state wildlife agencies, and local stakeholders to ensure adequate avoidance, minimization, or compensation of potential adverse impacts to greater sage-grouse.

Direct and Indirect Effects

Impacts to greater sage-grouse from the construction and operation of the proposed Project can be grouped into two main categories, direct and indirect. Direct impacts include habitat loss, disturbance from construction activities resulting in temporary displacement of individuals, and mortality when greater sage-grouse collide with power lines or their supporting infrastructure, such as guy wires. Indirect impacts could include avoidance as a result of increased predation from perching raptors and human activity during construction and operation.

A summary of impact parameters for greater sage-grouse leks is presented in **Table 6-7,** which shows that a total of 45 occupied/active leks occur within 4 miles of the proposed Project route (i.e., 23 occupied leks in Wyoming and 11 active leks in Colorado, and 11 active leks in Utah). Additional direct and indirect impacts to greater sage-grouse habitat including Wyoming Core Population Areas, Colorado Preliminary Priority Habitat, Colorado Preliminary General Habitat, Utah brood-rearing and nesting habitat, Utah Wintering Habitat, and Utah Occupied Habitat are presented in **Table 6-8**. In total, the Project would result in the construction and operation disturbance of 3,171 acres and 753 acres, respectively, of sagebrush shrubland habitat found along the Project route in Wyoming, Colorado, and Utah as shown in **Table 6-8**. Indirect impacts would occur to 323,256 acres of potential sage-grouse habitat within the greater sage-grouse analysis area (**Table 6-8**). A summary of greater sage–grouse attendance at leks within 4 miles of the alignment is presented in **Table 6-9** and a summary of the number of visible occupied leks within 0.5, 1, 2, and 4 miles of alignments are presented in **Table 6-10**.

Explanation of Visibility Impact Analysis for Occupied Greater Sage–grouse Leks

The numbers of occupied sage-grouse leks visible from the alignments, as presented in **Table 6-10**, were based on line of sight calculations, which accounted for a number of variables. The vertical distance above the alignment by which raptors and corvids could perch on transmission line tower structures was based on the assumption that raptors and corvids would perch an average of 150 vertical feet above ground surface on tower structures as well as an assumed raptor height of 2 feet. Thus, visibility of occupied greater sage-grouse leks was based on line of sight from 152 vertical feet above the alignment.

Visibility calculations also were based on topographical variation within 4 miles of the alignment that would affect visibility of sage-grouse leks from potential perches 152 vertical feet above the alignment. For example, a sage-grouse lek in an area with flat terrain might be visible from 1 mile away, whereas a lek in an area with hilly or mountainous terrain might not be visible from 1 mile away due to an obstruction to line of sight. Due to a lack of data on vegetative structure and height within 4 miles of the alignment, vegetative height was not figured into line–of–sight calculations. Occupied leks visible from within 4 miles of the alignment would potentially be at greater risk of predation by perching raptors. However, implementation of general and site-specific measures listed under **SSWS–5** are anticipated to limit raptor and corvid predation and impacts to sage-grouse visible from the alignment. Thus, impacts associated with these occupied leks are expected to be low magnitude.

Table 6-7 Summary of Impact Parameters for Greater Sage–grouse Leks

Parameter	Region I	Region II	Region III	Analysis Area Total
Wyoming				
Number of occupied leks within 0.5 mile of alignments in Wyoming	1	-	-	1
Number of occupied leks within 1 mile of alignments in Wyoming	3	-	-	3
Number of occupied leks within 2 miles of alignments in Wyoming	8	-	-	8
Number of occupied leks within 3 miles of alignments in Wyoming	17	-	-	17
Number of occupied leks within 4 miles of alignments in Wyoming	23	-	-	23
Colorado				
Number of occupied leks within 0.5 mile of alignments in Colorado	1	-	-	1
Number of occupied leks within 1 mile of alignments in Colorado	5	-	-	5
Number of occupied leks within 2 miles of alignments in Colorado	7	-	-	7
Number of occupied leks within 3 miles of alignments in Colorado	8	-	-	8
Number of occupied leks within 4 miles of alignments in Colorado	11	-	-	11
Utah				
Number of occupied leks within 0.5 mile of alignments in Utah	-	3	-	3
Number of occupied leks within 1 mile of alignments in Utah	-	3	-	3
Number of occupied leks within 2 miles of alignments in Utah	-	6	-	6
Number of occupied leks within 3 miles of alignments in Utah	-	9	-	9
Number of occupied leks within 4 miles of alignments in Utah	-	10	1	11
Total Analysis Area				
Total number of occupied leks within 0.5 mile of alignment	2	3	-	5
Total number of occupied leks within 1 mile of alignment	8	3	-	11
Total number of occupied leks within 2 miles of alignment	15	6	-	21
Total number of occupied leks within 3 miles of alignment	25	9	-	34
Total number of occupied leks within 4 miles of alignment	34	10	1	45
Length of transmission line in miles (habitat fragmentation and collision potential)[1]	158	252	281	691

[1] Length refers to length of 600–kV transmission line and serves as a proxy metric for avian collision potential.

1

Table 6-8 Summary of Proposed Action Impact Parameters for Greater Sage–grouse Habitats

Parameter	Region I			Region II			Region III			Analysis Area Total		
Habitat Disturbance	Construction Impact	Operation Impact	Indirect Impact	Construction Impact	Operation Impact	Indirect Impact	Construction Impact	Operation Impact	Indirect Impact	Construction Impact	Operation Impact	Indirect Impact
Impacts to Wyoming core population areas (acres)	204	34	19,223	-	-	-	-	-	-	204	34	19,223
Impacts to Colorado Preliminary Priority Habitat (acres)	419	108	42,836	-	-	-	-	-	-	419	108	42,836
Impacts to Colorado Priority General Habitat (acres)	457	114	51,237	265	49	29,426	-	-	-	722	163	80,663
Impacts to Utah nesting/brood–rearing habitat (acres)	-	-	-	861	185	101,186	-	-	-	861	185	101,186
Impacts to Utah wintering habitat (acres)	-	-	-	692	154	80,200	-	-	-	692	154	80,200
Impacts to Utah occupied habitat[1]	-	-	-	890	197	105,380	-	-	-	890	197	105,380
Impacts to potential greater sage-grouse habitat[2]	1,218	269	124,553	1,334	348	139,370	655	130	68,892	3,207	747	332,815

[1] Occupied habitat includes brood–rearing habitat and wintering habitat.

[2] Potential greater sage-grouse habitat is based on acres of impacts to sagebrush shrubland vegetation community within the greater sage-grouse analysis area.

Table 6-9 Summary of Greater Sage–grouse Attendance at Leks within 4 miles of the Alignment

Parameter[1]	Region I	Region II	Region III
Wyoming			
Number of active leks	23	-	-
Peak male attendance combined 2004 – 2013[2]	461	-	-
Minimum male attendance combined 2004 – 2013[3]	9	-	-
3–year average lek attendance[1]	6.85	-	-
Average attendance across all leks[4]	10.33	-	-
Total attendance 2004 – 2013[1]	1,736	-	-
Number of leks with no attendance 2009 – 2013[5]	7	-	-
Survey effort[6] (percent)	93.3	-	-
Colorado			
Number of active leks	11	-	-
Peak male attendance combined 2004 – 2013[2]	339	-	-
Minimum male attendance combined 2004 – 2013[3]	28	-	-
3–year average lek attendance[1]	9.60	-	-
Average attendance across all leks[4]	14.69	-	-
Total attendance 2004 – 2013[1]	1,440	-	-
Number of leks with no attendance 2009 – 2013[5]	1	-	-
Survey effort[6] (percent)	98.0	-	-
Utah			
Number of active leks	-	10	-
Peak male attendance combined 2004 – 2013[2]	-	222	-
Minimum male attendance combined 2004 – 2013[3]	-	65	-
3–year average lek attendance[1]	-	9.83	-
Average attendance across all leks[4]	-	13.23	-
Total attendance 2004 – 2013[1]	-	939	-
Number of leks with no attendance 2009 – 2013[5]	-	1	-
Survey effort[6] (percent)	-	88.7	-

[1] Lek count numbers are male birds only, most recent data used.

[2] Sum of the 10–year peak annual counts from all leks within 4 miles combined (2004–2013).

[3] Sum of the 10–year minimum count from all leks within 4 miles combined (2004–2013).

[4] Total males observed/Number of surveys.

[5] Although leks are classified as active or occupied, surveys have not observed male attendance over previous 5 years.

[6] Number of surveys/Number of potential surveys (10 years x 28 leks = 280 potential surveys).

1

Table 6-10 Summary of Greater Sage–grouse Lek Visibility

Parameter	Region I	Region II	Region III
Wyoming			
Number of visible occupied leks within 0.5 mile of alignments	-	-	-
Number of visible occupied leks within 1 mile of alignments	3	-	-
Number of visible occupied leks within 2 miles of alignments	11	-	-
Number of visible occupied leks within 3 miles of alignments	18	-	-
Number of visible occupied leks within 4 miles of alignments	21	-	-
Colorado			
Number of visible occupied leks within 0.5 mile of alignments	-	-	-
Number of visible occupied leks within 1 mile of alignments	6	-	-
Number of visible occupied leks within 2 miles of alignments	12	-	-
Number of visible occupied leks within 3 miles of alignments	13	-	-
Number of visible occupied leks within 4 miles of alignments	16	-	-
Utah			
Number of visible occupied leks within 0.5 mile of alignments	-	1	-
Number of visible occupied leks within 1 mile of alignments	-	1	-
Number of visible occupied leks within 2 miles of alignments	-	4	-
Number of visible occupied leks within 3 miles of alignments	-	8	-
Number of visible occupied leks within 4 miles of alignments	-	9	1
Analysis Area Total			
Number of visible occupied leks within 0.5 mile of alignments	-	1	-
Number of visible occupied leks within 1 mile of alignments	9	1	-
Number of visible occupied leks within 2 miles of alignments	23	4	-
Number of visible occupied leks within 3 miles of alignments	31	8	-
Number of visible occupied leks within 4 miles of alignments	37	9	1

Table 6-10 identifies potential direct impacts by Project phase to sage-grouse based upon the TransWest Sage-grouse Analysis Framework and the five–factor analysis of potential threats to the species and its habitat contained in the USFWS's 12–month finding on petitions to list the species under the ESA. Evaluation of each potential direct impact upon local sage-grouse populations is based upon current scientific literature, professional agency biologist judgment, and information regarding Project development provided by the applicant.

Direct Impacts and Loss of Greater Sage–grouse

Mortalities Resulting from Electrocutions due to Collisions with Energized Components

Tables 6-11 and **6-12** summarize the factors used to assess direct and indirect Project-related impacts to greater sage-grouse, respectively. Wildlife mortalities as a result of electrocution can occur when the distance between phase conductors or the distance between grounded and energized hardware is less than the wrist to head span or head to foot distance of a bird (APLIC 2006). Under all Project alternatives, there would be no potential for electrocution of sage-grouse due to collisions with energized components of transmission lines because of the small wing span and height of sage-grouse relative to the proposed spacing of conductors and grounded elements. Electrocution risk within the analysis area is primarily associated with smaller (i.e., 60 kV or less) power lines, due to the size of towers and spacing of the wires

(APLIC 2006). For the proposed Project, the 345–kV lines associated with the ground electrode beds are the only components with electrocution potential.

Table 6-11 Factors for Evaluation of Potential Direct Impacts to Greater Sage–grouse

Factor	Potential Direct Impact	Project Phase	
		Construction	Operation
Direct Loss of Birds	Mortalities resulting from electrocutions due to collisions with energized components		X
	Mortalities resulting from collisions with Project infrastructure including transmission towers, conductors, lines, guy wires, or fences	X	X
	Mortalities resulting from collisions with construction equipment and vehicles	X	X
	Mortalities resulting from destruction of nests	X	
	Mortalities resulting from nest abandonment due to disturbance	X	X
Present or threatened destruction, modification, or curtailment of habitat or range	Loss of habitat resulting from construction of tower sites, access roads, terminal locations, and other ancillary facilities	X	X
	Fragmentation of sage-grouse habitat due to the construction of new access roads, removal of vegetation at tower sites, increased EMF, or introduction of tall structures	X	X
	Degradation of sage-grouse habitat and function	X	X
	General disturbance to sage-grouse and disruption of breeding activities due to human presence and noise	X	X
	Decreased nest initiation, nest success, and recruitment resulting from disruption of foraging, seasonal migration, breeding (lekking), nesting, brood rearing, and wintering activities	X	
	Interruption or adjustments to seasonal sage-grouse migrations and movements		X
	Reduction of sage-grouse habitat suitability resulting from the introduction and establishment of noxious weeds		X
Overutilization (harvest)	Increased un–authorized harvest resulting from increased access to sage-grouse habitat via construction of new access roads		X
Disease and predation	Potential for increased avian predation due to increased perching opportunity		X
	Potential for increased mammalian predation pressure resulting from habitat fragmentation and new predator movement corridors		X
Inadequacy of existing regulatory mechanisms	No direct impacts identified		
Other natural or man–made factors affecting the species continued existence	No direct impacts identified		

Table 6-12 Factors for Evaluation of Potential Indirect Impacts to Greater Sage–grouse

Factor	Potential Indirect Impact	Project Phase	
		Construction	Operation
Direct Loss of Birds	No indirect impacts identified		
Present or threatened destruction, modification, or curtailment of habitat or range	Reduction of sage-grouse habitat suitability resulting from the introduction and establishment of noxious weeds		X
	Avoidance of habitat due to potential increase in avian predation pressure		X
Overutilization (harvest)	Increased un–authorized harvest resulting from increased access to sage-grouse habitat via construction of new access roads		X
Disease and predation	Increased physiological stress and susceptibility to disease and predation resulting from human noise and presence	X	X
Inadequacy of existing regulatory mechanisms	No indirect impacts identified		
Other natural or man–made factors affecting the species continued existence	Degradation of sage-grouse habitat suitability resulting from the application of herbicides		X

Impacts to sage-grouse from electrocution would be minimized by the implementation of design feature TWE–30 (Chapter 3.0), in which TransWest commits to the construction of the transmission line and associated infrastructure consistent with APLIC 2006 recommendations. Conservation measure **WLF–8** (Chapter 3.0) would further minimize the potential impact of electrocution by requiring Project conformance with conservation measures recommended in APLIC 2012.

Mortalities Resulting from Collisions with Project Infrastructure Including Transmission Towers, Conductors, Lines, Guy Wires, or Fences

Avian mortality from collisions with power lines is well documented (Brown and Drewien 1995). While sage-grouse are predominantly a ground–dwelling species, the risk for collision during flight is heavily dependent upon power line sizes (e.g., 345–kV versus 600–kV) and locations such as locations between loafing and feeding areas or along migration routes. Highest collision probabilities appear to occur where sage-grouse typically fly between foraging and loafing habitats that are bisected with lower voltage overhead lines (SAIC 2001).

The potential for mortalities of sage-grouse as a result of in–flight collisions with transmission lines and towers would increase under all Project alternatives within occupied sage-grouse habitats. While quantitative information regarding the rates of sage-grouse collisions with towers and lines is generally lacking, factors influencing collision rates can include location, configuration, structure type, species specific behaviors, and environmental conditions (e.g., visibility, weather, topography) (APLIC 2006). Past research has shown that the static wire, also referred to as the shield or groundwire, has posed the greatest collision danger to birds (APLIC 2012; Faanes 1987). Most of the documented static-wire collisions occur when birds increase their altitude in apparent attempts to avoid conductor wires. Birds maneuvering to avoid the conductor wires actually increased collision risk and, in the absence of static wires, most collisions could have been avoided. Static wires on the larger (e.g., 500 kV and 600 kV) transmission lines, such as the proposed Project, are typically positioned at the top of the structures and therefore, pose less of a collision threat to low–flying sage-grouse. The greatest collision risks to sage-grouse from the proposed Project are the guy wires associated with each tower. The guy wires support the towers and are typically angled to the anchor point. Therefore, bird species, such as sage-grouse, could have a greater potential for collision risk because of the smaller wing to body ratio (i.e., heavy wing–load), resulting in lower flight heights and a greater occurrence of takeoffs and landings crossing guy wire heights. Because of their lack of flying efficiency, species such as the greater sage-grouse could be more likely to collide with the guy wires unless the wires are properly marked or even eliminated

in high use habitat areas (i.e., using self–supporting steel lattice structures or tubular steel monopoles instead of guyed lattice structures).

Documentation of direct mortality of sage-grouse resulting from collisions with transmission lines is limited. One study in Idaho showed that a substantial proportion of annual mortality can be caused by transmission line collisions. Beck et al. (2006) monitored survival of 15 radio–collared juvenile sage-grouse in the Medicine Lodge area of Clark County, Idaho and 43 juvenile sage-grouse in the Table Butte area of Clark and Jefferson counties, Idaho in 1997 and 1998. Although all mortality documented in the Medicine Lodge area was attributed to predation, 33 percent of the juvenile mortality (two of the six fatalities) in the Table Butte area was attributed to collisions with transmission lines. The frequency of sage-grouse collisions with transmission lines is difficult to evaluate and juvenile mortality in the Table Butte area could have been more of a function of available habitat and the specific location of the transmission line rather than the transmission line design itself (i.e., transmission line was not sited properly to avoid important habitats). In addition, a majority of transmission lines are located in remote areas with little human presence and dead birds are often picked up by scavengers before humans are able to find and report them; therefore, reported losses must be considered a superficial measure of actual collision mortality (Faanes 1987; Longridge 1986; Thompson 1978).

A majority of literature on power line impacts has been derived from studies that looked at several different facilities associated with energy development (e.g., oil and gas well pads, access roads, compressor stations, power lines, etc.). Additionally, due to very limited data on collision mortality of sage-grouse from power lines, it cannot be determined if collision rates vary by capacity of power lines.

Impacts to sage-grouse from collisions with Project infrastructure would be minimized by the implementation of design feature TWE–30 (Chapter 3.0), in which TransWest commits to the construction of the transmission line and associated infrastructure consistent with APLIC 2006 recommendations. Conservation measure **WLF–8** would further minimize the potential for electrocutions by requiring Project conformance with conservation measures recommended in APLIC 2012. These measures, along with both the general and site-specific measures discussed under **SSWS–5**, would require TransWest to implement several actions to avoid and minimize potential impacts to the greater sage-grouse and its habitat.

Marking guy wires would increase the visibility of these wires and would reduce the potential for collisions, especially in areas between important roosting and foraging habitat. A study in South Carolina involving two 115–kV transmission lines showed that the bird collision rate was 53 percent lower for marked transmission lines versus unmarked transmission lines (Savereno et al. 1996). The study concluded that aviation markers were effective at increasing the transmission line visibility and reducing bird collisions. Alternatively, constructing alternative structures such as self–supporting steel lattice structures instead of guyed lattice structures would eliminate the collision potential from guy wires to sage-grouse.

The feasibility of using alternative transmission tower structure types within areas designated as high quality sage-grouse habitat depends on multiple factors. Engineering constraints that may limit the use of self–supporting structures can include, but are not limited to: extreme topography, unstable or erodible soils, local geology, and local hydrology. Other resource considerations that also may determine the applicability of alternative self–supporting structures can include but are not limited to: local recreation patterns (e.g., designated recreational OHV or snowmobile trails), sensitive vegetation communities, and sensitive visual resources. Determinations of appropriate structure types will be made in coordination with the appropriate land and resource management agencies during development of the Notice to Proceed POD as outlined in Section 2.3.1.

Mortalities Resulting from Collisions with Construction Equipment and Vehicles

Sage-grouse mortality resulting from collisions with construction equipment would likely be very low. Equipment used in transmission line construction generally moves at a slow rate or is stationary for long periods (e.g., cranes). The potential for sage-grouse mortalities resulting from collisions with vehicles traveling on project access roads is higher than the risk associated with construction equipment and increases proportionally with the speed of each individual vehicle. Road conditions also can affect the rate of collisions as vehicle speeds tend to be lower on unimproved and one–lane roads. The risk of direct mortality to sage-grouse from collisions with equipment and vehicles during construction and maintenance is most likely limited to nesting hens or young chicks that have limited mobility.

Impacts to sage-grouse from collisions with construction vehicles and equipment would be minimized by the implementation of design feature TWE–34 (Chapter 3.0), in which TransWest commits to providing training to all Contractor and Subcontractor personnel and others involved in construction activities occurring within occupied sage-grouse habitat. Furthermore, the implementation of conservation measure **SSWS–5** would require TransWest to restrict construction and maintenance vehicle speeds to 15 mph when traveling on unimproved Project roads within occupied sage-grouse habitat. This would reduce the potential for sage-grouse collisions with vehicles and equipment.

Mortalities Resulting from Destruction of Nests

All Project action alternatives would result in construction and operation of the Project within habitats suitable for sage-grouse nesting. The potential for mortalities of nesting sage-grouse resulting from the destruction of active nests exists due to the amount of habitat crossed by each alternative. This potential is limited by seasonal restrictions of construction and operation activities, which would be applied to sage-grouse habitat within 4 miles of active leks as listed in Final EIS Appendix C, Tables C.3–1 through C.3–29. Research conducted in Colorado, Idaho, and Wyoming suggests that approximately 80 percent of sage-grouse nests are located within 4 miles of the lek where breeding occurs (CGSSC 2008). Conservation measures outlined under **SSWS 5** would further minimize the potential impact of nest destruction by requiring the siting of the transmission line away from breeding and nesting habitats to the extent practicable. If active nests located outside of the 4-mile lek buffer are encountered during construction or maintenance activities, TransWest has committed to implementing design feature TWE-34 (Appendix C), which would require immediate coordination with the appropriate land management agency's biologists to ensure adequate protection is afforded to the resource. Currently, state wildlife management agencies do not have a standard recommended buffer for active sage-grouse nests located outside of the 4 mile seasonal restrictions; therefore, any buffers applied would be on a case–by–case basis in coordination with the appropriate state agency biologists. Implementation of proposed mitigation measure **SSWS–5.4** would further reduce potential impacts to breeding and nesting greater sage-grouse by prohibiting disruptive construction and maintenance activities within four miles of active leks during the breeding season. These design features and protection measures are anticipated to minimize direct impacts to nesting sage-grouse. TransWest has committed to implementing design feature TWE–34 (Chapter 3.0), which would require immediate coordination with the appropriate land management agency's biologists to ensure adequate protection is afforded to the resource. These design features and protection measures are anticipated to minimize direct impacts to nesting sage-grouse.

Mortalities Resulting from Nest Abandonment due to Disturbance

Sage-grouse display one of the lowest nest success rates of all upland game birds and hens have been observed abandoning active nests due to human disturbance and ground disturbing activities within a certain proximity (Schroeder 1997) and the presence of livestock (Crawford et al. 2004). The potential for nest abandonment can be ameliorated by implementation of seasonal restrictions for construction and operation activities applied to sage-grouse habitat within 4 miles of active leks, as listed in Table C.3–1

through C.3–29 located in Final EIS Appendix C. Conservation measures outlined under **SSWS–5** would further minimize the potential impact of nest destruction by requiring the siting of the transmission line away from breeding and nesting habitats to the extent practicable. If active nests located outside of the 4–mile timing restrictions are encountered during construction or maintenance activities, TransWest has committed to implementing design feature TWE–34 (Chapter 3.0), which would require immediate coordination with the appropriate land management agency's biologists to ensure adequate protection is afforded to the resource. These design features and protection measures are anticipated to minimize direct impacts to nesting sage-grouse.

Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

Loss of Habitat Resulting from Construction of Tower Sites, Access Roads, Terminal Locations, and Other Ancillary Facilities

Under all Project action alternatives, construction activities could result in permanent habitat loss, fragmentation, and the temporary displacement of sage-grouse from construction areas due the removal of native sagebrush vegetation, noise, and increased human activity. Sage-grouse may avoid previously occupied areas due to noise and disturbance from vehicle traffic (Lyon and Anderson 2003). The disturbance and degradation of sagebrush can reduce habitat carrying capacity for local breeding populations of sage-grouse, especially in areas where high quality sagebrush habitat is limited (Braun 1998; Connelly et al. 2000). Alternatively, sage-grouse may simply avoid otherwise suitable habitat as the density of roads and transmission lines increases (Holloran 2005).

The potential for disturbance of suitable sage-grouse lekking and breeding habitat can be ameliorated by implementing seasonal restrictions of construction and operation activities applied to sage-grouse habitat within 4 miles of active leks as listed in Table C.3–1 through C.3–29 located in Final EIS Appendix C. Conservation measures outlined under **SSWS–5** would further minimize the potential impact of nest destruction by requiring the siting of the transmission line away from breeding and nesting habitats to the extent practicable. These design features and protection measures are anticipated to minimize direct impacts to nesting sage-grouse.

Fragmentation of Greater Sage–grouse Habitat due to the Construction of New Access Roads, Removal of Vegetation at Tower Sites, Increased EMF, Introduction of Tall Structures

Transmission lines could cause sage-grouse to abandon otherwise suitable habitat or disrupt movement patterns among seasonal habitats (SAIC 2001). Transmission lines might also serve as barriers to movement as a result of avoidance behavior (Desholm and Kahlert 2005; Robel et al. 2004). Production of EMF by transmission lines also has been associated with avoidance of otherwise suitable habitat by avian species (Fernie and Reynolds 2005). Sage-grouse and other prairie gallinaceous birds have evolved in habitat largely devoid of tall structures. It is unclear how these species react to structure heights. Recent research in southern Wyoming has reported sage-grouse avoidance of brood–rearing habitats within 2.9 miles of transmission lines (LeBeau 2012). Knick et al. (2013) observed increased lek activity and persistence in areas of sage-grouse habitat characterized as having lower densities of transmission lines in comparison to sage-grouse habitats with increased densities of transmission lines and infrastructure. Studies completed on greater and lesser prairie–chickens have suggested avoidance behavior associated with the height of transmission lines. This avoidance could create an unintentional buffer along the transmission lines and roads of at least 328 feet in width (and probably more) for prairie-chickens. There also appears to be avoidance in the placement of nests and leks (Pruett et al. 2009a,b). These studies showed that greater and lesser prairie–chickens were not only more likely to avoid transmissions lines but also less likely to nest, cross, or maintain a home range near transmission lines (Pruett et al. 2009a,b). The movement of prairie–chickens was shown to be altered by the transmission lines, creating habitat fragmentation (Pruett et al. 2009a,b). These conclusions are derived from research on greater and lesser prairie chickens, a species that is similar in some aspects of life histories to sage-

grouse and therefore might not be representative of potential sage–grouse behavioral responses to the introduction of tall structures.

Degradation of Greater Sage–grouse Habitat and Function

Construction of the Project under all action alternatives would result in the degradation of sage-grouse habitat function. Removal of vegetation at tower locations, new access roads, and other work areas and facilities would result in the loss of and/or degradation to suitable sage-grouse habitat. Areas of vegetation removal would be minimized through the use of existing access road networks and the restoration of areas temporarily disturbed during construction activities in accordance with land management agency or private landowner requirements. The long-term loss of suitable sage-grouse habitat would be limited to those areas included in the operation and maintenance of the transmission line. However, as discussed in Final EIS Appendix D, it is anticipated that, upon decommissioning of the Project, reclamation measures would result in the return of impacted areas to native habitats. Herbaceous (grass and forb–dominated) vegetation communities would be expected to return to a native state within a relatively short period of time (e.g., 5 years). Other more diverse and slow–growing habitats such as sagebrush shrublands could require up to 50 years or longer before returning to native conditions.

General Disturbance to Greater Sage–grouse and Disruption of Breeding Activities due to Human Presence and Noise

Construction activities could result in permanent habitat loss, degradation, fragmentation, and the temporary displacement of sage-grouse from construction areas due to noise and increased human activity. The disturbance and degradation of sagebrush habitat can reduce its carrying capacity and adversely affect local breeding populations of sage-grouse, especially in areas where high quality sagebrush habitat is limited (Braun 1998; Connelly et al. 2000). Alternatively, sage-grouse may simply avoid otherwise suitable habitat as the density of roads and transmission lines increases (Holloran 2005).

This impact would be minimized by the application of species–specific agency conservation measures and timing limitations, as listed in Final EIS Appendix C and conservation measures outlined under **SSWS–5** would further minimize the potential impact of nest destruction by requiring the siting of the transmission line away from breeding and nesting habitats to the extent practicable Implementation of proposed mitigation measure **SSWS–5.4** would further reduce potential impacts to breeding and nesting greater sage-grouse by prohibiting disruptive construction and maintenance activities within four miles of active leks during the breeding season. These design features and protection measures are anticipated to minimize direct impacts to nesting sage-grouse. Implementation of **SSWS–15** would protect sage-grouse by requiring the Contractor to immediately notify the appropriate land management agencies and provide the location and nature of the finding. Construction in the vicinity of the bird(s) would be halted and would not resume until a biologist from the appropriate agency determines that the bird(s) would not be affected by continued construction.

Decreased Nest Initiation, Nest Success, and Recruitment Resulting from Disruption of Foraging, Seasonal Migration, Breeding (Lekking), Nesting, Brood Rearing, and Wintering Activities

Sage-grouse may avoid previously occupied areas due to noise and disturbance from vehicle traffic as evidenced by the observed rates of decline in male sage-grouse lek attendance, which have been reported to be correlated to traffic volumes on roads within proximity to active leks (Lyon and Anderson 2003). Depending on the season, displacement could impact lekking, nesting and brood–rearing hens, and birds on winter ranges. Sage-grouse that are displaced by construction activities might move to areas with lower quality habitat, resulting in an overall effect of reduced survival, nest initiation, and

breeding success. Fragmentation of sagebrush habitats also could interrupt the gene flow between distinct isolated areas of suitable breeding habitat.

Interruption or Adjustments to Seasonal Greater Sage–grouse Migrations and Movements

Under all Project action alternatives, the potential for causing interruption of or adjustments to sage-grouse migrations between seasonally important habitats could occur as a result of construction and operation activities within occupied sage-grouse habitats. Depending on the season, displacement and avoidance of areas near the transmission line could impact birds on leks, nesting and brood–rearing hens, and birds on winter ranges. This potential shift in behavior would represent a functional fragmentation of otherwise suitable sage-grouse habitat and could result in reduced breeding activity, nest initiation, brood–rearing success, and recruitment. The effects of fragmentation of sage-grouse habitat could further result in reduced gene flow between populations within the Project vicinity as the majority of gene flow is likely the result of movement of individuals between neighboring leks and populations, not the long distance migrations of individuals across larger portions of the species range (Oyler–McCance et al. 2005). Connectivity amongst leks has been observed to be a significant contributor to population stability and persistence (Knick and Hanser 2011; Knick et al. 2013).

Project design feature TWE–32 would require TransWest to identify sensitive areas to sage-grouse (e.g., leks, nesting habitat, wintering habitat, etc.) and implement seasonal timing restrictions and protection buffers. Conservation measures outlined under **SSWS–5** would require the siting of the transmission line ROW to be coordinated with appropriate wildlife management agencies in order to avoid areas of sage-grouse nesting and brood-rearing habitat within 4 miles of active leks to the extent practicable. Implementation of proposed mitigation measure **SSWS–5.4** would further reduce potential impacts to breeding and nesting greater sage-grouse by prohibiting disruptive construction and maintenance activities within 4 miles of active leks during the breeding season. These design features and protection measures are anticipated to minimize direct impacts to nesting sage-grouse.

Reduction of Greater Sage–grouse Habitat Suitability Resulting from the Introduction and Establishment of Noxious Weeds

Additional impacts from transmission line construction and associated access roads (e.g., two–tracks, mowed or cleared access ways) could include the reduction of sage-grouse habitat quality resulting from the spread of invasive and noxious plant species (Gelbard and Belknap 2003; SAIC 2001). This potential impact can adversely affect sage-grouse recruitment as invasive and noxious plants could out–compete native forbs, which sage-grouse rely on for forage during brood–rearing. Noxious weeds invasions within sagebrush vegetation communities also have resulted in the increase of number and frequency of wildfires that have widespread detrimental effects upon greater sage-grouse habitat conditions (West and Yorks 2002; Crawford et al. 2004). Big sagebrush communities invaded by cheat grass have estimated mean fire return intervals of 10 years in many areas, whereas the natural fire regime is conservatively estimated to be 10 to 20 times longer (Connelly et al. 2004). Areas of big sagebrush that experience increased fire frequencies often result in removal of sagebrush canopy

Implementation of conservation measures **NX–1** and **NX–2** (Table C.5–1, Final EIS Appendix C) would minimize impacts to sage-grouse habitat associated with the potential introduction or spread of noxious weeds and invasive plant species. These measures would be implemented in coordination with the development of a Noxious Weed Management Plan as described in Table 9 of Final EIS Appendix D. This plan would be developed in accordance with appropriate land management agencies' standards and would be consistent with agency permitting stipulations for the control of noxious weeds and invasive species (EO 13112). Measures included in the plan could include, but would not be limited to, the washing of construction equipment and vehicles prior to arriving within the construction area and mechanical removal or herbicide treatments of existing weed populations. These measures would substantially reduce the potential for the establishment of new weed invasions and the further spread of

existing weed populations within sage-grouse habitat located along the Project. However, the spread of noxious and invasive weeds could continue to occur even with the implementation of the Noxious Weed Management Plan.

Overutilization

Recreational hunting of sage-grouse populations within the analysis area occurs in Wyoming and Colorado. The hunting of four specific sage-grouse populations in Utah is currently legal, although none of these populations would be crossed by any of the Project alternatives. Recreational hunting is not considered to be a principal cause of range–wide declines in sage–grouse populations and the USFWS did not determine state hunting regulations to be inadequate in the 12–month findings on petitions to list the species under the ESA (75 FR 13910). Utah, Colorado, and Wyoming state wildlife agencies regulate hunting of sage-grouse with the primary goal of establishing hunting seasons and take limits that support the long term growth and sustainability of local populations (CGSSC 2008; Christiansen 2010; UDWR 2009).

Implementation of Project design feature TWE–33 would reduce any potential impacts to sage-grouse from unauthorized harvest by Project construction and maintenance personnel by providing mandatory sensitive species awareness training which includes information regarding applicable hunting regulations and other wildlife conservation measures. Overutilization is not discussed further in this document.

Disease and Predation

Potential for Increased Avian Predation due to Increased Perching Opportunity

The level of perching opportunity for avian predators within the Project analysis area is anticipated to increase under all Project alternatives. Avian predators, particularly raptors and corvids, are attracted to overhead utility lines because they provide perches for various activities, including hunting (APLIC 2006). Transmission towers increase a raptor's range of vision, allow for greater speed during attacks on prey, and serve as territorial markers (APLIC 2006; Manville 2002; Steenhof et al. 1993). Most research on power lines and raptor and corvid populations has documented a positive relationship between power lines and increased perches and nest sites. Although a direct correlation between power lines and increased predation risks for sage-grouse has not been documented, sage-grouse may avoid power lines due to increased predation risk (Lammers and Collopy 2007). It also is important to note that in some regions of the U.S., sage-grouse are an important food item for raptor species (i.e., golden eagles). This is especially true when other prey populations are exhibiting down cycles (e.g., black–tailed jackrabbit, white–tailed prairie dog, etc.). Golden eagles follow sage- grouse during their seasonal migrations and numerous researchers have documented golden eagle predation on sage-grouse (Gibson and Bachman 1992; Schroeder et al. 1999). Although the majority (80 to 90 percent) of golden eagle predation occurs on mammalian species (Kochert et al. 2002), predation of male birds at leks can be substantial in certain areas, especially if other prey populations are currently low. Golden eagles have been observed to prey on sage–grouse opportunistically, and typically hunt sage–grouse by swooping from a high soar (Kochert et al. 2002; Watson 1997). Consequently, power poles may not play an important role in eagle predation of sage–grouse. Golden eagles often fly over and attack birds on leks, disrupting lek behaviors and scattering birds (Hartzler 1974; Jenni and Hartzler 1978). Other documented avian predators of sage-grouse or their nests include black–billed magpie, common raven, ferruginous hawk, red–tailed hawk, rough–legged hawk, Swainson's hawk, gyrfalcon, and northern goshawk (Schroeder et al. 1999). Although the authors caution that results are preliminary and yet to be peer reviewed, recent research conducted for the Sierra Pacific Power Company's Falcon-Gondor transmission line suggests that sage-grouse nests with more total shrub cover had a greater probability of success than nests with less cover, regardless of distance from the transmission line (Blomberg et al. 2010; Nonne et al. 2013). Kolada et al. (2009) reported higher sage-grouse nest success in California as shrub cover increased. Therefore, this research suggests that the risk of increased raptor and corvid predation on sage-grouse may be mitigated by maintaining and restoring sagebrush canopy cover, particularly within important nesting and brood–rearing habitat.

Potential for Increased Predation Pressure Resulting from Habitat Fragmentation and New Predator Movement Corridors

Under all Project action alternatives, construction of transmission lines and associated access roads (e.g., two–tracks, mowed or cleared access ways) would increase the availability of travel corridors for terrestrial mammalian predators (Gelbard and Belknap 2003; SAIC 2001). This development could increase predation rates of individual sage-grouse, nesting hens, and juvenile sage-grouse during brood–rearing periods. This impact would be minimized by the application of general and site-specific conservation measures outline **SSWS–5** are anticipated to reduce predation pressure resulting from construction and operation of the transmission line.

Inadequacy of Existing Regulatory Mechanisms

Under all Project action alternatives, existing regulatory mechanisms related to sage-grouse conservation and management would not be modified. All proposed Project activities are not anticipated to result in a reduction of adequacy of existing regulatory mechanisms. Furthermore, all Project activities would be consistent with all applicable existing statutory regulations and any future regulations currently under development by the BLM, USFS, and states in response to the USFWS 12–month findings on petitions to list the sage-grouse under the ESA. In the event that the sage-grouse is eventually listed under the ESA, the BLM would comply with its responsibilities as a federal agency by entering into formal Section 7 consultation with the USFWS for the species.

Other Natural or Man–made Factors Affecting the Species' Continued Existence

Secondary roads that are used more often to access construction areas also could result in traffic that can negatively impact sage-grouse through increased noise or vehicular and pedestrian harassment. New secondary access roads (i.e., two–tracks) that are not gated to restrict public access or reclaimed immediately following construction also could provide increased human access to previously inaccessible sage-grouse habitats, allowing for increased vehicle and pedestrian harassment at lek sites and increased hunting pressure. Ground disturbance associated with secondary road construction and use also increases the potential for noxious weed invasion and vehicles driving these roads could increase the possibility of igniting fires (Leu et al. 2008).The potential impacts of wildfire to vegetation communities is discussed in Section 3.21.5.

Indirect Impacts

Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

Reduction of Greater Sage–grouse Habitat Suitability Resulting from the Introduction and Establishment of Noxious Weeds

This potential impact is discussed above under Direct Impacts.

Avoidance of Habitat Due to Potential Increase in Avian Predation Pressure

As discussed above, the potential for avian predation could increase under all action alternatives for the Project. Evidence supporting the theory that sage-grouse will avoid areas near power lines due to increased avian predation pressure is currently inconclusive. Preliminary results of the Falcon to Gondor study on sage-grouse did not report a connection between sage–grouse demographics (i.e., male survival and movement, female survival, pre–fledging chick survival, and nest survival) and proximity to the power line (Nonne et al. 2013). Although this study supports the idea that the impact of power lines

upon sage-grouse demographics and breeding behavior may not strongly impacted by the presence of power lines, the authors caution that these results are preliminary and that confounding factors of climatic conditions and wildfire may have affected observed results.

In northern California, power lines have had a negative impact on lek attendance and strutting activity has ceased on all leks within 1 mile of one particular power line, while other power lines located in sage-grouse habitat also are believed to be impacting populations (Bi–State Local Planning Group [Bi–State Plan] 2004). A study in Washington State found that 19 of 20 leks (95 percent) documented within 5 miles of 500–kV transmission lines are now vacant, while the vacancy rate for leks further than 5 miles is 59 percent (22 of 37 leks; Washington Department of Fish and Wildlife [WDFW] 2008). In Oregon, a 250–kV transmission line was constructed within 0.5 mile of a sage-grouse lek that had an average attendance of 41 males during the period 1949 to 1980. After the transmission line was constructed from 1981 to 1982, an average of only 5 males per lek was counted between 1982 and 2005, with no birds being counted on the lek since 2006 (Oregon Department of Fish and Wildlife [ODFW] 2009). The cause of this decline, or perhaps extirpation, cannot be directly linked to the transmission line but it is likely part of a cumulative effect from development in the area. It also was noted that the Oregon statewide sage-grouse population from 1980 to 1988 (the period when the lek declined) reached relatively high levels.

Based on the lack of specific research on power lines and ambiguity associated with results of many of these studies, it is not possible to ascertain the relative magnitude of indirect impacts based on capacity of the power line. To the extent that increased predation and harassment caused by raptors and corvids may influence sage-grouse use of adjacent habitats, there is probably little difference based on capacity of power lines, as all power lines provide opportunities for raptors and corvids to perch. It is likely that shorter towers used on 34.5–kV versus 500–kV lines would have less impact, but this cannot be confirmed based on available literature. It also is not known if smaller capacity lines result in less "behavioral" habitat fragmentation (i.e., fragmentation resulting from sage-grouse being more reluctant to cross 500–kV lines than 345–kV lines.

Implementation of site-specific conservation measures outlined under **SSWS–5** would help minimize the potential for increased predation on sage-grouse by limiting raptor and corvid perching locations through the installation of perch diverters and the development of a Raven Management Plan (Table C.5–1, Final EIS Appendix C). While power lines fitted with anti–perching devices do not necessarily eliminate perching entirely (Lammers and Collopy 2007) and there is no direct evidence that perch diverters successfully reduce avian predation of sage-grouse, they are designed to discourage use of the power line as a hunting perch which could in turn decrease the potential for predation by raptors and corvids on sage-grouse.

Disease and Predation

Increased Physiological Stress and Susceptibility to Disease and Predation Resulting from Human Noise and Presence

Under all Project action alternatives, the potential for an increase in the susceptibility of sage-grouse to disease and predation resulting from the stress induced by human presence and noise during construction and maintenance activities could occur. Research of avian physiological responses to disturbance has observed measured declines in individual body condition resulting from increases of blood corticosteroid levels (Siegel 1980). Reductions of sage-grouse populations studied in southwestern Wyoming have been attributed to influences of natural gas infrastructure on the survival levels of sage-grouse hens (Holloran 2005).

Most research on power lines and raptor and corvid populations has documented a positive relationship between power lines and increased perches and nest sites. Although a direct correlation between power lines and increased predation risks for sage-grouse has not been documented, sage-grouse may avoid power lines due to increased predation risk (Lammers and Collopy 2007).

Inadequacy of Existing Regulatory Mechanisms

No indirect impacts are identified.

Other Natural or Man–made Factors Affecting the Species' Continued Existence

Degradation of Greater Sage–grouse Habitat Suitability Resulting from the Application of Herbicides

Ground disturbance would occur under all Project action alternatives resulting in the potential increase for establishment of noxious weeds. Noxious weeds are discussed above under Direct Impacts. The potential application of herbicides to prevent, control, and remove noxious weeds would be coordinated through the development of the Project's Noxious Weed Management Plan (Design Feature TWE–26) as described in Final EIS Appendix D, Table 9. This plan would be developed in accordance with appropriate land management agencies' standards and would be consistent with agency permitting stipulations for the control of noxious weeds and invasive species (EO 13112).

Implementation of general conservation measure **SSWS–5.6** and design feature TWE-26 would require that TransWest coordinate the use of all herbicides in sage-grouse habitat under the Noxious Weed Management Plan with all applicable federal and state wildlife management agencies prior to application. This would ensure that no unanticipated impacts to sagebrush understory vegetation communities would occur as a result of construction, operation, and vegetation management actions. In addition, implementation of conservation measure **VEG–1** would aid in reclamation activities and restoring communities (i.e., sagebrush shrubland) to native ecosystems, especially in areas where reclamation is difficult.

Cumulative Effects

No reasonably foreseeable non-federal actions have been identified within the vicinity of the proposed Project action area for the greater sage-grouse.

Offsite Compensatory Mitigation

In an effort to comply with BLM IM 2012–043 guidance, the BLM has developed a framework for impact analysis that is focused on the listing factors considered by the USFWS for evaluating future listing and protection of sage-grouse under the ESA. As part of the framework, consideration of compensation for both short–term and long–term direct and indirect loss of sage-grouse and its habitat will be included in the TransWest Sage-grouse Mitigation and Habitat Equivalency Analysis Plan. This framework is included in Appendix J of the Final EIS. This plan will be completed upon the final assessment of the full range of impacts resulting from the construction, operation, and maintenance of the Project. Furthermore, the framework specifies the use of Habitat Equivalency Analysis (HEA), conducted by TransWest, as a standardized basis for determining a 1–to–1 ratio for habitat services lost or mitigated. TransWest intends to continue compliance with BLM IM 2012–043 through considering the implementation of both on–site and off–site compensatory mitigation measures developed during the HEA process.

Overview of Habitat Equivalency Analysis

The HEA is a process of quantifying interim and permanent habitat disturbance, measured as a loss of habitat services from pre–disturbance conditions, and scaling compensatory habitat requirements to those disturbances (Dunford et al. 2004; King 1997; Kohler and Dodge 2006; NOAA 2009, 2006).

Habitat services are generally quantified using a metric that is representative of the functionality or quality of habitat (i.e., the ability of that habitat to provide wildlife "services" such as nest sites, forage, cover from predators, etc.). When wildlife habitat is the primary service of interest, areas with the highest habitat service levels are those areas with highest habitat quality. Interim (or short–term) habitat

disturbances are those services that are absent during certain phases of the Project that would have been available if that disturbance had not occurred (e.g., temporary vegetation losses, temporary soil partitioning, temporary displacement of wildlife populations). Permanent (or long–term) habitat disturbances are those that remain after Project construction and interim reclamation and recovery are complete (e.g., permanent vegetation loss, permanent loss of wildlife or fisheries populations, irrecoverable impacts to soils or water as a result of contamination). The benefits of applying HEA to the Project are that:

- The approach has been thoroughly evaluated and documented in scientific literature and has been tested in multiple court cases.
- It provides a quantitative analysis of direct and indirect impacts.
- It provides a standard framework for developing appropriate mitigation ratios.
- It is applicable to any ecosystem type where appropriate habitat service metrics can be defined.

Upon completion of the HEA, TransWest will work with cooperating agencies and stakeholders to develop conservation measures that can be used to compensate for the interim and permanent losses of habitat services resulting from project construction, operation, and maintenance. Mitigation measures likely to be considered include, but are not limited to:

1. Fence marking, modification, or removal – Fences would be marked, modified, or removed to reduce or remove threats to sage-grouse. Marking would be prioritized in areas near leks, in winter concentration areas, in known migration corridors, or in areas between known roosting and foraging habitats.
2. Sagebrush restoration or enhancement projects – Sagebrush restoration or enhancement projects might include seeding sagebrush and associated understory vegetation into previously disturbed or burned areas or transplanting already established sagebrush stems and seedlings into areas where sagebrush has been removed or thinned. Appropriate land management agency or landowner coordination would be important to ensure sagebrush enhancement activities support ongoing and future land use objectives.
3. Understory improvement projects – Understory habitat conditions could be improved by over–seeding existing sage-grouse habitats with appropriate forbs, grasses, or other desirable plant species; seeding previously disturbed areas with forbs and grasses to create a suitable mosaic of habitat for various life stages of sage-grouse; removing undesirable non–native understory species; or improving residual cover of existing understory species to increase cover and improve nest success.
4. Conifer removal – In areas where conifers are encroaching into suitable sage-grouse habitat, conifer removal (specifically removal of pinyon pine and juniper) could be used to reduce habitat fragmentation and to restore previously unsuitable habitat.
5. Brood–rearing habitat improvement – During summer months, mesic habitats adjacent to appropriate cover are necessary for brood–rearing and summer use. In areas where these habitats have been removed, altered, or are not available for other reasons, habitat enhancements focused on restoring or creating mesic habitats could be used to improve brood–rearing conditions.
6. Conservation easements – Where possible, conservation easements could be used to provide long–term contractual protection of high–quality sage-grouse habitat, conservation efforts, and improvement projects. TransWest's ability to acquire conservation easements would be dependent upon the willingness of private landowners to participate in a conservation program. Landowner coordination would be important to ensure that activities support ongoing and future land use objectives.

After considering design features and conservation measures, remaining Project construction and operation impacts to the greater sage-grouse would be limited to habitat loss, fragmentation, potential mortality from collisions, and disturbance during routine maintenance activities. This disturbance is anticipated to have little impact, given the linear nature of the Project and extent of native habitats in the surrounding Project region.

Monitoring

There are currently no known short- or long-term monitoring and reporting plans for greater sage-grouse specific to the Project analysis area; however, State wildlife agencies conduct long-term lek monitoring activities throughout the analysis area.

Determination

The greater-sage grouse is a candidate for ESA listing and therefore no determination of effects is required.

6.4 Platte River Species

The effects of potential water depletions are analyzed on five species (least tern, piping plover, whooping crane, pallid sturgeon, and western prairie fringed orchid), which occur in the Platte River in Nebraska. These species are grouped together because the only impact issue is potential water depletions. There would be no direct disturbance from the Proposed Action, since their occupied habitat is located a considerable distance downstream of the Project corridors in Wyoming.

6.4.1 Environmental Baseline

6.4.1.1 Conservation Status

Least Tern (Endangered – Interior Population)

The interior least tern was designated as endangered on May 28, 1985 (50 FR 21784). No critical habitat has been designated for this subspecies. The Interior Least Tern Recovery Plan was issued in September 1990.

Historically, the breeding range of this species extended from Texas to Montana and from eastern Colorado and New Mexico to southern Indiana. It included the Rio Grande, Red, Missouri, Arkansas, Mississippi, and Ohio river systems. The interior least tern continues to breed in most of the historic river systems, although its distribution generally is restricted to less altered river segments (USFWS 1990b).

The proposed Project disturbance areas in Wyoming are located a considerable distance from the Platte River habitat for this species in Nebraska. Population status and trends for the least tern (interior population) are not presented in this document because the only potential effect to the species from the proposed Project is water depletion, as analyzed below. No critical habitat has been designated for the least tern in the Platte River system.

Piping Plover (Threatened – Northern Great Plains Population)

The piping plover was designated as endangered/threatened on December 11, 1985 (50 FR 50726). The Great Lakes piping plover population was listed as endangered while the remaining Atlantic and northern Great Plains populations were listed as threatened. Migrating and wintering populations of piping plover also were classified as threatened. Designated critical habitat for the piping plover does not exist within the special status wildlife analysis area. A recovery plan for the Great Lakes and Northern Great Plains Piping Plover populations was issued on May 12, 1988. 1 The 5–Year Review for this population was issued in September 2009.

The proposed Project disturbance areas in Wyoming are located a considerable distance from the Platte River habitat for this species in Nebraska. Population status and trends for the piping plover (northern Great Plains population) are not presented in this document because the only potential effect from the proposed Project is water depletion, as analyzed below. No critical habitat has been designated for northern Great Plains population of the piping plover in the Platte River system.

Whooping Crane (Endangered)

The whooping crane was listed as endangered on March 11, 1967 (32 FR 4001). In May 2007, the third revision of the Whooping Crane Recovery Plan was issued (72 FR 29544). Critical habitat for the whooping crane is not present in the special status wildlife analysis area (USFWS 2012x). As of August 2011, the total population of whooping cranes in the wild was estimated at 437.

Whooping cranes nest in, and adjacent to, the Aransas-Wood Buffalo National Park (AWBP) in Canada, and winter in coastal marshes in Texas at the Aransas NWR (USFWS 2012x). During spring and fall migration, the AWBP whooping crane population migrates through the central Great Plains. Birds from the AWBP population depart from their wintering grounds in Texas starting in late March through the beginning of May. Fall migration typically begins in mid-September, with most birds arriving on wintering grounds between late October and mid-November (CWS and USFWS 2007).

The proposed Project disturbance areas in Wyoming are located a considerable distance from the Platte River habitat for this species in Nebraska. Population status and trends for the whooping crane are not presented in this document because the only potential effect from the proposed Project is water depletion, as analyzed below. Critical habitat for this species occurs along Nebraska portions of the Platte River between Lexington and Dehman, Nebraska (USFWS 1978).

Pallid Sturgeon (Endangered)

Pallid sturgeon was listed as endangered in 1990 (55 FR 36641) and a recovery plan was published in 1993 (USFWS 1993). Downstream portions of the Platte River in Nebraska contain occupied habitat for the pallid sturgeon. This species has been collected in the Lower Platte River defined as downstream of the mouth of the Elkhorn River. The upper end of occupied habitat for the pallid sturgeon is more than 350 miles downstream of the refined transmission corridors in Wyoming. No critical habitat has been designated for this species in the Platte River.

The pallid sturgeon is a bottom-dweller that occurs in areas with strong current and firm sandy bottoms in the main channel of large turbid rivers (Platte River Recovery Implementation Program 2014). Studies in the Platte River and elsewhere have determined that pallid sturgeon mainly use the downstream edges of sand and gravel bars and submerged dunes, which are formed primarily during high flows (Bureau of Reclamation and USFWS 2006). This species is slow-growing and late-maturing fish that feeds on small fishes and aquatic invertebrates.

Pallid sturgeon can be long-lived, with females reaching sexual maturity later than females. Based on wild fish, the estimated age for initial reproduction was 15 to 20 years for females and 5 years for males (Keenlyne and Jenkins 1993, as cited in USFWS 2014c). Spawning occurs between March and July, depending on temperature conditions. The suspected spawning habitat occurs over coarse substrate or bedrock in relatively deep water with relatively fast flows (USFWS 2014c). Adult pallid sturgeon can move considerable distances upstream prior to spawning. Newly hatched larvae are predominantly pelagic and drift with currents for considerable distances (up to 125 miles).

Western Prairie Fringed Orchid (Threatened)

Western prairie fringed orchid was listed as threatened pursuant to the ESA on September 28, 1989 (54 FR 39857 39863). The western prairie fringed orchid is a perennial orchid of the North American tall grass prairie occurring in North Dakota, Minnesota, Iowa, Missouri, Kansas and Nebraska. The total population size has been estimated at four large populations each containing over 1,000 individuals.

The proposed Project disturbance areas in Wyoming are located a considerable distance from the Platte River habitat for this species in Nebraska. Population status and trends for the western prairie fringed orchid are not presented in this document because the only potential effect to the species is from water depletion, as analyzed below.

6.4.1.2 Life History and Habitat Association

Least Tern (Endangered – Interior Population)

The interior least tern breeds and forages on barren or sparsely vegetated sandbars adjacent to waterbodies. This species breeds in colonies on sandy or pebbly, sparsely vegetated islands or shorelines. Interior least terns spend 4 to 5 months at their breeding sites. Nest locations are usually well above the water's edge, since nesting is typically initiated during high river flows, when only small amounts of sandy shoreline are exposed. Therefore, the size of nesting habitat depends on water levels and the extent of associated sandbars. The interior least tern also will nest on artificial habitats, including sand and gravel pits and dredge islands (USFWS 1990b).

Piping Plover (Threatened – Northern Great Plains Population)

The piping plover breeds and forages on sandy lakeshore beaches, sandbars within riverbeds, or wet, sandy pastures. Nesting habitat for the piping plover consists of sparsely vegetated shorelines around small alkali lakes; large reservoir beaches; river islands and adjacent sandpits; and shorelines associated with industrial ponds. It constructs a scrape nest in sand or gravel (Haig and Plissner 1993). Nesting piping plovers have been found in least tern nesting colonies at a number of sites on Great Plains river sandbars and sand pits (USFWS 1988b).

Whooping Crane (Endangered)

Whooping cranes utilize a variety of habitats during migration, including freshwater marshes; wet prairies; shallow portions of rivers, reservoirs, lakes, and lagoons; and forage in grain and stubble fields. Whooping cranes roost on submerged or barren sandbars.

Pallid Sturgeon (Endangered)

Pallid sturgeon can be long-lived, with females reaching sexual maturity later than females. Based on wild fish, the estimated age for initial reproduction was 15 to 20 years for females and 5 years for males (Keenlyne and Jenkins 1993, as cited in USFWS 2014c). Spawning occurs between March and July, depending on temperature conditions. The suspected spawning habitat occurs over coarse substrate or bedrock in relatively deep water with relatively fast flows (USFWS 2014c). Adult pallid sturgeon can move considerable distances upstream prior to spawning. Newly hatched larvae are predominantly pelagic and drift with currents for considerable distances (up to 125 miles).

Western Prairie Fringed Orchid (Threatened)

The species occupies wet, mesic sub-irrigated prairies and sedge meadows along the floodplain of the Platte River. Alterations to the peak flows of the Platte River have facilitated the conversion of most low-lying areas near the river from grassland to intensive agriculture (Sidle and Faenes 1997). Thus, little habitat remains that is suitable for the species along the Platte River.

6.4.1.3 Threats

Threats to the interior lease tern, piping plover, whooping crane and its critical habitat, pallid sturgeon, and western prairie fringed orchid are not discussed in this document because the only potential effect to the species from the proposed Project is from water depletion, as analyzed below.

6.4.1.4 Recovery

Recovery objectives and criteria for the interior least tern, piping plover, whooping crane and its critical habitat, pallid sturgeon, and western prairie fringed orchid are not discussed in this document because the only potential effect to the species from the proposed Project is from water depletion, as analyzed below.

6.4.2 Assessment of Effects

6.4.2.1 Area of Analysis

The analysis area for the least tern, piping plover, whooping crane, pallid sturgeon, and western prairie fringed orchid, collectively referred to as the target species, includes potential water diversion points in the North Platte Basin and continues downstream to the Platte River basin. The upper end of occupied habitat for these species is located in the Platte River in Nebraska at a considerable distance from the closest refined transmission corridor. No critical habitat for the piping plover, least tern, pallid sturgeon, or western prairie fringed orchid occurs in the Platte River system. Critical habitat for the whooping crane is designated in the Platte River system in Nebraska. The analysis area would exclude the transmission corridors and the potential disturbance area beyond the corridors, since there is no occupied habitat that is crossed by the refined transmission corridor and the engineered alignment.

6.4.2.2 Conservation Measures

No additional protection measures are proposed for the federally listed Platte River species or whooping crane critical habitat.

6.4.2.3 Direct and Indirect Effects

There would be no direct effects on the least tern, piping plover, whooping crane, pallid sturgeon, or western fringed orchid, since the occupied habitat for these species is located in the Platte River system in Nebraska. The section of the Platte River that contains these species is located a considerable distance downstream of any construction or operation disturbance areas in Wyoming. In addition, any ground disturbance by construction or operation activities would not result in sediment or potential fuel spill effects on these species due to the considerable distance downstream to occupied or critical habitat.

The Platte River Recovery Implementation Program (PRRIP), established in 2006, is implementing actions designed to assist in the conservation and recovery of the target species and their associated habitats along the central and lower Platte River in Nebraska through a basin-wide cooperative approach agreed to by the States of Wyoming, Nebraska, and Colorado and the U.S. Department of the Interior [Program, I.A.1.]. The Program addresses the adverse impacts of existing and certain new water related activities on the Platte River target species and associated habitats, and provides ESA compliance[1] for effects to the target species and whooping crane critical habitat from such activities including avoidance of any prohibited take of such species [Program, I.A.2 & footnote 2.]. The State Wyoming is in compliance with their obligations under the Program.

For Federal actions and projects participating in the Program, the PRRIP Final Environmental Impact Statement (Final EIS) and the June 16, 2006 programmatic biological opinion (PBO) serve as the description of the environmental baseline and environmental consequences for the effects of the

1 "ESA Compliance" means: (1) serving as the reasonable and prudent alternative to offset the effects of water related activities that USFWS found were likely to cause jeopardy to one or more of the target species or to adversely modify critical habitat before the Program was in place; (2) providing offsetting measures to avoid the likelihood of jeopardy to one or more of the target species or adverse modification of critical habitat in the Platte River basin for new or existing water-related activities evaluated under the ESA after the Program was in place; and (3) avoiding any prohibited take of target species in the Platte River basin.

Proposed actions on the listed target species, whooping crane critical habitat, and other listed species in the central and lower Platte River addressed in the PBO. These documents are hereby incorporated into this Biological Assessment by this reference.

Table II-1 of the PBO (pages 21-23) contains a list of species and critical habitat in the action area, their status, and the USFWS's determination of the effects of the Federal Action analyzed in the PBO. The USFWS determined in the PBO that the continued operation of existing and certain new water-related activities could adversely affect but would not likely jeopardize the continued existence of the endangered whooping crane, interior population of the least tern, and pallid sturgeon, or the threatened northern Great Plains population of the piping plover. Further, the USFWS found that the continued operation of existing and certain new water-related activities could adversely affect but would not likely jeopardize the threatened western prairie fringed orchid associated with the central and lower reaches of the Platte River in Nebraska, and was not likely to adversely affect designated critical habitat for the whooping crane.

In Wyoming, the Project operations qualify as a "new water related activity" because the water use is assumed to be depletion without determination of specific water sources. A depletion constitutes a new surface water or hydrologically connected groundwater activities which could affect the quantity or timing of water reaching the associated habitats of the target species implemented after July 1, 1997 [Program, I.A. footnote 3]. The existing water related activity conforms to the criteria in Section III of Chapters 2 or 3 of the Depletions Plan, Platte River basin, Wyoming (Wyoming's Depletions Plan [Program, Attachment 5, Section 7]) and:

1. The existing water related activity is operated on behalf of Wyoming water users;
2. The State Coordinator will determine if the activity qualifies as an existing water related activity; and
3. If required by the State Coordinator, the Applicant will sign a Wyoming Recovery Agreement to document any mitigation requirements need to qualify as an existing water activity.

Accordingly, the impacts of this activity to the target species, whooping crane critical habitat, and other listed species in the central and lower Platte River addressed in the PBO are covered and offset by operation of Wyoming's Depletions Plan as part of the PRRIP.

TransWest intends to rely on the provisions of the Program to provide ESA compliance for potential impacts to the target species and whooping crane critical habitat. The BLM intends to require, as a condition of any approval, that TransWest fulfill the responsibilities required of Program participants in Wyoming. The BLM also intends to retain discretionary Federal authority for the Project, consistent with applicable regulations and Program provisions, in case re-initiation of Section 7 consultation is required.

In total, approximately 9.8 acre-feet of water would be used within the Platte River basin. Approximately 8 acre-feet of water would be used for construction within the refined transmission corridor. In addition, 1.8 acre-feet of water would be used for dust control during construction of the Northern Terminal (substation/converter station). The source of water would include municipal supplies, commercial sources, or a temporary water use agreement with landowners holding existing water rights. Since specific water sources have not been identified at this time, the USFWS cannot determine if the water sources have been through Section 7 consultation. Therefore, the USFWS assumes that all of the construction water use would be new depletions. This action would represent a consumptive water use from the Platte River basin of 9.8 acre-feet during a 3-year time frame when water would be used for construction purposes. This volume represents an average annual depletion of 3.3 acre-feet per year for the 3-year construction period. This small depletion would represent an adverse effect on the federally listed Platte River species and critical habitat for the whooping crane. The Platte River Recovery Implementation Program would be used to mitigate for the effects of water depletions on federally listed species in the Platte River. If the proposed water-related activity will deplete more than 0.1 acre-feet in

the Platte River system and will rely on surface water or hydrologically connected groundwater, an evaluation is required by the Wyoming State Engineer to determine whether the water use is a new or existing activity. If the activity is considered an existing water-related activity, the State Coordinator will determine whether any further action is required to be covered by the PRRIP. If further actions are required, a Wyoming Platte River Recovery Agreement will be executed between the water user and the Wyoming State Engineer.

The PRIP would be effective in minimizing effects of potential water depletions on least tern, piping plover, whooping crane and its critical habitat, pallid sturgeon, and western fringed orchid. However, if new water sources are used that have connections to surface flows in the North Platte Basin in Wyoming and they have not been previously consulted on by the USFWS, there could be a small net effect on these Platte River species. It is not possible to quantify the net effect other than relative terms, since water sources have not been identified at this time.

6.4.2.4 Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the Project action area in Wyoming regarding water depletions. However, it is reasonable to expect that future water depletions could occur in the North Platte drainage and Platte River Basin as a result of non-federal actions such as agricultural or land development. The PRRIP was established to mitigate the effects of water depletions on federally endangered fish species in the Platte River Basin.

6.4.2.5 Determination

Effect on the Species: The Proposed Action *may affect, is likely to adversely affect* the interior population of the least tern, northern Great Plains population of the piping plover, whooping crane, pallid sturgeon, and western prairie fringed orchid as a result of potential water depletions. Construction and operation activities would not directly affect these species, since there is no occupied habitat within the corridor crossings.

Effect on Whooping Crane Critical Habitat: The Proposed Action *may affect, is likely to adversely affect* whooping crane critical habitat as a result of potential water depletions. Since there is no critical habitat in the Platte River system for the other target species, there would be no effect of potential water depletions on critical habitat for these species.

Rationale: Any water depletions in the North Platte and Platte River basins may affect the federally listed species in the Platte River system. However, the PRRIP would provide funds to assist in reducing the effects of flow reductions on the pallid sturgeon and other federally listed species in the Platte River system. The magnitude of the water depletion would depend on the selected water sources and whether they are connected to surface flows in the North Platte basin and if they have been consulted on previously.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
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MAY 07 2015

In Reply Refer To:
06E13000-2014-TA-0052a

Memorandum

To: State Director, Bureau of Land Management, Wyoming State Office, Cheyenne, Wyoming

From: Field Supervisor, U.S. Fish and Wildlife Service, Wyoming Field Office, Cheyenne, Wyoming

Subject: Final Biological Assessment for TransWest Express Transmission Project

On April 8, 2015, we received an e-mail from AECOM Environment notifying our office to download a copy of the final biological assessment (BA) for the TransWest Express Transmission Project (Project), and we also received a hard copy of the BA on April 15, 2015. The Project (proposed action) is to construct a 600-kilovolt, direct current transmission line across Wyoming, Colorado, Utah, and Nevada to deliver about 3,000 megawatts of power from Wyoming to Nevada. This memo acknowledges the U.S. Fish and Wildlife Service's (Service) receipt of your request to initiate formal section 7 consultation on the Project. The consultation concerns the effects of the Project on various listed species and designated critical habitats in all four states.

We have reviewed the final BA and provide the following response pursuant to regulations implementing section 7(a)(2) of the Endangered Species Act of 1973, as amended (ESA) (50 CFR §402.14(c)). In particular, the Service has not received all of the information necessary to initiate formal consultation on the Project, and we request the Bureau of Land Management (BLM) address the following issues and data needs.

Colorado River Fish and Designated Critical Habitat

If water depletions will occur in the state of Wyoming, the BA should include Wyoming in the list of states where water depletions will affect species downstream of the withdrawal site for all four listed fish species (bonytail, Colorado pikeminnow, humpback chub, and razorback sucker) and their designated critical habitat. Currently, the BA includes only Wyoming for the Colorado pikeminnow and razorback sucker but not for bonytail and humpback chub. Water depletions in the state of Wyoming affect all four listed fish and their critical habitat.

The BA assumes water use from the Colorado River will occur over the 3-year construction period of the entire line, but the calculation of the depletion within these watersheds should focus on the period in which the water is used. For example, if construction of the transmission line within Wyoming and Colorado (Project Region I) is completed within 1 year, the entire depletion for that watershed would occur in 1 year, not over 3 years. If, however, water is used over all 3 years as described in the BA, the current 3-year approach is adequate.

The BA reaches a likely to adversely affect determination for all four listed fish species and their designated critical habitat due to water depletions only. For Colorado pikeminnow and razorback sucker, the BA states that the "Herbicide Use Plan would *minimize* potential effects of maintenance activities on" these species (emphasis added) (pp. 6-72 and 6-85). Rather than "minimize" adverse effects, the BA should incorporate sufficient information from the Herbicide Use Plan to describe why the application of herbicides (and additives, surfactants, adjuvants, etc.) will result in effects that are either discountable or insignificant. If effects are more than discountable or insignificant, the application of herbicides is likely to adversely affect. Of particular concern are spills or introduction (e.g., overspray, runoff) of chemicals into backwater or other slow or no flow habitats (e.g., oxbows, slackwaters) where larval fish are present. The Herbicide Use Plan (or Pesticide Use Plan per TWE-58) may include the necessary conservation measures to ensure the spill or introduction of chemicals does not occur, or that effects will be discountable or insignificant, but the BA should state this information.

The razorback sucker does not need to be included for the state of Nevada because water depletions at the level of water use as proposed will not warrant consultation in Nevada, and the proposed route will not directly impact the species or its habitat.

Platte River Species

The BA currently assumes the Project will deplete 9.8 acre-feet of water from the Platte River and states that TransWest intends to rely on the provisions of the Platte River Recovery Implementation Program and associated programmatic biological opinion to provide ESA compliance for effects to Platte River species. Because the proposed water-related activity will deplete more than 0.1 acre-feet from the Platte River, the Wyoming State Engineer must determine whether the water use from the Platte River is a new or existing activity. Therefore, the determination from the Wyoming State Engineer needs be included in the BA.

Western Yellow-billed Cuckoo and Proposed Critical Habitat

Based on the analysis of effects and conservation measures currently described in the BA, we do not agree with the determination of May Affect, Not Likely to Adversely Affect for this species in Utah, because effects could be more than discountable or insignificant. However, incorporating the following additional conservation measures will ensure effects to the species would be discountable or insignificant:

- o Prior to *pre-construction* activities including geotechnical work, field surveys will be conducted within the transmission corridor and a 0.25-mile buffer to determine all areas

of suitable habitat. Results of suitable habitat determinations will be provided to the local Service Field Office for review and concurrence.

- S Tower structures will not be sited within field-verified suitable habitat. Instead, the transmission line will span waterways where suitable habitat for the species exists.

- S Tower structures will not be sited within proposed critical habitat[1].

- If activity within 0.25 mile of suitable habitat cannot be avoided and ambient noise levels increase within suitable habitat, one of the following will occur:
  - o S Activity that results in an increase in noise levels in suitable habitat will not be conducted between June 1 – August 31 (Utah seasonal restriction); or,
  - o S Breeding season surveys will be conducted in suitable habitat within the analysis area in accordance with established protocols. If western yellow-billed cuckoo surveys document presence of yellow-billed cuckoo, additional avoidance and minimization measures will be identified and implemented in coordination with the local Service Field Office.

- S We recommend the BA provide clarifying language for conservation measure SSWS-6 ("If an active western yellow-billed cuckoo nest is identified during surveys, it would be avoided by a minimum of 500 feet.") that surveyors will not actively look for nests.

  Survey protocols for this species warn against looking for nests because: 1) they are notoriously difficult to find; and 2) it results in disturbance to nesting birds that may result in nest abandonment. We recommend against active nest searches and, therefore, recommend the BA incorporate this recommendation. In addition, if a nest is found during presence/absence surveys (or indication of a nest), the surveyors should not approach the nest but follow appropriate survey protocols for transmitting information to the local Service Field Office.

- S The italicized portion of the following conservation may be impracticable to monitor and implement. We recommend instead that TWE and BLM commit to span suitable habitat.

  "If an active western yellow-billed cuckoo nest is identified during surveys, it would be avoided by a minimum of 500 feet, *and Project activities would ensure that sufficient habitat within a minimum 5-acre habitat patch size is retained. Vegetation management would ensure that a 65 percent canopy cover with a mean canopy height of 23-33 feet would be retained.*"

- S We recommend the BA include a conservation measures for a cuckoo-specific vegetation management plan that addresses areas where the power line crosses suitable habitat.

[1] While proposed critical habitat is not final and could change, the proposed critical habitat provides an indication about where suitable habitat occurs for the species. Not siting structures within proposed critical habitat has two primary benefits: (1) it may reduce or eliminate the need for future Project modifications (e.g., if field surveys find habitat is occupied), and (2) should substantially minimize impacts to critical habitat, perhaps eliminating the need to conduct formal section 7 consultation on adverse effects to final critical habitat, when designated.

The BA should indicate clearly and specifically in the Executive Summary and Introduction if BLM wishes to conference on proposed critical habitat for the western yellow-billed cuckoo.

The proposed critical habitat needs to have its own evaluation of effects, including a description of how the project will affect proposed critical habitat and conservation measures to avoid or reduce those effects. This analysis should focus on the primary constituent elements (PCEs) identified in the proposed critical habitat rule. For example, construction within proposed critical habitat may result in the temporary or permanent loss of riparian woodland habitat, one of the PCEs. Effects to riparian woodland habitat can be avoided or minimized. For example, the rationale for the effects determination (p. 6-47) states that proposed critical habitat along the Green River and Lake Fork River would be avoided by spanning. We support spanning the proposed critical habitat and recommend the BA include this as a specific commitment by including it as a conservation measure.

Please clarify the determination for proposed critical habitat. It is unclear if the language is intended to be similar to a May Affect, Not Likely to Adversely Affect determination or if the intent is effects are not likely to result in Destruction or Adverse Modification of proposed critical habitat. For proposed critical habitat, action agencies make a determination of either "may affect is not likely to result in destruction or adverse modification" or "may affect is likely to result in destruction or adverse modification." If the former, conferencing is voluntary; if the latter, conferencing is required. Agencies may also request a conference concurrence for proposed critical habitat (i.e., a May Affect, Not Likely to Adversely Affect determination), but effects must still be insignificant, discountable, or wholly beneficial.

If the BLM requests our concurrence with a determination of May Affect, Not Likely to Adversely Affect for proposed critical habitat for this species, we recommend the following conservation measures be incorporated into the BA:

- l Tower structures will not be sited within proposed critical habitat (i.e., the transmission line will span waterways where critical habitat is proposed).

- l Activity within a 0.25 mile of proposed critical habitat will be avoided between June 1 – August 31 (Utah seasonal restriction) to avoid an increase in ambient noise levels and disturbance to cuckoo using proposed critical habitat.

- l Develop a cuckoo-specific vegetation management plan that addresses areas where the power line crosses proposed critical habitat.

If the proposed critical habitat cannot be avoided by the Project, we recommend the following be included in the BA to address potential adverse impacts should the proposed critical habitat impacted by the Project become designated critical habitat:

- l Permanent habitat loss within proposed critical habitat will be mitigated at a 3:1 ratio within the same proposed critical habitat unit.

- S Temporary habitat loss within proposed critical habitat will be mitigated at a 2:1 ratio within the same proposed critical habitat unit.

Clay Phacelia

We do not agree with your determination of May Affect, Not Likely to Adversely Affect for clay phacelia, because you have not committed to pre-project surveys and you have not committed to avoid disturbance to suitable habitat. In addition, the measures on Page 6-92, under SS-8 (3, 4 and 8) are not compatible with a determination of May Affect, Not Likely to Adversely Affect since these measures are connected to activities within 650 feet of plants. We recommend BLM commit to the conservation measures for this species in Attachment 1 in order to get to a May Affect, Not Likely to Adversely Affect.

We provide the following additional comments:

On Page 6-92, under SS-8 (1), BLM commits to 100 percent clearance surveys within 650 of the centerline in modeled habitat. We recommend that surveys be conducted in suitable habitat 650 feet from the edge of disturbance not just from the centerline. In addition, the modeled habitat is our best approximation of suitable habitat for planning purposes but suitable and/or occupied habitat may exist outside of the modeled habitat. Surveys outside of modeled habitat but within suitable habitat may be necessary especially in areas where ground disturbing activities are to occur, because the model has not been ground-truthed and to ensure that all plants are avoided.

We recommend avoidance, minimization and compensatory mitigation for impacts to suitable habitat as the amount of existing suitable habitat for clay phacelia is restricted and the conservation of the species depends on ensuring enough suitable habitat for its resiliency and redundancy. Any loss or degradation of habitat is considered an adverse effect to the species.

Deseret Milkvetch

We do not agree with your determination of May Affect, Not Likely to Adversely Affect for Deseret milkvetch, because there is no commitment to avoid all suitable habitat and occupied habitat by 300 feet. In addition, without a commitment to avoid use of the existing access road to the north of Birdseye that connects to Blind Canyon Road, there will be adverse effects to the species.

We recommend that BLM commit to identify suitable habitat for this species. We recommend that BLM add the following language to SS-7 as follows *in italics*:

- S Item 14: No vegetation treatments *or site preparation activities* would be performed in suitable or occupied Deseret milkvetch habitat.

- S Item 15: Project disturbance within suitable habitat will not exceed 10 percent cumulatively. *Mitigation measures will be implemented for any disturbance in Deseret milkvetch suitable or occupied habitat.*

We recommend the BLM commit to compensatory mitigation for temporary and permanent construction activity and development or ground disturbance in Deseret milkvetch suitable habitat or occupied habitat. We recommend acquisition of conservation easements in occupied habitat at a 3:1 ratio.

Ute Ladies'-tresses

In order to reach a May Affect, Not Likely to Adversely Affect determination for this species, we recommend the following conservation measure:

The Service's Utah Field Office will review and accept the final potential habitat model for the species. Please commit to this measure on page 6-104, in the Direct and Indirect Effects section.

We provide the following additional comments:

P. 6-104, lines 29-31: The sentence beginning with, "Whereas the proposed action…" should be revised to state: "Whereas the proposed action would affect potential Ute ladies'-tresses habitat as modeled, it would have no effect on any currently known populations of the species."

TWE-29 (page 3-5): Federally listed species are not included in the description, but yet TWE-29 is cited as a conservation measure for Ute ladies'-tresses. Please revise TWE-29 to cite applicability to federally listed species.

Virgin River Chub

The Virgin River Chub is only listed where it occurs in the Virgin River, and there are no plans to list the species in the Muddy River, so there will be no impacts or effects to the listed species or its habitat based on the proposed alignment. Therefore, we recommend omitting this species from the consultation.

Desert Tortoise

The proposed route only crosses desert tortoise habitat in Nevada, so the desert tortoise does not need to be included for the state of Utah.

California Condor

The Federal status of California condor is listed as "Endangered; EXP/NE-Utah" (Page 1-7, Table 1-1). However, all potential impacts to condor from the Utah portion of the project would affect the endangered portion of the population, not the EXP/NE population. Potential impacts to the nonessential, experimental condor population would occur in Nevada. We recommend replacing "Utah" with "Nevada" in the table as appropriate.

The document states, "Any condor occurring outside of the experimental population area, including those on National Park lands and in southeastern Nevada, are listed as endangered under the ESA" Page 6-25, Lines 4-5. Outside of the experimental population, the condor is

endangered, regardless of land ownership. Within the experimental population, for purposes of consultation, the condor is treated as a proposed species, except for land in the National Park System or National Wildlife Refuge System, where the condor is treated as a threatened species. We recommend correcting the language in the BA to accurately reflect condor status in the National Park.

Southwestern Willow Flycatcher

There is a commitment to a May 1-August 15 seasonal buffer for habitat disturbances within 0.25 mile of occupied southwestern willow flycatcher habitat (Page 6-33, Line 1-2). The Utah Field Office recommends a seasonal buffer between April 15 and August 15.

We look forward to receiving the additional information and clarification presented to you in this memo so that we may initiate formal consultation. The formal consultation process for the Project will not begin until we receive all of the information, or a statement explaining why that information cannot be made available. We will notify you when we received this additional information; our notification memo will also outline the dates within which formal consultation should be complete and the biological opinion delivered on the proposed action.

We appreciate your efforts to ensure the conservation of endangered, threatened, and candidate species and migratory birds. If you have questions regarding this biological opinion or your responsibilities under the ESA, please contact Tyler Abbott of my staff at the letterhead address or phone (307) 772-2374, extension 231.

Attachment: Clay Placelia Conservation Measures

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To: Tyler Abbot, Deputy Field Supervisor, U.S. Fish and Wildlife Service, Wyoming Field Office, Cheyenne, Wyoming

From: Mary Jo Rugwell, Wyoming State Director, Bureau of Land Management, Wyoming State Office, Cheyenne, Wyoming

Subject: Final Addendum to the April 8, 2015, TransWest Express Transmission Project Biological Assessment in response to U.S. Fish and Wildlife Letter No. 06E13000-2014-TA-0052a

Date: October 26, 2015

Introduction

This memorandum provides supplemental information for the TransWest Express Transmission Project (TWE or Project) Final Biological Assessment (BA) that was submitted to the U.S. Fish and Wildlife Service (USFWS) on April 8, 2015. This memorandum has been prepared in response to input provided to the Bureau of Land Management (BLM) by the USFWS on May 7, 2015 and subsequent related coordination among the BLM, USFWS, and Applicant through October 16, 2015. It also provides new information on the distribution and extent of potential western yellow-billed cuckoo habitat and associated species-specific analysis area and revises the impacts analysis for this species to include portions of the cuckoo analysis area that were inadvertently left out of the April 8 BA. The memo also provides revised action area and species-specific analysis area maps and effects analyses related to a minor revision to the TWE action area in Moffat County, Colorado. This revision reflects BLM Colorado's selection of Tuttle Micro-Siting Option 4 as the agency preferred alternative in this area and recognizes that the final alignment of the Project through this area may vary within this corridor as a result of negotiations with private landowners. Finally, the memo provides a revised analysis of impacts and a revised determination of effects for Deseret milkvetch based on new survey data provided by TransWest Express LLC based on a field-based habitat assessment and species-specific presence/absence survey completed in June of 2015.

This memorandum provides reference to the sections, pages, and line numbers of the April 8, 2015, TWE BA to which changes apply. The information and verbiage inserts provided below replace and supersede related portions of the Final BA submitted on April 8, 2015. Note that the final, revised versions of species-specific analysis area maps are provided in Attachment A. Similarly, final species-specific conservation measures are presented in Attachment D.

Purpose of Document

The April 8, 2015, TWE BA omitted the Bureau of Reclamation from the list of action agencies involved in ESA section 7 consultation for the Project. Consequently, the following sentences should be revised as follows:

Section 1.1, Page 1-1, Lines 12-16 – Revise sentence to read: This BA has been prepared for the purpose of consultation (per Section 7 of the ESA) between the action agencies (i.e., BLM, Western, the U.S. Forest Service [USFS] and the Bureau of Reclamation [Reclamation]); and the U.S. Fish and Wildlife Service (USFWS) on the expected effects of the TWE agency preferred alternative (hereafter referred to as the Proposed Action) on threatened and endangered species with potential to occur in the action area (Figure 1-1).

Section 1.1, Page 1-4, Lines 12-16 – Revise sentence to read: As part of this BA, the BLM, Western, USFS and Reclamation request formal Section 7 consultation with the USFWS for the Project. The action agencies also request USFWS concurrence with the determinations made in this BA.

Project Description

As noted above, BLM Colorado's selection of Tuttle Micro-Siting Option 1 as the agency preferred alternative resulted in a minor change in the action area in Moffat County Colorado. This change is reflected in a widening of the action area in this location. Figure 2-1 has been revised to reflect this change and is provided in Attachment A of this memorandum.

Canada Lynx

Section 6.1.1.1, Page 6-6, Figure 6-1 Area of Analysis for Canada Lynx – The figure has been revised to reflect the expanded action area in the vicinity of Tuttle Micro-siting Option 4. This revision does not change the lynx analysis area or the assessment of direct and indirect impacts for this species. The revised figure is included in Attachment A of this memorandum.

Colorado River Fish and Designated Critical Habitat

Executive Summary, Page ES-1, Table ES-1 – Add "Wyoming" to the list of states applicable to bonytail and humpback chub due to the potential for water depletions in the Wyoming portion of the Upper Colorado River Watershed to affect these species and their designated critical habitat.

Section 6.1.4.1, Page 6-65, Figure 6-9, Areas of Analysis for Bonytail and Humpback Chub – The figure has been revised to show the Wyoming portion of the analysis area. In addition, the Upper Colorado and Missouri River Hydrographic Regions have been added. The revised figure is provided in Attachment A.

Section 6.1.4.1, Page 6-66, Lines 7 and 8 – Add "(Wyoming and Colorado)" after Region I and "(Colorado and Utah)" after Region II.

Section 6.1.4.1, Page 6-64; Section 6.1.4.2, Page 6-71; Section 6.1.4.3, Page 6-75;and Section 6.1.4.5, Page 6-84 (Direct and Indirect Effects sections for bonytail, Colorado pikeminnow, humpback chub, and razorback sucker, respectively) – Add the following paragraph on herbicide use effects:

> Herbicides would be used to control the spread of noxious weeds and vegetation maintenance activities in the ROW. Adverse impacts to the endangered fish species and other aquatic biota from herbicide use would be avoided by following Project design features and applicable

conservation measures including TWE-58, NX-2, AB-4, and SSS-13, described below. The use of any herbicide would be agreed upon in advance with the landowner or agency responsible for managing the lands where the chemical would be applied and would be used in accordance with the label. Under the proposed action herbicides would not be stored, mixed, or loaded, or equipment rinsed near or on stream banks, lake shorelines, ditches, irrigation canals, or other areas where runoff could impact an aquatic body. Furthermore, buffer zones would be provided along streams, rivers, lakes, and riparian areas, including riparian areas along ephemeral and intermittent streams, as well as downstream habitats and species/populations of interest. Appropriate herbicide-free buffer zones would be observed for herbicides not labeled for aquatic use, with minimum widths of 25 feet for vehicle and 10 feet for hand spray applications. In addition, mitigation measures NX-2 and AB-4 (Table 3-2 of the BA and repeated below for convenient reference) would be implemented to ensure that all applicable state and federal laws would be followed regarding chemical use, chemical storage, weather conditions, and chemical drift. Implementation of project design feature TWE-58 and Conservation Measures NX-2, AB-4, and SS-13 would ensure that impacts to aquatic biota from herbicide use would be insignificant or discountable.

Section 6.1.4.1, Page 6-64; Section 6.1.4.2, Page 6-69; Section 6.1.4.3, Page 6-75; and Section 6.1.4.5, Page 6-84 (Conservation Measures sections for bonytail, Colorado pikeminnow, humpback chub, and razorback sucker, respectively) – Add general conservation measures TWE-22, TWE-24, TWE-58, SSS-1, NX-2, and AB-4; and a new endangered Colorado River Fish-specific conservation measure (**SSS-13**) as follows.

TWE-22: Runoff from excavated areas, construction materials or wastes (including truck washing and concrete washes), and chemical products such as oil, grease, solvents, fuels, and pesticides will be controlled. Excavated material or other construction material will not be stockpiled or deposited near or on stream banks, lake shorelines, ditches, irrigation canals, or other areas here runoff could impact the environment.

TWE-24: Vehicle refueling and servicing activities will be performed in designated construction zones located more than 100 feet from wetlands and intermittent streams and more than 500 feet from perennial streams. Spill prevention and containment measures or practices will be incorporated as needed.

TWE-58: As part of the POD, the Applicant will provide a Pesticide Use Plan as a component of the Noxious Weed Management Plan. The Plan will address compliance with all applicable federal, state and local regulations.

NX-2: Herbicide spraying would be conducted following all applicable state and federal laws regarding chemical use, adverse weather, chemical storage, and chemical drift. Further guidelines and protocols for herbicide spraying on BLM land are provided in the Final BLM Vegetation Treatment Using Herbicides Programmatic EIS (BLM Vegetation EIS) (BLM 2007). Standard operating procedures for herbicide spraying identified in the BLM Vegetation EIS include buffers for sensitive areas such as riparian and wetland areas and threatened and endangered species habitat, timing restrictions, and safety protocols (BLM 2007). No aerial spraying of herbicides would be permitted within 500 feet of known sensitive species with hand-only application methods allowed.

AB-4: (Herbicide Use Plan): As part of vegetation management, the applicant would prepare an Herbicide Use Plan. The Plan would identify a list of approved herbicides that may be used as well as locations of areas that may be treated. Licensed herbicide applicators would be used in

the treatment process. All herbicides would be used in accordance with label instructions for the chemical. The Plan would comply with all applicable federal, state, and local regulations.

SSS-13: (Herbicide Use in Vicinity of Endangered Colorado River Fishes Habitat): Refer to Attachment D for the text of this measure.

Section 6.1.4.2, Page 6-70, Figure 6-10, Area of Analysis for Colorado Pikeminnow – The figure has been revised (see Attachment A) to show the Wyoming portion of the analysis area. In addition, the Upper Colorado and Missouri River Hydrographic Regions have been added.

Section 6.1.4.2, Page 6-71, Lines 17 – 23 – Conservation Measure **SSS-4** has been modified to place further restrictions on Project activities in critical habitat for the Colorado pikeminnow. Refer to Attachment D for the final, revised version of **SSS-4**.

Section 6.1.4.2, Page 6-72, Lines 10 and 11 – Add "(Wyoming and Colorado)" after Region I and "(Colorado and Utah)" after Region II.

Section 6.1.4.3, Page 6-75, Lines 30 and 31 – Add "(Wyoming and Colorado)" after Region I and "(Colorado and Utah)" after Region II.

Section 6.1.4.5, Page 6-82, Lines 16 and 17 – The Area of Analysis was revised to include occupied and critical habitat located downstream of the potential points of diversion in Wyoming, Colorado, and Utah.

Section 6.1.4.5, Page 6-83, Figure 6-12, Area of Analysis for Razorback sucker has been revised to exclude the Arizona and Nevada portion of the action area as the Project would have no effect on razorback suckers in Arizona and Nevada. Consequently, these states have been removed from the species-specific analysis area.

Section 6.1.4.5, Page 6-84, Lines 23-29 – Replace text of Conservation Measure SSS-4 with that presented above and in Attachment D of this memo.

Section 6.1.4.5, Page 6-84, Lines 36-40 – The last part of the paragraph was deleted beginning with the sentence "Critical habitat is designated for the Las Vegas Wash . . .". The Nevada portion of the Project area was deleted from the analysis area for razorback sucker.

Section 6.1.4.5, Page 6-85, Lines 13 and 14 – Add "(Wyoming and Colorado)" after Region I and "(Colorado and Utah)" after Region II.

<u>Platte River Species</u>

Per USFWS direction received on May 29, 2015, (ESA Consultations Involving Platte River Depletions: Information for Project Proponents in Wyoming on the Platte River Recovery Implementation Program, August 3, 2007) if the Applicant commits to using existing municipal or other water sources that have already been consulted upon pursuant to the Biological Opinion on the Platte River Recovery Implementation Program, the Project would have no effect on the federally listed Platte River species. TransWest has provided a letter (Attachment B) stating this commitment. As such, the determinations for the Platte River species are changed to "no effect" and the following sections of the BA revised as follows:

Executive Summary, Page ES-2, Table ES-1 – Change Platte River species determinations to "No Effect."

Section 6.4.2.5, Page 6-151, Lines 20 and 25 – The Project would not use any new water sources that are hydrologically connected to the Platte River System. Consequently, the determination statements are changed as follows:

> **Effect on the Species**: The Proposed Action would have no effect on the interior population of the least tern, northern Great Plains population of the piping plover, whooping crane, pallid sturgeon, and western prairie fringed orchid.
> **Effect on Whooping Crane Critical Habitat**: The Proposed Action would have no effect on whooping crane critical habitat.

Existing regulatory requirements dictate that when TransWest does identify specific water sources for use in Project construction the company will, in accordance with the Platte River Recovery Implementation Program (PRRIP), provide a letter to the Wyoming State Engineers Office listing those sources. It is anticipated that the State Engineer will confirm that TransWest's water sources comprise an existing water-related activity that is covered under the 2006 programmatic biological opinion for the PRRIP. If this is the case, the Project will qualify for streamlined consultation under the PRRIP and the analysis provided in the current BA will be sufficient documentation of the Project's effects on these species. The Service would then issue a "tiered biological opinion" to the BLM documenting that the Project's water-related activities are covered by the PRRIP and are not likely to jeopardize the continued existence of the listed Platte River species nor adversely modify these species' critical habitat.

<u>Western Yellow-billed Cuckoo and Proposed Critical Habitat</u>

Section 6.2.1.4, Pages 6-44 and 6-45, Figure 6-6 Region I and II Area of Analysis for Western Yellow-billed Cuckoo – This figure has been revised to reflect the change in the action area and cuckoo analysis area in the vicinity of the Tuttle Micro-Siting Options in Moffat County, Colorado and to include potential habitat and additional species-specific analysis areas that were inadvertently omitted from the April 8, 2015, TWE BA.

Section 6.1.2.4, Page 6-46, Lines 25-27, Direct and Indirect Effects – Incorporation of the portion of the yellow-billed cuckoo analysis area that was inadvertently omitted from the April 8 BA results in an increase of estimated impacts to potential cuckoo habitat of 54 acres for construction and 21.5 acres for operation. This sentence is therefore revised to read: The proposed Project could result in the construction and operation disturbance of up to 134 acres (0.6 percent) and 39 acres (0.2 percent), respectively, of modeled potential western yellow-billed cuckoo habitat in the analysis area.

Refer to Attachment C of this memo for a description of western yellow-billed cuckoo habitat requirements provided by the USFWS. These requirements form the basis for the field-based habitat assessment that would be conducted per conservation measure SSWS-6.1 described below.

Section 6.1.2.4, Page 6-46, Lines 3 – 23, Conservation Measure **SSWS-6**, which is specific to the western yellow-billed cuckoo has been revised. Refer to Attachment D for the final version of **SSWS-6**.

> *Effectiveness*: Conservation Measure **SSWS-6** would avoid or minimize impacts to the western yellow-billed cuckoo and its habitat through a variety of means. Application of this measure would result in avoidance of impacts to proposed critical habitat and field-verified suitable habitat by requiring that project facilities be sited outside of these habitats and that the transmission line span these areas at a height sufficient to preclude the need for clearing or pruning riparian vegetation. If it is not feasible to completely avoid impacts to proposed critical habitat and field-verified suitable habitat, implementation of this conservation measure would minimize impacts to the species by restricting construction activities within 0.5 mile of these habitats to outside of the

active breeding season. If vegetation- or surface-disturbing activities must occur in proposed critical habitat or field-verified suitable habitat during the breeding season, clearance surveys (conducted in accordance with established USFWS protocols) would be conducted and activities would only be allow to commence if surveys indicate that the species is not present in these areas. If surveys determine that the western yellow-billed cuckoo is present within 0.5 mile of the disturbance area, then vegetation clearing or management efforts and other surface-disturbing activities would be delayed until after the breeding and nesting season to ensure that individuals are not adversely affected by these actions.

Section 6.1.2.4, Page 6-46, Yellow-billed Cuckoo Direct and Indirect Effects: Add analysis of project impact to the primary constituent elements (PCEs) of Proposed Critical Habitat (FR 79 48554) as follows:

PCE-1 - Riparian woodlands: Impacts to riparian woodlands in proposed critical habitat and other field-verified suitable yellow-billed cuckoo habitats would be avoided or minimized through implementation of Conservation Measure SSWS-6, as amended above.
PCE-2 - Adequate prey base: Project conformance with applicable RMP stipulations and BMPs, the general conservation measures identified in the BA listed as being applicable to this species, and Conservation Measure SSWS-6, as amended above, would ensure that habitat for cuckoo prey species (large insect fauna and tree frogs) remains within the ROW and that no fuels, other hazardous materials, and/or herbicides would be used in these areas in a manner that would result in adverse effects to cuckoo prey species in breeding areas during the nesting season.
PCE-3 - Dynamic riverine processes: Project construction, operations, and decommissioning/reclamation would have no discernible effect on riverine processes. Thus, Project implementation would have no effect on this PCE.

Section 6.1.2.4, Page 6-47, Lines 24-25 – Determination: Change existing text to the following:

Effect on Proposed Critical Habitat: The Proposed action *may affect but is not likely to result in the destruction or adverse modification* of proposed critical habitat for the western yellow-billed cuckoo. The BLM is voluntarily conferencing on Project-related effects to proposed critical habitat.

<u>Clay Phacelia</u>

The USFWS stated they “do not agree with (the) determination of May affect, Not Likely to Adversely Affect for clay phacelia” because the lead agencies have not committed to pre-project surveys nor to avoidance of disturbance to suitable habitat. With regard to pre-project surveys, general conservation measure SS-1 is listed as applicable to clay phacelia in Section 6.1.5.1, Page 6-92, Line 24 of the BA. This measure requires the Applicant to conduct species-specific surveys and avoid impacts to species found within the ROW through structure and ROW design modifications. Conservation Measure SS-8.1, as presented in the BA, and SS-8.2, as amended below, also specify completion of clearance surveys for this species.

With regard to avoiding disturbance to clay phacelia habitat, the lead agencies have committed to avoiding impacts to occupied habitat by 650 feet. Impacts to field-verified suitable habitat will be avoided or minimized to the extent practicable. Changes to clay phacelia-specific Conservation Measure SS-8 have been made to clarify the lead agencies’ approach to avoiding impacts to clay phacelia and minimizing impacts to field-verified suitable habitat. These changes are reflected in the revised text of SS-8 presented below.

Refer to Attachment C for a description of clay phacelia habitat requirements provided by the USFWS. These requirements form the basis for the field-based habitat assessment that would be conducted per conservation measure SS-8.1 described in Attachment D.

Section 6.1.5.1, Page 6-93, Lines 27 – 42; Page 6-94, Lines 1-8 – Species-specific conservation measure **SS-8** (Avoidance of Impacts to Clay Phacelia) has been revised. Refer to Attachment D for the final version of this measure.

> *Effectiveness:* Conservation measure **SS-8** would avoid all occupied clay phacelia habitat plus a 650 foot buffer. Impacts to field-verified suitable habitat would be minimized. Coordination with USFWS would occur for activities occurring within field-verified suitable habitat and in areas where site-specific project design and engineering may warrant disturbance within 650 feet of occupied habitat for the benefit of clay phacelia. Project construction would not affect known occupied clay phacelia habitat (the nearest reintroduction site is 1.6 miles from the proposed center line and the nearest natural population is approximately 2.7 miles from the proposed centerline) and would affect less than 0.8% of modeled habitat. In addition, the lead agencies have committed to avoid all occupied habitat by at least 650 feet or as determined in coordination with USFWS to benefit the species. As a result, impacts to this species would be insignificant or discountable.

<u>Deseret Milkvetch</u>

Executive Summary, Table ES-1, Page ES-2 – Change the Deseret milkvetch species determination from "May affect, not likely to adversely affect" to "May affect, likely to adversely affect."

On June 12, 2015, TransWest contractor SWCA Environmental Consultants (SWCA) conducted a habitat assessment and survey for Deseret milkvetch along the portion of Blind Canyon Road that the Applicant has proposed to use to access the Project ROW and around proposed tower locations in this area (SWCA 2015). Full protocol-level, presence-absence surveys were conducted within 300 feet of Blind Canyon Road between Highway 89 approximately 1 mile north of Birdseye, Utah, to the road's intersection with the proposed Project ROW. Reconnaissance-level surveys were conducted within 300 feet of proposed tower locations. Refer to revised Figure 6-15 for the location of this survey effort and a delineation of occupied Deseret milkvetch habitat based on the combined results of this survey and the results of previous habitat assessments provided by the USFWS (Franklin 1990, Fitts and Fitts 2010). Results of the 2015 survey effort indicated that it may not be possible to completely avoid impacts to Deseret milkvetch as there are multiple occurrences of the plant within 300 feet of Blind Canyon Road and one of the proposed tower locations and there is suitable habitat present within 300 feet of three of the proposed tower locations.

Accordingly, the species-specific conservation measure **SS-7** presented on pages 6-99, Lines 25-41 and page 6-100, Lines 1-46, has been revised. The final version of this measure is presented in Attachment D. The assessment of direct and indirect effects, cumulative effects, and determination provided on page 6-101, Lines 1 – 33 of the BA are replaced by the following:

[*Note*: Refer to Attachment C for a description of Deseret milkvetch habitat requirements provided by the USFWS. These requirements form the basis for the field-based habitat assessment that would be conducted per conservation measure SS-7.1 described in Attachment D.]

> *Effectiveness:* Implementation of conservation measure **SS-7** would result in the avoidance or minimization of Project-related impacts to Deseret milkvetch individuals. Impacts to occupied and field-verified suitable habitat for the Deseret milkvetch would also be minimized. In locations where it is not possible to avoid impacts to field-verified suitable habitat, clearance surveys would

be conducted and project facilities would be sited at least 300 feet away from documented occurrences of Deseret milkvetch where technically and economically feasible. Where it has been documented through detailed site-specific engineering and design Deseret milkvetch plants occur within 300 feet of proposed disturbance additional minimization measures will be implemented to reduce surface disturbance and impacts to individual plants.

Direct and Indirect Effects

The types of direct and indirect effects to Deseret milkvetch and its associated habitat resulting from construction, operation, and decommissioning of the Proposed Action would be similar to those presented for clay phacelia.

Based on the current preliminary engineered alignment and the locations of known occurrences, temporary and permanent ground disturbances within the proposed ROW may affect this species. Direct and indirect impacts to Deseret milkvetch could occur as a result of the proximity of known occurrences to access roads and at least one tower location. Blind Canyon Road is proposed to be used as a primary access road for the Project ROW in this area. Improvements to Blind Canyon Road would not occur within 300 feet of Deseret milkvetch plants; however, there is potential for improvements to and/or use of this road (outside of the 300-foot buffer around individual plants) to result in adverse effects on individual plants due to erosion/sedimentation and the generation of fugitive dust.

Based on field surveys completed to date (Franklin 1990, Fitts and Fitts 2010, SWCA 2015), known occupied habitat for Deseret milkvetch comprises approximately 217.7 acres. With direct effects to occupied habitat defined as the area within the footprint of a proposed facility and indirect effects defined as the area of habitat within 300 feet of a proposed facility, project infrastructure (as currently designed) would directly impact 0.9 acre (0.4%) of occupied habitat and indirectly affect 27.1 acres (12%) of known occupied habitat. Direct effects to habitat would be approximately evenly distributed among Blind Canyon Road, other access roads, and construction work areas (e.g., structure work areas; wire pulling, tensioning, and splicing sites). The majority of indirect impacts (e.g., potential adverse effects to reproduction and photosynthesis associated with increased dust within 300 feet of a facility) would be primarily associated with use of Blind Canyon Road (approximately 60%) followed by impacts associated with other access roads and temporary work areas (approximately 20% each).

Based on a combination of census and transect data, Fitts and Fitts (2010) estimated that the total Deseret milkvetch population consisted of between 197,277 and 211,915 plants. Using the average of these two figures, 204,596 plants, combined with 1,070 plants recorded by SWCA in 2015 yields a total population estimate of roughly 205,666 individuals. The estimated number of individuals that could be directly affected by construction of project infrastructure is 83 plants or 0.04% of the total population. Based on current data, all of the plants that would be directly affected by the project would be those occurring in the construction work area around TWE Structure SL 79. The estimated number of individuals that could be indirectly affected by the Project (i.e., those occurring within 300 feet of access roads and construction work areas) is 995 plants or 0.48% of the total known population. The vast majority of these plants occur along Blind Canyon Road.

It should be noted that the above presents a worst-case scenario of impacts. Implementation of the Applicant-committed mitigation measures, design features, and general conservation measures listed above and conservation measure **SS-7** described above would result in the Project avoiding or minimizing impacts to Deseret milkvetch individuals. These measures also would result in the avoidance of impacts to suitable Deseret milkvetch habitat outside of the ROW and the minimization of impacts to suitable Deseret milkvetch habitat within the ROW.

Cumulative Effects

No reasonably foreseeable non-federal future actions have been identified within the vicinity of the Deseret milkvetch area of analysis.

Determination

Effect on the Species: The Proposed Action *may affect, and is likely to adversely affect* Deseret milkvetch.

Effect on Critical Habitat: No critical habitat has been proposed or designated for Deseret milkvetch; thus, there would be *no effect* to critical habitat for this species.

Rationale: Construction and operation of the Proposed Action would affect occupied habitat and known occurrences of Deseret milkvetch. Prior to final engineering design, a habitat assessment and full protocol presence-absence surveys would be conducted along the proposed ROW and new/improved access roads to determine whether additional suitable habitat and individual plants occur within the analysis area. All occurrences of the species identified during the 2015 and subsequent survey efforts would be avoided by a minimum of 300 feet to the extent possible given existing topographic and geologic siting constraints. Implementation of the listed design features, general conservation measures, and conservation measure SS-7, would result in avoidance or minimization of Project-related impacts to Deseret milkvetch and minimization of or compensation for impacts to its habitat.

<u>Ute Ladies'-tresses</u>

Section 6.1.5.3, Page 6-104, Lines 13-22 – The Ute ladies'-tresses species-specific conservation measure **SS-2** has been revised. Refer to Attachment D for the final version of this measure.

Section 6.1.5.3, Page 6-104, Line 27, Direct and Indirect Impacts – BLM Colorado's selection of Tuttle Micro-Siting Option 4 in Moffat County as the agency preferred alternative would result in an incremental increase in impacts to modeled Ute ladies'-tresses habitat. Increases to impact acreages resulting from clearing, construction, and operation activities comprise 0.02, 0.03, and 0.01 acre, respectively. These increases are too small to affect the estimated overall Project impact acreage of 81 acres presented on Line 27.

Per USFWS request, the shapefiles for the final Ute ladies'-tresses habitat model that were developed for the NEPA analysis and provided the basis for our impacts discussion in the BA were sent to Amy Defreese of the USFWS Utah Ecological Services Field Office on June 5, 2015.

Section 6.1.5.3, Page 6-104, Line 8 – Delete TWE-29 from list of Applicant-committed conservation measures and design features applicable to this species. Applicant-committed measures TWE-31 covers federally listed species:

> **TWE-31**: Mitigation measures that will be developed during the consultation period with the BLM and the USFWS under Section 7 of the ESA will be adhered to, along with mitigation developed in conjunction with state authorities.

Section 6.1.5.3, Page 6-104, Lines 29-31 – Revise sentence to read: "Whereas the proposed action would affect potential Ute ladies'-tresses habitat as modeled, it would have no effect on any currently known populations of the species."

Section 6.1.5.3, Page 6-105, Figure 6-16 – This figure has been revised to reflect the expanded action area/species-specific analysis area in the vicinity of the Tuttle Micro-siting Option 4 in Moffat County, Colorado. Refer to Attachment A for the revised figure.

Virgin River Chub

Executive Summary, Page ES-2, Table ES-1 – Delete Virgin River chub.

Section 1.3, Page 1-7, Table 1-1 – Delete Virgin River chub.

Section 6.1.4.6, Pages 6-86 through 6-89 – Delete Virgin River Chub section.

Desert Tortoise

Executive Summary, Page ES-1, Table ES-1 – Delete Utah from list of applicable states for Mojave desert tortoise. Within the action area, this species occurs only in Nevada.

Section 6.1.3.1, Page 6-53, Lines 6-49; Pages 6-54 – 6-58; Page 6-59, Lines 1-20 – Mojave desert tortoise species-specific conservation measure **SSWS-4** has been revised and updated with input from the BLM Las Vegas and Caliente Field Offices and the USFWS Southern Nevada Field Office. The final version of this measure is presented in Attachment D.

California Condor

Page 1-7, Table 1-1 – Replace "EXP/NE-Utah" with "EXP/NE-Nevada" as the only area in which the proposed action would have potential to affect the EXP/NE population of the California condor is in Nevada. In Utah, potential Project-related effects to this species would be to the federally listed endangered population.

Section 6.1.2.1, Page 6-25, Lines 3-4 – Revise sentence to state: "In Utah, the condor population is considered as EXP/NE south of I-70 and east of I-15, except where it occurs on land within the National Park System and National Wildlife Refuge System, where it is treated as a threatened species."

Section 6.1.2.1, Page 6-25, Lines 4-5 – Delete: "including those on National Park lands and in southeastern Nevada" to clarify that any condors outside of the 10(j) boundary are considered endangered.

Southwestern Willow Flycatcher

Section 6.1.2.2, Page 6-31, Lines 27-41; Page 6-33, Lines 1-2 – The southwestern willow flycatcher species-specific conservation measure **SSWS-8** has been revised. Refer to Attachment D for the final version of this measure.

Section 6.1.2.2, Page 6-33, Line 2 – Replace "May 1 to August 15" with "April 15 to August 15."

Black-Footed Ferret

Section 6.2.1.1, Page 6-115, Figure 6-19, Area of Analysis for Black-footed Ferret – This figure has been revised to reflect BLM Colorado's selection of Tuttle Micro-Siting Option 4 in Moffat County as the agency preferred alternative and the associated expansion of the action area in this location. This revision does not change the black-footed ferret analysis area or the assessment of direct and indirect impacts for this species.

Greater Sage-Grouse

On October 2, 2015, the FWS announced a 12-month finding on petitions to list the greater sage-grouse (Centrocercus urophasianus) as an endangered or threatened species under the Endangered Species Act of 1973, as amended. After review of the best available scientific and commercial information, FWS found that listing the greater sage-grouse is not warranted at this time.

Section 6.3.1.1, Page 6-122, Figure 6-20, Area of Analysis for Greater Sage-Grouse – This figure has been revised to reflect BLM Colorado's selection of Tuttle Micro-Siting Option 4 in Moffat County as the agency preferred alternative and the associated expansion of the action area in this location. No greater sage-grouse leks would be affected by this change.

Section 6.3.1.1, Page 6-129, Lines 22-25, Direct and Indirect Effects – Due to BLM Colorado's selection of Tuttle Micro-Siting Option 4 as the agency preferred alternative, there would be an incremental reduction in impacts to greater sage-grouse habitat compared with the comparable segment of the Proposed Action analyzed in the April 8 BA. To account for this change, replace the text identifying total project impacts with: In total, the Project would result in the construction and operation disturbance of 3,134 acres and 741 acres, respectively, of sagebrush shrubland habitat found along the Project route in Wyoming, Colorado, and Utah as shown in Table 6-8. Indirect impacts would occur to 321,028 acres of potential sage-grouse habitat within the greater sage-grouse analysis area (Table 6-8).

Section 6.3.1.1, Page 6-131, Table 6-8, Row 2, Impacts to Colorado Preliminary Priority Habitat (PPH) – Tuttle Micro-Siting Option 4 would result in an incremental increase in the amount of PPH (10 acres for construction, 1 acre for operation) affected by the Project in this area. Consequently, change construction, operation, and indirect impact numbers to 429, 107, and 42,043 acres, respectively.

Section 6.3.1.1, Page 6-131, Table 6-8, Row 3, Impacts to Colorado Preliminary General Habitat (PGH) – Tuttle Micro-Siting Option 4 would result in an incremental decrease in the amount of PGH (47 acres for construction, 11 acres for operation) affected by the Project in this area. Consequently, change construction, operation, and indirect impact numbers to 410, 103, and 49,802 acres, respectively.

References

Section 7.0 References, the following literature citations are added to this section:

Fitts, R., and S. G. Fitts. 2010. Survey and Monitoring the Rare Endemic Plant *Astragalus desereticus* (Deseret Milkvetch). Draft 2009 Project. Utah Natural Heritage Program. February 2010. 9pp.

SWCA Environmental Consultants (SWCA). 2015. Deseret Milkvetch Survey Report for the TransWest Express Transmission Project. Report prepared for TransWest Express LLC. August 2015. 48pp.

Summary and Conclusion

The BLM initiated informal consultation in 2009. The USFWS, along with other federal agencies entered into a Consultation Agreement in 2011. A species list was refined and submitted to the FWS for concurrence on October 27, 2014. The FWS issued formal concurrence with this list on October 31, 2014. All species recommended by the FWS for inclusion in the BA have been carried forward for analysis. As described in the April 8, 2015, Biological Assessment (as modified by this memorandum), a determination was made that the Project would have *no effect* on several species and /or their critical habitats due to various Project- or species-specific factors; no additional concurrence or further consultation is required for these species.

The Proposed Action *may affect but is not likely to adversely affect* the ESA-listed species presented in Table 1, below. Note for the Platte River Species, Table 1 reflects the changes in the Species Determinations to a No Effect per USFWS's direction and consistency with the PRRIP streamlined consultation process. We request your concurrence with the determinations for these species. We are also requesting a Conference Report on western yellow-billed cuckoo proposed critical habitat as indicated in Table 1, below.

Table 1. Species for which the Proposed Action Would Have No Effect or May Affect but is Not Likely to Adversely Affect

Species	State[1]	Federal Status	Species Determination	Critical Habitat Determination
Federally Listed Threatened and Endangered Species				
Canada Lynx	Wyoming, Colorado, Utah	Threatened	May affect, not likely to adversely affect	Not applicable
Gray Wolf	Utah, Colorado	Endangered	May affect, not likely to adversely affect	Not applicable
Utah Prairie Dog	Utah	Threatened	May affect, not likely to adversely affect	Not applicable
California Condor	Utah, Nevada	Endangered, EXP/NE	May affect, not likely to adversely affect	No effect: Critical habitat is well outside action area
Southwestern Willow Flycatcher	Nevada	Endangered	May affect, not likely to adversely affect	No effect: Critical habitat is well outside action area
Yuma Clapper Rail	Nevada	Endangered	May affect, not likely to adversely affect	Not applicable
Western Yellow-billed Cuckoo	Wyoming, Colorado, Utah, Nevada	Threatened	May affect, not likely to adversely affect	May affect, not likely to result in destruction or adverse modification of proposed critical habitat. BLM is conferencing on this proposed critical habitat
June Sucker	Utah	Endangered	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Barneby Ridgecress	Utah	Endangered	May affect, not likely to adversely affect	Not applicable
Clay Phacelia	Utah	Endangered	May affect, not likely to adversely affect	Not applicable
Ute Ladies'-tresses Orchid	Wyoming, Colorado, Utah	Threatened	May affect, not likely to adversely affect	Not applicable
Species Proposed for Federal Listing and EXP/NE Populations of Listed Species				
Black-Footed Ferret	Wyoming, Colorado, Utah	Endangered - EXP/NE	Not likely to jeopardize; BLM is conferencing on this species	Not applicable
Platte River Species[3]				
Interior Least Tern	Wyoming	Endangered	No Effect	Not applicable
Piping Plover	Wyoming	Threatened	No Effect	Not applicable
Whooping Crane	Wyoming	Endangered	No Effect	No Effect
Pallid Sturgeon	Wyoming	Endangered	No Effect	Not applicable
Western Prairie Fringed Orchid	Wyoming	Threatened	No Effect	Not applicable

[1] State in which species occurs in Project action area or state in which water depletions could occur that would affect species downstream of the withdrawal site.

As described in the BA and, where applicable, as modified by this memorandum, the Proposed Action *may affect and is likely to adversely affect* the ESA-listed species and critical habitats presented in Table 2, below. Therefore, we request initiation of formal consultation under Section 7 of the ESA for the Mojave desert tortoise, bonytail, Colorado pikeminnow, humpback chub, razorback sucker, and Deseret milkvetch.

Table 2. Species for which the Proposed Action May Affect and Is Likely to Adversely Affect

Species	State[1]	Federal Status	Species Determination	Critical Habitat Determination
Federally Listed Threatened and Endangered Species				
Mojave Desert Tortoise	Utah, Nevada	Threatened	May affect, likely to adversely affect	May affect, likely to adversely affect
Bonytail[2]	Colorado, Utah	Endangered	May affect, likely to adversely affect	May affect, likely to adversely affect
Colorado Pikeminnow	Wyoming, Colorado, Utah	Endangered	May affect, likely to adversely affect	May affect, likely to adversely affect
Humpback Chub[2]	Colorado, Utah	Endangered	May affect, likely to adversely affect	May affect, likely to adversely affect
Razorback Sucker	Wyoming, Colorado, Utah, Nevada	Endangered	May affect, likely to adversely affect	May affect, likely to adversely affect
Deseret Milkvetch	Utah	Threatened	May affect, likely to adversely affect	Not applicable

[1] State in which species occurs in Project action area or state in which water depletions could occur that would affect species downstream of the withdrawal site.

[2] Affected by water depletions only.

BLM considers submission of this supplemental information to complete our consultation package and initiate formal consultation for those listed species and critical habitats listed in Table 2. Again, we also request USFWS concurrence with our effects determinations for species listed in Table 1. In addition, we request that a draft biological opinion be completed in 90 days and provided to BLM for review. TWE is a Presidential Priority Project and its Section 7 milestone schedule is attached for your consideration (Attachment E). Please contact Sharon Knowlton, BLM Project Manager, at (307) 775-6124 regarding this consultation request.

This concludes our response to the USFWS' May 7, 2015, memorandum and presentation of additional information as noted above. Please refer to the following attachments for supplementary materials related to the responses provided above:

Attachment A – Revised Maps
Attachment B – Letter from TransWest Express, LLC, committing to use of existing water sources already covered under the Biological Opinion for the Platte River Recovery Implementation Program
Attachment C – U.S. Fish and Wildlife Service Recommended Habitat Requirements for the Western Yellow-billed Cuckoo, Clay Phacelia, and Deseret Milkvetch; and Indicators of Non-Habitat for Ute Ladies'-tresses
Attachment D – Compiled Species-Specific Conservation Measures
Attachment E – TransWest Express Transmission Project ESA Section 7 and NEPA Milestone Schedule

Attachment B

TransWest Express, LLC
Letter Committing to Use of Existing Water Sources Already Covered under the Biological Opinion for the Platte River Recovery Implementation Program

TRANSWEST EXPRESS LLC

555 Seventeenth Street
Suite 2400
Denver, CO 80202
Tel 303.298.1000
Fax 303.299.1356

VIA ELECTRONIC MAIL

May 29, 2015

Sharon Knowlton
Project Manager
Bureau of Land Management
Wyoming State Office
5353 Yellowstone Road
Cheyenne, Wyoming 82009

Re: TransWest Express Transmission Project Water Supply

Dear Sharon:

This letter clarifies TransWest Express LLC's (TransWest's) commitments regarding the water supply for the TransWest Express Transmission Project (TWE Project). Pursuant to our discussions, the water sources to be used by TransWest for the construction, operation, maintenance, and decommissioning of the TWE Project will consist of: (1) municipal sources; (2) commercial sources; or (3) existing water rights that have already undergone consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act. No new water rights will be developed. In the event that TransWest pursues the use of any existing water rights that have not been consulted on under Section 7 the Endangered Species Act, TransWest will insure that consultation is completed prior to using the water.

This letter serves as a commitment by TransWest to use the above described water sources; however, TransWest will also revise its Plan of Development to reflect this commitment. TransWest's March 2015 Plan of Development (POD) currently states the following regarding water sources:

> "The required water [for the TWE Project] will be procured from municipal sources, from commercial sources, or under a temporary water use agreement with landowners holding existing water rights. No new water rights will be required." *See March 2015 POD at p. 5-35.*

The above statement is hereby amended to read as follows:

> The required water will be procured from municipal sources, from commercial sources, or under a temporary water use agreement with landowners holding existing water rights. No new water rights will be required. TransWest will only use existing water rights that have already undergone consultation with USFWS under Section 7 of the ESA. In the event that TransWest pursues the use of any existing water rights that have not been consulted on under Section 7 the Endangered Species Act, TransWest will insure that consultation is completed prior to using the water.

TRANSWEST EXPRESS LLC

Future updates of the POD, including the Notice to Proceed (NTP) POD, which will be issued following publication of the Record of Decision for the TWE Project, will include this clarification.

Thank you for allowing us to clarify our intent regarding water sources for the TWE Project. If you have any questions regarding this information or our commitments, please contact me at 303-299-1546.

Sincerely,

Garry Miller
Vice President, Land and Environmental Affairs

cc: Steve Blazek, Western Area Power Administration
Matt Petersen, AECOM

Attachment C

U.S. Fish and Wildlife Service
Recommended Habitat Requirements for the
Western Yellow-billed Cuckoo, Clay Phacelia, and Deseret Milkvetch;
And Indicators of Non-Habitat for Ute Ladies'-tresses

Transwest Express Transmission Line Project: Guidelines for identification of suitable breeding and nesting habitat for western yellow-billed cuckoo in Utah, Colorado, and Wyoming

The purpose of this guidance is to assist agencies and project proponents in identifying areas that meet minimum criteria as potentially suitable breeding and nesting habitat for yellow-billed cuckoo in Utah, Colorado and Wyoming. Areas that meet the minimum criteria should be (1) avoided by 0.5 mile[1], or (2) surveyed, and/or (3) carried forward for evaluation of potential effects.

Step 1: Identify and delineate all riparian habitats within 0.5 mile of the proposed action, below the elevation of 8,500 feet.

Step 2: Identify suitable cuckoo breeding and nesting habitat, including associated foraging areas.

Riparian patches used by breeding and nesting cuckoos vary in size and shape, ranging from a relatively contiguous stand of mixed native/exotic[2] vegetation to an irregularly shaped mosaic of dense vegetation with open areas. The following parameters characterize suitable breeding and nesting cuckoo habitat:

- Vegetation[3] that is predominantly multi-layered, with riparian canopy trees and at least one layer of understory shrubby vegetation;
- Patches of multi-layered vegetation (as described above) that are at least 12 acres (5 ha) or greater in extent and separated from other patches of suitable habitat by at least 300 meters;
- Somewhere within a patch, the multi-layered riparian vegetation (as described above) should be at least 100 meters wide by 100 meters long. This is to avoid patches that may be long enough to meet the minimum area (12 acres) but are so narrow that they are unsuitable-- 750 m x 75 m (length x width) for example; and,
- Open areas, or gaps of multi-layered vegetation within a patch area less than 300 meters.

Breeding and nesting cuckoos will forage in riparian patches that have an overstory canopy *only* and are within 300 meters (m) of the edge of suitable breeding and nesting habitat. Identify suitable foraging habitat of nesting cuckoo to include single layer overstory canopy that is within 300 meters of suitable breeding and nesting habitat.

[1] A 0.5-mile buffer is likely the largest buffer necessary to preclude impacts to the species from noise, light and human disturbance. Regardless, this buffer could be adjusted according to the type of activity and noise that is generated (for example, oil well drilling as opposed to construction vehicle traffic).

[2] Western yellow-billed cuckoo have been documented nesting in tamarisk, consequently, the presence of tamarisk should not eliminate a vegetation patch from a suitability determination. However the odds of cuckoo occurrence decrease rapidly as the amount of tamarisk cover increases.

[3] Riparian overstory and understory vegetation that supports suitable cuckoo habitat may include: cottonwood (*Populus spp*), willow (*Salix* spp), alder (*Alnus spp*), walnut (*Juglans spp*), boxelder (*Acer spp*), sycamore (*Plantanus spp*), ash (*Fraxinus spp*), mesquite (*Prosopis spp*), tamarisk (*Tamarix spp*), and Russian olive (*Elaeagnus angustifolia*). Suitable understory vegetation does not include grasses or forbs although herbaceous vegetation is often present alongside shrubby understory.

Recommended habitat requirements for clay phacelia (Armstrong 1992, USFWS 1982):

The attributes below describe occupied clay phacelia habitat. Since very little habitat is occupied, we do not know the range or variability of each of the attributes where clay phacelia might occur thus those mapping suitable habitat should not rule out habitat that does not fit these attributes perfectly. Instead these attributes serve as general guidelines and are not meant to be all encompassing. Surveyors should include all habitats that closely match these attributes where the potential for clay phacelia exists.

Surveyors should check reference populations prior to surveys to get a better understanding of the species, its phenology at the time of surveys and the attributes of the habitat. Surveys should be coordinated with the US Forest Service botanist for the species who has knowledge of the species and its habitat requirements.

Geology: Outcroppings of the Douglas Creek and Garden Gulch members of the Green River Formation

Soils: Shale based clay colluvium with varying sizes of fragmented shale. Can grow on a range of soil types including fine texture soil, equal parts sand, clay and silt with pebbles often with "flat slabs of lithified shale" covering the surface. It can also grow on loose shale plate outcrops with roots establishing in buff to grey color clay. pH 7.4-7.8. Suitable habitat model uses 7.7 to 7.9.

Vegetation: Pinon-juniper, mountain brush community. Extremely sparse vegetation with bare ground and rock covering 97.8% of the surface. Vegetation cover of 2.2% composed of *Eriogonum umbellatum, Achnatherum hymenoides, Juniperus osteosperma , Mentzelia laevicaulis,* and *Quercus gambelii* but little vegetation grows adjacent to clay phacelia (although some invasive, exotics have established) . No biological soil crust. Suitable habitat model uses canopy cover of less than 13 percent.

Elevations: 5900 ft to 6400 ft

Slope: Average 70%. Suitable habitat model uses 35% to 95%

Aspect: SE to W (can be snow free for varying periods during the winter). Suitable habitat model uses E to N.

Suitable Habitat Attributes for Deseret milkvetch (*Astragalus desereticus*) (Franklin 1990; Stone 1992; Humphrey 1993; Fitts 2009; USFWS 2011):

Surveyors should check multiple areas of occupied habitat prior to surveys to get a better understanding of the species, its phenology at the time of surveys, and the soil and vegetation attributes of the habitat. Surveys should be coordinated with the State Heritage Program botanist (Robert Fitts) because he has knowledge of the species and its habitat requirements.

Surveys need to be performed during the FWS recommended survey period because Deseret milkvetch individuals go dormant with little to no above ground presence during the summer heat.

Geology & Soils: *Astragalus desereticus* grows in exposed outcrops of the Moroni formation. The outcrops in the species' range are composed of a poorly sorted mixture of tuff, breccia, and volcanic cobbles and pebbles along with sandstone and siltstone and well-rounded clasts of tan quartzite and dark-blue limestone. The surfaces of the poorly sorted outcrops that are occupied by the species range from primarily sandy to gravels with no apparent sand at all on the surface. Derived soils are considered stony sandy loams. Typically, these outcrops have steep slopes and are sparsely vegetated.

Aspect: Plants are primarily found on S, SW, and W facing slopes, although few plants found on N-facing slopes.

Associated species: *Astragalus desereticus* occurs in a sagebrush-juniper community (Welsh and Chatterley 1985). Species that are associated with *A. desereticus* are *Pinus edulis* (twoneedle pinyon), *Juniperus osteosperma* (Utah juniper), *Quercus gambelii* (Gambel oak), *Artemisia tridentata* (big sagebrush), *Purshia tridentata* (antelope bitterbrush), *Astragalus calycosus* (Torrey's milkvetch), *Astragalus utahensis* (Utah milkvetch) *Opuntia polyacantha* (plains pricklypear), *Pseudoroegneria spicata* (bluebunch wheatgrass), *Achnatherum hymenoides* (Indian ricegrass), *Hesperostipa comata* (needle and thread), and *Eriogonum brevicaule* (shortstem buckwheat) (Franklin 1990; Stone 1992; Humphrey 1993; Fitts 2009). *Bromus tectorum* (cheatgrass) also was one of the main associated species in portions of the *A. desereticus* population (Humphrey 1993).

U.S. Fish and Wildlife Service Indicators of Unsuitable Habitat for Ute Ladies'-Tresses (*Spiranthes diluvialis*) Orchid (Lewinsohn 2015)

- Appropriate hydrology not present, typically indicated by:
  - area comprised of mostly upland vegetation
  - area that dries up by mid-July, with a water table lower than 12 to 18 inches below the soil surface

- Heavy clay soils present

- Soils strongly alkaline

- Site heavily disturbed, such as, for example:
  - stream banks channelized and stabilized by heavy rip-rap
  - highway rights-of-way built on filled or compacted soil or rock material
  - construction sites where construction has either stripped the topsoil or where construction has been completed within the last 5 years but the area has not been revegetated (Ute ladies'-tresses orchid has been found in some heavily disturbed sites where hydrology is appropriate, such as revegetated gravel pits, heavily grazed riparian edges and pastures, and along well-traveled trails developed on old berms)
  - Stream banks steep, transition from stream margin to upland areas abrupt
  - Site characterized by standing water with cattails, bulrushes, and other emergent aquatic vegetation- note margins may be suitable habitat
  - Riparian areas, stream banks, or wetlands vegetated with dense rhizomatous species such as reed canary grass (*Phalaris arundinacea*), tamarisk or salt cedar (*Tamarix ramosissima*), teasel (*Dipsacus sylvestris*), common reed (*Phragmites australis*), or saltgrass (*Distichlis spicata*)
  - Riparian areas overgrazed or otherwise managed such that the vegetation community is comprised of upland native or weedy species or is unvegetated. (Note that the orchid can tolerate rather extreme overgrazing as long as it has not resulted in a drop in the water table as indicated by conversion of the riparian or wet meadow pasture vegetation community to mostly upland species)
  - Potential habitat is no longer in a natural condition, for example, has been converted to agricultural uses and is now plowed and cropped, or has been converted to lawns or golf courses (wet meadow pastures with a mix of native and non-native pasture grasses, including pastures that are regularly hayed, are suitable potential habitat)

- Wetland is a brackish playa or pothole not fed by springs or not in the floodplain of or hydrologically connected with a riparian system or other source of fresh water (note that fens and wetlands associated fresh water springs are suitable potential habitat).

References

Halterman, M., M.J. Johnson, J.A. Holmes and S.A. Laymon. 2015. A Natural History Summary and Survey Protocol for the Western Distinct Population Segment of the Yellow-billed Cuckoo: U.S. Fish and Wildlife Techniques and Methods, 45 p.

Laymon, S. 2015. Pers. Comm.

Lewinsohn, Jennifer. 2015. E-mail communication between Jena Lewinsohn of the U.S. Fish and Wildlife Service Utah Ecological Services Field Office and Christine Pontarolo of the BLM National Transmission Support Team.

U.S. Fish and Wildlife Service. 2014. Final rule determining threatened status for the western yellow-billed cuckoo. Federal Register 79: 59992-60038.

Attachment D

TransWest Express Transmission Project
Species-Specific Conservation Measures

Attachment D

Species-Specific Conservation Measures

Desert Tortoise

SSWS-4: To avoid and minimize impacts to the desert tortoise and its habitat, TransWest will coordinate with the BLM, Western, Boulder City, Clark County (Nevada), Bureau of Reclamation, and USFWS to implement appropriate conservation measures during construction, including but not limited to:

1. Depending on the distance between concurrent construction activities in desert tortoise habitat, TransWest will provide at least one Field Contact Representative (FCR) to be responsible for overseeing compliance with protective measures for the desert tortoise. Where the distance between activities is over 100 miles, an additional FCR will be required. The FCR will be an authorized biologist approved by the BLM, applicable state wildlife agencies, such as the Nevada Department of Wildlife (NDOW) and the USFWS and will be present during all Project activities within desert tortoise habitat. TransWest will ensure that FCR(s) and supporting authorized biologists and desert tortoise monitors will have authority to halt any activities that are in violation of the stipulations in the Biological Opinion (BO) for the Project. The FCR will prepare and submit a daily report to the BLM and USFWS for all work activities within desert tortoise habitat.
2. All TransWest employees and its contractors working in the field will be required to complete a desert tortoise education program prior to reporting in the field. The program will be approved by the BLM and USFWS and will cover such topics as desert tortoise distribution within the Project Area, general behavior and ecology, sensitivity to human activities, legal protection, penalties for violation (ESA), conservation and protection measures, reporting requirements, fire prevention, etc. All field workers will be instructed that activities must be confined to locations within the approved areas. The program will instruct participants to report all observations of desert tortoises and their sign during construction activities to the nearest tortoise monitor or authorized biologist who will, in turn, inform the FCR.
3. An authorized desert tortoise biologist will possess at least a bachelor's degree in biology, ecology, wildlife science, herpetology, or closely related fields as determined by the BLM, NDOW, and USFWS. The authorized biologist must have demonstrated prior field experience using accepted resource agency techniques to survey for desert tortoises and tortoise sign. Authorized biologists will have special training in accepted techniques for moving desert tortoises, excavating tortoise burrows and relocating burrow contents including tortoises and eggs. As a guideline, USFWS approval of an authorized biologist requires that the applicant have at least 60 days project experience as a desert tortoise monitor. In addition, the biologist will have the ability to recognize and accurately record survey results and must be familiar with the terms and conditions of the BO that resulted from project-level consultation between BLM and the USFWS. All tortoise biologists will be familiar with the Desert Tortoise (Mojave Population) Field Manual (USFWS 2009). Desert tortoise monitors will possess at least a bachelor's degree in biology, ecology, wildlife science, herpetology, or closely related fields as determined by the BLM and USFWS and have prior field experience using accepted resource agency techniques to survey for desert tortoises and tortoise sign. Desert tortoise monitors will not be permitted to move tortoises or excavate tortoise burrows. All FCRs, other authorized biologists, and tortoise monitors will have the ability to recognize and accurately record biological information in the field.
4. TransWest will coordinate with the BLM and USFWS to ensure that an appropriate number of authorized biologists and tortoise monitors are onsite during construction to ensure the protection of desert tortoises. TransWest will submit the names of all authorized biologists and tortoise monitors to the BLM and USFWS for review and approval at least 30 days prior to initiation of any desert tortoise clearance surveys. Project activities will not begin until authorized biologists and tortoise monitors have been approved. Replacements of authorized biologists and tortoise monitors will require BLM and USFWS approval. Authorized biologists will be assigned to monitor each area of

activity where conditions exist that may result in take of desert tortoise (for example, clearing, construction, grading, recontouring, and reclamation activities). The BLM and TransWest will ensure that a tortoise monitor or authorized biologist will be assigned to each piece/group of large equipment. All authorized biologists and tortoise monitors will be responsible for determining compliance with terms and conditions of the BO, the Project ROD, and other applicable agreements. With input from authorized biologists and tortoise monitors, the FCR(s) will maintain a detailed record of all desert tortoises encountered during Project surveys and monitoring.

5. All construction vehicle movement outside of the ROW will to be restricted to pre designated access, contractor acquired access, or public roads. Any routes of travel that require construction or modification will have an authorized biologist or desert tortoise monitor survey the area for tortoises prior to modification or construction of the route. Off-road travel by vehicles and equipment will be prohibited.

6. To limit the potential for adverse impacts resulting from contact with construction equipment, vehicles, and personnel, TransWest will implement a Project area vehicle speed limit of 15 mph during the tortoise active season (temperatures >65ºF) and 20 mph during the tortoise inactive season (temperatures <65ºF).

7. Whenever a vehicle or construction equipment is parked within desert tortoise habitat, whether the engine is engaged or not, the ground around and underneath the vehicle will be inspected for desert tortoises prior to moving the vehicle. If a desert tortoise is observed, the vehicle will not be moved and an authorized biologist will be contacted. If possible, the tortoise will be left to move on its own. If necessary, the tortoise will be removed and relocated by the authorized biologist in accordance with the tortoise handling procedures, as presented in the Desert Tortoise Field Manual (USFWS 2009), which TransWest will include or incorporate by reference in the POD.

8. The area of construction activity will be pre-determined with removable flagging and confine all activities to these areas. All construction sites and access roads will be clearly marked or flagged at the outer limits prior to the onset of any surface-disturbing activity. All personnel will be informed that their activities must be confined within the marked or flagged areas. No permanent paint or other marking agents will be applied to vegetation or rocks.

9. All desert tortoise burrows and pallets that fall outside of, but within 50 feet of, the construction work area will be flagged for avoidance. Desert tortoise burrows will not be marked in a manner that facilitates poaching or provides a cue for predators. Avoidance flagging will be designed to be easily distinguished from access route or other flagging, and will be designed in consultation with experienced construction personnel and authorized biologists. All flagging will be removed immediately following construction activities.

10. Construction sites, staging areas, and access routes will be cleared by an authorized tortoise biologist before the start of construction. An authorized biologist(s) will perform preconstruction surveys on all construction sites for desert tortoises using survey techniques providing 100 percent coverage of the area proposed for disturbance. If construction occurs during the desert tortoise active season (March 1 through October 31), or when temperatures and environmental conditions are conducive to tortoise activity as stated in the USFWS Desert Tortoise Handbook or determined by an authorized biologist, a second clearance survey will occur to ensure all live tortoises have been cleared from the area of potential disturbance. This survey will occur immediately before surface disturbance. During the inactive season (November 1 through February 28, except as noted above) when conditions are not conducive to tortoise activity as determined by an authorized biologist, the initial preconstruction survey will be adequate. If a second survey will be completed, it will be performed immediately prior to surface disturbance.

11. To limit the potential for adverse impacts resulting from contact with construction equipment, vehicles, and personnel, TransWest will ensure that all construction-related activities are monitored by an authorized biologist or desert tortoise monitor with the authority to stop construction activities upon the detection of a tortoise within the Project area. During the active season (March 1 – October 31), an authorized biologist or approved desert tortoise monitor will be onsite for the

duration of construction activities in desert tortoise habitat. During the inactive season (November 1 through February 28, except when conditions are conducive to tortoise activity (i.e., when temperatures are above 65°F), authorized biologists or desert tortoise monitors will be onsite during all phases of transmission line construction to ensure that all construction vehicles and heavy equipment remain within the boundaries of the marked construction zone. If necessary, an authorized desert tortoise biologist will be brought on site to excavate any tortoise burrow that might be impacted.

12. Desert tortoises and eggs found within construction sites will be removed by authorized desert tortoise biologists in accordance with the most current protocols identified by BLM and USFWS. If any tortoise active nests are encountered, USFWS will be contacted immediately, prior to removal of any tortoises or eggs from those burrows, to determine the most appropriate course of action. Unoccupied burrows will be collapsed or blocked to prevent tortoise re-entry. All desert tortoises located in harm's way will be relocated to safe areas up to 1,000 feet from the point of capture. Desert tortoises that are found above-ground will be placed in the shade of a shrub and out of harm's way, following the most current protocol approved by BLM and USFWS. Relocated tortoises will not be placed in existing occupied burrows. If an existing burrow that is similar in size, shape, and orientation to the original burrow is unavailable, the authorized biologist will construct one. Desert tortoises moved during inactive periods will be monitored for at least two days after placement in the new burrows to ensure their safety. The authorized biologist will be allowed some judgment and discretion to ensure that survival of the desert tortoise is likely. Desert tortoises will not be placed on lands outside the administration of the federal government without the written permission of the landowner. Desert tortoises will be purposely moved only by authorized tortoise biologists and solely for the purpose of moving them out of harm's way.

13. Authorized desert tortoise biologists will follow procedures for handling tortoises in accordance with the most current protocols identified by BLM and USFWS. All tortoises will be handled using disposable surgical gloves. The gloves will be disposed of after handling each tortoise. Equipment or materials that contact desert tortoises will be sterilized, disposed of, or changed before contacting another tortoise. The authorized biologist will document each tortoise encounter/handling with the following information, at a minimum: a description of the situation; vegetation type; date of observation; weather conditions; condition and health; any apparent injuries and state of healing; if moved, the GPS location from which it was captured and the location in which it was released; map locations; whether the animal voided its bladder; and identifying markings (that is, identification numbers marked on lateral scutes or attached transmitters).

14. If desert tortoises need to be moved at a time of day when harmful ambient temperatures exist (i.e., less than 40°F or greater than 95°F or 35°C at 5 cm aboveground or 43°C at ground surface), they will be held overnight in a clean plastic box. These tortoises will be kept in the care of the authorized biologist under appropriate controlled temperatures and released the following day when temperatures are favorable. All cardboard boxes will be appropriately discarded after one use and never hold more than one tortoise.

15. Any excavated holes or trenches related to transmission line construction (e.g., tower foundations, ground electrode wells) left open overnight will be covered and/or tortoise-proof fencing will be installed to prevent the possibility of tortoises falling into the open holes. Any tortoise found in an excavated hole or trench will be promptly removed by an authorized desert tortoise biologist in accordance with USFWS-approved protocols or if the biologist is not allowed to enter the excavation for safety reasons, the alternative method for removal must have prior approval by USFWS. Tortoise escape ramps will be placed inside the excavation or trench so as to not entrap tortoises. All excavations will be inspected for tortoises before filling.

16. Any construction pipe, culvert, or similar structure with a diameter greater than 3 inches left above ground on the construction site for one or more nights will be inspected for tortoises before the material is moved, buried, or capped. As an alternative, all structures may be capped before being stored on the construction site.

17. Permanent tortoise-proof fencing will be installed around the perimeters of the Southern Terminal and approved ground electrode site to prevent tortoises from wandering onto the Project site where they will be in harm's way. Any gates or gaps in the fence will be constructed and operated so as to prevent tortoise entry (e.g., "tortoise guards and/or keeping gates closed). Tortoise fencing will be inspected on a daily basis during ground disturbing activities to ensure that there are no breaches in the fencing material. Fence specifications will be consistent with those approved by the USFWS (USFWS 2009). Permanent tortoise-proof fencing along the Project area will be appropriately constructed, monitored, and maintained. Fencing will be inspected in accordance with Table SSWS-4.1 unless modified by the USFWS. Monitoring and maintenance will be conducted by TransWest staff or contractors and will include removal of trash and sediment accumulation and restoration of zero ground clearance between the ground and the bottom of the fence, including re-covering the bent portion of the fence if not buried. Maintenance activities will occur regularly for the life of the Project and will be carried out concurrently and in conjunction with fence inspections. Fence monitoring and maintenance activities will be documented as they occur and this documentation will be provided to the BLM on a quarterly basis.

Table SSWS-4.1 Desert tortoise fence inspection requirements

Condition	Minimum Requirements
First week following fence installation; tortoises active	Inspect fence perimeter, tortoise guards, and gates twice per day, timed to occur when tortoises may be pacing the fenceline.
First week following fence installation; tortoises inactive	Inspect fence perimeter, tortoise guards, and gates once per day.
Beginning the second week following fence construction, tortoises active	Inspect fence perimeter, tortoise guards, and gates once per day.
Beginning the second week following fence construction, tortoises inactive	Inspect fence perimeter, tortoise guards, and gates once per month.
Following major storm event, tortoises active	Inspect fence perimeter, tortoise guards, and gates within 48 hours.
Following major storm event, tortoises inactive	Inspect fence perimeter, tortoise guards, and gates within 72 hours.
Breach in fence observed, tortoise guard or gate requires maintenance, tortoises active	Repair within 48 hours of breach occurrence.
Breach in fence observed, tortoise guard or gate requires maintenance, tortoises inactive	Repair within 1 week of breach occurrence.

18. Water applied for dust control will not be allowed to pool outside of desert tortoise fenced areas, as this can attract desert tortoises. Leaks from water trucks or water tanks will be promptly repaired to prevent pooling water. During the desert tortoise active season, an authorized biologist or desert tortoise monitor will be assigned to patrol each area being watered. This individual will patrol the area immediately after the water is applied and at approximate 60-minute intervals until the ground is no longer wet enough to attract tortoises. No dust palliatives (e.g., calcium or magnesium chlorides, dust oils, plant or animal extracts, enzymes, synthetic polymers, etc.) other than water are approved for use in desert tortoise habitat.
19. In construction areas where re-contouring is not required, vegetation will be left in place wherever possible and original contours will be maintained to avoid excessive root damage and allow for re-sprouting.
20. If blasting is necessary, a 200-foot radius area around the blasting site will be surveyed and all desert tortoises located aboveground within this 200-foot radius of the blasting site will be moved 500 feet from the blasting site, placed in an unoccupied burrow, and temporarily penned to prevent tortoises that have been temporarily relocated from returning to the site. Tortoises in burrows will be left in their burrows. All burrows, regardless of occupied status, will be stuffed with newspapers, flagged, and location recorded using a GPS unit. Immediately after blasting, newspaper and

flagging will be removed. If a burrow or cover site that could be occupied has collapsed, it will be excavated to ensure that no tortoises have been buried and are in danger of suffocation.

21. Constructed road berms will be less than 12 inches in height and have slopes of less than 30 degrees. Where road berms consist primarily of rocks, gaps will be opened to allow for tortoise passage.

22. To prevent mortality, injury, and harassment of desert tortoises and damage to their burrows and cover sites, no pets will be permitted in any Project construction area.

23. To limit the potential for predation of desert tortoise by corvids and raptors, TransWest will construct self-supporting tubular/monopole towers with perch discouragers throughout USFWS-designated critical habitat and in all tortoise habitat (USGS model rating of 0.6 or higher) where the Project is not co-located with existing transmission lines with steel lattice towers. Islands of non-habitat (USGS model rating of <0.6) within surrounding tortoise habitat (USGS model rating of 0.6 or higher) also will be subject to self-supporting tubular/monopole towers with perch discouragers.

24. To limit the potential for predation of desert tortoise by corvids, TransWest will follow the BLM Southern Nevada District's Raven Management Plan (or a similar plan as coordinated among TransWest, BLM, and USFWS) that outlines active adaptive management strategies for controlling raven predation and nesting within the Project ROW, including post-construction monitoring for ravens and removal of raven nests, consistent with the restrictions implemented by the Migratory Bird Treaty Act. If evidence of raven nesting is observed in the ROW, the USFWS will be notified within three calendar days.

25. To limit the potential for predation of desert tortoise by corvids, coyotes, feral dogs, and other opportunistic predators, TransWest will require all construction waste to be contained and removed from the Project area in a manner that does not attract corvids to the Project area (as per the BLM Southern Nevada District's Raven Management Plan). All trash and food items will be placed in raven-proof containers and removed daily.

26. The use of herbicides within USFWS-designated critical habitat, ACECs, and general desert tortoise habitat (USGS model rating of 0.6 or higher) will be prohibited without prior approval from the USFWS, BLM, and applicable state wildlife agency.

27. TransWest will coordinate with the BLM to ensure that appropriate measures are implemented to minimize public access and use of the transmission line ROW following completion of the Project. Such measures may include signs and substantial physical barriers, and rehabilitation actions that will make the ROW impassible to vehicles.

28. To compensate for desert tortoise habitat affected during construction, TransWest will offset these effects through either an acceptable land acquisition or an assessed financial contribution, based on the final construction footprint. The BLM requires Section 7 desert tortoise mitigation fees for all acres of new disturbance (permanent and temporary). As of March 1, 2015, the current rate is $834 per acre for tortoise habitat and is subject to a multiplier ranging from 1 to 6 in critical habitat. The multiplier(s) used for TWE will be determined by USFWS based on habitat quality, timing and duration of impacts, existing and adjacent levels of disturbance, and other factors. This rate will increase on March 1, 2015.

29. Upon completion of construction, a thorough inspection of the site will be conducted by the FCR(s) and authorized biologists to determine the extent of compliance with the conditions of USFWS's BO, including agreements between TransWest and the agencies. Annual and comprehensive final Project reports will be submitted to BLM and the USFWS Southern Nevada Fish and Wildlife Office in Las Vegas. Project reports will document the numbers and locations of desert tortoises encountered, all instances of tortoise take resulting from harassment, harm, injury, or mortality, their disposition, effectiveness of protective measures, practicality of protective measures, recommendations for future measures that allow for better protection or more workable implementation, and the number of acres disturbed. Annual reports will cover the calendar year and are due April 1 of the following year (e.g., the annual report for calendar year 2014 is due April 1,

2015). Final Project reports are due within 60 days following completion of the Project or each phase of the Project.

30. All vehicles and equipment that are not in areas enclosed by desert tortoise exclusion fencing will stop activities in desert tortoise habitat during rainfall events in the more-active season (generally March 1 to October 31), and if temperatures are above 60°F but below 95°F for more than 7 consecutive days. The FCR or designee will determine, in coordination with the BLM and USFWS, when it is appropriate for Project activities to continue.

31. Any deaths and injuries of desert tortoises will be investigated as thoroughly as possible to determine the cause. The wildlife staff of the USFWS Las Vegas FO (702-515-5230), BLM Las Vegas FO (702-515-5000), BLM Caliente FO (775-726-8100) and Nevada Department of Wildlife Las Vegas Office (702-486-5127) must be verbally informed of desert tortoise injuries or death immediately and within 5 business days in writing (electronic mail is sufficient). The FCR or other authorized desert tortoise biologist will complete a Desert Tortoise Handling and Take Report.

TransWest will undertake the following measures to minimize potential Project effects on desert tortoises during operation and maintenance activities:

32. TransWest will submit a list of planned maintenance activities by name, category, location, and approximate start date to the BLM Las Vegas and Caliente FOs. TransWest also will forward the list of activities to the USFWS and state agencies. The agencies will have 30 days following receipt of the report to consider the proposed action. In the event of a rejection, TransWest will work with the agencies to resolve issues. Agency approval of the proposed list of projects is valid for one year after agency acceptance.

33. The following measures will apply to normal maintenance activities that do not result in new disturbance.

    a. All TransWest employees and its contractors involved with transmission line ROW inspection and maintenance activities will be required to take a tortoise education program described previously (Measure 2).

    b. If desert tortoises or their burrows occur in the work area, TransWest will implement appropriate measures described previously.

    c. Upon completion of each maintenance activity in the ROW, all used material and equipment will be removed from the site. This condition does not apply to fenced sites.

    d. Routine road surface maintenance activities on existing access and/or patrol roads will be conducted during the inactive season of the desert tortoise, unless accompanied by an authorized biologist. Localized repair of major damage may take place throughout the year.

34. All mitigation measures stipulated for construction activities during the construction phase for the desert tortoise inactive season will be applicable to operation and maintenance activities that result in surface disturbance during the inactive season.

35. All mitigation measures stipulated for construction activities during the construction phase for the desert tortoise active season will be applicable to operation and maintenance activities that result in surface disturbance during the active season.

36. All maintenance activities in critical tortoise habitat that use heavy equipment (whether there is surface disturbance or not) will require an authorized desert tortoise biologist to be on-site during the active season and on-call during the inactive season.

37. The following measures will apply to maintenance activities that may extend outside the transmission line ROW corridors.

    a. In addition to measures (b) and (c), TransWest will implement appropriate measures for operations and maintenance activities described for construction-phase activities (Measures 1-31, above);

b. For maintenance activities that result in surface disturbance during the active season of the desert tortoise: the width of the activity corridor will be determined prior to the onset of ground-disturbing activities. Work areas will be restricted to the narrowest possible corridors and generally will not be expected to extend beyond the Project ROW; and

c. TransWest will contact the BLM if activities may extend outside of the transmission line ROW in all or in part; re-initiation of section 7 consultation may be required for activities that extend beyond the ROW.

38. Emergency repairs: for emergency situations during the operation and maintenance phase of the Project, TransWest will notify the appropriate local BLM field office (Las Vegas Field Office and/or Caliente Field Office) and the USFWS Southern Nevada Field Office within 48 hours. As a part of this emergency response, the BLM and USFWS may require specific measures to protect desert tortoises. During cleanup and repair, the agencies also may require measures to recover damaged habitats.

Greater Sage-grouse

SSWS-5*:* To avoid or minimize Project-related impacts to greater sage-grouse and its habitat, the BLM and Western have coordinated with applicable federal and state land and wildlife management agencies and other stakeholders to develop a suite of mitigation measures for this species. In addition, TransWest has developed a Habitat Equivalency Analysis (HEA) to quantitatively determine an appropriate level of compensatory mitigation that will be implemented to offset unavoidable impacts to sage-grouse habitat. Applicant-committed measures proposed as part of the HEA process are further discussed in Section 3.8.6.3. The BLM and Western support the implementation of the TransWest's HEA process and compensatory mitigation measures in conjunction with the following impact avoidance and minimization measures developed through the NEPA process.

General Measures: To reduce impacts to greater sage-grouse from construction and operation of the proposed Project, TransWest, in consultation with the BLM, Western, and applicable federal and state land and wildlife management agencies, will be required to implement the following general design features:

1. Placement of Project structures and access roads will maximize use of topographic features to visually screen Project facilities from high quality greater sage-grouse habitat (i.e., Wyoming – within sage-grouse core habitat and within 4 miles of active leks; Colorado – within preliminary priority habitat; Utah – within occupied habitat and within 4 miles of active leks.

2. To minimize fragmentation of suitable sage-grouse breeding, brood-rearing, and wintering habitats, the approved transmission line ROW will use existing roads, create no new permanent roads, be accessed via drive and crush wherever possible, and be micro-sited in coordination with applicable state and federal wildlife management.

3. To limit corvid predation on greater sage-grouse, TransWest will develop a Raven Management Plan that outlines active adaptive management strategies for controlling raven predation and nesting within the Project ROW and includes post–construction monitoring for ravens and removal of raven nests.

4. To limit disturbance to lekking and nesting activity, disruptive construction and maintenance activities within 4 miles of occupied/active leks will be prohibited between March 1 and June 30. Activities determined to be non-disruptive by the BLM, Western, and applicable federal and state land and wildlife management agencies will be permitted between March 1 and June 30.

5. To limit the potential for adverse impacts resulting from contact with construction equipment, vehicles, and personnel, TransWest will implement a vehicle speed limit of 15 mph on roads without posted speed limits in areas of occupied sage-grouse habitat.

6. Under Applicant Committed Design Feature TWE-26, TransWest has committed to developing a Noxious Weed Management Plan in accordance with existing BLM Pesticide Use Plan requirements. Control of noxious weeds will minimize the potential for weed-related degradation of

occupied sage-grouse habitat. Prior to the use of chemical weed control agents, herbicide applications will be reviewed by agency wildlife biologists to ensure consistency with state and local greater sage-grouse conservation goals.

***Site Specific Measures**:* In addition to requiring implementation of the general mitigation measures discussed above, the BLM and Western will consider requiring additional impact avoidance and minimization measures on a site-specific basis in areas of greater sage-grouse habitat located within areas that meet all of the following state-specific criteria:

- Areas within 4 miles of active leks and within Wyoming Core Areas designated under EO 2011-05;
- Areas within 4 miles of active leks and within areas of PPH in Colorado; and
- Areas within 4 miles of active leks and within areas of designated brood-rearing habitats and winter concentration areas in Utah.

Identification of additional greater sage-grouse mitigation measures to be implemented in local areas will be completed prior to finalization of the POD in coordination with TransWest, BLM, Western, and local interdisciplinary teams comprised of applicable federal and state land and wildlife management agency staff. Criteria for determining site-specific measures could include, but will not be limited to: existing vegetation communities, existing fragmentation, proximity to active leks, visibility of the proposed transmission line and towers from active lek locations, presence of noxious and invasive weed species, topography, proximity to USFWS PACs, proximity to designated winter concentration areas, proximity to nesting habitat, proximity to brood rearing habitat, proximity to available water sources, proximity to other anthropogenic sources of disturbance, and co-location with existing transmission infrastructure.

Additional measures identified by the BLM and Western for consideration on a site-specific basis in coordination with appropriate federal and state agencies will include:

1. Installation of alternative structure types consisting of self-supporting tubular steel monopole structures to reduce the potential for perching and nest construction by avian predators of greater sage-grouse.
2. Installation of perch deterrents on transmission structures to reduce the potential for perching by avian predators of greater sage-grouse.
3. In areas determined to be unsuitable for the installation of self-supporting tubular steel monopoles, TransWest may be required to install agency-approved guy wire marking devices on all transmission tower guy lines to increase the visibility of each wire and reduce the risk of collision by flying greater sage-grouse.
4. Outfit all newly constructed fencing with agency–approved bird diverters/wire markers.

Western Yellow-billed Cuckoo

SSWS-6: To avoid or minimize impacts to the western yellow–billed cuckoo and its habitat, including proposed critical habitat, TransWest will coordinate with the USFWS, applicable state and federal land management agencies and private landowners (as appropriate) to implement the following conservation measures during construction, operations and maintenance:

1. Prior to final engineering and design of the transmission line and initiation of construction activities (e.g., geotechnical borings), TransWest will conduct a habitat assessment, including field verification, to delineate all areas of suitable western yellow-billed cuckoo habitat within 0.5 mile of the proposed edge of Project disturbance. Results of the habitat assessment will be provided to the lead and local USFWS Ecological Services Field Offices for review.

2. TransWest will avoid all vegetation clearing and/or other surface-disturbing activities within 0.5 mile of field-verified suitable habitat and proposed critical habitat.
3. Where field-verified suitable habitat and proposed critical habitat for western yellow-billed cuckoo cannot practicably be avoided by 0.5 mile, TransWest will implement the following measures:
    a. TransWest will avoid all vegetation clearing, broadcast herbicide spraying, and/or other surface-disturbing activities within 0.5 mile of field-verified suitable habitat and proposed critical habitat during western yellow-billed cuckoo breeding season (June 1 to August 31).
    b. For existing access roads within field-verified suitable habitat and proposed critical habitat for western yellow-billed cuckoo, TransWest will avoid upgrades that will require clearing and pruning riparian vegetation.
    c. TransWest will design and locate tower structures within proposed critical habitat and field-verified suitable habitat for the western yellow-billed cuckoo to minimize the need to clear or prune riparian vegetation.
    d. Should riparian vegetation management be required within proposed critical habitat and field-verified suitable habitat for the western yellow-billed cuckoo, TransWest will:
        i. submit a preliminary vegetation management proposal to the USFWS that outlines the location, methods, and extent of the proposed activity;
        ii. conduct a pre-construction site visit with the USFWS and applicable state and federal land management agencies and private landowners (as appropriate) to evaluate the proposal and determine additional site-specific approaches to protect riparian function and nesting habitat; and
        iii. submit a final vegetation management proposal to USFWS that outlines the location, methods, and extent of the proposed activity and any site-specific approaches or modifications determined at the site visit to demonstrate that the effects are not more than insignificant or discountable.
4. When construction activities cannot be avoided within 0.5 mile of field-verified suitable habitat and proposed critical habitat for western yellow-billed cuckoo during the breeding season (June 1 to August 31), TransWest will conduct protocol breeding-season surveys prior to any disturbance unless species occupancy and distribution information is complete, available, and supports a conclusion that the species is not present; or unless otherwise agreed to by the USFWS and BLM in response to mitigating factors such as existing disturbance, screening, or site-specific habitat conditions. All surveys must be conducted by surveyors operating under a recovery permit.
5. If protocol surveys document presence of western yellow-billed cuckoo, construction will not be permitted within 0.5 miles of occupied habitat during the breeding season (June 1 to August 31). If protocol surveys do not document presence of western yellow-billed cuckoo, construction will be allowed to proceed as scheduled.TransWest may perform noxious weed control efforts in the form of spot treatments and hand-cutting of weeds in conformance with herbicide label requirements and other applicable conservation measures set forth herein.
6. Within field-verified suitable habitat and proposed critical habitat for western yellow-billed cuckoo, reclamation and reseeding practices and development of seed mixes will be determined in coordination with the land management agency and USFWS.

Utah Prairie Dog

SSWS-7: To avoid or minimize impacts to the Utah prairie dog, TransWest will implement the following measures:

1. Pre-construction surveys during the active season, will be conducted according to approved methods, at a minimum of 2 weeks prior to surface disturbance within suitable habitat (as

determined during 2013 and 2014 surveys), unless species occupancy and distribution information is complete, current, and available through coordination with local agencies (BLM, UDWR, and USFWS). Surveys will be conducted by USFWS-certified Utah prairie dog surveyors. In the event species occurrence is verified, consultation with USFWS will be re-initiated and TransWest may be required to modify operational plans, at the discretion of the authorized officer, to include additional appropriate protection measures for the minimization of impacts on the Utah prairie dog and its habitat.

2. All Project employees will be informed of the occurrence of the Utah prairie dog in the general area, and of the threatened status of the species. They will be informed of activities that constitute "take," and the potential penalties (up to $200,000 in fines and 1 year in prison) for taking Utah prairie dogs, which are listed under ESA.
3. Project-related vehicle maintenance activities will be conducted in maintenance facilities. Should it become necessary to perform vehicle or equipment maintenance on-site, these activities will avoid identified Utah prairie dog colonies, or will be conducted outside of a 350-foot buffer surrounding the colonies. Precautions will be taken to ensure contamination of maintenance sites by fuels, motor oils, grease, etc., does not occur, and such materials are contained and properly disposed of off-site. Inadvertent spills of petroleum based, or other toxic materials will be cleaned up and removed immediately.
4. Construction equipment and materials extending beyond one breeding season (i.e., laydown yards) will not be staged within 0.5 mile of an occupied Utah prairie dog colony. Temporary laydown yards (that do not extend beyond more than one breeding season) may be approved within 350 feet of identified Utah prairie dog colonies; however, to ensure Utah prairie dogs do not move into these areas additional conservation measures such as silt fencing and barriers will be applied.
5. Reclamation and restoration efforts in suitable Utah prairie dog habitat will be conducted in accordance with the Vegetation Composition Guidelines for Utah Prairie Dog Habitat using native seed, unless otherwise specified in coordination with the USFWS and BLM.
6. Project personnel will not be permitted to have firearms (except for law enforcement) or pets in their possession while on the Project site within Utah prairie dog habitat.
7. If a dead or injured Utah prairie dog is located, initial notification will be made to the USFWS Division of Law Enforcement, Utah FO at (801) 975-3330, to the Southern Region UDWR at (435) 865-6100, and to the BLM Authorized Officer at (435) 865-3000. Instruction for proper handling and disposition of such specimens will be issued by the Division of Law Enforcement. Care will be taken in handling sick or injured animals to ensure effective treatment, and care and in handling dead specimens to preserve biological material in the best possible state.
8. To limit the potential for adverse impacts resulting from contact with construction equipment, vehicles, and personnel, TransWest will implement a Project vehicle speed limit of 15 miles per hour (mph) on new Project access roads or roads without an established, posted speed limit within areas of suitable habitat identified by the USFWS, BLM, and UDWR.

Southwestern Willow Flycatcher

SSWS-8: To avoid or minimize impacts to the southwestern willow flycatcher, TransWest will coordinate with the USFWS, applicable state and federal land management agencies and private landowners (as appropriate) to implement the following conservation measures during construction, operations and maintenance:

1. Prior to final engineering and design of the transmission line and initiation of construction activities (e.g., geotechnical borings), TransWest will conduct a habitat assessment, including field verification, to delineate suitable southwestern willow flycatcher habitat within 0.5 mile of the proposed edge of Project disturbance. Results of the habitat assessment will be provided to the lead and local USFWS Ecological Services Field Offices for review.

2. TransWest will avoid all vegetation clearing, broadcast herbicide spraying, and/or other surface disturbing activities within 0.5 mile of field-verified suitable habitat for southwestern willow flycatcher.
3. If field-verified suitable southwestern willow flycatcher habitat cannot be avoided by 0.5 mile, prior to implementation of vegetation clearing or ground-disturbing activities, southwestern willow flycatcher protocol surveys will be conducted within suitable habitat that falls within 0.25 mile of the Project disturbance footprint.
4. Ground disturbing activities will be avoided within 0.25 mile of known occupied southwestern willow flycatcher habitat. If occupied southwestern willow flycatcher habitat cannot be avoided by 0.25 mile, TransWest will conduct protocol surveys to determine current year activity. If southwestern willow flycatchers are determined to be present, ground-disturbing activities will not occur between May 1 and August 15 (the southwestern willow flycatcher breeding period).
5. Any ground disturbing activities in occupied southwestern willow flycatcher habitat will be monitored to ensure that adverse impacts to southwestern willow flycatcher and the occupied habitat are avoided or minimized.
6. Within field-verified suitable southwestern willow flycatcher habitat, reclamation and reseeding practices and development of seed mixes will be determined in coordination with the land management agency and USFWS. Native species will be preferred over non-native species for revegetation of habitat in disturbed areas.

Black-footed Ferret

SSWS-9: Prior to final engineering design, TransWest will conduct a habitat assessment and, if necessary, species-specific surveys for black-footed ferrets using a USFWS-approved survey protocol. Survey results will be used to avoid siting Project infrastructure (e.g., towers and access roads) within suitable black-footed ferret habitat (i.e., active white-tailed prairie dog colonies that are greater than 200 acres in area) the black-footed ferret analysis area.

To limit potential Project-related increases in raptor predation on black-footed ferrets and associated prey populations, TransWest will be required, subject to consultation with the BLM, USFWS, Western, and applicable state wildlife agencies, to use alternative structure types (e.g., tubular monopoles) with perch discouragers on segments of the proposed Project located within the black-footed ferret analysis area.

Federally Listed Fish

SSS-2 (Avoidance of Water Withdrawal and Entrainment/Impingement Effects for Federally Listed Fish Species): Where critical habitat for the Colorado River federally endangered fish species cannot be avoided as water sources for construction purposes, TransWest will be required to obtain approval from the USFWS and state or federal agencies responsible for managing the land and critical habitat areas. Agency approval will ensure that water withdrawal methods will avoid or minimize entrainment or impingement effects to early life stages of endangered fish species. Requirements for water pumping in critical habitat areas will include: 1) avoidance of pumping between approximately April 1 through August 31, with specific dates dependent upon the water year; 2) intake hoses will be screened with 3/32-inch mesh size; 3) intake velocity will not exceed 0.33 feet/second in an area where larval stages of the federally endangered fish may be present; and 4) pumping from off-channel locations (i.e., no connection to the river during high spring flows) will use an infiltration gallery constructed in a USFWS-approved location. Additional guidance on pumping methodology is provided in the NMFS's (1997) document entitled Fish Screening Criteria for Anadromous Salmonids.

SSS-4 (Avoidance of Impacts to Critical Habitat for Federally Listed Fish Species): Implementation of the following measures will avoid or minimize impacts to designated critical habitat (i.e., the 100-year

floodplain) for the Colorado pikeminnow and razorback sucker where the proposed action will cross the Yampa and Green Rivers:

1. No permanent structures or new roads will be constructed in critical habitat for the Colorado pikeminnow and razorback sucker along the Green River.
2. Any temporary disturbance to soils within the 100-year floodplain of the Yampa and Green Rivers during construction, including temporary river crossings by vehicles, will be minimized to the extent possible and disturbed areas will be promptly stabilized and reclaimed to minimize the potential for erosion.
3. TransWest will avoid siting temporary facilities such as staging areas, material stockpiles, fly yards, and wire pulling and tensioning sites in designated critical habitat.
4. No construction equipment will operate in or cross the actively flowing channel of the Yampa and Green Rivers.
5. Where the transmission line crosses designated critical habitat, it will be micro-sited to minimize the need for riparian vegetation disturbance (e.g., shrub and tree removal, cutting, or pruning) in the 100-year floodplain during the construction, operation, and maintenance phases of the Project. In areas where riparian vegetation disturbance is expected due to constraints in micro-siting, TWE will coordinate with the USFWS and BLM.
6. For any activities within the 100-year floodplain of the Yampa River, the following measures will apply:
    a. Construction and maintenance of Project facilities located in the floodplain of the Yampa River will take place during seasonal low flows.
    b. Ground disturbance and vegetation clearing will be located in areas that avoid or minimize impacts on the PCEs of Colorado pikeminnow critical habitat.
    c. Ground disturbance and vegetation clearing will be minimized in the Yampa River floodplain. Drive-and-crush access and construction techniques will be used to the extent feasible. In areas where drive-and-crush access and construction techniques are not feasible, the least impactful technique will be used. In areas where vegetation clearing is necessary, vegetation will be trimmed with the root balls left intact and in place wherever possible.
    d. No new permanent roads will be constructed within the 100-year floodplain. Any grading activities will be conducted in a way that avoids altering seasonal flow regimes.
    e. Soil stabilization and erosion control measures will be implemented during construction and through completion of reclamation activities. Specific erosion control measures will be developed in coordination with the USFWS and identified in the Stormwater Pollution Prevention Plan, which is a component of the POD.
7. Prior to any vegetation removal in critical habitat for the Colorado pikeminnow and razorback sucker, a preconstruction site visit will be attended by the BLM, USFWS, TransWest, and construction representatives to discuss implementation of measures designed to protect riparian function and critical habitat PCEs for these species.
8. Refueling and storing potentially hazardous materials will not occur within a 328-foot radius of the Yampa and Green Rivers and their perennial tributaries. Spill-prevention practices and containment measures will be incorporated into the Water Resources Protection Plan, Appendix W of the POD.

SSS-6: (Approval of Water Use from June Sucker Habitat Areas): Any potential water use from Utah Lake, Provo River, and the Spanish Fork River that will represent a new depletion must be approved by UDWR and the Utah State Engineer, Utah Division of Water Rights.

SSS-13: (Herbicide Use in Vicinity of Endangered Colorado River Fishes Habitat): No aerial or broadcast herbicide treatments will be applied for vegetation management within 2,500 feet of bonytail, Colorado pikeminnow, humpback chub, or razorback sucker designated critical habitat. For noxious weed control within 2,500 feet of listed Colorado River fishes' designated critical habitat, the following restrictions apply:

1. Herbicides will not be applied over surface water.
2. Only agency-approved herbicides registered for use near water will be used within 328 feet of surface water or in areas with a high leaching potential.
3. For spot treatments, minimum herbicide spray distances (buffers) from live water are as follows:
    a. Backpack spraying operations – 20 feet.
    b. Other mechanized applications (e.g., truck or all-terrain vehicle mounted equipment) – 50 feet.

Ute Ladies'-tresses Orchid

SS-2: To avoid or minimize impacts to the Ute ladies'-tresses orchid and its habitat, including proposed critical habitat, TransWest will coordinate with the USFWS, applicable state and federal land management agencies and private landowners (as appropriate) to implement the following conservation measures during construction, operations and maintenance:

1. Field habitat assessments will be conducted to identify areas of potentially suitable Ute ladies tresses habitat in the Project area where surveys will be conducted. Field habitat assessments:
    a. Must be conducted by qualified individual(s) approved by the BLM and USFWS.
    b. Will occur during the growing season.
    c. Will occur within 300 feet of any planned disturbance or areas likely to experience hydrology changes resulting from Project activities.
    d. Will identify habitat meeting the criteria described in 1992 Interim Survey Requirements for Ute ladies'-tresses Orchid (USFWS 1992) and Rangewide Status Review of Ute Ladies'-Tresses (Spiranthes diluvialis) (Fertig et. al 2005).
    e. Will exclude habitats meeting the indicators of non-habitat listed in Attachment C.
2. Surveys to determine Ute ladies'-tresses habitat occupancy will be conducted in suitable habitat. The following requirements for inventories apply:
    a. Must be conducted by qualified individual(s) and according to 1992 Interim Survey Requirements for Ute ladies'-tresses Orchid (FWS 1992).
    b. Will not occur in areas where existing roads will be used without improvement.
    c. Will be conducted at a time when the plant can be detected and during appropriate flowering periods.
    d. Will be conducted for at least 1 year prior to any temporary disturbance in suitable habitat (e.g., overland travel to access geotechnical boring location). Two additional years of surveys will be conducted after the temporary disturbance for a total of 3 years of surveys.
    e. Three consecutive years of surveys will be required prior to any permanent disturbance (e.g., road widening, new road construction, placement of other infrastructure).
3. For any activities associated with the geotechnical investigation the following requirements apply:
    a. All work within 300 feet of occupied Ute ladies' tresses habitat will be moved or abandoned.

b. All work within 300 feet of suitable habitat will be monitored by a biological monitor to ensure compliance with all applicable conservation measures.

c. Existing access roads within 300 feet of suitable Ute ladies'-tresses habitat may be used, but not improved.

4. Design Project infrastructure to minimize direct or indirect impacts on suitable habitat both in and downstream of the Project area:

    a. Alteration and disturbance of hydrology will not be permitted.

    b. Disturbance footprint size shall be reduced to the minimum needed, without compromising safety.

    c. New access routes for the Project shall be limited.

    d. Roads and utilities shall share common right-of-ways where possible.

    e. Rights-of-way widths shall be reduced and the depth of excavation needed for the road bed shall be minimized.

    f. Construction and right-of-way management measures shall avoid soil compaction that will impact Ute ladies' tresses habitat.

    g. Offsite impacts or indirect impacts shall be avoided or minimized (i.e., install berms or catchment ditches to prevent spilled materials from reaching occupied or suitable habitat through either surface or groundwater).

    h. Signage shall be placed to limit off-road travel in sensitive areas.

    i. Vehicles and equipment shall be made to stay on designated routes and other cleared/approved areas.

    j. All disturbed areas will be revegetated with species approved by USFWS and BLM botanists.

5. Project-related construction activities will avoid individual plants by a minimum of 300 feet. In proximity to occupied habitat, Project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts on populations and to individual plants:

    a. Follow recommendations for Project design in suitable habitats.

    b. Create designs that will avoid altering site hydrology and concentrating water flows or sediments into occupied habitat.

    c. Minimize the disturbed area through interim and final reclamation. Reclaim disturbance following construction to the smallest area possible.

6. In proximity to occupied habitat, all construction activities will be overseen by a biological monitor to ensure compliance with all applicable conservation measures. The biological monitor will also:

    a. Make areas for avoidance visually identifiable in the field (e.g., flagging, temporary fencing, rebar, etc.) before and during construction.

    b. Provide the USFWS and BLM with a post-construction report of compliance, impacts, and extent of impacts on Ute ladies'-tresses no later than 4 months upon Project completion.

7. The following restrictions apply to herbicide use in suitable or occupied Ute ladies'-tresses habitat:

    a. No aerial or broadcast herbicide treatments will be applied for vegetation management within 2,500 feet of suitable or occupied Ute ladies'-tresses habitat.

    b. For noxious weed control within 2,500 feet of suitable or occupied Ute ladies'-tresses habitat, manual spot treatments (i.e. backpack sprayers) shall be used.

c. All those involved in the herbicide application shall be accompanied by a qualified botanist/ecologist familiar with Ute ladies'-tresses to help herbicide applicators identify Ute ladies'-tresses and avoid impacts on individual plants.

d. Treatments will not be done when wind speeds exceed 6 miles per hour.

e. Drift reducing agents shall be used when practical.

f. A reduced application rate will be used.

g. Pump pressure will be reduced, per label instructions.

h. Droplet size will be increased to the largest size possible while still effectively covering the target vegetation. This could be accomplished using larger nozzles or reduced pressure.

i. Herbicides shall be stored in spill proof containers away from special status plant habitats.

8. Notify the USFWS immediately if any Ute Ladies' tresses are located during surveys or monitoring. In the event that Ute Ladies tresses are located, additional discussions between the BLM and USFWS will be conducted to review site plans and ensure that the appropriate avoidance measures are implemented.

Deseret Milkvetch

SS-7: Due to the known locations of Deseret milkvetch within the agency-preferred route and access roads, complete avoidance of impacts to Deseret milkvetch plants through modification of engineering design and access routes does not appear to be feasible. TransWest Express will commit to the following conservation measures to avoid and minimize impacts to Deseret milkvetch to the extent feasible and compensate for impacts where direct loss or damage to Deseret milkvetch plants cannot be avoided as identified below. The following Project-related conservation measures will minimize effects to Deseret milkvetch from Project-related activities identified in Section 2.3 of the BA. TransWest will coordinate with the USFWS, applicable state and federal land management agencies and private landowners (as appropriate) to implement appropriate conservation measures during construction and operation. These measures will include but not be limited to the following:

1. A field habitat assessment will be conducted prior to any Project-related vegetation clearing or ground-disturbing activities to determine whether suitable habitat is present within 300 feet (400 feet if Project activities are located upslope of habitat) of the proposed edge of disturbance where the Project traverses the Desert milkvetch consultation boundary. If the Project can avoid all field-verified suitable habitat and associated 300-foot buffer (400 feet if upslope), no species-specific surveys are necessary.

2. If avoidance of field-verified suitable habitat and surrounding 300-foot buffer (400-foot if Project is located upslope of habitat) is not possible, Deseret milkvetch surveys will be conducted within portions of the Project disturbance footprint that fall within 300 feet (400 feet if upslope) of field-verified suitable habitat to determine occupancy prior to implementation of vegetation clearing or ground-disturbing activities.

3. If species-specific surveys are necessary, they will be performed by qualified individual(s) and according to USFWS-accepted survey protocols. Surveys will be conducted during the flowering and/or fruiting period when the plant can be detected and correctly identified. Surveys will be valid for one calendar year.

4. Following completion of the species-specific surveys, a final report and data will be provided to BLM, USFS, and USFWS for additional coordination with TransWest to inform Project engineering and design and to discuss the application and implementation of site-specific avoidance and minimization measures.

5. To the extent feasible based on inter-agency coordination, no new development or permanent ground disturbance, including but not limited to roads, poles, pads, towers, etc., will occur within a

300-foot buffer of occupied Deseret milkvetch habitat. If construction activities occur upslope of suitable or occupied habitat, the buffer may be increased to 400 feet to prevent additional erosion within the habitat.

6. Wire will be strung between towers aerially with no ground disturbance (e.g., no pulling and tensioning sites) in field-verified suitable habitat or within 300 feet of occupied Deseret milkvetch habitat.

7. To the extent feasible based on inter-agency coordination, no new roads will be established within a 300-foot buffer of field-verified suitable or occupied Deseret milkvetch habitat. If construction activities are to occur upslope of suitable or occupied habitat, the buffer may be increased to 400 feet to prevent additional erosion within the habitat. Adjustments will be considered in coordination with USFWS.

8. Blind Canyon Road, the existing access road to the north of Birdseye, contains plants alongside the road and within 300 feet of the road edge. This road will not be used unless TransWest can demonstrate that the road will be used in its existing condition, without upgrades that increase the footprint of the road. If Blind Canyon road will be used, the Project commits to the following conservation measures:

    a. Road widening will not occur with 300 feet of Deseret milkvetch plants or known occurrences

    b. Road realignment will not occur within 300-feet of Deseret milkvetch plants or known occurrences. The one exception is the USFWS-recommended realignment of the existing road to avoid use of one hairpin turn as identified by the USFWS. This recommended realignment will reduce future road use within Deseret milkvetch occupied habitat.

    c. All construction vehicles will be power-washed to remove weed seed before entering the road to avoid or minimize weed introduction into Deseret milkvetch habitat.

    d. This road will not be used during the flowering period of Deseret milkvetch, between May 1 and June 30 to minimize the impact of dust on pollination and reproduction.

    e. This road may be used during the active growing season, outside the flowering period: March 1 - April 30 and July 1 - August 31. During these time periods, dust abatement will be employed during all phases of construction, maintenance, and operation. Only water (no chemicals, reclaimed production water, or oil field brine) will be used for dust abatement measures).

    f. Vehicle speeds on this road will be restricted to no more than 15 miles per hour in order to reduce fugitive dust during the time of the year when Deseret milkvetch plants are most vulnerable to dust-related impacts (March through August).

    g. Prior to use of this road, project managers will inform construction crews, weed crews and new staff of the conservation measures for the species and provide them with maps that depict Deseret milkvetch habitat.

    h. Weed control monitoring along Blind Canyon Road will be performed within 50-feet of the road for 2 consecutive years following completion of construction. Weeds will be treated using manual methods (i.e. hand-pulled, removed with tools such as shovels or pulaskis) and removed from the area. For weeds where manual methods are not an effective treatment method, see conservation measure m, below.

9. Existing access roads that avoid occupied habitat will be utilized to the extent practicable to limit additional fragmentation from new road development within the species' habitat. To the extent feasible, the same measures identified in conservation measure SS-7.8, above, will be applied to other existing access roads near the known population of Deseret milkvetch, if plants are found within 300 feet of those roads. If plants are found within 300 feet of those roads, the Project

TransWest will document the extent of Project compliance with conservation measure SS-7.8 in a post-construction compliance report to USFWS (see measure SS-7.10f, below).

10. If Deseret milkvetch plants are determined to be present within 300 feet of the proposed surface disturbance and the Project cannot maintain the 300 foot buffer, the following measures will be implemented:

    a. A qualified biologist or botanist must be on-site pre-construction to clearly mark or flag avoidance areas so they are visible during construction. The same qualified personnel will be present during construction and installation of erosion control measures, if appropriate. The same qualified personnel will be present during construction to monitor avoidance of these areas and document impacts.

    b. Proposed activities will be designed to have the least impact on Deseret milkvetch habitat by incorporating design features that reduce surface impact:

        i. Reduce size of surface disturbance to the minimum amount needed for construction while maintaining a safe working environment (e.g., site transmission structures in unsuitable habitat to the extent possible);

        ii. No stockpiling of materials in occupied or suitable habitat;

        iii. Remove all construction material after construction is complete;

        iv. Avoid clearing of low stature vegetation around work areas and limit disturbance to the native vegetation community to the extent that is practicable and will provide a safe working environment;

        v. Minimize disturbance needed for new access roads and use drive and crush methods to the extent feasible. Use mechanical clearing only for larger stature vegetation such as trees.

    c. If fill material is needed, fill materials will not be sourced from areas identified during pre-construction surveys as field-verified suitable or occupied Deseret milkvetch habitat. If fill material is brought in to the construction site, it will be free of waste, pollutants, and noxious weeds/seeds.

    d. Where the Project cannot avoid direct loss or damage of Deseret milkvetch plants, the Project will commit to the following seed transplant minimization measure: Seeds will be collected (as per Center for Plant Conservation Guidelines) from all plants anticipated to be directly impacted prior to construction by a qualified botanist and provided to a permitted institution to propagate individual plants. The institution will propagate the species to collect a minimum of 100 seeds per lost individual plant. Intact seeds will be transplanted into high-quality suitable habitat or occupied habitat in coordination with USFWS.

    e. Monitoring will be performed to evaluate plant survival after construction that will include plants within 300 feet of new surface disturbance, control sites, and any transplant sites that are necessary. The monitoring plan will be coordinated with USFWS and will be performed for a minimum of 5 years.

    f. Post-construction reports will be prepared by the botanist and submitted to the BLM at the end of construction at each site that identifies compliance with the conservation measures, the areal extent of impacts to occupied habitat, the number of plants impacted and the nature of those impacts, and locations identified on maps. These construction survey reports will be submitted to USFWS at the end of each quarter by the BLM. At the end of construction activities for all projects, a final survey and impact report will be prepared and submitted to the BLM by the botanist. Once the report is deemed complete, BLM will submit this report to USFWS. This report will identify the full extent of impacts to Deseret milkvetch during construction and will include: impacts to individual plants, an accounting of acreage impacts within occupied habitat, and locations identified on maps. NOTE: Impact

areas presented in this BA are a preliminary estimate. Final areas will be determined post-construction and submitted to USFWS to comply with the Section 7 of the ESA.

11. Following completion of construction, TransWest will provide a GIS shapefile or documentation of new and upgraded access routes to the appropriate emergency fire operations personnel with the State of Utah, the BLM, the USFS, and USFWS, as well as a notification statement that there is a federally listed plant species within the area of Birdseye, Utah. This information will be provided no later than one year post-construction of this specific transmission line segment.
12. No vegetation treatments will be performed within 300 feet of occupied Deseret milkvetch habitat.
13. Herbicide use in and adjacent to Deseret milkvetch habitat:
    a. No aerial or broadcast herbicide treatments will be applied for vegetation management within 2500 feet of suitable or occupied Deseret milkvetch habitat.
    b. For noxious weed control within 2500 feet of suitable or occupied Deseret milkvetch habitat, manual spot treatments (e.g., using backpack sprayers or mechanical controls) will be used and the following measures will be implemented:
        i. All those involved in herbicide application will be accompanied by a qualified botanist/ecologist familiar with Deseret milkvetch to help herbicide applicators identify Deseret milkvetch and avoid impacts on individual plants.
        ii. Treatments will not be done when wind speeds exceed 6 miles per hour. At lower wind speeds, drift reducing agents will be used when practicable, the application rate and/or pump pressure will be reduced per herbicide label instructions, and droplet size will be increased to the largest size possible while still effectively covering the target vegetation. This could be accomplished using larger nozzles or reduced pressure.
        iii. Herbicides will be stored in spill-proof containers away from special status plant habitats.
        iv. Short-residual herbicides such as glyphosate will be prioritized for use in occupied habitat over other equally effective herbicides for the target weed species.
        v. The following two herbicides will not be used in occupied or suitable habitat: Sulfometuron and Chlorsulfuron
14. Permanent Project disturbance within known occupied habitat (217.7 acres) will not exceed 1 percent cumulatively (21.8 acres) from the TWE Project.

Clay Phacelia

SS-8: To avoid or minimize impacts to the clay phacelia, TransWest will coordinate with the USFWS, applicable state and federal land management agencies and private landowners (as appropriate) to implement the following conservation measures during construction, operations and maintenance:

1. A field habitat assessment will be conducted prior to final engineering and design to: (a) ground-truth the U.S. Forest Service's August 2013 clay phacelia habitat model, and (b) determine whether suitable habitat is present within a 650-foot buffer surrounding modeled habitat where this area is traversed by the proposed right-of-way or where suitable habitat has potential to be affected by other Project-related disturbance including geo-technical testing sites, fly yards, access roads, etc. Results of habitat assessments will be provided to the BLM, USFS, and USFWS for review. TransWest will coordinate with the federal agencies immediately following the completion and review of habitat assessments.
2. Following the habitat assessment and agency coordination, TransWest will conduct 100 percent clearance surveys during the clay phacelia flowering season (typically late June-July) where Project-related disturbance will occur within 650 feet of field-verified suitable habitat. Surveys will be completed in accordance with USFWS-approved protocols prior to final engineering and design.

TransWest will provide survey results and coordinate with the BLM, USFS, and USFWS. If occupied clay phacelia habitat is found within 650 feet of proposed Project disturbance, TransWest will coordinate with the BLM, USFS, and USFWS to discuss final engineering and design options in relation to the survey results.

3. Project-related vegetation clearing and surface-disturbing activities will avoid all occupied clay phacelia habitat, including that found during field surveys, by 650 feet. If individual clay phacelia plants cannot be avoided by 650 feet, then TransWest will coordinate with the BLM, USFS, and USFWS to discuss site-specific characteristics of the occupied habitat in relation to Project activities and a determination will be made to re-initiate consultation as appropriate.
4. Only water (no chemicals, reclaimed production water, or other) will be used for dust abatement measures within field-verified suitable clay phacelia habitat.
5. Dust abatement will be employed during maintenance activities in field-verified suitable clay phacelia habitat over the life of the Project during the time of the year when the plant is most vulnerable to dust-related impacts (March through August).
6. No aerial or broadcast herbicide treatments will be conducted for purposes of vegetation management within 2,500 feet of occupied clay phacelia habitat. If aerial or broadcast spraying of herbicides for noxious weed control must be conducted within 2,500 feet of individual clay phacelia plants, then consultation will be reinitiated.
7. Within field-verified suitable clay phacelia habitat, reclamation and reseeding practices and development of seed mixes will be determined in coordination with the BLM, USFS, and USFWS botanists.

References

U.S. Fish and Wildlife Service (USFWS). 1992. Interim Survey Requirements for Ute Ladies'-tresses Orchid (*Spiranthes Diluvialis*). November 23, 1992. 9pp. Accessed online on October 22, 2015 at: http://www.fws.gov/mountain-prairie/endspp/protocols/UteLadiesTress1992.pdf.

Attachment E

TransWest Express Transmission Project
ESA Section 7 and NEPA Milestone Schedule

TWE Transmission Project
BA and ROD Milestone Schedule
October 26, 2015

Project Milestone	Duration[1]	Start	Finish
Prepare Biological Assessment (BA)			
AECOM revise Draft BA to reflect new agency preferred alternative	25 days	Mon 1/26/2015	Fri 2/27/2015
BLM/Western Draft BA review and USFWS courtesy review	15 days	Mon 3/2/2015	Fri 3/20/2015
AECOM prepare Final BA for submittal to USFWS	13 days	Mon 3/23/2015	Wed 4/8/2015
BLM submits Final BA to USFWS	0 days	Wed 4/8/2015	Wed 4/8/2015
USFWS Completeness Review	29 edays	Wed 4/8/2015	Thu 5/7/2015
BLM Prepares Draft Response to Completeness Review	50 days	Fri 5/8/2015	Thu 7/16/2015
USFWS Courtesy Review of Draft Response Memo	6 days	Fri 7/17/2015	Fri 7/24/2015
BLM Prepares and Submits Final Response Memo	65 days	Mon 7/27/2015	Mon 10/26/2015
USFWS Initiates Conference, Informal, and Formal Consultation and provides a draft Conference and Biological Opinion (BO) to Federal Agencies	90 edays	Mon 10/26/2015	Mon 1/25/2016
USFWS Receives Agency Comments and Issues Final Conference and BO to Federal Agencies	45 days	Mon 1/25/2016	Mon 3/10/2016
Project Milestone	**Duration**	**Start**	**Finish**
BLM Record of Decision (ROD)			
AECOM/BLM Incorporates BO into ROD	5 days	Thu 3/10/2016	Wed 3/16/2016
BLM Director or AS/LM Signs ROD and Approves for Publication	10 days	The 3/17/2016	Wed 3/30/2016
ROD NOA Published in Federal Register, ROD and Director's Protest Resolution Report Posted Online	0 days	Wed 3/30/2016	Wed 3/30/2016
30-day appeal period for ROW related decisions	30 edays	Wed 3/30/2016	Fri 4/29/2016

[1]days = work days; edays = calendar days

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
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JAN 2 0 2016

Memorandum

To: Field Supervisor, U.S. Fish and Wildlife Service, Wyoming Field Office, 5353 Yellowstone Road, Suite 308A Cheyenne, Wyoming, 82009

From: Mary Jo Rugwell Acting State Director, Bureau of Land Management, Wyoming State Office, Cheyenne, Wyoming

Subject: Second Addendum to the April 8, 2015, TransWest Express Transmission Project Biological Assessment, USFWS Log No. 06E13000-2014-F-0052

Introduction

This memorandum provides additional information for the TransWest Express Transmission Project (TWE or Project) Final Biological Assessment (BA) that was submitted to the U.S. Fish and Wildlife Service (USFWS) on April 8, 2015 and the final BA addendum memorandum (BA Memo) that was submitted to the USFWS on October 26, 2015. This memorandum has been prepared to address a minor change in the Proposed Action, disclose the amount of water expected to be used during Project operations, refine the conservation measures for the western yellow-billed cuckoo, and provide supplementary information related to the Mojave desert tortoise. The information on operations water usage is being presented in response to the USFWS's review of and comments on TransWest's November 15, 2015, Plan of Development (POD). Conservation measures for the yellow-billed cuckoo have been revised based on questions and comments received from the USFWS via email on November 25, 2015. Additional information on utilities co-located with the Project corridor and a refined effects analysis breaking down impacts to Mojave desert tortoise habitat by county and land ownership has been completed in response to the USFWS's December 10, 2015, email request for supplementary information on baseline conditions for and project-related effects to this species.

This memorandum provides reference to the sections, pages, and line numbers of the April 8, 2015, TWE BA to which changes apply. The information and verbiage inserts provided below replace and supersede related portions of the Final BA submitted on April 8, 2015 and the BA Memo submitted on October 26, 2015.

Project Description

The Southern Nevada District of the Bureau of Land Management (BLM) has changed their preferred alternative for the proposed ground electrode site in Region III (email from P. Rhinehart, BLM, to D. Fetter, AECOM; November 19, 2015). Rather than the Halfway Wash East site, the previously preferred site for this facility, the southern ground electrode facility would be located in the Halfway Wash – Virgin River site, which is immediately adjacent to and west of the former site, placing it closer to the proposed transmission line Right-of-Way (ROW).

Section 2.1, Page 2-4, Table 2.5 is therefore changed to:

Table Error! No text of specified style in document.**-1 Proposed Action Ground Electrode System Lengths and Areas of Disturbance**

Ground Electrode System Sites	Length (miles)		Construction Disturbance (acres)				Operation Disturbance (acres)			
	34.5-kV AC Overhead Line	Access Road	Ground Electrode Sites	Over-head Lines	Access Roads	Total	Ground Electrode Sites	Over-head Lines	Access Roads	Total
Bolten Ranch	15	21	65	40	46	**151**	6	<1	46	**52**
Halfway Wash – Virgin River	8	9	65	13	13	**92**	6	<1	13	**19**

Construction and operation of the Halfway Wash – Virgin River site would entail fewer total acres of disturbance than would construction and operation of the Halfway Wash East ground electrode site. Thus, construction and operation of this site would result in an incremental reduction in impacts to federally listed species known or with potential to occur in this area (e.g., Mojave desert tortoise, California condor) relative to those associated with the previously preferred site.

Colorado River Fish and Designated Critical Habitat

The TWE BA and BA Memo addressed federally listed Colorado River species and associated critical habitat that could be affected by Project-related water use during construction. These analyses neglected to account for on-going annual water use during the operations phase of the project. According to TransWest's current plan of development (TransWest, November 2015),the Southern Terminal, which is located within the Colorado River watershed, would use an estimated 1.25 acre-feet of water per year for office use and evaporative cooling and misting systems.

Water used at the Southern Terminal would be obtained from existing sources and would not represent a new depletion to the Colorado River. Moreover, the water use would be in the Lower Basin of the Colorado River for which there is no recovery plan or programmatic consultation and associated depletion fee in place for listed fish. Consequently, planned construction and operations

water use at the Southern Terminal were not evaluated as a depletion effect on listed fish in the Colorado River. Water used for operation of the Southern Terminal would have no effect on these species.

Platte River Species

Section 6.4 of the TWE BA and the BA Memo addressed federally listed Platte River species that could be affected by Project-related water use during construction. These analyses neglected to account for on-going annual water use during the operations phase of the project. According to TransWest's current plan of development (TransWest, November 2015), the Northern Terminal, which is located within the North Platte River watershed, would use an estimated 1.08 acre-feet of water per year. Consequently, the following sentences should be revised as follows:

Section 6.4.2.3, Page 6-150, Lines 34 – 37: In total, approximately 9.8 acre-feet of water would be used within the Platte River basin during Project construction. Of this amount, approximately 8.0 acre-feet would be used during construction of the transmission line and northern ground electrode site and 1.8 acre-feet would be used during construction of the Northern Terminal (substation/converter station), including dust control. During the operations phase of the Project, water use at the Northern Terminal would consist of 1.08 acre-feet per year for office use and evaporative cooling and misting systems.

Just as for construction water use, water used for operations would be obtained from existing municipal or other water sources that have already been consulted upon pursuant to the Programmatic Biological Opinion on the Platte River Recovery Implementation Program. Consequently, water used during Project construction and during long-term operation of the Northern Terminal would have no additional effect on federally listed species occurring downstream in the main-stem Platte River.

Once water sources for TWE construction and operations use have been identified, TransWest will coordinate with the Wyoming State Engineers office and consultation on the listed Platte River species will proceed as specified in the October 26, 2015, BA Memo.

Yellow-billed Cuckoo

In response to questions and concerns raised by the USFWS in response to the language of the conservation measures for western yellow-billed cuckoo provided in the October 26, 2015, BA Memo, the BLM has revised the wording of SSWS-6, the species-specific conservation measure designed to avoid or minimize Project-related impacts to this species. The revised conservation measure is included in a revised "Attachment D" to the October 26 BA Memo.

Mojave Desert Tortoise

As noted above, the USFWS Southern Nevada Office has requested additional information related to Project impacts on Mojave desert tortoise habitat (email from S. Cooper, USFWS, to M. Slaughter, BLM; December 10, 2015). The information requested relates primarily to a refined breakdown of

linear miles and acreages of Project disturbance by BLM District Office, land ownership, and tortoise habitat classification (critical vs. non-critical). The length of existing above- and below-ground utilities within the action area was also requested as well as information on tortoise survey data for the southernmost portion of the line. This portion of the line, south of the I-15 crossing, was not covered by surveys conducted for TWE. Instead, survey data from the Southern Nevada Intertie Project (SNIP) was used to provide site-specific tortoise information for this portion of the line. The following text and tables provide the requested information and supplement the overall assessment of project effects provided in Section 6.1.3.1 of the TWE BA.

Section 6.1.3.1, Page 6-52 – Following Line 40, insert the following summary of SNIP data:

One of the alternatives for the proposed SNIP Transmission Line is co-located with the TWE Proposed Action from where the Project crosses I-15 southward to its terminus near the McCullough Substation. Desert tortoise surveys conducted for the proposed SNIP Transmission Line were completed in 2009. For the SNIP surveys, biologists followed 2009 desert tortoise survey protocol developed by the USFWS. During the surveys, at least one USFWS-authorized biologist was present at all times. The surveys were conducted from April 23 through June 3, 2009 during the tortoise's active period. Surveys were initiated at dawn and were only conducted when ground temperatures were below 95 degrees Fahrenheit (35 degrees Celsius). Surveys were conducted within the ROW and a zone-of-influence (ZOI). The ROW included 100 percent coverage and encompassed a 100-foot buffer on either side of the centerline of the proposed transmission line using 10-meter (~30-foot) wide belt transects. Presence/absence surveys were conducted in the ZOI. These surveys were conducted along one side of the ROW where the proposed transmission line was parallel to an existing transmission line. In areas where the proposed line was not parallel to an existing line, ZOI surveys were conducted on both sides of the transmission line, conducted at 150-meters, 300-meters, and 450-meters from the edge of the ROW.

Twenty-seven days of surveys and 645 transect miles were surveyed, including alternatives that were later modified or eliminated from consideration. Within that time, 15 live Desert Tortoises and 187 other detection's were documented. These included 105 burrows, 42 scat, 35 carcasses, 2 egg shells, 1 bone, and 1 set of tracks.

BA Figure 6.8 – Area of Analysis for Desert Tortoise has been modified to show the portions of the Proposed Action through potential tortoise habitat that were surveyed for TWE and SNIP. The revised figure is attached. Note that the Proposed Action does not intersect the Boulder City Conservation Easement located southwest of Boulder City in Clark County, Nevada.

Section 6.1.3.1, Page 6-57, Lines 12-18: Conservation Measure SSWS-4.23 – The BLM Nevada State Director has identified where self-supporting tubular steel monopoles will be required within Mojave desert tortoise habitat (email from Amy Lueders to Mary Jo Rugwell, November 6, 2015). Accordingly, Conservation Measure SSWS-4.23 (Attachment D) has been revised to reflect the use of monopoles in designated critical habitat only.

Section 6.1.3.1, Page 6-60, Lines 14-20: Replace this overall accounting of Project-related effects to Mojave desert tortoise habitat, with the following refined analysis based on the current, detailed project design.

Direct impacts to desert tortoise habitat would occur as a result of the construction and operation disturbance of 1,382 acres (0.6 percent) and 395 acres (0.2 percent), respectively, of potential (i.e., non-critical) habitat (USGS model rating $\geq$ 0.6) within the analysis area. In addition, approximately 304 acres (0.6 percent) and 62 acres (0.1percent) of impact would occur to USFWS-designated desert tortoise critical habitat as a result of construction and operation activities, respectively. Approximately 115.6 miles of the transmission line would be located in Mojave desert tortoise habitat within the North-East Mojave Recovery Unit, of which 28.4 miles would traverse designated critical habitat. These impacts have been broken down by land ownership and habitat classification (critical vs. non-critical) as summarized in the following tables.

Existing Utilities in the Action Area through Mojave Desert Tortoise Habitat

In response to the USFWS's request for information on the length of the Proposed Action that is located adjacent to other existing above- and below-ground utilities, AECOM obtained existing ROW data from the BLM's Las Vegas and Caliente Field Offices. These data show that the Project has been sited adjacent to existing pipelines (e.g., Kern River, Holly/UNEV) and/or transmission lines (e.g., Pecos – Harrisburg 345 kV, Navajo – McCullough 550 kV) through tortoise habitat (including both critical and potential, non-critical habitat) from Segment 1530 near Toquop Wash to Segment 1830 at the Southern Terminal (refer to BA Figures 2-3 and 2-4 for the location of referenced Project segments). Revised Figure 6.8 (attached) shows where the TWE action area encompasses the ROWs of existing linear utilities through Mojave desert tortoise habitat. The following table summarizes the combined lengths of existing linear utilities located within the TWE desert tortoise analysis area by County/BLM Field Office.

Existing Linear Utilities Located within the TWE Action Area through Desert Tortoise Habitat

County/BLM District	Length of TWE Transmission Line Located in Potential and Designated Critical Tortoise Habitat (miles)	Existing Facilities within the TWE Action Area	Combined Length of Existing Facilities Located within TWE Action Area through Potential and Designated Critical Tortoise Habitat (miles)
Lincoln/Ely District	31	Transmission Lines	23
		Pipelines	34
Clark/Southern Nevada District	85	Transmission Lines	480
		Pipelines	174
Total	116	Transmission Lines	503
		Pipelines	208

The following tables present the refined analysis of Project-related impacts to desert tortoise habitat by County/BLM District and habitat class.

Mojave Desert Tortoise Habitat Disturbance – Transmission Line

County	Desert Tortoise (DETO) Habitat Type	Total Disturbance (acres)			Line length within habitat (miles)	DETO Habitat Disturbance - Access Roads				DETO Habitat Disturbance - Overhead line (acres)	
						Length of Access (miles)		Access road area (acres)			
		Jurisdiction	Constr.	Operation		Constr.	Operation	Constr.	Operation	Constr.	Operation
Lincoln	Beaver Dam Slope Critical	Federal	66	16	5.3	12.4	12.0	16.1	15.6	49.6	0.1
	Mormon Mesa Critical	Federal	89	17	8.4	15.8	15.0	18.3	17	70.6	0.4
	Non-Critical	Federal	215	44	16.9	35.2	34.6	44.6	43.4	169.3	0.3
		Private	1	1	0.0	0.8	0.8	0.9	0.9	0.0	0.0
Clark	Mormon Mesa Critical	Federal	143	29	14.7	27.9	27.1	30.3	28.7	112.8	0.1
	Non-Critical	Federal	782	171	63.8	134.9	130.9	177.1	169.5	603.6	1.9
		Private	94	19	6.5	18.1	17.9	19.1	18.7	74.4	0.3

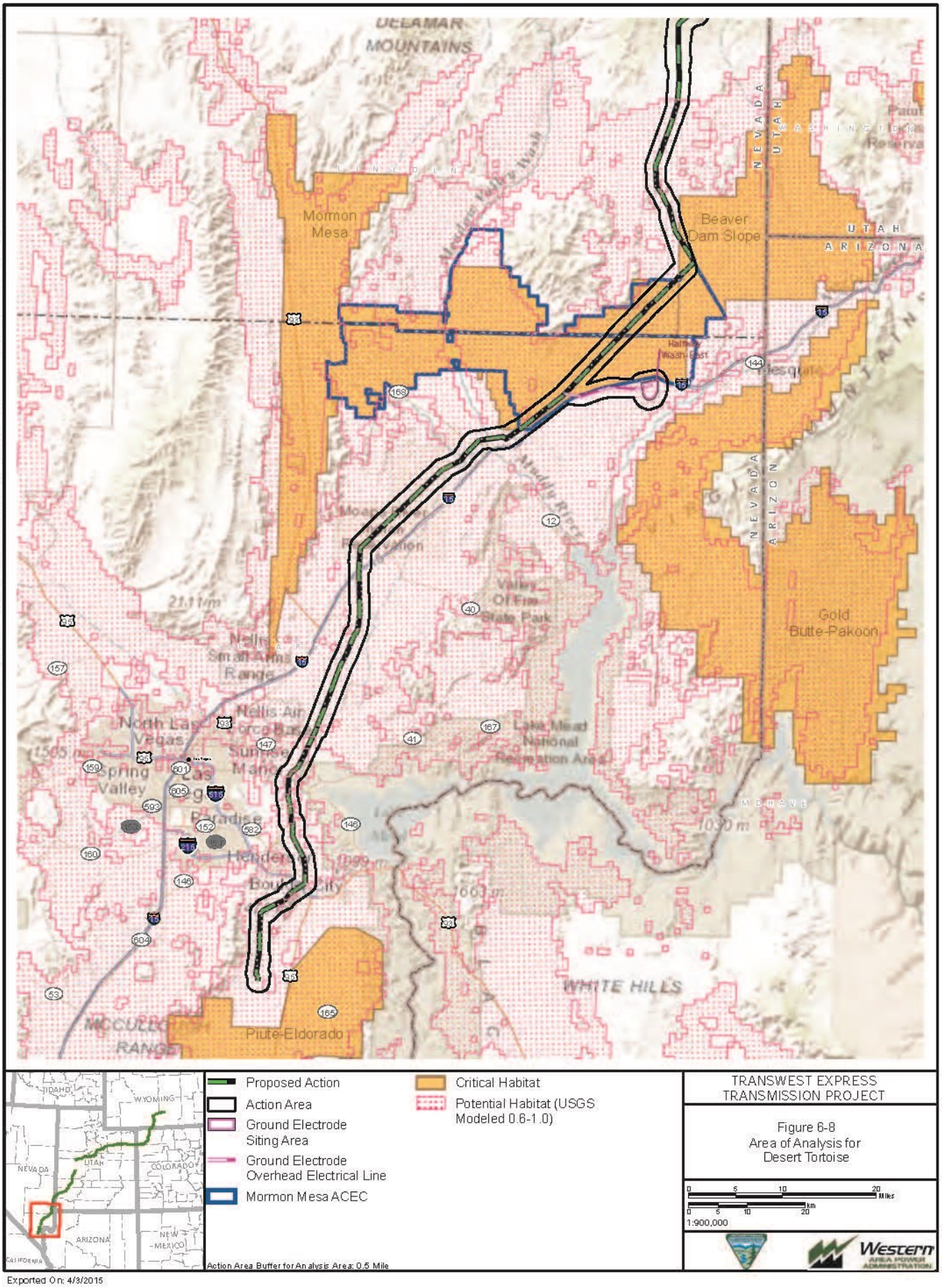
Mojave Desert Tortoise Habitat Disturbance – Southern Terminal Including 500kV Interconnections

County	DETO Habitat Type	Total Disturbance (acres			Line length within habitat (miles)	DT Habitat Disturbance - Access Roads				DT Habitat Disturbance - Facility (acres)	
						Length of Access (miles)		Access road area (acres)			
		Jurisdiction	Constr.	Operation		Constr.	Operation	Constr.	Operation	Constr.	Operation
Clark	Non-Critical	Private	234	156	6.8	11.4	11.1	14.9	14.3	218.3	141.4

Mojave Desert Tortoise Habitat Disturbance – Southern Ground Electrode Facility and Ground Electrode Line

County	DETO Habitat Type	Total Disturbance (acres			Line length within habitat (miles)	DT Habitat Disturbance - Access Roads				DT Habitat Disturbance - Facility (acres)	
						Length of Access (miles)		Access road area (acres)			
		Jurisdiction	Constr.	Operation		Constr.	Operation	Constr.	Operation	Constr.	Operation
Clark	Morman Mesa Critical	Federal	6	0	1.5	1.5	0	2.9	0	3.2	0
	Non-Critical	State	56	4	4	6.4	3.1	9.9	3.5	45.8	0.2

If there are any questions regarding this TransWest Express Transmission Project memorandum providing additional information for the TransWest Express Transmission Project Final Biological Assessment (BA) that was submitted on April 8, 2015 and the final BA addendum memorandum (BA Memo) that was submitted on October 26, 2015, please contact Sharon Knowlton, 307 775 6124, sknowlto@blm.gov; Dennis Saville 307 775 6106, dsaville@blm.gov; or Christine Fletcher 435 865 3035, cfletcher@blm.gov.


DELAMAR MOUNTAINS
Mormon Mesa
Beaver Dam Slope
UTAH
ARIZONA
NEVADA
Gold Butte-Pakoon
Piute-Eldorado
WHITE HILLS
Lake Mead National Recreation Area
Valley Of Fire State Park
Nellis Small Arms Range
North Las Vegas
Spring Valley
Paradise
Henderson
Boulder City
Proposed Action
Action Area
Ground Electrode Siting Area
Ground Electrode Overhead Electrical Line
Mormon Mesa ACEC
Critical Habitat
Potential Habitat (USGS Modeled 0.6-1.0)
Action Area Buffer for Analysis Area: 0.5 Mile
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 6-8
Area of Analysis for Desert Tortoise
1:900,000
Western AREA POWER ADMINISTRATION
Exported On: 4/3/2015

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Wyoming State Office
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Cheyenne, Wyoming 82003-1828

In Reply Refer To:
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WYW – 177893
5101 (930)
2800

APR 08 2016

Memorandum

To: Field Supervisor, U.S. Fish and Wildlife Service, Wyoming Field Office, 5353 Yellowstone Road, Suite 308A, Cheyenne, Wyoming, 82009

From: Mary Jo Rugwell, Acting State Director

Subject: Third Addendum to the April 8, 2015, TransWest Express Transmission Project Biological Assessment, USFWS Log No. 06E13000-2014-F-0052

Introduction

This memorandum provides additional information for the TransWest Express Transmission Project (TWE or Project) Final Biological Assessment (BA) that was submitted to the U.S. Fish and Wildlife Service (USFWS) on April 8, 2015; the final BA addendum memorandum (BA Memo) that was submitted to the USFWS on October 26, 2015; and the second addendum memorandum (BA Memo II) that was submitted to the USFWS on January 20, 2016. This memorandum provides:

- : An updated analysis of Project impacts in Mojave desert tortoise habitat reflecting the use of self-supporting tubular monopole tower structures through designated critical habitat for this species;
- : Updated conservation measures for the Mojave desert tortoise (SSWS-4) and June sucker
- : (SSS-6). SSWS-4 has been revised to reflect the most current language used by the USFWS Southern Nevada Field Office and the Bureau of Land Management (BLM) Las Vegas Field Office in their standard reasonable and prudent measures and associated terms and conditions for incidental take of Mojave desert tortoises associated with linear utility projects. SSS-6 has been revised to conform to language provided by the USFWS Utah Field Office. These measures are provided in a revised and updated "Attachment D" (attached) that was originally developed for the October 26, 2015 BA Memo and compiles all of the species-specific conservation measures applicable to the TWE section 7 consultation; and

- µ A letter from the Wyoming State Engineers Office (attached) applicable to the Project's section 7 consultation for impacts to federally listed Platte River species that have potential to be affected by construction- and operation-related water usage in the North Platte River drainage.

The information provided below replaces and supersedes related portions of the April 8, 2015 BA, the October 26, 2015 BA Memo, and the January 20, 2015 BA Memo II.

Mojave Desert Tortoise Habitat Impact Analysis

The TransWest Express Transmission Project (Project) Biological Assessment (BA) submitted to USFWS on April 8, 2015 included an estimate of Project disturbance (both construction and operation) in the designated critical habitat for the Mojave Desert population of desert tortoise. This estimate was based on an indicative model that relied upon representative portions of the Project route where preliminary engineering was completed for tower locations, access roads, and other temporary work areas, and then extrapolated to all portions of the alternatives based on terrain types and other known factors. The estimate of disturbance through the designated critical habitat in the original BA submittal was 377 acres during construction and 117 acres during operation.

The two BA addendum responses have been provided to USFWS that contain clarifications and refinements to the original BA. BA Memo II, submitted on January 20, 2016, included refined Project disturbance numbers within desert tortoise habitat based on preliminary engineering completed by TransWest for the entire Agency Preferred Alternative (BLM's Proposed Action) (TransWest 2015a; POWER Engineers 2015). The estimated Project disturbance reported through the designated critical habitat in that submittal was 304 acres during construction and 72 acres during operation.

The BLM is requiring the Project to use self-supporting tubular monopole transmission structures across the approximately 29 miles that are within designated critical habitat as a measure to minimize perching and nesting opportunities for avian predators. TransWest has committed to utilize these structures across 2.7 miles of designated critical habitat where the BLM's Proposed Action is not co-located with existing transmission lines. The refined Project disturbance numbers provided in BA Memo II accounted for this commitment, but did not account for the approximately 26.3 additional miles that the BLM is requiring use of tubular monopoles (TransWest 2015b).

In order to account for this additional mileage of self-supporting tubular transmission structures, the BLM referenced the January 23, 2015 memo submitted by TransWest and supporting materials (specifically Exhibit B: "TransWest Express Transmission Structures: Engineering Evaluation and Comparison of Design Features, Construction Methods and Cost" by POWER Engineers, 2015), along with geospatial data provided by TransWest on December 29, 2015. Based on these sources, the BLM quantifies herein the additional Project disturbance and construction traffic that will occur from the requirement for the additional mileage of self-supporting tubular transmission structures.

To estimate the additional Project disturbance, BLM has assumed that the area required for access roads and temporary work areas would remain unchanged. Although the area required for construction of each tower would also remain unchanged, the self-supporting tubular structures would not be as tall as the lattice structure types, therefore decreasing the span length and increasing the number of structures

required to cross the same distance. The increase in number of structures would: (1) increase the amount of construction and operation disturbance, and (2) potentially preclude the ability for the tower locations to be matched perpendicular to the existing tower locations.

Comparison of span lengths, the number of structures required per mile, and construction and operation disturbance per structure and per mile are detailed in the table below.

Table 1. Comparison of Parameters from Different Project Tangent Tower Structures

	Guyed Lattice	Self-supporting Lattice	Self-supporting Tubular
Structure Height (feet)	120 to 180	120 to 180	100 to 150
Span Length (feet)	900 to 1,500	900 to 1,500	700 to 1,200
Structures per Mile (count)	4 to 6	4 to 6	5 to 8
Construction Area per Structure (square feet)	50,000	50,000	50,000
Construction Area per Mile (acres)	4.6 to 6.9	4.6 to 6.9	5.7 to 9.2
Operation Area per Structure (square feet)	29	900	40
Operation Area per Mile (acres)	0.003 to 0.004	0.083 to 0.124	0.005 to 0.007

Source: POWER Engineers 2015, pg. 3.

The additional construction and operation disturbance areas have been calculated based on the larger increases in area per mile reported in the table above. The result indicates that up to approximately 60 acres of additional construction disturbance (additional 20 percent) and less than one-tenth of an acre of additional operation disturbance (less than 0.1percent increase) will be expected through the designated critical desert tortoise habitat above the acreages reported in the BA Memo II. The revised total construction and operation disturbance through the designated critical habitat is 364 acres and 72 acres, respectively.

Accordingly, the table summarizing transmission line construction and operation impacts to tortoise habitat that was provided in BA Memo II has been revised to reflect the additional area of construction impacts associated with use of self-supporting tubular monopole tangent structures through designated critical habitat for the Mojave desert tortoise. This information is provided in Table 2, below.

Table 2. Mojave Desert Tortoise Habitat Disturbance – Transmission Line

County	Desert Tortoise Habitat	Jurisdiction	Total Disturbance - Transmission Line and Access Roads (acres)		Transmission Line Length (miles)	Total Disturbance - Southern Terminal and Interconnections (acres)		Total Disturbance - Southern Ground Electrode Facility and Line (acres)		Grand Total (acres)
			Constr.	Operation[1]		Constr.	Operation[1]	Constr.	Operation[1]	
Lincoln	Beaver Dam Slope Critical	Federal	72	16	5.3	0	0	0	0	
	Mormon Mesa Critical	Federal	109	17	8.4	0	0	0	0	
	Non-Critical	Federal	215	44	16.9	0	0	0	0	
		Private	1	1	0	0	0	0	0	
Clark	Mormon Mesa Critical	Federal	177	29	14.7	0	0	6	0	
	Non-Critical	Federal	782	171	63.8	0	0	0	0	
		Private	94	19	6.5	234	156	0	0	
		State	0	0	0	0	0	56	4	
Total	Critical	All	358		28.4	0		6		364
	Non-Critical		1092		87.2	234		56		1382

[1] Disturbance from operation and maintenance activities represents long-term disturbance that is a subset of the original construction disturbance.

An additional impact that the required tower types will entail is an increase in construction traffic to each tower location because of the need for heavier lift equipment, removal of excavation spoils from foundations, and transport of concrete for foundations.

> Given the estimated five structures per mile and the anticipated construction requirements, this would result in approximately 80 to 90 additional truck trips per mile and 1,250 miles of additional vehicle travel per mile when compared with the guyed lattice towers. (POWER Engineers 2015, pg. 5).

Based on this and the additional miles of the requirement for tubular structures stated above, there will be approximately 2,100 to 2,500 additional truck trips (32,875 truck miles) to construct the tubular structures across the designated critical habitat.

References

TransWest Express LLC (TransWest). 2015a. Memorandum RE: Trnasmission Structure Design as Wildlife Mitigation. To Sharon Knowlton (BLM) and Steve Blazek (Western), from Garry L. Miller (TransWest) dated January 23, 2015

TransWest. 2015b. Email to Sharon Knowlton (BLM), from David Smith (TransWest) dated December 29, 2015 containing information and geospatial data for TransWest Express Transmission Project preliminary engineering for Agency Preferred Alternative within desert tortoise habitats.

POWER Engineers. 2015. Exhibit B to January 23, 2015 memo from TransWest: TransWest Express Transmission Structures: Engineering Evaluation and Comparison of Design Features, Construction Methods and Cost. January 23, 2015.

ATTACHMENT D

Species-Specific Conservation Measures

(Revised April 1, 2016)

Desert Tortoise

SSWS-4[1]: To avoid and minimize impacts to the Mojave desert tortoise and its habitat, BLM, Western, TransWest and others designated to act as agents of BLM and Western will implement the following measures during construction:

1. ù *Field Contact Representative* – TransWest will designate one Field Contact Representative (FCR) (also called a Compliance Inspection Contractor) for each contiguous stretch of construction activity or isolated work area. The FCR will serve as an agent of BLM and be responsible for overseeing compliance with protective measures for the desert tortoise and reporting all instances of non-compliance or incidental take. BLM has discretion over approval of potential FCRs; however, those also acting as authorized desert tortoise biologists must be determined as qualified by the USFWS. All FCRs will report directly to BLM. All FCRs and supporting authorized biologists and desert tortoise monitors will have copies of all stipulations when work is being conducted on the site and will be responsible for overseeing compliance with terms and conditions of the ROW grant, including those for listed species. The FCRs, authorized desert tortoise biologists, and desert tortoise monitors will have authority to halt any activities that are in violation of the stipulations in the biological opinion for the Project. The FCR will be onsite year-round during all project construction activities. The presence of an FCR is not typically required for operation and maintenance activities.

   Within three days of employment or assignment, TransWest and the BLM will provide the USFWS with the names of the FCR(s).

2. ù *Authorized desert tortoise biologist* – All authorized desert tortoise biologists (and monitors) are agents of BLM and shall concurrently report directly to BLM and the USFWS regarding all compliance issues related to this biological opinion and take of desert tortoises; this includes all draft and final reports of non-compliance or take. The initial draft report shall be provided to the BLM and USFWS within 24 hours of the observation of take or non-compliance.

   An authorized desert tortoise biologist will be assigned to each piece or group of large equipment engaged in activities that may result in take of desert tortoise (for example, clearing, blasting, grading, backfilling, re-contouring, and reclamation activities) and other work areas that pose a risk to tortoises. BLM has discretion on whether to require a monitor instead of an authorized desert tortoise biologist to monitor equipment that is low risk to tortoises.

   Authorized desert tortoise biologists, monitors, and the FCR (see SSWS-4.1) shall be responsible for ensuring compliance with all conservation measures for the project. This responsibility includes: (1) enforcing the litter-control program; (2) ensuring that desert tortoise habitat disturbance is restricted to authorized areas; (3) ensuring that all equipment and materials are stored within the boundaries of the construction zone or within the boundaries of previously-disturbed areas or designated areas; (4) ensuring that all vehicles associated with construction activities remain within the proposed construction zones; (5) ensuring that no tortoises are underneath project vehicles and equipment prior to use or movement; (6) ensuring that all monitors (including the authorized desert tortoise biologist) have a copy of the required measures in their possession, have read them, and they are readily available to the monitor when on the project site.

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[1] Measure has been changed since submittal of the April 8, 2015, Biological Assessment

An authorized desert tortoise biologist will serve as a mentor to train desert tortoise monitors and will approve monitors if required. An authorized desert tortoise biologist is responsible for errors committed by desert tortoise monitors.

An authorized desert tortoise biologist is responsible for recording and reporting each desert tortoise handled. Information will include the following: location (GPS), date and time of observation, whether the desert tortoise was handled, general health and whether it voided its bladder, location desert tortoise was moved from and location moved to, unique physical characteristics of each tortoise, and effectiveness and compliance with the desert tortoise protection measures. This information will be provided directly to the BLM and USFWS.

Potential authorized desert tortoise biologists must submit their statement of qualifications to the USFWS's Southern Nevada Fish and Wildlife Office in Las Vegas for approval, allowing a minimum of 30 days for USFWS response. The statement form is available on the internet at: *http://www.fws.gov/nevada/desert_tortoise/auth_dt_form.htm.*

Prior to final approval to begin work on the project, the authorized desert tortoise biologists will have read the required measures (terms and conditions and other stipulations) and have a copy of the measures available at all times while on the project site. BLM shall provide the appropriate agency contact for the project to the USFWS and the USFWS will include the forms with approval letters. Biologists and monitors should be visibly identifiable on the project site, which may include use of a uniquely designated hardhat or safety vest color.

3. è *Desert tortoise monitor* – Desert tortoise monitors assist an authorized desert tortoise biologist during surveys and serve as apprentices to acquire experience. Desert tortoise monitors ensure proper implementation of protective measures, and record and report desert tortoises and sign observations in accordance with the recording and reporting requirements for authorized desert tortoise biologists specified in SSWS-4.2, above. They will report incidents of noncompliance to the authorized desert tortoise biologist or FCR. No monitors shall be on the project site unless supervised by an authorized desert tortoise biologist or approved by the BLM.

   If a desert tortoise is in immediate harm's way (for example, certain to immediately be crushed by equipment), desert tortoise monitors may move the desert tortoise then place it in a designated safe area until an authorized desert tortoise biologist assumes care of the animal.

   Desert tortoise monitors may not conduct field or clearance surveys or other specialized duties of an authorized desert tortoise biologist unless directly supervised by an authorized desert tortoise biologist or approved to do so by the USFWS; "directly supervised" means an authorized desert tortoise biologist has direct sight and voice contact with the desert tortoise monitor (within approximately 200 feet of each other).

   Within 3 days of employment or assignment, the project proponent and BLM shall provide the USFWS with the names of desert tortoise monitors who would assist an authorized desert tortoise biologist.

4. è *Coordination* – TransWest will coordinate with the BLM and USFWS to ensure that an appropriate number of authorized biologists and tortoise monitors are onsite during construction to ensure the protection of desert tortoises. Project activities will not begin until authorized biologists and tortoise monitors have been approved. Replacement of authorized biologists and tortoise monitors will require BLM and USFWS approval. Authorized biologists will be assigned to monitor each area of activity where conditions exist that may result in take of desert tortoise (for example, clearing, construction, grading, recontouring, and reclamation activities). The BLM and TransWest will ensure that a tortoise monitor or authorized biologist will be assigned to each piece or group of large equipment. All authorized biologists and tortoise monitors will be responsible for determining

compliance with terms and conditions of the biological opinion, the Project ROD, and other applicable agreements. With input from authorized biologists and tortoise monitors, the FCR(s) will maintain a detailed record of all desert tortoises encountered during Project surveys and monitoring.

5. C *Timing of Construction* – The BLM shall ensure that when possible, the project proponent schedules and conducts construction, operation, and maintenance activities within desert tortoise habitat during the less-active season (generally October 31 to March 1) and during periods of reduced desert tortoise activity (typically when ambient temperatures are less than 60 or greater than 95°F). All vehicles and equipment that are not in areas enclosed by desert tortoise exclusion fencing will stop activities in desert tortoise habitat during rainfall events in the more-active season (generally March 1 to October 31), and if temperatures are above 60 but below 95°F for more than 7 consecutive days. The FCR or designee will determine, in coordination with the BLM and USFWS, when it is appropriate for project activities to continue.

6. C *Desert Tortoise Education Program* – A desert tortoise education program shall be presented to all personnel on site during construction activities by an agency or authorized desert tortoise biologist. The USFWS, BLM, and appropriate state agencies shall approve the program. At a minimum, the program shall cover desert-specific Leave-No-Trace guidelines, the distribution of desert tortoises, general behavior and ecology of this species, sensitivity to human activities, threats including introduction of exotic plants and animals, legal protection, penalties for violation of State and Federal laws, reporting requirements, and project measures in this biological opinion). All field workers shall be instructed that activities must be confined to locations within the approved areas and their obligation to walk around and check underneath and vehicles and equipment before moving them (or be cleared by an authorized desert tortoise biologist). In addition, the program shall include fire prevention measures to be implemented by employees during project activities. The program shall instruct participants to report all observations of desert tortoise and their sign during construction activities to the FCR and authorized desert tortoise biologist.

7. C *Vehicle Travel* – Project personnel shall exercise vigilance when commuting to the project area to minimize risk for inadvertent injury or mortality of all wildlife species encountered on paved and unpaved roads leading to and from the project site. Speed limits will be clearly marked, and all workers will be made aware of these limits. Onsite, personnel shall carpool to the greatest extent possible.

   During the desert tortoise less active season (generally November through February), vehicle speed on project-related access roads and in the work area will not exceed 25 mph. All vehicles and construction equipment will be tightly grouped.

   During the more active season (generally March through October), and if temperatures are above 60°F but below 95°F for more than 7 consecutive days, vehicle speed on project-related access roads and in the work area will not exceed 15 mph. All vehicles and construction equipment will operate in groups of no more than three vehicles. An authorized desert tortoise biologist and desert tortoise monitor will escort or clear ahead of vehicles and equipment for ROW travel. The escort will be on foot and clear the area of tortoises in front of each traveling construction equipment group (see *Desert tortoise clearance*). The escort will use a recreational vehicle with ground visibility (for example, UTV); however, at least one authorized desert tortoise biologist and one desert tortoise monitor must ride together and survey both sides of the vehicle. The pace will be determined by an authorized desert tortoise biologist and shall be slow enough to ensure adequate inspection.

   New access and spur road locations will be sited to avoid potentially active tortoise burrows to the maximum extent practicable.

   All construction vehicle movement outside of the ROW will be restricted to pre designated access, contractor acquired access, or public roads. Any routes of travel that require construction or modification will have an authorized biologist or desert tortoise monitor survey the area for tortoises prior to modification or construction of the route.

Off-road travel by vehicles and equipment will generally be prohibited. However, where impacts to native vegetation can be minimized (i.e., where creation of new access roads and blading of existing access roads can be avoided) through use of drive and crush methods, this mode of access is preferred provided that it is conducted in accordance with SSWS-4.9 and all other applicable desert tortoise impact avoidance and habitat impact minimization measures stated herein.

8. ó *Unauthorized Access* – BLM will ensure that unauthorized personnel, including the public and off-duty project personnel, do not travel on project-related temporary access roads, to the greatest extent practicable.

   During the more active season (generally March through October), and if temperatures are above 60 but below 95°F for more than 7 consecutive days, project- and non-project-related activities on all access roads that intersect the ROW will be monitored and logged. During construction, the ROW will be fenced at public roads that intersect the ROW. Signs will say that access on the ROW is strictly prohibited except by authorized personnel and that violators will be prosecuted.

9. ó *Parked Vehicles* – Whenever a vehicle or construction equipment is parked within desert tortoise habitat, whether the engine is engaged or not, the ground around and underneath the vehicle will be inspected for desert tortoises prior to moving the vehicle. If a desert tortoise is observed, the vehicle will not be moved and an authorized biologist will be contacted. If possible, the tortoise will be left to move on its own. If necessary, the tortoise will be removed and relocated by the authorized biologist in accordance with the tortoise handling procedures, as presented in the Desert Tortoise Field Manual (USFWS 2009), which TransWest will include or incorporate by reference in the POD.

10. ó*Construction Work Area* – The area of construction activity will be pre-determined with removable flagging and all activities will be confined to these areas. All construction sites and access roads will be clearly marked or flagged at the outer limits prior to the onset of any surface-disturbing activity. All personnel will be informed that their activities must be confined within the marked or flagged areas. No permanent paint or other marking agents will be applied to vegetation or rocks.

    All desert tortoise burrows and pallets that fall outside of, but within 50 feet of, the construction work area will be flagged for avoidance. Desert tortoise burrows will not be marked in a manner that facilitates poaching or provides a cue for predators. Avoidance flagging will be designed to be easily distinguished from access route or other flagging, and will be designed in consultation with experienced construction personnel and authorized biologists. All flagging will be removed immediately following construction activities.

    Any construction pipe, culvert, or similar structure with a diameter greater than 3 inches left above ground on the construction site for one or more nights will be inspected for tortoises before the material is moved, buried, or capped. As an alternative, all structures may be capped before being stored on the construction site.

    In construction work areas where re-contouring is not required, vegetation will be left in place wherever possible and original contours will be maintained to avoid excessive root damage and allow for re-sprouting.

    Constructed road berms will be less than 12 inches in height and have slopes of less than 30 degrees. Where road berms consist primarily of rocks, gaps will be opened to allow for tortoise passage.

    To prevent mortality, injury, and harassment of desert tortoises and damage to their burrows and cover sites, no pets will be permitted in any Project construction work area.

    All vehicles and equipment that are not in areas enclosed by desert tortoise exclusion fencing will stop activities in desert tortoise habitat during rainfall events in the more-active season (generally March 1 to October 31), and if temperatures are above 60°F but below 95°F for more than 7

consecutive days. The FCR or designee will determine, in coordination with the BLM and USFWS, when it is appropriate for Project activities to continue.

11. *Desert tortoise clearance* – Prior to surface-disturbing activities, authorized desert tortoise biologists potentially assisted by desert tortoise monitors, shall conduct a clearance survey to locate and remove all desert tortoises from harm's way including areas to be disturbed using techniques that provide full coverage of all areas (USFWS 2009). During the more active season, clearance surveys will be conducted either the day prior to, or the day of, any surface-disturbing activity. During the less active season, clearance surveys will be conducted within 7 days prior to any surface-disturbing activity. No surface-disturbing activities shall begin until two consecutive surveys yield no individuals.

    An authorized biologist shall excavate all burrows that have characteristics of potentially containing desert tortoises in the area to be disturbed with the goal of locating and removing all desert tortoises and tortoise eggs. During clearance surveys, all handling of desert tortoises and their eggs and excavation of burrows shall be conducted solely by an authorized desert tortoise biologist in accordance with the most current USFWS-approved guidance (currently USFWS 2009). If any active tortoise nests are encountered, the USFWS must be contacted immediately, prior to removal of any tortoises or eggs from those burrows, to determine the most appropriate course of action. Unoccupied burrows shall be collapsed or blocked to prevent desert tortoise entry. Outside construction work areas, all potential tortoise burrows and pallets within 50 feet of the edge of the construction work area shall be flagged. If the burrow is occupied by a tortoise during the less active season, the tortoise shall be temporarily penned (see SSWS-4.14). No stakes or flagging shall be placed on the berm or in the opening of a desert tortoise burrow. Desert tortoise burrows shall not be marked in a manner that facilitates poaching. Avoidance flagging shall be designed to be easily distinguished from access route or other flagging, and shall be designed in consultation with experienced construction personnel and authorized biologists. All flagging shall be removed following construction activities.

    An authorized desert tortoise biologist will inspect areas to be backfilled immediately prior to backfilling.

12. *Desert Tortoise in Harm's Way* – Any project-related activity that may endanger a desert tortoise shall cease if a desert tortoise is seen on the project site. Project activities may resume after an authorized desert tortoise biologist or desert tortoise monitor (see restrictions in SSWS-4.3) removes the desert tortoise from danger or after the tortoise has moved to a safe area on its own.

    During the more active season and if temperatures are above 60 but below 95°F for more than 7 consecutive days, at least one monitor shall be assigned to observe spoil piles prior to excavation and covering.

13. *Herbicide Use* – The use of herbicides within USFWS-designated critical habitat, ACECs, and general desert tortoise habitat (USGS model rating of 0.6 or higher [Nussear et al. 2009]) will be prohibited without prior approval from the USFWS, BLM, and applicable state wildlife agency.
14. *Handling of Desert Tortoises* – Desert tortoises shall only be moved by an authorized desert tortoise biologist or desert tortoise monitor (see restrictions in SSWS-4.3) solely for the purpose of moving the tortoises out of harm's way. During construction, operation, and maintenance, an authorized desert tortoise biologist shall pen, capture, handle, and relocate desert tortoises from harm's way as appropriate and in accordance with the most current USFWS-approved guidance. No tortoise shall be handled by more than one person. Each tortoise handled will be given a unique number, photographed, and the biologist will record all relevant data on the Desert Tortoise Handling and Take Report to be provided to BLM in accordance with the project reporting requirements.

    Desert tortoises that occur aboveground and need to be moved from harm's way shall be placed in the shade of a shrub, 150 to 1,640 feet from the point of encounter.

    If desert tortoises need to be moved at a time of day when ambient temperatures could harm them (less than 40°F or greater than 95°F), they shall be held overnight in a clean cardboard box. These

desert tortoises shall be kept in the care of an authorized biologist under appropriate controlled temperatures and released the following day when temperatures are favorable. All cardboard boxes shall be discarded after one use and never hold more than one tortoise. If any tortoise active nests are encountered, the USFWS must be contacted immediately, prior to removal of any tortoises or eggs from those burrows, to determine the most appropriate course of action.

Desert tortoises located in the project area sheltering in a burrow during the less active season may be temporarily penned in accordance with SSWS-4.14 at the discretion of an authorized desert tortoise biologist. Desert tortoises should not be penned in areas of moderate to heavy public use; rather they should be moved from harm's way in accordance with the most current USFWS-approved guidance (currently USFWS 2009).

Desert tortoises shall be handled in accordance with the most current USFWS-approved guidance (currently USFWS 2009). Equipment or materials that contact desert tortoises (including shirts and pants) shall be sterilized, disposed of, or changed before contacting another tortoise to prevent the spread of disease. All tortoises shall be handled using disposable surgical gloves and the gloves shall be disposed of after handling each tortoise. An authorized desert tortoise biologist shall document each tortoise handling by completing the Desert Tortoise Handling and Take Report.

The authorized biologist will document each tortoise encounter or handling with the following information, at a minimum: a description of the situation; vegetation type; date of observation; weather conditions; condition and health; any apparent injuries and state of healing; if moved, the GPS location from which it was captured and the location in which it was released; map locations; whether the animal voided its bladder; and identifying markings (that is, identification numbers marked on lateral scutes or attached transmitters).

15. *Penning* – Penning shall be accomplished by installing a circular fence, approximately 20 feet in diameter to enclose and surround the tortoise burrow. The pen should be constructed with 1-inch horizontal by 2-inch vertical, galvanized welded wire. Steel T-posts or rebar should be placed every 5 to 6 feet to support the pen material. Pen material will extend 18 to 24 inches aboveground. The bottom of the enclosure will be buried 6 to 12 inch or bent towards the burrow, have soil mounded along the base, and other measures implemented to ensure zero ground clearance. Care shall be taken to minimize visibility of the pen by the public. An authorized desert tortoise biologist or desert tortoise monitor shall check the pen at a frequency to ensure that the desert tortoise is secure and not stressed. No desert tortoise shall be penned for more than 48 hours without written approval by the USFWS. Because this is a new technique, all instances of penning or issues associated with penning shall be reported to the USFWS within 3 days.

16. *Wildlife Escape Ramps* – Any excavated holes or trenches related to transmission line construction (e.g., tower foundations, ground electrode wells) left open overnight will be covered or tortoise-proof fencing will be installed to prevent the possibility of tortoises falling into the open holes. Earthen plugs, with wildlife escape ramps on either side of the plug, will be provided in open trench segments at no greater than every 0.25 mile. These distances will be reduced if the FCR and authorized desert tortoise biologist determine that the plug and escape ramp spacing is insufficient to facilitate animal escape from the trench. Any tortoise that is found in a trench or excavation shall be promptly removed by an authorized desert tortoise biologist in accordance with the most current USFWS-approved guidance. If the authorized desert tortoise biologist is not allowed to enter the excavation or trench for safety reasons, the alternative method of removal must have prior approval by the USFWS. All excavations will be inspected for tortoises before filling.

17. *Temporary Tortoise-Proof Fencing* – All construction areas, including open pipeline trenches, hydrostatic testing locations, and tie-in work will be fenced with temporary tortoise-proof fencing or inspected by an authorized desert tortoise biologist periodically throughout and at the end of the day and immediately the next morning. BLM and the USFWS will determine the appropriate length of open trench that will be allowed on the project.

Fencing will be designed in a manner that reduces the potential for desert tortoises and hatchlings to access the construction areas. Thus, the lower 6 to 12 inches of fencing will be folded outward (away from the construction area and towards the direction a tortoise would approach the work area), and covered with sufficient amount of soil, rocks, and staking to maintain zero ground clearance and secure the bottom section of material. An authorized desert tortoise biologist will check the integrity of the fencing every 2 hours and ensure that there are no breaches in the fencing and no desert tortoises pacing the fence. After the fencing is erected and secure, the inside will be cleared by an authorized desert tortoise biologist. The fencing must remain closed during any construction activities.

18. *Permanent Tortoise-Proof Fencing* – Tortoise-proof fencing will be installed around the perimeters of the Southern Terminal, southern ground electrode site, and any other permanent aboveground facilities that require regular monitoring and maintenance. Fence specifications will be consistent with those approved by the USFWS (USFWS 2009). Tortoise guards shall be placed at all road access points where desert tortoise-proof fencing is interrupted, to exclude desert tortoises from the facility. Gates shall provide minimal ground clearance and deter ingress by desert tortoises. Permanent tortoise-proof fencing along the facility area shall be appropriately constructed, monitored, and maintained. Fencing shall be inspected in accordance with Table SSWS-4.1 and reports prepared in accordance with SSWS-4.34 unless modified by the USFWS. Monitoring and maintenance shall include regular removal of trash and sediment accumulation and restoration of zero ground clearance between the ground and the bottom of the fence, including re-covering the bent portion of the fence if not buried.

Table SSWS-4.1 Desert tortoise fence inspection requirements

Fence Inspections Immediately After Installation	
Condition	Minimum Requirements
First two weeks following fence installation if tortoise burrows or tortoises are located and cleared within the fenced area during the tortoise more active season	Inspect fence perimeter, tortoise guards, and gates once per day, timed to occur when tortoises may be pacing the fenceline.
First two weeks following fence installation if tortoise burrows with tortoises are located and cleared within the fenced area during the tortoise less active season	Inspect fence perimeter, tortoise guards, and gates once per day.
If no tortoises or tortoise burrows are located within the fenced area (regardless of tortoise more or less active season)	Implement standard fence inspections (see below).
Standard Fence Inspections	
Condition	Minimum Requirements
Following major storm event, tortoise more active season	Inspect fence perimeter, tortoise guards, and gates within 48 hours.
Following major storm event, tortoise less active season	Inspect fence perimeter, tortoise guards, and gates within 72 hours.
Breach in fence observed, tortoise guard or gate requires maintenance, tortoise more active season	Repair within 48 hours of breach occurrence.
Breach in fence observed, tortoise guard or gate requires maintenance, tortoise less active season	Repair within 1 week of breach occurrence.

19.)*Dust Control* – Water applied for dust control will not be allowed to pool outside of desert tortoise fenced areas, as this can attract desert tortoises. Leaks from water trucks or water tanks will be promptly repaired to prevent pooling water. An authorized biologist or desert tortoise monitor will be assigned to patrol each area being watered. This individual will patrol the area immediately after the water is applied and at approximate 60-minute intervals until the ground is no longer wet enough to attract tortoises if conditions favor tortoise activity. No dust palliatives (e.g., calcium or magnesium

chlorides, dust oils, plant or animal extracts, enzymes, synthetic polymers, etc.) other than water are approved for use in desert tortoise habitat.

20. *Blasting* – If blasting is required in desert tortoise habitat, detonation shall only occur after the area has been surveyed and cleared by an authorized desert tortoise biologist. A 200-foot radius area around the blasting site will be surveyed and all desert tortoises located aboveground within this 200-foot radius of the blasting site will be moved 500 feet from the blasting site, placed in an unoccupied burrow, and temporarily penned (see SSWS-4.14) to prevent tortoises that have been temporarily relocated from returning to the site. Tortoises in burrows will be left in their burrows. All burrows, regardless of occupied status, will be stuffed with newspapers, flagged, and location recorded using a GPS unit. Immediately after blasting, newspaper and flagging will be removed. If a burrow or cover site that could be occupied has collapsed, it will be excavated to ensure that no tortoises have been buried and are in danger of suffocation.

21. *Raven and Raptor Perching* – To limit the potential for predation of desert tortoise by corvids and raptors, TransWest will construct self-supporting tubular monopole towers with perch discouragers throughout USFWS-designated critical habitat for the Mojave desert tortoise.

22. *Raven Management* – To limit the potential for predation of desert tortoise by corvids, TransWest will follow the BLM Southern Nevada District's Raven Management Plan (or a similar plan as coordinated among TransWest, BLM, and USFWS) that outlines active adaptive management strategies for controlling raven predation and nesting within the Project ROW, including post-construction monitoring for ravens and removal of raven nests, consistent with the restrictions implemented by the Migratory Bird Treaty Act. If evidence of raven nesting is observed in the ROW, the USFWS will be notified within three calendar days.

23. *Litter Control* – To limit the potential for predation of desert tortoise by corvids, coyotes, feral dogs, and other opportunistic predators, TransWest will require all construction waste to be contained and removed from the Project area in a manner that does not attract corvids to the Project area (as per the BLM Southern Nevada District's Raven Management Plan). All trash and food items will be placed in raven-proof containers and removed daily.

24. *Habitat Impact Compensation Fees* – For disturbance of desert tortoise critical habitat on Federal and State lands in Nevada, compensation rates are determined by the formula described in the "Compensation for the Desert Tortoise" (Hastey et al. 1991), where compensation for disturbance of critical habitat starts at a 1:3 ratio from the base rate of $849 for an acre of disturbance in non-critical habitat (this is the rate as of March 1, 2016, and will be reassessed in 2017). Compensation rates can range up to a 1:6 ratio based on several factors. For 83 acres of disturbance of critical habitat in Lincoln County, two points were added to the 1:3 ratio - one point for the term of effect which is expected to be long term (greater than 10 years) and one point for existing disturbance on site which is little or none. Therefore the compensation for these 83 acres of disturbance will be assessed at a 1:5 ratio ($849 x 5 = $4,245) for a total of $352,335. For the remainder of disturbance in critical habitat in Lincoln (98 acres) and Clark (183 acres) Counties, only one point would be added for the term of effect which is expected to be long term (greater than 10 years); the second point for existing disturbance is not being added since the project components will be collocated or adjacent to existing ROWs or disturbance. This results in a 1:4 ratio ($849 x 4 = $3,396). Therefore, the compensation for the 98 acres of disturbance in Lincoln County will be $332,808, and for the 183 acres of disturbance in Clark County, it will be $621,468. The remainder of the disturbance will occur in non-critical habitat and is therefore assessed at the base compensation rate of $849. For Lincoln County, 216 acres at $849 equals $183,384. For Clark County, 838 acres at $849 equals $711,462. The total compensation for disturbance of desert tortoise critical habitat and non-critical habitat in Lincoln and Clark Counties is therefore $2,201,457.

With regard to Project-related impacts to Mojave desert tortoise habitat on private lands in Clark County, Nevada, TransWest has elected to comply with the terms and conditions of the section 10(a)(1)(B) incidental take permit for the Clark County Multiple Species Habitat Conservation Plan (MSHCP) for the 328 acres of project disturbance that would occur on these lands during construction. Accordingly, TransWest has agreed to pay appropriate mitigation fees to comply with the Clark County MSHCP. TransWest will provide proof of adherence to the provisions of the permit and MSHCP through enforceable terms that the BLM adds to the applicant's ROW grant. The BLM will retain such proof of adherence in the project ROW file. Proof of adherence refers to payment receipts for mitigation fees assessed under the MSHCP prior to any surface-disturbing activity within the proposed action area. By complying with the section 10(a)(1)(B) incidental take permit and MSHCP, effects of the proposed action on private land will be minimized and mitigated through implementation of measures administered through MSHCP activities and programs.

25. *Disposition of dead or injured desert tortoises* – In the event that a dead or injured desert tortoise is found within the action area for the TWE project, the BLM and Western must include the following notification procedures in their respective incidental take permit and ROW grant.

    - The applicant must notify the Southern Nevada Fish and Wildlife Office and BLM by telephone (702 515-5230) or email within 24 hours of locating any dead or injured desert tortoises or the next business day thereafter. The report must include the date, time, and location of the carcass, a photograph, cause of death, if known, and any other pertinent information.
    - Transport injured desert tortoises to a qualified veterinarian for treatment. Contact the USFWS regarding their final disposition if any injured desert tortoises survive.
    - Handle dead specimens to preserve biological material in the best possible state for later analysis, if such analysis is needed. The USFWS will make this determination when the BLM or the applicant provides notice that a desert tortoise has been killed by project activities.

To avoid and minimize potential Project effects on desert tortoises during power line operation and maintenance activities, BLM, Western, and others designated to act as agents of BLM and Western will implement the following measures:

26. *Coordination* – TransWest will submit a list of planned maintenance activities involving vegetation clearing or ground disturbance by name, category, location, and approximate start date to the BLM Las Vegas and Caliente FOs. TransWest also will forward the list of activities to the USFWS and state agencies. The agencies will have 30 days following receipt of the report to consider the proposed action. In the event of a rejection, TransWest will work with the agencies to resolve issues. Agency approval of the proposed list of projects is valid for one year after agency acceptance.

27. *Routine Maintenance* – The following measures will apply to normal maintenance activities that do not result in new disturbance.

    a. All TransWest employees and its contractors involved with transmission line ROW inspection and maintenance activities will be required to take a tortoise education program described previously (Measure SSWS-4.5).

    b. If desert tortoises or their burrows occur in the work area, TransWest will implement appropriate measures described previously.

    c. Upon completion of each maintenance activity in the ROW, all used material and equipment will be removed from the site. This condition does not apply to fenced sites.

    d. Routine road surface maintenance activities on existing access or patrol roads will be conducted during the inactive season of the desert tortoise, unless accompanied by an authorized biologist. Localized repair of major damage may take place throughout the year.

28. ÷*Less-Active Season* – All mitigation measures stipulated for construction activities during the construction phase for the desert tortoise in the less-active season will be applicable to operation and maintenance activities that result in surface disturbance during the less-active season.

29. ÷*More-Active Season* – All mitigation measures stipulated for construction activities during the construction phase for the desert tortoise in the more-active active season will be applicable to operation and maintenance activities that result in surface disturbance during the more-active season.

30. ÷*Use of Heavy Equipment* – All maintenance activities in critical tortoise habitat that use heavy equipment (whether there is surface disturbance or not) will require an authorized desert tortoise biologist to be on-site during the more-active season and on-call during the less-active season.

31. ÷*Work Outside ROW* – The following measures will apply to maintenance activities that may extend outside the transmission line ROW corridors.

    a. ÷ In addition to measures (30b) and (30c), TransWest will implement appropriate measures for operations and maintenance activities described for construction-phase activities (Measures 1-24, above);

    b. ÷ For maintenance activities that result in surface disturbance during the more-active season of the desert tortoise: the width of the activity corridor will be determined prior to the onset of ground-disturbing activities. Work areas will be restricted to the narrowest possible corridors and generally will not be expected to extend beyond the Project ROW; and

    c. TransWest will contact the BLM if activities may extend outside of the transmission line ROW in all or in part; re-initiation of section 7 consultation may be required for activities that extend beyond the ROW.

32. ÷*Emergency repairs* – For emergency situations during the operation and maintenance phase of the Project, TransWest will notify the appropriate local BLM field office (Las Vegas Field Office or Caliente Field Office, as appropriate) and the USFWS Southern Nevada Field Office within 48 hours. As a part of this emergency response, the BLM and USFWS may require specific measures to protect desert tortoises. During cleanup and repair, the agencies also may require measures to recover damaged habitats.

Reporting Requirements:

33. ÷*Non-compliance*—Any incident occurring during project activities that was considered by the FCR, authorized desert tortoise biologist, or biological monitor to be in non-compliance with this biological opinion shall be immediately documented by an authorized desert tortoise biologist. Documentation shall include photos, GPS coordinates, and details on the circumstances of the event. The incident will be included in the annual report and post-project report.

34. ÷*Fence inspection*—Quarterly reports (January-March, April-June, July-September, and October – December) for monitoring and repair of tortoise-proof fencing as specified in Table 1, shall be submitted to the USFWS's Southern Nevada Fish and Wildlife Office in Las Vegas. Reports are due within the first 30 days following each quarter. For example, the report for quarter January-March is due April 30).

35. ÷*Project Construction* – Upon completion of construction, a thorough inspection of the site will be conducted by the FCR(s) and authorized biologists to determine the extent of compliance with the conditions of USFWS's biological opinion, including agreements between TransWest and the agencies. Annual and comprehensive final Project reports will be submitted to BLM and the USFWS Southern Nevada Fish and Wildlife Office in Las Vegas. Project reports will document the numbers and locations of desert tortoises encountered, all instances of tortoise take resulting from

harassment, harm, injury, or mortality, their disposition, effectiveness of protective measures, practicality of protective measures, recommendations for future measures that allow for better protection or more workable implementation, and the number of acres disturbed. Annual reports will cover the calendar year and are due April 1 of the following year (e.g., the annual report for calendar year 2016 is due April 1, 2017). Final project reports are due within 60 days following completion of project construction and must include shapefiles depicting actual disturbance in desert tortoise non-critical and critical habitat.

36. ý*Project Operation and Maintenance*—A written assessment report shall be submitted annually to the USFWS outlining the operation and maintenance activities that occurred over the past year. Report to include the following: (1) frequency of implementation of minimization measures, biological observations, (2) general success of each of the minimization measures, and (3) summary all deaths, injuries, and illnesses of desert tortoises within the project area, whether associated with project activities or not. The report is due April 1 of each year.

37. ý*Restoration Monitoring*—Vegetation restoration success shall be monitored by TransWest and reported to the BLM and USFWS. Monitoring will include both qualitative and quantitative data collection and analysis. Monitoring frequency and parameters for restoration success will be described in the required restoration and reclamation plan.

Greater Sage-grouse

SSWS-5*:* To avoid or minimize Project-related impacts to greater sage-grouse and its habitat, the BLM and Western have coordinated with applicable federal and state land and wildlife management agencies and other stakeholders to develop a suite of mitigation measures for this species. In addition, TransWest has developed a Habitat Equivalency Analysis (HEA) to quantitatively determine an appropriate level of compensatory mitigation that will be implemented to offset unavoidable impacts to sage-grouse habitat. Applicant-committed measures proposed as part of the HEA process are further discussed in Section 3.8.6.3. The BLM and Western support the implementation of the TransWest's HEA process and compensatory mitigation measures in conjunction with the following impact avoidance and minimization measures developed through the NEPA process.

General Measures: To reduce impacts to greater sage-grouse from construction and operation of the proposed Project, TransWest, in consultation with the BLM, Western, and applicable federal and state land and wildlife management agencies, will be required to implement the following general design features:

1. Placement of Project structures and access roads will maximize use of topographic features to visually screen Project facilities from high quality greater sage-grouse habitat (i.e., Wyoming – within sage-grouse core habitat and within 4 miles of active leks; Colorado – within preliminary priority habitat; Utah – within occupied habitat and within 4 miles of active leks.
2. ý To minimize fragmentation of suitable sage-grouse breeding, brood-rearing, and wintering habitats, the approved transmission line ROW will use existing roads, create no new permanent roads, be accessed via drive and crush wherever possible, and be micro-sited in coordination with applicable state and federal wildlife management.
3. ý To limit corvid predation on greater sage-grouse, TransWest will develop a Raven Management Plan that outlines active adaptive management strategies for controlling raven predation and nesting within the Project ROW and includes post–construction monitoring for ravens and removal of raven nests.
4. ý To limit disturbance to lekking and nesting activity, disruptive construction and maintenance activities within 4 miles of occupied/active leks will be prohibited between March 1 and June 30.

Activities determined to be non-disruptive by the BLM, Western, and applicable federal and state land and wildlife management agencies will be permitted between March 1 and June 30.

5. é To limit the potential for adverse impacts resulting from contact with construction equipment, vehicles, and personnel, TransWest will implement a vehicle speed limit of 15 mph on roads without posted speed limits in areas of occupied sage-grouse habitat.

6. é Under Applicant Committed Design Feature TWE-26, TransWest has committed to developing a Noxious Weed Management Plan in accordance with existing BLM Pesticide Use Plan requirements. Control of noxious weeds will minimize the potential for weed-related degradation of occupied sage-grouse habitat. Prior to the use of chemical weed control agents, herbicide applications will be reviewed by agency wildlife biologists to ensure consistency with state and local greater sage-grouse conservation goals.

***Site Specific Measures**:* In addition to requiring implementation of the general mitigation measures discussed above, the BLM and Western will consider requiring additional impact avoidance and minimization measures on a site-specific basis in areas of greater sage-grouse habitat located within areas that meet all of the following state-specific criteria:

- é Areas within 4 miles of active leks and within Wyoming Core Areas designated under EO 2011-05;
- é Areas within 4 miles of active leks and within areas of PPH in Colorado; and

Areas within 4 miles of active leks and within areas of designated brood-rearing habitats and winter concentration areas in Utah.

Identification of additional greater sage-grouse mitigation measures to be implemented in local areas will be completed prior to finalization of the POD in coordination with TransWest, BLM, Western, and local interdisciplinary teams comprised of applicable federal and state land and wildlife management agency staff. Criteria for determining site-specific measures could include, but will not be limited to: existing vegetation communities, existing fragmentation, proximity to active leks, visibility of the proposed transmission line and towers from active lek locations, presence of noxious and invasive weed species, topography, proximity to USFWS PACs, proximity to designated winter concentration areas, proximity to nesting habitat, proximity to brood rearing habitat, proximity to available water sources, proximity to other anthropogenic sources of disturbance, and co-location with existing transmission infrastructure.

Additional measures identified by the BLM and Western for consideration on a site-specific basis in coordination with appropriate federal and state agencies will include:

1. Installation of alternative structure types consisting of self-supporting tubular steel monopole structures to reduce the potential for perching and nest construction by avian predators of greater sage-grouse.

2. é Installation of perch deterrents on transmission structures to reduce the potential for perching by avian predators of greater sage-grouse.

3. é In areas determined to be unsuitable for the installation of self-supporting tubular steel monopoles, TransWest may be required to install agency-approved guy wire marking devices on all transmission tower guy lines to increase the visibility of each wire and reduce the risk of collision by flying greater sage-grouse.

4. é Outfit all newly constructed fencing with agency–approved bird diverters/wire markers.

Western Yellow-billed Cuckoo

SSWS-6[1]**:** To avoid or minimize impacts to the western yellow-billed cuckoo and its habitat, including proposed critical habitat, TransWest will coordinate with the USFWS, applicable state and federal land management agencies and private landowners (as appropriate) to implement the following conservation measures during construction, operation, and maintenance:

1.] Prior to final engineering and design of the transmission line and initiation of construction activities (e.g., geotechnical borings), TransWest will conduct a habitat assessment, including field verification, to delineate all areas of suitable western yellow-billed cuckoo habitat within 0.5 mile of the proposed edge of Project disturbance. Results of the habitat assessment will be provided to the lead and local USFWS Ecological Services Field Offices for review.

2.] No surface disturbing activity (i.e. towers, permanent and temporary project facilities, new access roads) will occur within field-verified suitable habitat and proposed critical habitat.
    a.] For existing access roads within field-verified suitable habitat and proposed critical habitat for western yellow-billed cuckoo, TransWest will avoid upgrades that require clearing and pruning riparian vegetation.
    b. Where it is necessary for TransWest to cross field-verified suitable habitat and proposed critical habitat for the western yellow-billed cuckoo, TransWest will design and locate tower structures outside of these habitats in a way that will minimize the need to clear or prune riparian vegetation within these habitats.
    c.] Should riparian vegetation management be required within proposed critical habitat and field-verified suitable habitat for the western yellow-billed cuckoo, TransWest Will:
        i.] Submit a preliminary vegetation management proposal to USFWS that outlines the location, methods, and extent of the proposed activity;
        ii.] Conduct a pre-construction site visit with USFWS and applicable state and federal land management agencies and private landowners (as appropriate) to evaluate the proposal and determine additional site-specific approaches to protect riparian function and nesting habitat; and
        iii.] Submit a final vegetation management proposal to USFWS that outlines the location, methods, and extent of the proposed activity and any site-specific approaches or modifications determined at the site visit to demonstrate that the effects are not more than insignificant or discountable. If these effects are not insignificant or discountable, then consultation on the western yellow-billed cuckoo would be reinitiated.
3.] TransWest will avoid surface disturbing and disruptive activities (i.e. vegetation management, broadcast herbicide spraying, helicopter assisted construction, use of existing roads) within 0.5 miles of proposed critical habitat and field-verified suitable habitat during the western yellow-billed cuckoo breeding season (June 1 to August 31).
    a.] When surface-disturbing or other disruptive activities cannot be avoided within 0.5 miles of field-verified suitable habitat and proposed critical habitat , TransWest will conduct protocol breeding-season surveys prior to any disturbance unless species occupancy and distribution information is complete, available, and supports a conclusion that the species is not present; or unless otherwise agreed to by the USFWS and BLM in response to mitigating factors such as existing disturbance, screening, or site-specific habitat conditions. All surveys much be conducted by surveyors operating under a recovery

[1] Measure has been changed since submittal of the April 8, 2015, Biological Assessment

permit. All survey results will be submitted to the Service prior to initiation of construction activities in field-verified suitable habitat or proposed critical habitat.

b. If protocol surveys document presence of western yellow-billed cuckoo, surface-disturbing or other disruptive activities will not be permitted within 0.5 miles of occupied habitat during the breeding season (June 1 to August 31). If protocol surveys do not document presence of western yellow-billed cuckoo, construction will be allowed to proceed as scheduled.

c. TransWest may perform noxious weed control efforts during the western yellow-billed cuckoo breeding season (June 1 to August 31) in the form of spot treatments and hand-cutting of weeds in conformance with label requirements to minimize habitat degradation.

Utah Prairie Dog

SSWS-7[1]: To avoid or minimize impacts to the Utah prairie dog, TransWest will implement the following measures:

1. Pre-construction surveys during the active season, will be conducted according to approved methods, at a minimum of 2 weeks prior to surface disturbance within suitable habitat (as determined during 2013 and 2014 surveys), unless species occupancy and distribution information is complete, current, and available through coordination with local agencies (BLM, UDWR, and USFWS). Surveys will be conducted by USFWS-certified Utah prairie dog surveyors. In the event species occurrence is verified, consultation with USFWS will be re-initiated and TransWest may be required to modify operational plans, at the discretion of the authorized officer, to include additional appropriate protection measures for the minimization of impacts on the Utah prairie dog and its habitat.
2. All Project employees will be informed of the occurrence of the Utah prairie dog in the general area, and of the threatened status of the species. They will be informed of activities that constitute "take," and the potential penalties (up to $200,000 in fines and 1 year in prison) for taking Utah prairie dogs, which are listed under ESA.
3. Project-related vehicle maintenance activities will be conducted in maintenance facilities. Should it become necessary to perform vehicle or equipment maintenance on-site, these activities will avoid identified Utah prairie dog colonies, or will be conducted outside of a 350-foot buffer surrounding the colonies. Precautions will be taken to ensure contamination of maintenance sites by fuels, motor oils, grease, etc., does not occur, and such materials are contained and properly disposed of off-site. Inadvertent spills of petroleum based, or other toxic materials will be cleaned up and removed immediately.
4. Construction equipment and materials extending beyond one breeding season (i.e., laydown yards) will not be staged within 0.5 mile of an occupied Utah prairie dog colony. Temporary laydown yards (that do not extend beyond more than one breeding season) may be approved within 350 feet of identified Utah prairie dog colonies; however, to ensure Utah prairie dogs do not move into these areas additional conservation measures such as silt fencing and barriers will be applied.
5. Reclamation and restoration efforts in suitable Utah prairie dog habitat will be conducted in accordance with the Vegetation Composition Guidelines for Utah Prairie Dog Habitat using native seed, unless otherwise specified in coordination with the USFWS and BLM.
6. Project personnel will not be permitted to have firearms (except for law enforcement) or pets in their possession while on the Project site within Utah prairie dog habitat.
7. If a dead or injured Utah prairie dog is located, initial notification will be made to the USFWS Division of Law Enforcement, Utah FO at (801) 975-3330, to the Southern Region

[1] Measure has been changed since submittal of the April 8, 2015, Biological Assessment

UDWR at (435) 865-6100, and to the BLM Authorized Officer at (435) 865-3000. Instruction for proper handling and disposition of such specimens will be issued by the Division of Law Enforcement. Care will be taken in handling sick or injured animals to ensure effective treatment, and care and in handling dead specimens to preserve biological material in the best possible state.

8. To limit the potential for adverse impacts resulting from contact with construction equipment, vehicles, and personnel, TransWest will implement a Project vehicle speed limit of 15 miles per hour (mph) on new Project access roads or roads without an established, posted speed limit within areas of suitable habitat identified by the USFWS, BLM, and UDWR.

Southwestern Willow Flycatcher

SSWS-8[1]: To avoid or minimize impacts to the southwestern willow flycatcher, TransWest will coordinate with the USFWS, applicable state and federal land management agencies and private landowners (as appropriate) to implement the following conservation measures during construction, operations and maintenance:

1. • Prior to final engineering and design of the transmission line and initiation of construction activities (e.g., geotechnical borings), TransWest will conduct a habitat assessment, including field verification, to delineate suitable southwestern willow flycatcher habitat within 0.5 mile of the proposed edge of Project disturbance. Results of the habitat assessment will be provided to the lead and local USFWS Ecological Services Field Offices for review.
2. • TransWest will avoid all vegetation clearing, broadcast herbicide spraying, and/or other surface disturbing activities within 0.5 mile of field-verified suitable habitat for southwestern willow flycatcher.
3. • If field-verified suitable southwestern willow flycatcher habitat cannot be avoided by 0.5 mile, prior to implementation of vegetation clearing or ground-disturbing activities, southwestern willow flycatcher protocol surveys will be conducted within suitable habitat that falls within 0.25 mile of the Project disturbance footprint.
4. • Ground disturbing activities will be avoided within 0.25 mile of known occupied southwestern willow flycatcher habitat. If occupied southwestern willow flycatcher habitat cannot be avoided by 0.25 mile, TransWest will conduct protocol surveys to determine current year activity. If southwestern willow flycatchers are determined to be present, ground-disturbing activities will not occur between May 1 and August 15 (the southwestern willow flycatcher breeding period).
5. • Any ground disturbing activities in occupied southwestern willow flycatcher habitat will be monitored to ensure that adverse impacts to southwestern willow flycatcher and the occupied habitat are avoided or minimized.
6. • Within field-verified suitable southwestern willow flycatcher habitat, reclamation and reseeding practices and development of seed mixes will be determined in coordination with the land management agency and USFWS. Native species will be preferred over non-native species for revegetation of habitat in disturbed areas.

Black-footed Ferret

SSWS-9: Prior to final engineering design, TransWest will conduct a habitat assessment and, if necessary, species-specific surveys for black-footed ferrets using a USFWS-approved survey protocol. Survey results will be used to avoid siting Project infrastructure (e.g., towers and access roads) within suitable black-footed

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ferret habitat (i.e., active white-tailed prairie dog colonies that are greater than 200 acres in area) the black-footed ferret analysis area.

To limit potential Project-related increases in raptor predation on black-footed ferrets and associated prey populations, TransWest will be required, subject to consultation with the BLM, USFWS, Western, and applicable state wildlife agencies, to use alternative structure types (e.g., tubular monopoles) with perch discouragers on segments of the proposed Project located within the black-footed ferret analysis area.

Canada Lynx

SSWS–11: To avoid or minimize impacts to Canada lynx, TransWest would:

1. Limit disturbance to and within suitable habitat by staying on approved access routes.
2. Limit new access routes created by the Project.
3. Dirt and gravel roads traversing lynx habitat (particularly those that could become highways) should not be paved or otherwise upgraded (e.g., straightening of curves, widening of roadway, etc.) in a manner that is likely to lead to significant increases in traffic volume, traffic speed, increased width of the cleared ROW, or would foreseeably contribute to development or increases in human activity in lynx habitat.

Federally Listed Fish

SSS-2 (Avoidance of Water Withdrawal and Entrainment/Impingement Effects for Federally Listed Fish Species): Where critical habitat for the Colorado River federally endangered fish species cannot be avoided as water sources for construction purposes, TransWest will be required to obtain approval from the USFWS and state or federal agencies responsible for managing the land and critical habitat areas. Agency approval will ensure that water withdrawal methods will avoid or minimize entrainment or impingement effects to early life stages of endangered fish species. Requirements for water pumping in critical habitat areas will include: 1) avoidance of pumping between approximately April 1 through August 31, with specific dates dependent upon the water year; 2) intake hoses will be screened with 3/32-inch mesh size; 3) intake velocity will not exceed 0.33 feet/second in an area where larval stages of the federally endangered fish may be present; and 4) pumping from off-channel locations (i.e., no connection to the river during high spring flows) will use an infiltration gallery constructed in a USFWS-approved location. Additional guidance on pumping methodology is provided in the NMFS's (1997) document entitled Fish Screening Criteria for Anadromous Salmonids.

SSS-4[1] (Avoidance of Impacts to Critical Habitat for Federally Listed Fish Species): Implementation of the following measures will avoid or minimize impacts to designated critical habitat (i.e., the 100-year floodplain) for the Colorado pikeminnow and razorback sucker where the proposed action will cross the Yampa and Green Rivers:

1. No permanent structures or new roads will be constructed in critical habitat for the Colorado pikeminnow and razorback sucker along the Green River.
2. Any temporary disturbance to soils within the 100-year floodplain of the Yampa and Green Rivers during construction, including temporary river crossings by vehicles, will be minimized to the extent possible and disturbed areas will be promptly stabilized and reclaimed to minimize the potential for erosion.
3. TransWest will avoid siting temporary facilities such as staging areas, material stockpiles, fly yards, and wire pulling and tensioning sites in designated critical habitat.

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[1] Measure has been changed since submittal of the April 8, 2015, Biological Assessment

4. ÕNo construction equipment will operate in or cross the actively flowing channel of the Yampa and Green Rivers.

5. Where the transmission line crosses designated critical habitat, it will be micro-sited to minimize the need for riparian vegetation disturbance (e.g., shrub and tree removal, cutting, or pruning) in the 100-year floodplain during the construction, operation, and maintenance phases of the Project. In areas where riparian vegetation disturbance is expected due to constraints in micro-siting, TWE will coordinate with the USFWS and BLM.

6. For any activities within the 100-year floodplain of the Yampa River, the following measures will apply:

    a. Construction and maintenance of Project facilities located in the floodplain of the Yampa River will take place during seasonal low flows.

    b. Ground disturbance and vegetation clearing will be located in areas that avoid or minimize impacts on the PCEs of Colorado pikeminnow critical habitat.

    c. Ground disturbance and vegetation clearing will be minimized in the Yampa River floodplain. Drive-and-crush access and construction techniques will be used to the extent feasible. In areas where drive-and-crush access and construction techniques are not feasible, the least impactful technique will be used. In areas where vegetation clearing is necessary, vegetation will be trimmed with the root balls left intact and in place wherever possible.

    d. No new permanent roads will be constructed within the 100-year floodplain. Any grading activities will be conducted in a way that avoids altering seasonal flow regimes.

    e. Soil stabilization and erosion control measures will be implemented during construction and through completion of reclamation activities. Specific erosion control measures will be developed in coordination with the USFWS and identified in the Stormwater Pollution Prevention Plan, which is a component of the POD.

7. ÕPrior to any vegetation removal in critical habitat for the Colorado pikeminnow and razorback sucker, a preconstruction site visit will be attended by the BLM, USFWS, TransWest, and construction representatives to discuss implementation of measures designed to protect riparian function and critical habitat PCEs for these species.

8. ÕRefueling and storing potentially hazardous materials will not occur within a 328-foot radius of the Yampa and Green Rivers and their perennial tributaries. Spill-prevention practices and containment measures will be incorporated into the Water Resources Protection Plan, Appendix W of the POD.

SSS-6[1]: (Approval of Water Use from June Sucker Habitat Areas): Any water use from the Utah Lake drainage basin, including the Provo and Spanish Fork Rivers, will originate from an existing water right that is currently perfected (developed and in use). If this condition cannot be met, TransWest will consult with USFWS under section 7 of the ESA based on the location and methods for diversion and the amount of water proposed for depletion.

SSS-13[1]: (Herbicide Use in Vicinity of Endangered Colorado River Fishes Habitat): No aerial or broadcast herbicide treatments will be applied for vegetation management within 2,500 feet of bonytail, Colorado pikeminnow, humpback chub, or razorback sucker designated critical habitat. For noxious weed control within 2,500 feet of listed Colorado River fishes' designated critical habitat, the following restrictions apply:

1. ÕHerbicides will not be applied over surface water.

2. ÕOnly agency-approved herbicides registered for use near water will be used within 328 feet of surface water or in areas with a high leaching potential.

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[1] Measure has been changed or added since submittal of the April 8, 2015, Biological Assessment

3. For spot treatments, minimum herbicide spray distances (buffers) from live water are as follows: Ê
    a. Backpack spraying operations – 20 feet.
    b. Other mechanized applications (e.g., truck or all-terrain vehicle mounted equipment) – 50 feet.

Ute Ladies'-tresses Orchid

SS-2[1]: To avoid or minimize impacts to the Ute ladies'-tresses orchid and its habitat, including proposed critical habitat, TransWest will coordinate with the USFWS, applicable state and federal land management agencies and private landowners (as appropriate) to implement the following conservation measures during construction, operations and maintenance:

1. Ê Field habitat assessments will be conducted to identify areas of potentially suitable Ute ladies tresses habitat in the Project area where surveys will be conducted. Field habitat assessments:
    a. Ê Must be conducted by qualified individual(s) approved by the BLM and USFWS.
    b. Ê Will occur during the growing season.
    c. Ê Will occur within 300 feet of any planned disturbance or areas likely to experience hydrology changes resulting from Project activities.
    d. Ê Will identify habitat meeting the criteria described in 1992 Interim Survey Requirements for Ute ladies'-tresses Orchid (USFWS 1992) and Rangewide Status Review of Ute Ladies'-Tresses (Spiranthes diluvialis) (Fertig et. al 2005).
    e. Ê Will exclude habitats meeting the indicators of non-habitat listed in Attachment C.

2. Ê Surveys to determine Ute ladies'-tresses habitat occupancy will be conducted in suitable habitat. The following requirements for inventories apply:
    a. Ê Must be conducted by qualified individual(s) and according to 1992 Interim Survey Requirements for Ute ladies'-tresses Orchid (FWS 1992).
    b. Ê Will not occur in areas where existing roads will be used without improvement.
    c. Ê Will be conducted at a time when the plant can be detected and during appropriate flowering periods.
    d. Will be conducted for at least 1 year prior to any temporary disturbance in suitable habitat (e.g., overland travel to access geotechnical boring location). Two additional years of surveys will be conducted after the temporary disturbance for a total of 3 years of surveys.
    e. Ê Three consecutive years of surveys will be required prior to any permanent disturbance (e.g., road widening, new road construction, placement of other infrastructure).
3. Ê For any activities associated with the geotechnical investigation the following requirements apply:
    a. Ê All work within 300 feet of occupied Ute ladies' tresses habitat will be moved or abandoned.
    b. Ê All work within 300 feet of suitable habitat will be monitored by a biological monitor to ensure compliance with all applicable conservation measures.
    c. Ê Existing access roads within 300 feet of suitable Ute ladies'-tresses habitat may be used, but not improved.

[1] Measure has been changed since submittal of the April 8, 2015, Biological Assessment

4. Design Project infrastructure to minimize direct or indirect impacts on suitable habitat both in and downstream of the Project area:
    a. Alteration and disturbance of hydrology will not be permitted.
    b. Disturbance footprint size shall be reduced to the minimum needed, without compromising safety.
    c. New access routes for the Project shall be limited.
    d. Roads and utilities shall share common right-of-ways where possible.
    e. Rights-of-way widths shall be reduced and the depth of excavation needed for the road bed shall be minimized.
    f. Construction and right-of-way management measures shall avoid soil compaction that will impact Ute ladies' tresses habitat.
    g. Offsite impacts or indirect impacts shall be avoided or minimized (i.e., install berms or catchment ditches to prevent spilled materials from reaching occupied or suitable habitat through either surface or groundwater).
    h. Signage shall be placed to limit off-road travel in sensitive areas.
    i. Vehicles and equipment shall be made to stay on designated routes and other cleared/approved areas.
    j. All disturbed areas will be revegetated with species approved by USFWS and BLM botanists.
5. Project-related construction activities will avoid individual plants by a minimum of 300 feet. In proximity to occupied habitat, Project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts on populations and to individual plants:
    a. Follow recommendations for Project design in suitable habitats.
    b. Create designs that will avoid altering site hydrology and concentrating water flows or sediments into occupied habitat.
    c. Minimize the disturbed area through interim and final reclamation. Reclaim disturbance following construction to the smallest area possible.
6. In proximity to occupied habitat, all construction activities will be overseen by a biological monitor to ensure compliance with all applicable conservation measures. The biological monitor will also:
    a. Make areas for avoidance visually identifiable in the field (e.g., flagging, temporary fencing, rebar, etc.) before and during construction.
    b. Provide the USFWS and BLM with a post-construction report of compliance, impacts, and extent of impacts on Ute ladies'-tresses no later than 4 months upon Project completion.
7. The following restrictions apply to herbicide use in suitable or occupied Ute ladies'-tresses habitat:
    a. No aerial or broadcast herbicide treatments will be applied for vegetation management within 2,500 feet of suitable or occupied Ute ladies'-tresses habitat.
    b. For noxious weed control within 2,500 feet of suitable or occupied Ute ladies'-tresses habitat, manual spot treatments (i.e. backpack sprayers) shall be used.
    c. All those involved in the herbicide application shall be accompanied by a qualified botanist/ecologist familiar with Ute ladies'-tresses to help herbicide applicators identify Ute ladies'-tresses and avoid impacts on individual plants.
    d. Treatments will not be done when wind speeds exceed 6 miles per hour.

e. Drift reducing agents shall be used when practical.

f. A reduced application rate will be used.

g. Pump pressure will be reduced, per label instructions.

h. Droplet size will be increased to the largest size possible while still effectively covering the target vegetation. This could be accomplished using larger nozzles or reduced pressure.

i. Herbicides shall be stored in spill proof containers away from special status plant habitats.

8. à Notify the USFWS immediately if any Ute Ladies' tresses are located during surveys or monitoring. In the event that Ute Ladies tresses are located, additional discussions between the BLM and USFWS will be conducted to review site plans and ensure that the appropriate avoidance measures are implemented.

Deseret Milkvetch

SS-7[1]: Due to the known locations of Deseret milkvetch within the agency-preferred route and access roads, complete avoidance of impacts to Deseret milkvetch plants through modification of engineering design and access routes does not appear to be feasible. TransWest Express will commit to the following conservation measures to avoid and minimize impacts to Deseret milkvetch to the extent feasible and compensate for impacts where direct loss or damage to Deseret milkvetch plants cannot be avoided as identified below. The following Project-related conservation measures will minimize effects to Deseret milkvetch from Project-related activities identified in Section 2.3 of the BA. TransWest will coordinate with the USFWS, applicable state and federal land management agencies and private landowners (as appropriate) to implement appropriate conservation measures during construction and operation. These measures will include but not be limited to the following:

1. à A field habitat assessment will be conducted prior to any Project-related vegetation clearing or ground-disturbing activities to determine whether suitable habitat is present within 300 feet (400 feet if Project activities are located upslope of habitat) of the proposed edge of disturbance where the Project traverses the Desert milkvetch consultation boundary. If the Project can avoid all field-verified suitable habitat and associated 300-foot buffer (400 feet if upslope), no species-specific surveys are necessary.

2. àIf avoidance of field-verified suitable habitat and surrounding 300-foot buffer (400-foot if Project is located upslope of habitat) is not possible, Deseret milkvetch surveys will be conducted within portions of the Project disturbance footprint that fall within 300 feet (400 feet if upslope) of field-verified suitable habitat to determine occupancy prior to implementation of vegetation clearing or ground-disturbing activities.

3. If species-specific surveys are necessary, they will be performed by qualified individual(s) and according to USFWS-accepted survey protocols. Surveys will be conducted during the flowering and/or fruiting period when the plant can be detected and correctly identified. Surveys will be valid for one calendar year.

4. àFollowing completion of the species-specific surveys, a final report and data will be provided to BLM, USFS, and USFWS for additional coordination with TransWest to inform Project engineering and design and to discuss the application and implementation of site-specific avoidance and minimization measures.

5. à To the extent feasible based on inter-agency coordination, no new development or permanent ground disturbance, including but not limited to roads, poles, pads, towers, etc., will occur within a 300-foot buffer of occupied Deseret milkvetch habitat. If construction activities occur upslope of

[1] Measure has been changed since submittal of the April 8, 2015, Biological Assessment

suitable or occupied habitat, the buffer may be increased to 400 feet to prevent additional erosion within the habitat.

6. \ Wire will be strung between towers aerially with no ground disturbance (e.g., no pulling and tensioning sites) in field-verified suitable habitat or within 300 feet of occupied Deseret milkvetch habitat.

7. \ To the extent feasible based on inter-agency coordination, no new roads will be established within a 300-foot buffer of field-verified suitable or occupied Deseret milkvetch habitat. If construction activities are to occur upslope of suitable or occupied habitat, the buffer may be increased to 400 feet to prevent additional erosion within the habitat. Adjustments will be considered in coordination with USFWS.

8. \ Blind Canyon Road, the existing access road to the north of Birdseye, contains plants alongside the road and within 300 feet of the road edge. This road will not be used unless TransWest can demonstrate that the road will be used in its existing condition, without upgrades that increase the footprint of the road. If Blind Canyon road will be used, the Project commits to the following conservation measures:

    a. \ Road widening will not occur with 300 feet of Deseret milkvetch plants or known occurrences

    b. \ Road realignment will not occur within 300-feet of Deseret milkvetch plants or known occurrences. The one exception is the USFWS-recommended realignment of the existing road to avoid use of one hairpin turn as identified by the USFWS. This recommended realignment will reduce future road use within Deseret milkvetch occupied habitat.

    c. \ All construction vehicles will be power-washed to remove weed seed before entering the road to avoid or minimize weed introduction into Deseret milkvetch habitat.

    d. \ This road will not be used during the flowering period of Deseret milkvetch, between May 1 and June 30 to minimize the impact of dust on pollination and reproduction.

    e. \ This road may be used during the active growing season, outside the flowering period: March 1 - April 30 and July 1 - August 31. During these time periods, dust abatement will be employed during all phases of construction, maintenance, and operation. Only water (no chemicals, reclaimed production water, or oil field brine) will be used for dust abatement measures).

    f. \ Vehicle speeds on this road will be restricted to no more than 15 miles per hour in order to reduce fugitive dust during the time of the year when Deseret milkvetch plants are most vulnerable to dust-related impacts (March through August).

    g. Prior to use of this road, project managers will inform construction crews, weed crews and new staff of the conservation measures for the species and provide them with maps that depict Deseret milkvetch habitat.

    h. \ Weed control monitoring along Blind Canyon Road will be performed within 50-feet of the road for 2 consecutive years following completion of construction. Weeds will be treated using manual methods (i.e. hand-pulled, removed with tools such as shovels or pulaskis) and removed from the area. For weeds where manual methods are not an effective treatment method, see conservation measure m, below.

9. \ Existing access roads that avoid occupied habitat will be utilized to the extent practicable to limit additional fragmentation from new road development within the species' habitat. To the extent feasible, the same measures identified in conservation measure SS-7.8, above, will be applied to other existing access roads near the known population of Deseret milkvetch, if plants are found within 300 feet of those roads. If plants are found within 300 feet of those roads, the Project TransWest will document the extent of Project compliance with conservation measure SS-7.8 in a post-construction compliance report to USFWS (see measure SS-7.10f, below).

10. Òf Deseret milkvetch plants are determined to be present within 300 feet of the proposed surface disturbance and the Project cannot maintain the 300 foot buffer, the following measures will be implemented:

    a. ÒA qualified biologist or botanist must be on-site pre-construction to clearly mark or flag avoidance areas so they are visible during construction. The same qualified personnel will be present during construction and installation of erosion control measures, if appropriate. The same qualified personnel will be present during construction to monitor avoidance of these areas and document impacts.

    b. ÒProposed activities will be designed to have the least impact on Deseret milkvetch habitat by incorporating design features that reduce surface impact:

        i. ÒReduce size of surface disturbance to the minimum amount needed for construction while maintaining a safe working environment (e.g., site transmission structures in unsuitable habitat to the extent possible);

        ii. ÒNo stockpiling of materials in occupied or suitable habitat;

        iii. ÒRemove all construction material after construction is complete;

        iv. ÒAvoid clearing of low stature vegetation around work areas and limit disturbance to the native vegetation community to the extent that is practicable and will provide a safe working environment;

        v. ÒMinimize disturbance needed for new access roads and use drive and crush methods to the extent feasible. Use mechanical clearing only for larger stature vegetation such as trees.

    c. ÒIf fill material is needed, fill materials will not be sourced from areas identified during pre-construction surveys as field-verified suitable or occupied Deseret milkvetch habitat. If fill material is brought in to the construction site, it will be free of waste, pollutants, and noxious weeds/seeds.

    d. ÒWhere the Project cannot avoid direct loss or damage of Deseret milkvetch plants, the Project will commit to the following seed transplant minimization measure: Seeds will be collected (as per Center for Plant Conservation Guidelines) from all plants anticipated to be directly impacted prior to construction by a qualified botanist and provided to a permitted institution to propagate individual plants. The institution will propagate the species to collect a minimum of 100 seeds per lost individual plant. Intact seeds will be transplanted into high-quality suitable habitat or occupied habitat in coordination with USFWS.

    e. ÒMonitoring will be performed to evaluate plant survival after construction that will include plants within 300 feet of new surface disturbance, control sites, and any transplant sites that are necessary. The monitoring plan will be coordinated with USFWS and will be performed for a minimum of 5 years.

    f. Ò Post-construction reports will be prepared by the botanist and submitted to the BLM at the end of construction at each site that identifies compliance with the conservation measures, the areal extent of impacts to occupied habitat, the number of plants impacted and the nature of those impacts, and locations identified on maps. These construction survey reports will be submitted to USFWS at the end of each quarter by the BLM. At the end of construction activities for all projects, a final survey and impact report will be prepared and submitted to the BLM by the botanist. Once the report is deemed complete, BLM will submit this report to USFWS. This report will identify the full extent of impacts to Deseret milkvetch during construction and will include: impacts to individual plants, an accounting of acreage impacts within occupied habitat, and locations identified on maps. NOTE: Impact areas presented in this BA are a preliminary estimate. Final areas will be determined post-construction and submitted to USFWS to comply with the Section 7 of the ESA.

11. Following completion of construction, TransWest will provide a GIS shapefile or documentation of new and upgraded access routes to the appropriate emergency fire operations personnel with the State of Utah, the BLM, the USFS, and USFWS, as well as a notification statement that there is a federally listed plant species within the area of Birdseye, Utah. This information will be provided no later than one year post-construction of this specific transmission line segment.
12. No vegetation treatments will be performed within 300 feet of occupied Deseret milkvetch habitat.
13. Herbicide use in and adjacent to Deseret milkvetch habitat:
    a. ÐNo aerial or broadcast herbicide treatments will be applied for vegetation management within 2500 feet of suitable or occupied Deseret milkvetch habitat.
    b. For noxious weed control within 2500 feet of suitable or occupied Deseret milkvetch habitat, manual spot treatments (e.g., using backpack sprayers or mechanical controls) will be used and the following measures will be implemented:
        i. ÐAll those involved in herbicide application will be accompanied by a qualified botanist/ecologist familiar with Deseret milkvetch to help herbicide applicators identify Deseret milkvetch and avoid impacts on individual plants.
        ii. ÐTreatments will not be done when wind speeds exceed 6 miles per hour. At lower wind speeds, drift reducing agents will be used when practicable, the application rate and/or pump pressure will be reduced per herbicide label instructions, and droplet size will be increased to the largest size possible while still effectively covering the target vegetation. This could be accomplished using larger nozzles or reduced pressure.
        iii. ÐHerbicides will be stored in spill-proof containers away from special status plant habitats.
        iv. ÐShort-residual herbicides such as glyphosate will be prioritized for use in occupied habitat over other equally effective herbicides for the target weed species.
        v. The following two herbicides will not be used in occupied or suitable habitat: Sulfometuron and Chlorsulfuron
14. Permanent Project disturbance within known occupied habitat (217.7 acres) will not exceed 1 percent cumulatively (21.8 acres) from the TWE Project.

Clay Phacelia

SS-8[1]: To avoid or minimize impacts to the clay phacelia, TransWest will coordinate with the USFWS, applicable state and federal land management agencies and private landowners (as appropriate) to implement the following conservation measures during construction, operations and maintenance:

1. ÐA field habitat assessment will be conducted prior to final engineering and design to: (a) ground-truth the U.S. Forest Service's August 2013 clay phacelia habitat model, and (b) determine whether suitable habitat is present within a 650-foot buffer surrounding modeled habitat where this area is traversed by the proposed right-of-way or where suitable habitat has potential to be affected by other Project-related disturbance including geo-technical testing sites, fly yards, access roads, etc. Results of habitat assessments will be provided to the BLM, USFS, and USFWS for review. TransWest will coordinate with the federal agencies immediately following the completion and review of habitat assessments.
2. ÐFollowing the habitat assessment and agency coordination, TransWest will conduct 100 percent clearance surveys during the clay phacelia flowering season (typically late June-July) where Project-related disturbance will occur within 650 feet of field-verified suitable habitat. Surveys will be completed in accordance with USFWS-approved protocols prior to final engineering and design.

[1] Measure has been changed since submittal of the April 8, 2015, Biological Assessment

TransWest will provide survey results and coordinate with the BLM, USFS, and USFWS. If occupied clay phacelia habitat is found within 650 feet of proposed Project disturbance, TransWest will coordinate with the BLM, USFS, and USFWS to discuss final engineering and design options in relation to the survey results.

3. Project-related vegetation clearing and surface-disturbing activities will avoid all occupied clay phacelia habitat, including that found during field surveys, by 650 feet. If individual clay phacelia plants cannot be avoided by 650 feet, then TransWest will coordinate with the BLM, USFS, and USFWS to discuss site-specific characteristics of the occupied habitat in relation to Project activities and a determination will be made to re-initiate consultation as appropriate.
4. ÒOnly water (no chemicals, reclaimed production water, or other) will be used for dust abatement measures within field-verified suitable clay phacelia habitat.
5. ÒDust abatement will be employed during maintenance activities in field-verified suitable clay phacelia habitat over the life of the Project during the time of the year when the plant is most vulnerable to dust-related impacts (March through August).
6. ÒNo aerial or broadcast herbicide treatments will be conducted for purposes of vegetation management within 2,500 feet of occupied clay phacelia habitat. If aerial or broadcast spraying of herbicides for noxious weed control must be conducted within 2,500 feet of individual clay phacelia plants, then consultation will be reinitiated.
7. ÒWithin field-verified suitable clay phacelia habitat, reclamation and reseeding practices and development of seed mixes will be determined in coordination with the BLM, USFS, and USFWS botanists.

References

U.S. Fish and Wildlife Service (USFWS). 1992. Interim Survey Requirements for Ute Ladies'-tresses Orchid (*Spiranthes Diluvialis*). November 23, 1992. 9pp. Accessed online on October 22, 2015 at: http://www.fws.gov/mountain-prairie/endspp/protocols/UteLadiesTress1992.pdf.

<INSERT WYOMING STATE ENGINEERS OFFICE PLATTE RIVER WATER DEPLETION LETTER>

State Engineer's Office

HERSCHLER BUILDING, 4-E CHEYENNE, WYOMING 82002
(307) 777-7354 FAX (307) 777-5451

MATTHEW H. MEAD
GOVERNOR

PATRICK T. TYRRELL
STATE ENGINEER

March 21, 2016

Mary Jo Rugwell, Acting State Director
BLM, Wyoming State Office
P.O. Box 1828
Cheyenne, WY 82003-1828

RE: EIS for the TransWest Express Transmission Project

To Ms. Rugwell:

To assist in the Platte River Recovery Implementation Program (PRRIP) compliance process involving the preparation of an EIS for the TransWest Express Transmission Project, I reviewed the associated water-related activities.

I've determined that the use of 9.8 ac-ft of water in the North Platte River basin for dust control, office use, tower foundations, evaporative cooling, and misting systems is considered a new water-related activity and is covered under Wyoming's Depletions Plan. Due to the temporary status of many of these depletions and that the applicant has committed to procure water from existing or temporary sources, no mitigation is necessary as the depletions are covered by the state of Wyoming. However, if this project is found to have depletive effects in accordance with Wyoming's Depletions Plan, the project applicant and/or water permit holder may be required to mitigate depletions from this activity at a future date.

If any further questions or comments exist, please don't hesitate to contact me.

Sincerely,

M. Hoobler

Matthew J. Hoobler

River Coordinator – N. Platte, S. Platte, Belle Fourche
State Coordinator – Wyoming's Depletion Plan

Cc: USFWS ESWFO – PRRIP

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
5353 Yellowstone Road, Suite 308A
Cheyenne, Wyoming 82009

In Reply Refer To:
06E13000-2014-F-0052a

AUG 25 2016

Memorandum

To: State Director, Bureau of Land Management, Wyoming State Office, Cheyenne, Wyoming

From: Acting Field Supervisor, U.S. Fish and Wildlife Service, Wyoming Field Office, Cheyenne, Wyoming

Subject: Biological Opinion and Informal Consultation for the TransWest Express Transmission Line Right-of-Way Project—Carbon and Sweetwater Counties, Wyoming; Moffat and Rio Blanco Counties, Colorado; Duchesne, Sanpete, Uintah, Utah, Wasatch, Juab, Millard, Beaver, and Iron Counties, Utah; and Lincoln and Clark Counties, Nevada

Attached are the U.S. Fish and Wildlife Service's (Service) concurrence and final Biological Opinion (BO) for the Bureau of Land Management's (BLM) determinations of effects on species and their designated and proposed critical habitats pursuant to section 7(a)(2) of the Endangered Species Act of 1973, as amended (ESA; 50 CFR §402.13 and §402.14), for the proposed TransWest Express Transmission Line Right-of-Way Project (Project). The BLM is the lead federal agency for this Project, and the Western Area Power Administration (Western), U.S. Department of Agriculture Forest Service (USFS), and Bureau of Reclamation (Reclamation) are additional action agencies included under the BLM's section 7 consultation for the Project. The Applicant for the Project is TransWest Express, LLC.

This consultation addresses only the route selected as the preferred alternative for the Project by the BLM, including: the construction, operation, and maintenance of approximately 728 miles of new 600-kilovolt (kV) direct current (DC) transmission line extending from south-central Wyoming near Sinclair, Wyoming to the Eldorado Valley south of Boulder City in southern Nevada; construction of a northern and southern terminal; construction and improvement of access roads; and installation of ancillary facilities including communication systems and ground electrodes. A full description of the Project can be found in section 2.0 of the biological assessment (BA) and is incorporated here by reference.

This concurrence memo and BO are based on the following: (1) our review of the proposed action as described in the BLM's April 8, 2015, BA (BLM 2015a); (2) the information contained in the BLM's October 26, 2015, memo; (3) the information contained in the BLM's January 20, 2016, memo; and (4) the information contained in the BLM's April 8, 2016, memo. The BLM's October 26, 2015, memo consisted of a "Final Addendum to the April 8, 2015, TransWest Express Transmission Project Biological Assessment in response to U.S. Fish and Wildlife Letter No. 06E13000-TA-0052a" (hereafter, BA addendum; BLM 2015b). The BLM's January 20, 2016, memo consisted of a "Second Addendum to the April 8, 2015, TransWest Express Transmission Project Biological Assessment, USFWS Log No. 06E13000-2014-F-0052" (hereafter, second BA addendum; BLM 2016a). The BLM's April 8, 2016, memo consisted of a "Third Addendum to the April 8, 2015, TransWest Express Transmission Project Biological Assessment, USFWS Log No. 06E13000-2014-F-0052" (hereafter, third BA addendum; BLM 2016b). The complete administrative record of all documents and correspondence concerning this consultation is on file in the Wyoming Ecological Services Field Office.

This correspondence has two parts:

(1) Informal consultation:

a. The BLM determined that the Project may affect but is not likely to adversely affect the endangered gray wolf (*Canis lupus*) in Colorado and Utah, California condor (*Gymnogyps californianus*), southwestern willow flycatcher (*Empidonax traillii extimus*), Yuma clapper rail (*Rallus longirostris yumanensis*), June sucker (*Chasmistes liorus*), Barneby ridgecress (*Lepidium barnebyanum*), and clay phacelia (*Phacelia argillacea*), and the threatened Canada lynx (*Lynx canadensis*), Utah prairie dog (*Cynomys parvidens*), western distinct population segment of the yellow-billed cuckoo (*Coccyzus americanus*) and its proposed critical habitat, and Ute ladies'-tresses (*Spiranthes diluvialis*).

b. The BLM determined that the Project is not likely to jeopardize the continued existence of the experimental/non-essential populations of California condor and the experimental/non-essential populations of the black-footed ferret (*Mustela nigripes*).

c. The BLM determined that the Project will have no effect on species in the Platte River basin, including the whooping crane (*Grus americana*) and its critical habitat, interior least tern (*Sterna [Sternula] antillarum*), northern Great Plains population of the piping plover (*Charadrius melodus*), pallid sturgeon (*Scaphirhynchus albus*), and the western prairie fringed orchid (*Platanthera praeclara*). While it is important to submit determination of Project effects to our office, the ESA does not require Service concurrence on "no effect" determinations.

(2) Formal consultation and BO (Attachment 1):

a. The BO analyzes Project effects to the Colorado River listed fish species and their critical habitats: the endangered bonytail chub (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*G. cypha*), and razorback sucker (*Xyrauchen texanus*).

b. The BO analyzes the Project effects to the threatened Deseret milkvetch (*Astragalus desereticus*).

c. The BO analyzes the Project effects to the threatened Mojave desert tortoise (*Gopherus agassizii*) and its designated critical habitat.

Additionally, the BLM included potential effects of the Project on greater sage-grouse (*Centrocercus urophasianus*) due to the species' status as a candidate at the time of submittal of the final BA, though did not request to conference on this species. As of October 2, 2015, the greater sage-grouse is no longer a candidate species and was determined to not warrant protection under the ESA. The Service acknowledges the impact analysis conducted by the BLM, but we are not consulting on this species at this time.

Consultation History

The Service, the BLM, Western, and USFS (including the third-party contractor, AECOM) had numerous communications and coordination in the development of the final BA. An overview of consultation history associated with the proposed Project is provided below, and a full consultation history is available in the Wyoming Ecological Services Field Office.

May 2009	BLM requested the Service to be a cooperating agency on the Project and initiated informal consultation
January 2012	BLM and cooperating agencies entered into a consultation agreement with the Service
January/February 2014	BLM and cooperating agencies drafted BA outline and conservation measures
October 27, 2014	BLM submitted final species list for Project
October 31, 2014	Service approved final species list for Project
March 2, 2015	BLM submitted draft BA for Project
March 23, 2015	Service provided comments on draft BA
April 8, 2015	BLM submitted final BA for Project
May 7, 2015	Service requested additional information for final BA
July 17, 2015	BLM submitted draft addendum to final BA for Service review
July 24, 2015	Service provided comment on draft addendum to final BA
October 26, 2015	BLM submitted memo containing first addendum to final BA
October 30, 2015	Service accepted final BA and revisions and commenced writing of the BO and concurrence memo
December 10, 2015	Service requested additional information for desert tortoise, western yellow-billed cuckoo, and water use during operations
January 20, 2016	BLM submitted memo containing second addendum to final BA
January 25, 2016	Service submitted draft BO for Project
February 19, 2016	BLM provided comments on draft BO
February 24, 2016	Service submitted draft BO sections on desert tortoise and Canada lynx
March 18, 2016	BLM provided comments on draft BO section on desert tortoise
April 8, 2016	BLM submitted memo containing third addendum to final BA

Informal Consultation for the TransWest Express Transmission Line Project

Endangered population of Gray wolf

The gray wolf is rare in the southern Rocky Mountains, specifically south-western Wyoming, Colorado and Utah. It has potential to occur in any part of the action area because it uses a wide variety of habitat types such as prairie, forest, mountains and wetlands (USFWS 2006a). There are no known denning sites in the action area, and any wolves encountered would likely be dispersing animals. Consequently, Project activities at most would only cause insignificant disturbance, and only if a wolf happened to encounter construction activities.

We concur with your determination that the proposed action is not likely to adversely affect the endangered gray wolf for the following reasons:

- —There is a possibility of interaction between gray wolves and Project construction, operation, and maintenance crews, however the likelihood is low. Regardless, if evidence of a gray wolf is found in the Project area, BLM will require that the Applicant halt activities and only resume after coordination with an agency biologist. Consequently, any disturbance to gray wolves associated with Project activities would be temporary and discountable. Because construction would cease if a wolf is seen in the area, we do not anticipate injury or mortality of wolves from Project activities.
- —BLM will require the Applicant to rehabilitate and close to public use any Project right-of-ways or new access road, which will reduce the potential for long-term increases of human activities in potential wolf habitats. In addition, BLM will require the Applicant to minimize habitat loss and fragmentation by implementing selective right-of-way clearance-based vegetation management (as described in Appendix R of the Applicant's March 2015 Plan of Development). This management prescription allows for increased vegetation diversity and heights beneath the transmission line (BLM, 2015a). We therefore conclude that there will not be any significant loss of dispersal habitats.
- —Implementation of the following Applicant-committed mitigation measures, design features, and conservation measures will avoid and minimize impacts to the species: TWE-1 through TWE-5, TWE-9, TWE-12, TWE-26 through TWE-28, TWE-31, TWE-33, TWE-34, and TWE-64; WLF -6, WLF-10, and SSWS-15. These measures are described in Attachment 2 to this memo.

California Condor (inside and outside the nonessential experimental area)

A portion of the proposed project in Nevada occurs within the California condor 10(j) nonessential experimental population area (Figure 6-3 in the BLM's BA), and as such, condors in this area will be treated as though they are proposed for listing for section 7 consultation purposes. No proposed action impacting a population so designated could lead to a jeopardy determination for the entire species. However, a portion of the project also occurs outside but adjacent to the nonessential experimental population area where condors could extend and will be fully protected as endangered under the ESA.

No known condor records exist within the project action area in Nevada and Utah. Based on predictive models, potentially suitable foraging habitat occurs throughout the action area in both states, and potentially suitable nesting habitat is patchily distributed with a higher predominance in Nevada than Utah (BLM's BA). The majority of these areas are outside the 10(j) nonessential experimental population area. The nearest reported condor sighting is near the Colorado River in Arizona near the Nevada border (W. Austin, personal communication, 2014).

The BLM- and Applicant-committed measures to reduce, mitigate, or prevent direct and indirect Project effects to California condors include TWE-30, TWE-33, TWE-45, TWE-60, TWE-61, SSWS-15, WLF-2, and WLF-8 (see descriptions of these measures in the conservation measures document in Attachment 2 of this memo). We concur with your determination that the proposed action will not likely adversely affect the California condor outside of the 10(j) population area, and have determined that the proposed action will not jeopardize the continued existence of the condor within the 10(j) area for the following reasons:

- a Although condors have not been observed in the action area, there is the possibility of a rare interaction between condors and operations and maintenance ground crews conducting hazard vegetation removal, routine vegetation maintenance, vegetation disposal, inspections of vegetation and line facilities, maintenance and repair of line facilities, vehicle travel associated with all of these activities, and maintenance of access routes. We think these instances will be rare. As a result, any disturbance to condors associated with on-the-ground operations and maintenance activities (for example, flushing a condor from a perch or carcass) is anticipated to be insignificant and discountable.
- a Aerial monitoring (helicopter and fixed-wing reconnaissance and patrol flights) will also occur throughout the action area each year; thus, it is not unreasonable to anticipate that aircraft may briefly disrupt condors (for example, startle or flush them). Again, these incidents are expected to be rare and the overall effects of these disturbances to condors are anticipated to be insignificant and discountable.
- a No nesting areas for condors occur outside of the non-essential experimental boundary, and thus, no nesting occurs in Nevada. Therefore, nesting areas and nesting habitat will not be impacted by the proposed action.

Southwestern willow flycatcher

The southwestern willow flycatcher occurs or has the potential to occur in riparian and wetland areas in Nevada and Utah. In Nevada, the species has been documented in Lincoln and Clark Counties. Based on modeling, potential flycatcher habitat could occur where the proposed transmission line traverses Meadow Valley Wash, Muddy River, and Las Vegas Wash (BLM's BA). Designated critical habitat for the flycatcher occurs along the Virgin River in Nevada within approximately 2.5 miles of the proposed ground electrode siting area near Halfway Wash. In Utah, Iron County is within the range of southwestern willow flycatcher, and a small amount of habitat is predicted to occur in the action area (BLM's BA). Designated critical habitat for the flycatcher does not occur near the action area in Utah. In addition, there are no known breeding sites or positive detection points for southwestern willow flycatchers in Iron County (Day, email message, 2016).

In Nevada, one confirmed breeding site for the southwestern willow flycatcher occurs approximately 6 miles upstream from the action area along the Upper Muddy River at the Warm Springs Natural Area (McLeod and Pellegrini 2015; Pellegrini email message 2015). A single southwestern willow flycatcher was also confirmed along the Las Vegas Wash in 2008 (2.5 miles west of the action area; McLeod and Pellegrini 2009) and 2013 (4.2 miles west of the action area; Van Dooremolen 2014), but breeding was not confirmed in either year. Migrant willow flycatchers (subspecies undetermined) are detected almost annually along the Las Vegas Wash (Van Dooremolen 2015a). In Utah, no confirmed breeding sites for the southwestern willow flycatcher occur in the action area.

Conservation measure SSWS-8 will avoid and minimize impacts specifically for this species, and TWE-8, TWE-24, TWE-33, TWE-34, SSWS-15, WLF-1, WLS-4 and WLF-8 provide general conservation for this and other species (for a description of these measures, see the conservation measures document in Attachment 2 of this memo). We concur with your determination that the proposed action will not likely adversely affect the southwestern willow flycatcher or its designated critical habitat, and have determined that the proposed action will not jeopardize the continued existence of the species or result in adverse modification of its critical habitat in the action area for the following reasons:

- Although southwestern willow flycatchers have been detected near the action area, no known breeding sites are confirmed that are expected to be disturbed by the Project. Furthermore, the BLM proposes not to conduct ground-disturbing activities in occupied southwestern willow flycatcher habitat during the breeding season (May 1 through August 15) unless prior completion of current year Service-protocol-level surveys and application of appropriate monitoring and buffers in occupied nest sites. Therefore, no adverse impacts to breeding southwestern willow flycatchers are anticipated.
- Southwestern willow flycatcher habitat and potential habitat will not be removed by the project because the BLM will avoid field-verified habitat by 0.5 mile, or if through engineering and design habitat cannot be avoided by 0.5 mile, BLM will complete protocol-level surveys and avoid occupied habitat by 0.25 mile.
- The proposed project will not adversely impact designated critical habitat since no project activities will occur within 2.5 miles of where it occurs.

Yuma clapper rail

In the Project area, the Yuma clapper rail is known or has the potential to occur in marsh habitat in riparian and wetland areas in Clark County, Nevada. The species has been documented at several sites along the Muddy River, Virgin River, and Las Vegas Wash. Based on GIS vegetation layers for herbaceous wetlands, potential Yuma clapper rail habitat may occur where the Project traverses the Muddy River and Las Vegas Wash, and along the Virgin River where the ground electrode siting area will occur near Halfway Wash (BLM 2015a).

Biologists have detected Yuma clapper rails near the Project area during marsh bird breeding surveys and incidentally during other surveys. Along the Virgin River and the Lower Muddy River at the Overton Wildlife Management Area, Yuma clapper rails have been detected almost annually, while along the Upper Muddy River and Las Vegas Wash, Yuma clapper rails have been detected only sporadically (Braden *et al.*. 2009, Van Dooremolen 2015b, Van Dooremolen 2015c).

The proximity and most recent detection of Yuma clapper rails to the proposed project area vary. Along the Virgin River, the nearest detections occurred more than 8 miles away both upstream and downstream in 2001 and 2003 (McKernan and Carter 2002, Koronkiewicz *et al.* 2003). Along the Upper Muddy River, the nearest detections occurred in 2002, approximately 1.5 mile downstream of where the proposed line crosses the Muddy River (Rathbun and Braden 2003), and in 2008, approximately 6 miles upstream at the Warm Springs Natural Area (Braden *et al.*. 2009). Along the Las Vegas Wash, Yuma clapper rails were detected during the breeding season in 1998, 2005, and 2006 (Van Dooremolen 2015c). The closest detection to the proposed transmission line was the 2005 detection, which occurred approximately 0.5 mile upstream of the project area (Service Geospatial data). In August 2015, a single Yuma clapper rail was confirmed at the Clark County Wetlands Park approximately 4.5 miles upstream along the Las Vegas Wash from the proposed project (Van Dooremolen 2015c).

Conservation measures TWE-8, TWE-24, TWE-32, TWE-33, TWE-34, SSWS-15, WLF-1, WLF-4, and WLF-8 will be implemented to avoid and minimize potential effects of the Project on this species (see Attachment 2 for descriptions of these measures). We concur with your determination that the proposed action will not likely adversely affect the Yuma clapper rail, and have determined that the proposed action will not jeopardize the continued existence of the species in the action area for the following reasons:

- a Although Yuma clapper rails have been detected near the action area, the BLM will not conduct vegetation-clearing activities during the Yuma clapper rail breeding and nesting season (generally March 1 through June 30), or if avoidance of vegetation-clearing activities is not possible, BLM will conduct surveys prior to activities and will buffer occupied sites by an appropriate distance as identified in coordination with the BLM, Nevada Division of Wildlife, and the Service. Therefore, no adverse impacts to breeding Yuma clapper rails are anticipated.
- a Based on the location where Yuma clapper rails have been detected, we anticipate little to no suitable habitat is present in the proposed project area. Therefore, we anticipate any habitat that may be removed to result in an insignificant effect to the species.

June sucker

The June sucker is endemic to Utah Lake, and travels upstream to spawn in the Provo and Spanish Fork rivers. The Project action area crosses the Utah Lake drainage basin, and more specifically the Spanish Fork river basin. However, the closest waters occupied by the species are located 16 miles downstream of proposed Project disturbance, in Utah Lake. Critical habitat for the species is designated in the lower portion of the Provo River above its confluence with Utah Lake, approximately 20 miles from where construction, operation and maintenance activities are proposed in the action area.

We concur with your determination that the proposed action is not likely to adversely affect June sucker or its critical habitat for the following reasons:

- a No occupied habitat for the species is found within 16 miles of the Project action area. Consequently, no adverse impacts to June sucker are anticipated.
- a Critical habitat is 20 miles from the Project action area, and will not be directly affected

by Project activities. As identified in Conservation Measure SSS-6, any water use from the Utah Lake drainage basin (including Provo and Spanish Fork rivers) will originate from an existing water right that is currently perfected (developed and in use). Therefore, we do not anticipate that water depletions during construction will result in adverse impacts to critical habitat for the species.

Barneby ridge-cress

The Barneby ridge-cress is found at elevations between 6,200 and 6,500 feet above mean sea level on poorly developed soils in the Uinta and Green River formations. The only known occurrences of the species exist on ridges near the Indian Canyon drainage in the Uinta Basin (USFWS 1993). This drainage is approximately 4.5 miles south of the action area. Modeled potential habitat is crossed by the proposed Project. There are approximately 106 acres of modeled potential habitat within the action area (BLM 2015a). This habitat has not been field-verified.

We concur with your determination that the proposed action is not likely to adversely affect Barneby ridge-cress for the following reasons:

- j The proposed Project does not cross known occupied habitat. Consequently, we do not anticipate adverse impacts to known occurrences of the species.
- j Although there are 106 acres of modeled potential habitat within the action area, BLM has committed to conduct species surveys in these areas. Survey results will be used to inform siting for project structures and facilitate impact avoidance.
- j Implementation of the following Applicant-committed mitigation measures, design features, and conservation measures as proposed will avoid and minimize impacts to the species: TWE-1 through TWE-7, TWE-9 through TWE-13, TWE-19, TWE-22, TWE-23, TWE-26, TWE-27, TWE-29, TWE-31, TWE-33, TWE-34, TWE-47, TWE-57 through TWE-62, and TWE-64; NX-1, SS-1, SS-3 through SS-6, and SS-9. These measures are described in Attachment 2 to this memo.

Clay phacelia

Habitat that supports clay phacelia is restricted to sparsely vegetated, steep slopes composed of shale based clay on outcroppings of the Douglas Creek and Garden Gulch members of the Green River formation. Only two naturally occurring populations of clay phacelia exist, comprising a maximum of 300 plants (USFWS 2015). These two populations are found in Spanish Fork Canyon in Utah County, Utah and outside the action area for the proposed Project. Several re-introduction sites are also found outside the action area.

To determine where habitat for the species may occur outside currently known occupied locations, the Forest Service modeled approximately 1,350 acres of potentially suitable habitat for the species within the geological formations known to support the plant's habitat (U.S. Forest Service 2013). Approximately 270 acres of modeled potentially suitable habitat falls within the Project action area. The Forest Service model represents the best available information at this time. Actual acreage numbers may change upon field-verification of model results.

We concur with your determination that the proposed action is not likely to adversely affect clay phacelia for the following reasons:

- f The action area for the proposed Project does not cross current known occupied locations for clay phacelia. Consequently, we do not anticipate adverse impacts to known occurrences of the species.
- f As described in conservation measures SS-1 and SS-8, BLM has committed to field-verify modeled potential habitat within a 650-foot buffer of modeled habitat crossed by the Project right-of-way or project-related disturbance. BLM will further require the Applicant conduct species surveys where Project-related disturbance will occur within 650 feet of field-verified suitable habitat. Survey results will be used to inform siting for project structures and facilitate impact avoidance.
- f BLM will require the Applicant avoid vegetation clearing and surface-disturbing activities within a 650-foot buffer of occupied clay phacelia habitat. BLM will further require the use of water only for dust-abatement within field-verified suitable habitat. Herbicide treatments will not be conducted within 2,500 feet of occupied habitat. Therefore, we anticipate that Project effects to clay phacelia will be discountable.
- f Implementation of the following Applicant-committed mitigation measures, design features, and conservation measures as proposed will avoid and minimize impacts to the species: TWE-1 through TWE-7, TWE-9 through TWE-13, TWE-19, TWE-22, TWE-23, TWE-26, TWE-27, TWE-29, TWE-31, TWE-33, TWE-34, TWE-47, TWE-57 through TWE-62, and TWE-64; SS-1, SS-3 through SS-6, SS-8, and SS-9. These measures are described in Attachment 2 to this memo.

Section 7(a)(1) of the ESA directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

For clay phacelia, we recommend that the BLM or the Applicant consider: (1) acquiring conservation easements or fee title of private lands for the permanent, in-perpetuity protection of habitat for the species; (2) funding additional introduction efforts on USFS lands at five locations where pilot introduction efforts were successful; and (3) funding additional recovery efforts in occupied habitat such as population augmentation efforts and fencing to support the persistence of the species and prevent extinction in the wild.

Canada Lynx

The threatened Canada lynx is widespread in boreal and mixed hardwood forests across Alaska, Canada, the Great Lakes and New England. The range of the species extends south into the Rocky Mountains of the western United States where it inhabits montane coniferous woodlands at elevations above 6,500 feet above mean sea level in Wyoming, and above 8,000 feet in Colorado and Utah (Interagency Lynx Biology Team 2013).

Within the action area, BLM identified 18,325 acres of potential habitat for the species across Utah and Colorado. This potential habitat is composed of peripheral habitat in Utah and linkage areas in Utah and Colorado. Peripheral habitat is defined as areas where most historical lynx records are sporadic and generally correspond to periods following cyclic lynx population highs in Canada. There is no evidence of long-term presence or reproduction that might indicate

colonization or sustained use of these areas by the species. Linkage habitat is defined as areas that facilitate movement of lynx beyond their home range, such as dispersal, breeding season, or exploratory movements (Interagency Lynx Biology Team 2013).

We concur with your determination that the proposed action is not likely to adversely affect Canada lynx for the following reasons:

- u There is a possibility of interaction between Canada lynx and Project construction, operation, and maintenance crews, however the likelihood is low. Only peripheral and linkage habitat occurs within the Project action area. These areas do not support frequent use by the species. Regardless, if evidence of Canada lynx is found in the Project area during construction, operation or maintenance activities, BLM will require the Applicant halt activity and only resume after coordination with an agency biologist. Consequently, any disturbance to Canada lynx associated with Project activities would be temporary and discountable. Because construction would cease if a Canada lynx is seen in the area, we do not anticipate injury or mortality of the species from Project activities.
- u BLM will require the Applicant to rehabilitate and close to public use any Project right-of-ways or new access roads which will reduce the potential for long-term increases of human activities in potential lynx habitats. In addition, BLM will require the Applicant to minimize habitat loss and fragmentation by implementing selective right-of-way clearance-based vegetation management (as described in Appendix R of the Applicant's Plan of Development). This management prescription allows for increased vegetation diversity and heights beneath the transmission line (TransWest Express 2015). We therefore conclude that there will not be any significant loss of periphery and linkage habitats.
- u Implementation of the following Applicant-committed mitigation measures, design features, and conservation measures as proposed will avoid and minimize impacts to the species: TWE-1 through TWE-5, TWE-9, TWE-12, TWE-26 through TWE-28, TWE-31, TWE-33, TWE-34, and TWE-64; WLF-6, WLF-10, SSWS-11, and SSWS-15. These measures are described in Attachment 2 to this memo.

Utah prairie dog

The current range of the Utah prairie dog is limited to counties found in the central and southwestern quarter of Utah (USFWS 2012). Within the action area, BLM identified approximately 133,840 acres of potential Utah prairie dog habitat. The BLM conducted surveys within these Areas in 2013 and 2014, and identified only one historic Utah prairie dog site within the action area, where no recent activity was documented. The survey report concluded that the site is unoccupied and historic, encompassing approximately 32 acres (AECOM, 2014).

We concur with your determination that the proposed action is not likely to adversely affect Utah prairie dog for the following reasons:

- u There is no occupied habitat within the action area as determined by low and high-intensity surveys conducted in 2013 and 2014. To confirm that suitable habitat remains unoccupied, pre-construction species surveys will be conducted at a minimum of 2 weeks prior to surface disturbance. BLM will reinitiate consultation if Utah prairie dogs are found in the project area.

- b Implementation of the following Applicant-committed mitigation measures, design features, and conservation measures as proposed will avoid and minimize potential impacts to the species: TWE-1 through TWE-5, TWE-9, TWE-12, TWE-26, TWE-27, TWE-31, TWE-33, and TWE-34; SSWS-7, SSWS-15, NX-1, and NX-2. These measures are described in Attachment 2 to this memo.

Yellow-billed cuckoo, Western distinct population segment and proposed critical habitat
The western yellow-billed cuckoo has the potential to nest in the Project action area in riparian habitats characterized by multi-layered vegetation and comprised of tree canopy and understory shrubby vegetation (79 FR 59992; October 3, 2014). In the BA, BLM identified 18,146 acres of potential nesting habitat for the species across the action area. The species has been documented within 5 miles of the action area in Uintah, Duchesne, Utah and Wasatch counties, Utah (BLM 2015a). In Nevada, the species has been documented in or near the action area along the Muddy River, in Meadow Valley Wash, and along Las Vegas Wash (BLM 2015a).

Proposed critical habitat is found within the action area on the Green and Lake Fork rivers in Utah. Conferencing for proposed critical habitat under section 7(a)(4) of the ESA is not required, however the BLM requested conferencing on effects to proposed yellow-billed cuckoo critical habitat in order to facilitate required ESA section 7(a)(2) consultation once critical habitat designation is finalized (currently anticipated in 2016).

We concur with your determination that the proposed action is not likely to adversely affect western yellow-billed cuckoo and is not likely to adversely modify proposed critical habitat for the following reasons:

- b Prior to final engineering and design, the BLM will require the Applicant to conduct habitat assessments for the species within 0.5 mile of Project disturbance.
- b The BLM will require the Applicant to avoid all surface disturbing activity in field-verified suitable habitat and proposed critical habitat. In addition, all surface disturbing and disruptive activities within 0.5 mile of occupied habitat and proposed critical habitat during the species' breeding season, June 1 – August 31 will be avoided. Consequently, we believe that any effects to the species from human activity and noise will be discountable.
- b Using results of habitat assessments conducted prior to final engineering and design, tower structures will be sited and designed to minimize the need to clear or prune vegetation under the wires where the Project crosses field-verified suitable habitat and proposed critical habitat. Where vegetation management in these areas may be necessary, the Applicant will coordinate with the Service to ensure that impacts are minimal. Implementation of these measures lead us to conclude that losses of suitable, including proposed critical habitat will be insignificant.
- b The Applicant may use existing roads within field-verified suitable habitat and proposed critical habitat outside the breeding season; however, upgrades that require clearing or pruning vegetation will be avoided. Therefore, we anticipate that impacts to suitable habitat will be insignificant. We believe that use of existing roads in proposed critical habitat will not adversely modify that habitat.
- b Implementation of the following Applicant-committed mitigation measures, design

features, and conservation measures as proposed will avoid and minimize potential impacts to the species and proposed critical habitat: TWE-8, TWE-24, TWE-25, TWE-26, TWE-29, TWE-31, TWE-33, and TWE-32; WLF-1, WLF-4 through WLF-8, WLF-10, SSWS-6, and SSWS-15. These measures are described in Attachment 2 to this memo.

Ute Ladies'-tresses

The implementation of Applicant-committed measures and design features, as well as general and species-specific conservation measures will limit impacts of the Project on this species. The species-specific conservation measure (SS-2) calls for the Applicant to coordinate with the Service and applicable land managers to implement the following conservation measures during construction, operations, and maintenance: conduct field habitat assessments, conduct surveys in areas determined by the habitat assessment to provide suitable habitat, avoid construction-related activities within at least 300 feet of individual plants, and avoid aerial or broadcast herbicide treatments within 2,500 feet of suitable or occupied habitat.

We concur that the Project may affect, but is not likely to adversely affect the Ute ladies'-tresses based on the following:

- € Modeled potentially suitable habitat for this species will largely be avoided. Within the modeled habitat, pre-construction surveys will identify plants and occupied habitat so that individual plants and their habitats will be avoided, thereby removing potential for direct effects of the Project.
- € Implementation of species-specific conservation measure SS-2 and general measures TWE-1 through TWE-7, TWE-9 through TWE-13, TWE-19, TWE-22, TWE-23, TWE-26, TWE-27, TWE-29, TWE-31, TWE-33, TWE-34, TWE-47, TWE-57 through TWE-62, and TWE-64; NX-1, SS-1, SS-3, SS-4, SS-5, SS-6, and SS-9. These measures are described in Attachment 2 to this memo.

Nonessential, Experimental Population of Black-footed ferret

The BLM determined that the Project is not likely to jeopardize the nonessential, experimental populations of the black-footed ferret because, while the Project will impact white-tailed prairie dog colonies, species-specific conservation measure SSWS-9 states that surveys will be used to direct the siting of Project infrastructure outside of active white-tailed prairie dog colonies that are greater than 200 acres, which would direct construction outside of areas likely to be used by black-footed ferrets. A full description of SSWS-9 as well as general conservation measures applicable to this species (i.e. TWE-31, TWE-33, TWE-34, and WLF-10) is in Attachment 2 of this memo. The BLM is requiring the Applicant to develop a Predator Management and Monitoring Plan which would be implemented to address construction in areas where predation of white-tailed prairie dog and black-footed ferret are a concern. Therefore, the Service concurs that the Project may affect, but is not likely to jeopardize the experimental, nonessential population of black-footed ferret.

Platte River species

The BLM has determined that the Project will have no effect on listed species in the Platte River Basin. The Project will use approximately 9.8 acre-feet of water from the Platte River Basin for

construction activities over a three-year period and will use approximately 1.08 acre-feet of water per year during the 50-year operations phase of the Project. The Applicant has committed to use existing municipal or other water sources that (1) have already undergone Tier II consultation pursuant to the June 16, 2006, Programmatic Biological Opinion (PBO) on the Platte River Recovery Implementation Program (PRRIP; USFWS 2006b), (2) are not hydrologically connected to the Platte River and do not need consultation, or (3) are exempt from additional consultation pursuant to the PBO (e.g. Bureau of Reclamation long-term contracts at Glendo Reservoir). Attached to the BLM's BA addendum, the Applicant submitted a letter committing to use existing water sources already covered under the PBO for PRRIP (BLM 2015b). The BLM's third BA addendum contained a March 21, 2016, letter from the Wyoming State Engineer's Office confirming that the water used for the Project is a new temporary water-related activity that will be procured from existing or temporary sources (BLM 2016b). Based on this information, we understand that the Applicant will select existing or temporary water sources that have an existing Tier II consultation or do not need consultation. Therefore, the depletions resulting from the Project are covered under the PRRIP and are not likely to jeopardize the continued existence of the listed Platte River species nor adversely modify designated critical habitats of these species.

Greater sage-grouse

The BLM analyzed potential effects of the Project on the greater sage-grouse, which was a Candidate species at the time the BA was written. The BA also included conservation measure SSWS-5 to avoid or minimize Project-related impacts to greater sage-grouse and its habitat (see SSWS-5 attached to this memo). On October 2, 2015, the Service announced that the greater sage-grouse does not warrant listing under the ESA (80 FR 59858). Formal conservation commitments made by federal, state, and private landowners to protect the greater sage-grouse and its habitat were an important component of the Service's finding to not list the greater sage-grouse. The Service is in the process of working through the Technical Advisory Group with the BLM and the Applicant to finalize the greater sage-grouse impacts analysis, Conservation Objective Team Report/ Mitigation Framework Checklist consistency analyses, and mitigation plan. The objective of these efforts is to help this Project to achieve a net conservation benefit for the greater sage-grouse, contributing to precluding the need to list the species in the future.

The Service appreciates the BLM's continued interest in the conservation of threatened and endangered species. If you have questions regarding species addressed in this consultation package or the BO, please contact the following Service staff: **Wyoming** – Julie Reeves of our Wyoming Field Office (307) 772-2374, extension 232; **Colorado** – Creed Clayton of our Grand Junction Field Office (970) 628-7187; **Utah** – Amy Defreese of our Utah Field Office (801) 975-3330, extension 128; and **Nevada** – Susan Cooper at our Las Vegas Field Office (702) 515-5459.

Attachments:

1 – Biological Opinion for the TransWest Express Transmission Line Project
2 – Conservation Measures for the TransWest Transmission Line Project

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Attachment 1

Biological Opinion for the

TransWest Express Transmission Line Project

FORMAL CONSULTATION AND BIOLOGICAL OPINION FOR THE TRANSWEST EXPRESS TRANSMISSION LINE PROJECT

06E13000-2014-F-0052a

U.S. FISH AND WILDLIFE SERVICE
WYOMING ECOLOGICAL SERVICES FIELD OFFICE
CHEYENNE, WYOMING

Date_____

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Description of the proposed action

A detailed description of the TransWest Express Transmission Line Project (Project; i.e., proposed action or agency-preferred alternative) and the action area can be found in the biological assessment (BA). This consultation covers only the alternative and option which was determined to be preferred by the Bureau of Land Management (BLM). The Project includes the construction, operations, and maintenance of approximately 728 miles of new 600-kilovolt (kV) direct current (DC) transmission line within a 250-foot right-of-way (ROW) that will deliver approximately 3,000 megawatts of electric power from renewable and/or non-renewable energy sources in south-central Wyoming near Sinclair, Wyoming to the Eldorado Valley south of Boulder City in southern Nevada. The Project also includes the construction of a northern and southern terminal, construction and improvement of access roads, and installation of ancillary facilities including 12 to 15 fiber optic communication and regeneration facilities and two ground electrode systems. The Project includes pre-construction activities, environmental surveys, engineering surveys, geotechnical investigations, and construction activities of the towers and ancillary facilities, operations and maintenance, and decommissioning. The design of the transmission line includes primarily guyed steel lattice towers (Fletcher pers. comm. 2016). Where these structure types are not appropriate because of topography or presence of sensitive habitats, self-supporting steel lattice towers, and tubular steel towers may be used.

The action area is defined in 50 CFR 402 to mean "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action." It is the geographic area in which changes to the physical, chemical, and biotic environment can be caused directly or indirectly by the Project. For this Project, the action area identified in the BA includes the 250-foot ROW and the refined transmission corridor, which varies from 500 feet to 3,500 feet wide depending on local resource issues and siting constraints. Indirect effects of the Project are assessed in a 2-mile-wide corridor centered on the proposed ROW.

For the purpose of our evaluation of impacts to Colorado River fish, we define the action area to be the Colorado River watershed, and specifically: (1) for bonytail: occupied and critical habitat located downstream of potential points of water diversion to Lake Powell. This action area is the same as the action area defined on page 6-64 of the BA (BLM 2015a); (2) for Colorado pikeminnow: occupied and critical habitat located downstream of potential points of water diversion to Lake Powell, occupied and critical habitat crossed by the refined transmission corridors, and the potential disturbance area beyond the refined transmission corridors plus an approximately 1-mile downstream segment from the ROW crossings to address direct and indirect effects of the proposed action. This action area is the same as the action area defined on page 6-69 of the BA (BLM 2015a); (3) for humpback chub: occupied and critical habitat located downstream of potential points of water diversion to Lake Powell, occupied and critical habitat crossed by the refined transmission corridors and engineered alignment. This action area is the same as the action area defined on page 6-75 of the BA (BLM 2015a); and (4) for razorback sucker: occupied and critical habitat located downstream of potential points of water diversion to Lake Powell. This action area is the same as the action area defined on page 6-82 of the BA (BLM 2015a).

For the purpose of our evaluation of impacts to Deseret milkvetch, we define the action area to include the area directly disturbed by the action within the BA's Deseret milkvetch analysis area plus a 3,281-foot (1,000 meter) distance where fugitive dust resulting from project activities may impact the growth and reproduction of Deseret milkvetch individuals and invasive weeds may spread into Deseret milkvetch habitat along dirt road corridors used by the project. This distance is supported by our literature evaluation of road effects to plants (see USFWS 2014a) and studies that document dust dispersal from dirt roads out to 2,297 feet (700 meters) (Lewis 2013) and 3,281 feet (1,000 meters) (Walker and Everett 1987). While not based on site specific information, we consider the 3,281-foot (1,000 meter) distance to be a reasonable "upper bound" distance for plant impacts from the Project. Based on this distance, the action area includes all Deseret milkvetch occupied habitat east of Highway 89. This action area is larger than the BA's Deseret milkvetch analysis area as described on page 6-99 of the BA (BLM 2015a).

The action area for the Mojave desert tortoise for the Project includes the Southern Terminal Station, 250-foot wide transmission line corridor, access roads, and any ancillary facilities within desert tortoise habitat in Nevada (Figure 6-8 in the second BA addendum; BLM 2016a). In addition, the action area includes a 0.5-mile wide buffer around the Southern Terminal Station and along each side of linear project areas. We include a 0.5-mile buffer to address adverse effects to the Mojave desert tortoises whose home ranges overlap the proposed Southern Terminal Station and linear project areas. This area is the same as the Mojave desert tortoise action area defined on page 6-52 of the BA (BLM 2015a).

Colorado River Fish Species

I. Background

The Project proponents will use water from the Colorado River Basin. Consultation is not required if the water is obtained from sources with existing consultations (e.g., municipal); however, the Project proponents are currently unable to identify all of the future withdrawal locations and the precise amounts of water to be used from each location. If all water used for this Project is from withdrawals for which consultation has already occurred, then there will be no new effect from the water being used for this Project. For the Colorado River Basin, it is possible that some potential sources may already be addressed by existing consultations (e.g. some municipal systems); however, for purposes of this consultation, we assume all water used will be new depletions as the sources are unknown. Therefore, the action includes the potential consumptive use from the Colorado River system of up to 219 acre-feet of water during the three-year construction timeframe for the Project, which results in an average annual depletion of 73 acre-feet per year. The Project also includes the use of water from the Colorado River system during the operations and maintenance phase of the Project. This use will be up to 1.25 acre-feet per year. The BO for the Colorado River system is based on a template that tiers to existing programmatic biological opinion for the Colorado River.

The Project may also affect the Colorado River fish species by crossing occupied and critical habitat. The Project will span designated critical habitat and permanent ground disturbance will

be avoided in all locations. Conservation measure SSS-4 prohibits permanent structures or new roads in critical habitat for federally listed fish species. Critical habitat for Colorado pikeminnow is crossed by the Project in two locations and for the razorback sucker in one location.

The four federally endangered fish species of the upper Colorado River Basin include the endangered bonytail (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), and razorback sucker (*Xyrauchen texanus*). A Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program) was initiated on January 22, 1988. The Recovery Program was intended to be the reasonable and prudent alternative to avoid jeopardy to the endangered fish by depletions from the Upper Colorado River.

In order to further define and clarify the process in the Recovery Program, a section 7 agreement was implemented on October 15, 1993, by the Recovery Program participants. Incorporated into this agreement is a Recovery Implementation Program Recovery Action Plan (Plan), which identifies actions currently believed to be required to recover the endangered fish in the most expeditious manner in the Upper Colorado River Basin.

II. Colorado River Depletions

A part of the Recovery Program was the requirement that if a Project was going to result in a depletion, a depletion fee will be paid to help support the Recovery Program. On July 5, 1994, the U.S. Fish and Wildlife Service (USFWS) issued a biological opinion determining that the fee for depletions of 100 acre-feet or less will no longer be required. This was based on the premise that the Recovery Program has made sufficient progress to be considered the reasonable and prudent alternative avoiding the likelihood of jeopardy to the endangered fishes and avoiding destruction or adverse modification of their critical habitat by depletions of 100 acre-feet or less. Therefore, **the depletion fee for this Project is waived**.

We concur that the proposed Project may affect and is likely to adversely affect the four federally endangered fishes of the Upper Colorado River Basin and their designated critical habitat due to the associated 73 acre-feet average annual water depletion over the three-year construction period for the Project, and for the 1.25 acre-feet average annual depletion over the 50-year operations phase of the Project from the Lower Colorado River Basin. Permits or other documents authorizing specific projects, which result in depletions, should state that the BLM retains discretionary authority over each project for the purpose of endangered species consultation. If the Recovery Program is unable to implement the Plan in a timely manner, reinitiation of section 7 consultation may be required so that a new reasonable and prudent alternative can be developed by the USFWS.

III. Critical Habitat for Colorado River Fish Species

The Project may additionally affect listed fish species and their designated critical habitat within the Colorado River through the contribution of sediment and degradation of water quality caused

by ground disturbance from vehicles and heavy equipment during preconstruction, construction, operation, and maintenance activities. The Project crosses approximately 19 and 22 miles, respectively, upstream of critical habitat for the bonytail in the Yampa River and Green River (Desolation and Gray Canyons).

The Project crosses critical habitat for the Colorado pikeminnow in the Yampa (Moffatt County, Colorado) and Green Rivers (Uintah County, Utah and Moffatt County, Colorado). Approximately 1 acre in each of the crossings will be temporarily impacted by the Project. Occupied habitat for the Colorado pikeminnow also occurs downstream of crossings in the Colorado River and tributaries near the confluence with the Colorado, Price, and White Rivers. The only two known spawning sites for the Colorado pikeminnow are located downstream of the Project at Three Fords Canyon in the Gray Canyon area of the Green River (Carbon and Uintah Counties, Utah) and the lower 20 miles of the Yampa River (Moffatt County, Colorado).

The Project crosses critical habitat for the razorback sucker in the Green River and its 100-year floodplain from the confluence with the Yampa River to the Sand Wash (Uintah County, Utah). The Project will temporarily impact approximately 1 acre of critical habitat at the crossing of the Green River. Critical habitat for the razorback sucker is also located downstream of Project crossings in the Colorado, White, and Yampa Rivers. The Project crosses occupied habitat for the razorback sucker in the Green River. Occupied habitat for this species is also downstream of the Project crossing in the Little Snake River in Wyoming, the Colorado and White Rivers in Colorado, and Las Vegas Wash in Nevada.

The implementation of conservation measures within and near all critical habitats will minimize potential impacts of the Project. These include sediment protection for streams, avoidance of water withdrawal and entrainment/impingement effects, and committing to no permanent structures or new roads in critical habitat for federally listed fish. A complete list of conservation measures for the Project is located in the conservation measures Attachment 2 to this memo. Therefore, due to the implementation these conservation measures (specifically SSS-2, SSS-4, SSS-6, and SSS-13) to avoid impacts to critical habitat that is being crossed by the Project, we do not anticipate that the Project will adversely modify critical habitat for the federally listed fish species in the Colorado River basin.

Deseret milkvetch

I. Status of the Species

Status

Deseret milkvetch (*Astragalus desereticus*) was listed as a threatened species in 1999 (64 FR 56590). There is no critical habitat designated for the species.

In October 2006, we finalized a conservation agreement for the species with the Utah Natural Heritage Program (UNHP), Utah Division of Wildlife Resources (UDWR), and Utah Department of Transportation (UDOT). The conservation agreement works to alleviate the

threats of highway widening and livestock grazing for which the species was originally listed (see Threats to the Species, below).

The species' known abundance and amount of occupied habitat is higher than at the time of listing. When it was listed under the Endangered Species Act (ESA) in 1999, 5,000 – 10,000 Deseret milkvetch plants were known to occur in less than 300 acres (120 hectares) (64 FR 56591, October 20, 1999). A more extensive range-wide survey in 2008 documented 153,533 plants (Fitts and Fitts 2009), but this is considered an overestimate and our corrected population size for the surveyed areas is between 86,775 and 98,818 plants (USFWS 2011). Incorporating the most recent 2015 survey data, the species occurs on 354.84 acres (143.6 hectacres) of habitat, that is comprised of 57 percent on state land (200.78 acres (81.25 hectacres)), 40 percent on private land (142.09 acres (57.50 hectacres)), and 3 percent on federal land (11.96 acres (4.84 hectacres)). Future surveys in suitable habitat could contribute additional numbers to our population estimate.

In 2007, we published an advanced notice of rulemaking under which we intend to propose delisting *A. desereticus* based on the absence of threats to the species and an increase in plant abundance and occupied habitat (72 FR 3379, January 25, 2007). Since 2007, additional studies have shown that there is a larger area of occupied habitat and larger populations than previously known, and that there are no threats to the species (Fitts 2008; Fitts and Fitts 2009, 2010).

We concluded in the species' most recent 5-year status review that Deseret milkvetch should be proposed for delisting due to the absence of threats to the species and its habitat, and because the species' known range and population size is greater than previously thought (USFWS 2011). In October 2015, we received a petition to delist the species, and we published a 90-day finding determining that the petition presented substantial scientific information indicating the petitioned action may be warranted (81 FR 14058, March 16, 2016).

Species Description

Deseret milkvetch is a perennial, herbaceous, almost stemless member in the bean family (Barneby 1989). Individual plants are 2–6 inches (in) (5–15 centimeters (cm)) in height and arise from the base of an herbaceous stem. Stems are about 2 in (5 cm) tall. The pinnately compound leaves (feather-like arrangement with leaflets on both sides of a central stalk) are 2–4 in (5–10 cm) long with 11–17 leaflets. Leaflets are elliptical to ovate in shape, with a dense, silvery gray pubescence (short hairs) on both sides. Flower petals are either completely white or white with splashes of pink. Seed pods are 0.4–0.8 in (1–2 cm) long and densely covered with lustrous hairs and contain an average of 8.5 seeds per pod (Dodge 2009).

Distribution

Deseret milkvetch is a narrow endemic occurring in just one population near Birdseye, Utah, Utah County. The population occurs primarily on state, private, and U.S. Forest Service lands at

elevations between 5,400 and 6,000 feet (1,646-1,829 meters) (Franklin 1990; Stone 1992; Humphrey 1993; Fitts and Fitts 2010; SWCA 2015).

Deseret milkvetch occurs only on sandy-gravelly, steep-sloped hillsides of the Moroni formation. Surface soils are highly erosive, and a mixture of tuff, breccia, volcanic cobbles, sandstone, siltstone, quartzite, and blue limestone.

Deseret milkvetch occurs in a sagebrush-juniper community (Welsh and Chatterley 1985, England pers. comm. 2010). Species that are associated with Deseret milkvetch are *Pinus edulis* (twoneedle pinyon), *Juniperus osteosperma* (Utah juniper), *Quercus gambelii* (Gambel oak), *Artemisia tridentata* (big sagebrush), *Purshia tridentata* (antelope bitterbrush), *Opuntia polyacantha* (plains pricklypear), *Pseudoroegneria spicata* (bluebunch wheatgrass), *Achnatherum hymenoides* (Indian ricegrass), *Hesperostipa comata* (needle and thread), *Bromus tectorum* (cheatgrass) and *Eriogonum brevicaule* (shortstem buckwheat) (Franklin 1990; Stone 1992; Humphrey 1993; UDWR *et al.* 2006).

Life History

Deseret milkvetch appears to be a short-lived perennial, but additional studies are needed to determine the species growth, reproduction, and lifespan. Plants begin active growth shortly after snow melt in about mid-April, flower in May, and produce seeds in June (Stone 1992). Plants enter dormancy in mid-summer and are difficult to impossible to detect above-ground. New leaf and flower buds form at the soil surface in late summer and generally survive the winter because they are protected from severe cold by snow cover (Stone 1992).

Deseret milkvetch reproduces sexually (Stone 1992), and appears to require pollinators for seed production (Dodge 2009). The specific pollinators of Deseret milkvetch are not known, but solitary bees are likely important because they are common pollinators for the entire *Astragalus* genus (Geer *et al.* 1995; Watrous and Cane 2011). Bee pollinators generally need a diversity of native plants for foraging throughout the seasons, nesting and egg-laying sites, and undisturbed places for overwintering (Shepherd *et al.* 2003). Propagation efforts indicate the majority of seeds are viable and germination is readily obtained once the seed coat is scarified (seed coat is nicked or damaged to allow water to penetrate the seed coat) (Dodge 2009).

Additional information on the life history, population dynamics, status, and distribution are described in detail in the 2011 5-Year Review for the species (USFWS 2011).

II. Threats to the Species

At the time of listing, we identified residential development, highway widening, and livestock grazing and trampling as threats to the species, and also noted that small population size made Deseret milkvetch vulnerable to the identified threats and stochastic events (64 FR 56590).

Today, the identified threats of residential development, highway widening, and livestock grazing and trampling have either failed to materialize or are of very limited impact (USFWS 2011). Residential development has been minimal since 1993 and the likelihood of future development in the species habitat is low because the majority of the species' habitat, regardless of landowner, occurs on steep, rocky, and highly erosive slopes that are not conducive to development (England pers. comm. 2010; USFWS 2011).

Highway widening has not occurred to date and there are no plans to widen Highway 89 (USFWS 2011). Our conservation agreement with UNHP, UDOT, and UDWR addresses highway maintenance and plant protection within the existing Highway 89 right of way (ROW) as well as livestock grazing.

Livestock grazing and trampling has decreased in Deseret milkvetch habitat since the time of listing, and current levels are not significantly negatively impacting the population (72 FR 3379, January 25, 2007; USFWS 2011). Overall, fragmentation of habitat within the population is minimal and has not increased since listing.

Since listing, survey data shows the species' range is larger and population numbers are higher than previously thought (see Distribution, Life History, and Status, above). The population has successfully survived prolonged drought conditions and is stable or increasing in size. With a larger population size, the species is less vulnerable to stochastic events.

In summary, we recommended delisting the species in 2007 and 2011 based on the absence of threats to the species and an increase in known plant abundance and occupied habitat (see Distribution, Life History, and Status, above; 72 FR 3379, January 25, 2007; USFWS 2011). Threats identified in the original listing package including residential and highway development and livestock grazing have either failed to materialize or are of very limited impact. In addition, the species has shown resiliency to drought, and fragmentation of habitat is minimal.

III. Environmental Baseline

Regulations implementing the ESA (50 CFR 402.02) define the environmental baseline as follows:

-] The past and present impacts of all federal, state, or private actions and other human activities in the action area;
-] The anticipated impacts of all proposed state or federal projects in the action area that have already undergone formal or early section 7 consultation; and
-] The impact of state or private actions that are contemporaneous with the consultation process.

Status of the Species within the Action Area

In 2015, the Applicant had SWCA Environmental Consultants (SWCA) conduct project-level surveys in areas of known occupancy for Deseret milkvetch and nearby areas that were accessible to surveyors. The SWCA 2015 survey was performed within 300 feet of the existing Blind Canyon Road and a reconnaissance level survey was performed within 100 feet of five proposed transmission tower structures and the associated southern access route. Remaining areas that were not surveyed include 11 proposed transmission tower structures and approximately 8.2 miles of access roads. Overall, the scope of the Applicant's survey did not include the entirety of our action area.

A total of 1,075 Deseret milkvetch plants were located during the BLM survey (SWCA 2015). The majority of known Deseret milkvetch plants occur along the existing Blind Canyon Road. This represents 1.2 percent of the total population of Deseret milkvetch, using our low 2008 total population estimate of 86,775 plants. The BLM survey also identified 36.7 acres of suitable and 26.5 acres of occupied Deseret milkvetch habitat.

These surveys were consistent with the seasonal criteria of USFWS protocols for Deseret milkvetch surveys (USFWS 2011). However, the surveys were inconsistent with our protocol in that they included only a 100-foot buffer at the 5 proposed tower locations whereas USFWS protocols recommend a 300-foot buffer. In addition, many areas were not surveyed in 2015 because of their relative inaccessibility due to terrain and private land access, and the Applicant's survey did not include the entirety of our action area. Without protocol level surveys throughout the entire BLM survey area for Deseret milkvetch, the BLM and Applicant acknowledge the inability to document all Deseret milkvetch individuals and the extent of suitable and occupied habitat within the project area (see *Quantifying Effects of the Action*, below).

Because of the narrow scope of the Applicant's 2015 surveys, we conducted our own analysis of the species population relative to our defined action area. We estimate 77,095 plants occur within 3,281 feet (1,000 meters) of the Blind Canyon Road within the action area, based on the 2008 survey results (Fitts and Fitts 2009). We used a 1,000-meter buffer because this is the distance where fugitive dust resulting from project activities may impact the growth and reproduction of Deseret milkvetch individuals and invasive weeds may spread into Deseret milkvetch habitat along dirt road corridors used by the project. This distance is supported by our literature evaluation of road effects to plants (see USFWS 2014a) and studies that document dust dispersal from dirt roads out to 2,297 feet (700 meters) (Lewis 2013) and 3,281 feet (1,000 meters) (Walker and Everett 1987). While not based on site specific information, we consider the 3,281 foot (1,000 meter) distance to be a reasonable "upper bound" distance for plant impacts from the Project. This represents 89 percent of the total population of Deseret milkvetch.

Factors Affecting the Species within the Action Area

As described above (see Threats to the Species), there are no significant threats impacting the species in its range or in the action area. Ongoing activities in the action area include regular use of the Blind Canyon Road for public access, periodic use for transmission line maintenance access, and seasonal use for hunting and recreational activities. Grazing also occurs on a seasonal basis in the action area. However, we do not have information regarding the grazing

practices on private lands within the newly expanded range of the species. The southern access road is periodically used for transmission line maintenance access; however, the access road crosses private land and appears to receive very little use. Use of the southern access road is restricted by a locked gate.

IV. Effects of the Action

Regulations pursuant to section 7 of the ESA define effects of the action as "the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with the action, that will be added to the environmental baseline" (50 CFR § 402.02). Direct effects are defined as the direct or immediate effects of the action on the species or its habitat. Indirect effects are defined as those effects that are caused by or result from the proposed action, are later in time, and are reasonably certain to occur.

Effects of the action to Deseret milkvetch include the loss of plants and occupied habitat from the installation of tower structures and widening of access roads, the loss of plants from increased traffic along access roads that are occupied by the species, soil compaction and habitat degradation from construction and maintenance activities in occupied habitat, habitat fragmentation within the population from the construction of additional access roads, impacts to plant growth and reproduction from fugitive dust generation, habitat degradation, and the potential for encroachment of non-native weeds in disturbance areas along access roads and within occupied habitat. There is the potential for these effects to occur during all three phases of the proposed action, including the pre-construction, construction, and post-construction maintenance phases.

Ground-disturbing activities associated with construction staging and work areas, ingress and egress areas, tower pads, widening of existing access roads, and the construction of new access roads have the potential to adversely affect Deseret milkvetch in the short and long term. Ground-disturbing activities may result in the loss of plants and occupied habitat, compaction of soil and vegetation, soil disturbance, destruction of associated vegetation in occupied habitat, and herbicide use. These activities may destroy or reduce the vigor and fecundity of individual Deseret milkvetch plants. For example, plants present within existing access roads may be destroyed or crushed by construction and maintenance vehicles, and both plants and occupied habitat may be permanently lost by construction of tower pads.

Deseret milkvetch appear to be able to tolerate some levels of disturbance because they recolonize areas that have been disturbed by tracked vehicles and road grading equipment. Plants grow in disturbed soils (Franklin 1990; Fitts and Fitts 2009; SWCA 2015), and can grow larger on disturbed road cuts compared to plants in undisturbed habitat (Franklin 1990). However, it is unlikely that plants will recolonize backfilled areas if unsuitable soils are used. In addition, this tolerance is likely mediated by the effects of dust deposition, increased invasive species, and habitat fragmentation, as described below.

Habitat fragmentation associated with the construction of new access roads and spur roads has the potential to negatively impact the Deseret milkvetch population. Increased habitat fragmentation and reduced habitat connectivity can negatively affect genetic variability and population viability (Gilpin and Soule 1986), and has the potential to exert a cascading effect through a plant community by modifying inter-specific interactions, exacerbating edge effect, and potentially affecting the genetic composition of populations (Ellstrand and Elam 1993; Young *et al.* 1996; Debinski and Holt 2000).

Some of the negative effects of habitat fragmentation to plants are due to effects on pollinators that impact plant reproduction and fitness (Aizen *et al.* 2002; Debinski and Holt 2000; Gathmann and Tscharntke 2002; Kolb 2008; Lennartsson 2002; Moody-Weis and Heywood 2001). Fragmented plant populations appear to be less attractive to insect pollinators, which spend more time in larger, unfragmented plant habitats (Aizen *et al.* 2002; Goverde *et al.* 2002; Kolb 2008; Lennartsson 2002). Lower pollinator visitation rates are associated with reduced reproductive success in fragmented sites compared to intact sites (Jennersten 1988). Furthermore, insect pollinator diversity increases in larger plant populations with larger habitat areas (Mustajarvi *et al.* 2001) and decreases in isolated habitats with smaller plant populations (Steffan-Dewenter and Tscharntke 1999).

While there is the potential for habitat fragmentation to occur within the Deseret milkvetch population, we do not anticipate significant negative impacts to the population from the creation of additional access roads for this proposed action. This is primarily because existing access roads will be used to a large extent (Fetter 2016), and any new spur roads will be located near new tower locations that are outside of the known population and will be farther away from the existing transmission lines and associate infrastructure. The proposed transmission line ROW is located to the east and upslope of the existing transmission line installed in the 1980s; therefore it is farther away from Deseret milkvetch occupied habitat than the existing transmission line.

Effects to Deseret milkvetch growth and reproduction may occur from dust deposition as a result of increased traffic during the active growing and flowering season. Road traffic mobilizes and spreads dust on unpaved roads (Farmer 1993; Trombulak and Frissell 2000), and dust accumulation within nearby habitat can negatively affect plant growth and physiology (Eller 1977; Farmer 1993; Hobbs 2001; Spatt and Miller 1981; Sharifi *et al.* 1997; Thompson *et al.* 1984; Trombulak and Frissell 2000). The distance from a road at which dust can affect vegetation varies (Everett 1980; Spatt and Miller 1981; Walker and Everett 1987; Santelmann and Gorham 1988; McCrea 1984; Myers-Smith *et al.* 2006). Dust from vehicle traffic on dirt roads can travel up to 3,281 feet (1,000 meters) from the source (Walker and Everett 1987). Dust related impacts are greatest next to roads and impacts attenuate with distance from roads (references summarized in USFWS 2014a).

Dust deposition during the active growing and flowering season from increased traffic can impact Deseret milkvetch individuals. Dust can clog plant pores, increase leaf temperature, alter photosynthesis, and affect gas and water exchange (Sharifi *et al.* 1997; Ferguson *et al.* 1999; Lewis 2013), thereby negatively affecting plant growth and reproduction. During the flowering

period, dust negatively impacts plant reproduction out to a distance of 1,312 feet (400 meters) from dirt roads (Lewis 2013). However, we would expect impacts to be greatest within 300 feet (91 meters) of dirt access roads (Etyemezian *et al.* 2004; Veranth *et al.* 2003; Lewis 2013; Silver 2007). We anticipate dust deposition from the proposed action will be low during the pre-construction and post-construction phases of the project, and will be high but of short duration during the construction phase of the project.

Effects to Deseret milkvetch and occupied habitat may also include habitat degradation from construction and maintenance activities and subsequent soil compaction, and the potential for encroachment of non-native weeds in disturbance areas along access roads and within occupied habitat. Soil compaction may reduce the suitability of the habitat and affect future recruitment of the species in some locations.

Seeds from invasive species are often carried and spread by vehicles (Forman and Alexander 1998). The spread of invasive nonnative species is considered the second largest threat to imperiled plants in the United States (Wilcove *et al.* 1998), and is second only to habitat loss as factors responsible for biodiversity declines (Randall 1996). Invasive nonnative plants alter ecosystem attributes including geomorphology, fire regime, hydrology, microclimate, nutrient cycling, and productivity (Dukes and Mooney 2004). Invasive nonnative plants also can detrimentally affect native plants through competitive exclusion, alteration of pollinator behaviors, niche displacement, hybridization, and changes in insect predation. Examples are widespread and involve numerous taxa, locations, and ecosystems (Aguirre and Johnson 1991; D'Antonio and Vitousek 1992; DiTomaso 2000; Melgoza *et al.* 1990; Mooney and Cleland 2001; Levine *et al.* 2003; Traveset and Richardson 2006).

Quantifying Effects of the Action

Based on project designs identified in the BA and the BLM 2015 survey results, project infrastructure including tower locations and access roads may result in the loss of 83 Deseret milkvetch plants and 0.9 acre of occupied habitat. However, there are significant data gaps regarding the total number and location of Deseret milkvetch plants within the action area.

In order to address the data limitations of the proposed action, we evaluated a reasonable "upper bound" estimate of plant impacts in the unsurveyed portion of the action area. This reasonable "upper bound" estimate is initially based on the possible impacts to 83 plants from the survey of five tower locations and 1.4 miles of access road, as identified in the BA.

- u Since 5 towers represent 31 percent of the 16 towers that will be installed near Deseret milkvetch habitat, we calculated 268 plants (83/0.31) may be impacted from the construction of all 16 tower locations.
- u Since 1.4 miles of surveyed access road represents 15 percent of the total 9.6 miles of access roads that will be installed near Deseret milkvetch habitat, we calculated 553 plants (83/0.15) may be impacted from the construction of all access roads.

Based on our reasonable "upper bound" scenario for plant impacts, project infrastructure including tower locations and access roads may result in the loss of 821 plants (268 + 553); this

number represents 1% of the total population using the low 2008 population estimate of 86,775 plants. We anticipate this reasonable upper bound scenario for plant impacts will be greater than actual project impacts. Direct loss of plants from the proposed action will be documented and reported prior to construction.

Impacts primarily associated with dust deposition and possibly weed encroachment may affect all of the estimated 77,095 plants in the action area based on the 3,281-foot (1,000 meter) distance from roads and infrastructure (see *Description of the proposed action*, above). However, impacts will likely be greatest within 300 feet (91 meters) of Blind Canyon Road where 995 plants occurred in 2015 (SWCA 2015). These impacts may affect growth and reproduction of individual plants during the periods of active growth in the spring and fall when project activities occur; however, these impacts will not result in any loss of plants and should not result in a population level impact to Deseret milkvetch. Our evaluation is supported by the current status of the Deseret milkvetch population despite the construction and maintenance activities associated with the existing transmission line near the population.

To avoid and minimize impacts to Deseret milkvetch to the greatest extent possible, the BLM and Applicant will implement conservation measures (see the attached list of conservation measures), including: (1) avoid plant mortality and loss of occupied habitat where the majority of Deseret milkvetch plants occur in the BLM survey area by using the existing Blind Canyon Road and not upgrading the road where plants occur within 300 feet (91 meters) of the road; (2) minimize impacts to Deseret milkvetch plants in the proposed ROW and southern access roads by implementing a 300-foot (91 meter) buffer for new roads and structure locations where feasible; (3) minimize impacts to Deseret milkvetch plants from dust in the action area by avoiding use of the Blind Canyon access road during the flowering period and implementing dust abatement measures during the growing season; and (4) minimize impacts to Deseret milkvetch plants from weeds in the action area by power-washing construction vehicles prior to entering Blind Canyon road and monitoring and controlling invasive weeds along access roads with minimal-impact techniques.

V. Cumulative Effects

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area. Future federal actions that are unrelated to the proposed action are not considered under this section because they require separate consultation pursuant to section 7 of the ESA.

Unrelated state or private actions that are most likely to occur in the future within the action area is the continuation of ongoing baseline activities described above (Factors Affecting the Species in the Action Area). We have no information that indicates an increase in residential development, highway projects, or other activities will occur or increase in the action area. With the improvements and upgrades to the southern access road from this project, an increase in

recreational use is possible but not likely since the road is private access only and the road is blocked with a locked gate.

The current status of the Deseret milkvetch is not negatively affected by ongoing activities in the action area and we do not anticipate cumulative effects to increase in the action area in the future. Cumulatively, these past and future actions will contribute to the ongoing stability and growth of the Deseret milkvetch population.

VI. Conclusion

After reviewing the current status of Deseret milkvetch; the environmental baseline for the action area; the effects of the proposed action; and the cumulative effects, it is our biological opinion that this Project, as described in this biological opinion, is not likely to jeopardize the continued existence of Deseret milkvetch. We base our conclusion on the following:

1. UOur reasonable "upper bound" scenario for potential plant mortality (see *Quantifying Effects of the Action*) identifies the proposed action may result in the loss of 821 Deseret milkvetch plants that represent 1 percent of the total population. Potential growth and reproduction impacts associated with dust deposition and invasive weeds may affect an estimated 77,095 plants in the action area that represent 89 percent of the total population during project activities. However, dust and weed impacts will not result in the loss of any Deseret milkvetch plants and should not result in a population level impact to Deseret milkvetch. Our evaluation is supported by the current status of the Deseret milkvetch population despite the construction and maintenance activities associated with the existing transmission line near the population.

2. UThe BLM and Applicant's commitment to minimize impacts from dust generated by use of the existing Blind Canyon dirt access road in the action area by avoiding use on this road during the flowering period and implementing dust abatement measures during the growing season will greatly reduce negative effects to Deseret milkvetch growth and reproduction. The BLM and Applicant's commitment to minimize indirect impacts from weeds in the action area by power-washing construction vehicles prior to entering Blind Canyon road and monitoring and controlling invasive weeds with minimal-impact techniques along dirt access roads will minimize the spread of weeds and impacts to Deseret milkvetch associated with plant competition. Based on best available scientific information, these measures are anticipated to reduce dust and weed impacts to 89 percent of the Deseret milkvetch population so that the effect is not detectable at the population level. We conclude that effects from dust and weeds are discountable meaning they would be difficult to detect above baseline conditions and would be much smaller than the difference between our low and high population estimates of 86,775 and 98,818 plants.

3. UThe BLM and Applicant's commitment to: (1) avoid plant mortality and the loss of

occupied habitat where the majority of Deseret milkvetch plants occur in the BLM survey area by not upgrading the existing Blind Canyon Road where plants occur within 300 feet of the road; (2) minimize impacts to Deseret milkvetch plants in the proposed ROW and southern access roads by implementing a 300-foot (91 meter) buffer for new roads and structure locations where feasible.

4. –The BLM and Applicant's commitment to implement conservation measures across the entire action area regardless of landownership.

Mojave desert tortoise

I. Status of the Species and Critical Habitat Rangewide

The rangewide status of the Mojave desert tortoise (desert tortoise or tortoise, hereafter) consists of information on its listing history, species account, recovery plan, recovery units, distribution, reproduction, and numbers. This information is dated February 10, 2014, and represents the current rangewide status of the desert tortoise and its critical habitat. This information is provided on the USFWS's website at: http://www.fws.gov/nevada/desert_tortoise/dt/dt_life.html. If unavailable on this website, contact the Southern Nevada Fish and Wildlife Office in Las Vegas at (702) 515-5230, and provide File No. 84320-2015-F-0610 along with the request for the rangewide status of the desert tortoise dated February 10, 2014.

II. Environmental Baseline

The action area is defined as all areas to be affected directly or indirectly by the Federal action, including interrelated and interdependent actions, and not merely the immediate area involved in the action (50 CFR § 402.02). Subsequent analyses of the environmental baseline, effects of the action, cumulative effects, and levels of incidental take are based upon the action area as determined by the USFWS. Regulations implementing the Act define the environmental baseline as the past and present effects of all Federal, State, or private actions and other human activities in the action area (50 CFR § 402.02). Also included in the environmental baseline are the anticipated effects of all proposed Federal projects in the action area that have undergone section 7 consultation, and the effects of State and private actions that are contemporaneous with the consultation in progress.

The action area for the Mojave desert tortoise (desert tortoise or tortoise, hereafter) for the Project includes the Southern Terminal Station, 250-foot wide transmission line corridor, access roads, and any ancillary facilities within desert tortoise habitat in Nevada (Figure 6-8 in the second BA addendum; BLM 2016a). In addition, the action area includes a 0.5-mile wide buffer around the Southern Terminal Station and along each side of linear project areas. We include a 0.5-mile buffer to address adverse effects to desert tortoises whose home ranges overlap the proposed Southern Terminal Station and linear project areas. The buffer is based on reported

home range sizes of male desert tortoises (26.4 hectares [0.10 mi^2], 210 hectares [0.81 mi^2]), which are variable depending on weather and other environmental factors (Duda *et al.* 1999, Harless *et al.* 2009); straight-line distance that a male desert tortoise traveled in the first year following translocation (Walde *et al.* 2008); and the upper limits of the 95 percent confidence interval for the maximum straight-line distance that male and female desert tortoises were observed to disperse during the first year after being translocated (Nussear 2004, Field *et al.* 2007, Gowan and Berry 2009). While tortoises are not expected to be translocated outside their home ranges as a result of this project, we use these dispersal distances from translocation studies to represent the maximum distance a tortoise is likely to travel as a result of being moved.

Habitat throughout the desert tortoise action area consists primarily of creosote (*Larrea tridentata*) and white-bursage (*Ambrosia dumosa*) vegetation interspersed with areas of sparsely vegetated badlands, Joshua tree (*Yucca brevifolia*) woodland, blackbrush-ephedra (*Ephedra* sp.) vegetation, and invasive plant species (BLM 2014a). Vegetation for shelter and to a lesser extent forage, have been removed from parts of the utility corridor where other ROWs have been constructed or other disturbance has occurred. Undisturbed designated critical habitat in the action area retains the Primary Constituent Elements (PCEs) of critical habitat as discussed below. The disturbed portion of the action area contributes toward recovery by providing space and habitat connectivity, allowing unobstructed tortoise movements across contiguous desert tortoise home ranges. Although the action area continues to provide habitat connectivity, tortoises that cross the disturbed ROW would be exposed to predators, particularly smaller tortoises.

1. Status of the Desert Tortoise in the Action Area

For the purposes of this consultation, desert tortoise analysis area includes potential habitat greater or equal to 0.6 as modeled by the USGS (USGS; Nussear *et al.* 2009) and designated critical habitat within the action area. These areas represent a total of 300,857 acres of desert tortoise habitat including 249,538 acres of potential habitat and 51,319 acres of desert tortoise critical habitat within the Northeastern Mojave Recovery Unit (USFWS 2014b, BLM 2015).

The USFWS initiated range-wide monitoring of the desert tortoise in 2001, representing the first comprehensive attempt to determine densities of desert tortoises across their range. The USFWS (2014) used annual density estimates obtained from this sampling effort to evaluate range-wide trends in the density of desert tortoises over time. This analysis indicates that densities in the Northeastern Mojave Recovery Unit, in which the action area occurs, have increased by approximately 13.6 percent per year since 2004, with the rate of increase apparently resulting from increased survival of adults and subadults moving into the adult size class. The analysis also indicates that the populations in the other 4 recovery units are declining: Upper Virgin River (-5.1 percent), Eastern Mojave (-6.0 percent), Western Mojave (-8.6 percent), and Colorado Desert (-3.4 percent; however, densities in the Joshua Tree and Piute Valley conservation areas within this unit seem to be increasing).

BLM used two different sets of data to evaluate desert tortoises in the TWE action area. The first set of data is from project-specific surveys conducted for the northern portion of the proposed transmission line from approximately Interstate 15 (I-15) to the northern extent of desert tortoise

habitat (Figure 6-8 in the second BA addendum; BLM 2016a). In accordance with USFWS guidance (USFWS 2009), the Applicant, Western, BLM, and USFWS agreed to a probabilistic sampling approach of the northern portion of the proposed project (see BLM 2014a for survey design details). During surveys, biologists documented 11 live adult tortoises, 378 burrows, 34 pallets, 261 scat deposits, 21 carcasses, six egg shell fragments, 21 bone fragment deposits, and 18 sets of tracks (BLM 2014a). The resulting desert tortoise estimate the northern portion of the action area is 60 tortoises with a 95 percent confidence interval of (21, 170) (BLM 2014a).

The second set of data is from surveys that were conducted for the Southern Nevada Intertie Project (SNIP). The SNIP ROW and proposed TWE ROW are adjacent to each other with each having a 200- or 250-foot ROW for construction. Because of the close proximity, the tortoises that would be detected during surveys for each project would likely be similar. The following summary of SNIP survey information was provided by the BLM (second BA addendum; BLM 2016a). Surveys for the SNIP project were conducted in 2009, prior to when the USFWS's desert tortoise survey protocol was finalized. Surveys were conducted from April 23 to June 3, 2009, during the tortoise's more active season and when temperatures were below 35°C (95°F). Surveys consisted of a transect along the proposed SNIP transmission line route and transects every 10 meters (30 feet) from the transmission line within a 30-meter (100-foot) buffer on either side of the line. These surveys were conducted along one side of the SNIP ROW where it was parallel to an existing transmission line. In areas where the SNIP line was not parallel to an existing line, additional zone of influence surveys were conducted on both sides of the transmission line at 150 meters, 300 meters, and 450 meters from the edge of the ROW. In 2012, additional surveys along a 2.7-mile portion of the SNIP transmission line were conducted in the Dutchman Pass area. In total during surveys for the SNIP project, 15 live desert tortoises were observed, 105 burrows, 42 scat, 35 carcasses, two egg shells, one bone, and one set of tracks. Tortoise density estimates are not able to be derived from the data collected using these survey methods.

Efforts to accurately estimate the number of desert tortoises that may be encountered on long, linear projects such as the TWE project are difficult. We recognize that survey data represent a single point in time. All desert tortoises may not have been detected during the surveys, and the number of individuals in the project area will change in response to various factors. Variables that affect the number of tortoises that may occur or enter the TWE ROW include habitat quality and quantity, season, temperature, and precipitation. Number of tortoises in the project area will change if desert tortoises die or leave before construction of the proposed project begins; other unaccounted desert tortoises may move onto the site; and undetected hatchling desert tortoises may emerge from rodent burrows or nests on, or adjacent to the ROW. However, the information above provides the best available data to establish a baseline for analysis.

The area may contain desert tortoise nests with eggs. Based on studies performed in Ivanpah Valley and the Goffs study site in California that identified a sex ratio of 1:1 (Turner *et al.* 1984, Turner *et al.* 1987), we estimate that approximately half of the sub-adult and adult population is composed of reproductive females. However, it is difficult to estimate the number of eggs that may be within the proposed project area based on the number of reproductive females because of the following: (1) some territories of female desert tortoises may extend beyond the proposed

project area and their nests may be established outside the area; (2) fewer eggs may be present on the proposed project site at the time of construction depending on the time of the year; (3) the number of eggs that can be produced in a season is dependent on a variety of environmental and physiological factors; and (4) not all reproductive females produce eggs every year. Therefore, we are unable to estimate the number of eggs that may occur in the proposed project area.

In addition, global climate change may affect the desert tortoise and its recovery. The following information is summarized from the revised recovery plan for the desert tortoise (USFWS 2011). Global climate change and drought are potentially important long-term considerations with respect to recovery of the desert tortoise. Sufficient evidence exists that recent climatic changes have affected a broad range of organisms with diverse geographical distributions (Walther *et al.* 2002 in USFWS 2011). Although we do not have information regarding specific direct effects of climate change on the desert tortoise or its habitat, the Intergovernmental Panel on Climate Change has suggested a 3.5 to 4.0°C (6.3 to 7.2°F) increase in annual mean temperature, with the greatest increases occurring in summer (June-July-August mean up to 5°C (9°F) increase) (Christensen *et al.* 2007 in USFWS 2011). Precipitation likely will decrease by 5 to 15 percent annually in the region, with winter precipitation decreasing in the range of 5 to 20 percent (Christensen *et al.* 2007 in USFWS 2011).

Germination of desert tortoise food plants is highly dependent on stable winter precipitation and temperature. Forage base could be reduced due to increasing temperatures and decreasing or unreliable precipitation during critical winter months. Winter precipitation in the Mojave Desert is much more reliable than summer rains. One potential scenario is that winter precipitation would shift to the north over time, leading to drier winters in the Mojave Desert, negatively impacting the growth of the spring annual plants. Spring annual plants, which are dependent on winter precipitation, provide essential forage for the desert tortoise. However, rainfall patterns may change in unpredictable ways, some areas may get wetter and other areas drier, with both situations altering desert tortoise habitat. Areas with increased rainfall would likely have increased growth of non-native, invasive species, altering the mixture of plants available for desert tortoise forage and changing the fire regime. Therefore, desert tortoise habitat may potentially change over the life of the TWE project due to climate change. Further predictions need to be developed specifically for the desert tortoise to help inform recovery efforts.

2. Status of the Critical Habitat in the Action Area

The action area occurs in the Mormon Mesa and Beaver Dam Slope Critical Habitat Units within the larger Northeastern Mojave Recovery Unit for the desert tortoise. The critical habitat within the action area is both undisturbed and disturbed as a result of previous road, power transmission line, and other projects. The vegetation present in critical habitat within the undisturbed action area at lower elevations is characteristic of creosote scrub with large portions dominated by creosotebush and white bursage. Other vegetation types include saltbush (*Atriplex* spp.) scrub, blackbrush (*Coleogyne ramosissima*) scrub, blackbrush and Joshua tree woodland, and desert wash. Saltbush scrub consists of members of the genus *Atriplex* and other salt tolerant species. Blackbrush scrub is dominated by blackbrush and is common at the upper elevations of the project. Some of this community is co-dominant with Joshua trees, indicative of Joshua tree woodland. Desert washes are present throughout the action area, and the vegetation in these areas

consists of ephedra, cheesebush (*Ambrosia salsola*), and sweetbush (*Bebbia juncea*), with widely scattered catclaw acacia (*Acacia greggii*).

Desert tortoise critical habitat is composed of specific geographic areas that contain the PCEs of critical habitat, consisting of the biological and physical attributes essential to the species' conservation within those areas.

Below are the specific PCEs of desert tortoise critical habitat and their status in the action area.
PCE 1: Sufficient space to support viable populations within each of the six recovery units, and to provide for movement, dispersal, and gene flow.
Status: The action area is linear and includes areas disturbed by previous ROW projects. Although the project area has been impacted by previous development, sufficient space occurs to allow tortoises to move freely within and across the action area.

PCE 2: Sufficient quality and quantity of forage species and the proper soil conditions to provide for the growth of these species.
Status: Disturbances in the action area are mostly void of native plants important for desert tortoises. Undisturbed areas provide forage and proper soil conditions for tortoises.

PCE 3: Suitable substrates for burrowing, nesting, and overwintering; burrows, caliche caves, and other shelter sites.
Status: Although suitable substrates occur in the disturbed portion of the action area, desert tortoises likely nest and shelter in undisturbed areas within the action area.

PCE 4: Sufficient vegetation for shelter from temperature extremes and predators.
Status: This PCE occurs only in the undisturbed portion of the action area. Tortoises that use the disturbed area will be exposed to greater predation risk particularly from avian predators.

PCE 5: Habitat protected from disturbance and human-caused mortality.
Status: Critical habitat within the designated utility corridors has little protection from disturbance; however, projects proposed with a Federal nexus include measures to reduce human-caused mortality during construction.

3. Factors Affecting the Species and its Critical Habitat in the Action Area
Desert tortoise habitat occurs within two regions identified in the BLM EIS – Region III and Region IV. In Region III, the proposed alignment would occur predominantly on BLM-managed lands, also crossing BIA-managed lands through the Moapa River Reservation (BLM 2014b). In Region IV, the proposed alignment would occur predominately on BLM-managed lands, also crossing BOR-managed lands and private lands (BLM 2014b).

The proposed alignment would cross designated critical habitat for the desert tortoise in the Mormon Mesa Critical Habitat Unit (CHU) and Beaver Dam Slope CHU in Clark and Lincoln Counties (Figure 6-8 in second BA addendum; BLM 2016a). A major wildfire in 2005 burned approximately 3 percent of the critical habitat in the Mormon Mesa CHU and 26 percent of the critical habitat in the Beaver Dam Slope CHU.

The proposed project has been sited adjacent to several existing approved projects, including the Kern River pipeline, the UNEV pipeline, the Pecos-Harrisburg 345-kV transmission line, and the Navajo-McCullough 550-kV transmission line from TWE Segment 1530 near Toquop Wash to TWE Segment 1830 at the Southern Terminal (Figure 6-8 in second BA addendum; BLM 2016a). In Clark County, the entirety of the proposed TWE line would be collocated with approved ROWs and existing linear disturbance. In Lincoln County, 11.7 miles of the proposed TWE line is in designated critical habitat and 0.5 miles is in non-critical habitat would be collocated with approved ROWs and existing linear disturbance; the remainder of the line, 2.0 miles in designated critical habitat and 16.4 miles in non-critical habitat, would not be collocated with approved ROWs and existing linear disturbance (Spencer email message, 2016). Other existing disturbances and impacts to desert tortoises and habitat in the action area include roads, highways, railroad tracks, an electrical substation, a power plant, human disturbance associated with the Town of Moapa, and past cattle grazing (BLM 2014b).

a. Section 7 Consultations Affecting the Proposed Project Area

Several programmatic biological opinions have been issued to the BLM that include land in the action area for the project. The first one was issued on November 25, 1997 (USFWS File No. 1-5-F-251), for implementation of various land management programs within the Las Vegas District planning area excluding desert tortoise critical habitat and ACECs, and outside the Las Vegas Valley. Activities proposed that may affect the desert tortoise in the action area include issuance of a ROW, Recreation and Public Purposes Act leases, mineral material sales and leases, and mining plans of operation. The programmatic consultation is limited to activities which may affect up to 240 acres per project, and a cumulative total of 10,000 acres excluding land exchanges and sales. Only land disposals by sale or exchange in Clark County but outside the Las Vegas Valley are covered under the consultation up to a cumulative total of 14,637 acres. Thus, a maximum total of 24,637 acres of desert tortoise habitat may be affected by the proposed programmatic activities.

On June 18, 1998, the USFWS issued a programmatic biological opinion (PBO; USFWS File No. 1-5-98-F-053) to Southern Nevada District BLM for implementation of various land management programs within desert tortoise habitat and the Las Vegas planning area, including desert tortoise critical habitat and ACECs. Activities that were proposed that may affect the desert tortoise in the action area include recreation; designation of utility corridors and mineral material extraction areas; and designation of the desert tortoise ACECs.

On June 17, 2010, the Southern Nevada District BLM submitted a programmatic biological assessment to the USFWS to request consultation for program-level and project level actions that may affect, and are likely to adversely affect 19 threatened and endangered species, including the desert tortoise and of which 13 have designated critical habitat within the action area for the consultation. On January 2, 2013, the USFWS issued a non-jeopardy PBO to the BLM based on review of these activities (USFWS File No. 84320-2010-F-0365). While the BLM's 1998 resource management plan remains in effect, the 2013 PBO replaces the USFWS's 1998 document, which covered a 10-year period, and is expected to be in place through 2016.

On March 3, 2000, the USFWS issued a programmatic biological opinion to the BLM for potential effects to the desert tortoise from implementation of various land management programs in the Caliente Management Framework Plan Amendment area (USFWS File No. 1-5-99-F-450). The action area covered 305,376 hectares (754,600 acres) of BLM-administered lands in southern Lincoln County. The USWFS anticipated that up to 3,094 hectares (7,645 acres) of noncritical desert tortoise habitat and 384 hectares (950 acres) of critical desert tortoise habitat would be disturbed; in addition, up to 6,850 hectares (16,926 acres) of BLM-administered lands would be sold and developed for residential, industrial, commercial, and public infrastructure projects. This opinion was replaced by a programmatic biological opinion issued to the BLM's Ely District Office in 2008. No desert tortoises were killed, injured, or moved from harm's way, and no desert tortoise critical habitat was disturbed; however, 197 hectares (488 acres) of noncritical habitat were disturbed.

On July 10, 2008, the USWFS issued a programmatic biological opinion to the BLM for potential effects to the desert tortoise, and four other listed species, from implementation of various land management programs in the Ely District (USFWS File No. 84320-2008-F-0078). The action area covers 5.6 million hectares (13.9 million acres), but only 305,133 hectares (754,000 acres) in southern Lincoln County are in desert tortoise habitat. The programmatic biological opinion has a 10-year term ending in 2018. The USFWS anticipated that up to 24,028 hectares (59,375 acres) of desert tortoise critical habitat and up to 44,410 hectares (109,740 acres) of noncritical desert tortoise habitat would be affected from the proposed action; 9,156 hectares (22,624 acres) of desert tortoise critical habitat and up to 15,099 hectares (37,311 acres) of noncritical desert tortoise habitat were expected to be permanently disturbed. We exempted take of 47 desert tortoises through injury or mortality and 972 to be moved from harm's way. To date, no desert tortoises have been reported killed or injured; 1 tortoise has been moved from harm's way; and 115 hectares (284 acres) of desert tortoise critical habitat and 57 hectares (142 acres) of noncritical habitat have been disturbed.

In addition to PBOs, the following consultations address areas that overlap the action area addressed in this biological opinion.

Kern River Natural Gas Transmission (KRGT) Pipeline Project. Two parallel natural gas pipelines operated by Kern River occur within the project area. The pipeline projects required a license from the Federal Energy Regulatory Commission (FERC), ROWs from BLM, and permit from the Army Corps of Engineers. The biological opinion for the first KRGT pipeline was issued to FERC on December 21, 1990. The USFWS concluded that 45 desert tortoises may be killed or injured; 424 desert tortoises harassed; and 93 desert tortoise nests destroyed. As of June 24, 1991, approximately 23 deaths and 253 captures and movements of desert tortoise were recorded by Kern River along the pipeline ROW. Problems associated with vehicular traffic on the ROW and access roads may have contributed to the mortalities in combination with high desert tortoise activity levels that were not anticipated. Consequently, on June 24, 1991, FERC requested reinitiation of formal consultation for the project based on a high incidence of desert tortoise mortality and captures and movements on the pipeline project, which exceeded those limits established in the incidental take statement. The USFWS responded by letter dated June 28, 1991, and under reinitiation of consultation, imposed additional minimization measures,

increased the capture and movement limits for desert tortoise from 294 to an unlimited number, and injury or mortality limits from 25 to 35.

On July 9, 2002, the USFWS issued a biological opinion (USFWS File No. 1-5-02-F-0476) to FERC for construction and O&M of the second KRGT pipeline, adjacent to the first pipeline. The second pipeline project approximates the previous pipelines constructed under the 1990 and 1991 biological opinions. The pipeline ROW crosses approximately 318.8 miles of potential desert tortoise habitat, of which about 102.9 miles traverse desert tortoise critical habitat. Pipeline construction resulted in disturbance of 4,182 acres of desert tortoise habitat including 1,333 acres of desert tortoise critical habitat. Approximately 50 feet of the construction ROW overlapped the previously disturbed land that was affected by construction of the first KRGT pipeline. During construction of the second KRGT pipeline project, over 840 desert tortoises were encountered and one was killed as a direct result of project activities. Only one desert tortoise was observed in Utah; and approximately 380 tortoises in Nevada. One tortoise was killed on June 8, 2011, as a result of maintenance operations. Consequently, BLM and the USFWS agreed that the requirement for reinitiation of consultation had been triggered for O&M activities due to a desert tortoise mortality and additional effects to the desert tortoise from a large-scale translocation project in the pipeline action area. On September 28, 2011, the USFWS issued a biological opinion to BLM for O&M of the KRGT pipelines (USFWS File No. 84320-2011-F-0337).

UNEV Pipeline. On November 13, 2009, the USFWS issued a biological opinion to the BLM for ROW grants to construct, operate, and maintain the UNEV petroleum pipeline (USFWS File No. 84320-2011-F-0435). The UNEV gas pipeline project aligns with the previous KRGT pipeline ROWs. On April 8, 2011, a desert tortoise was killed after being buried under a spoil pile. A second tortoise was crushed by a project vehicle and killed on May 9, 2011. A third tortoise died on June 29, 2011, when it fell into an open project trench, exceeding the incidental take exempted in the biological opinion. Consultation was reinitiated, and the USFWS issued a second biological opinion on July 1, 2011, exempting three additional desert tortoise mortalities or injuries (five in total). On July 18, 2011, BLM reported a fourth desert tortoise mortality when a project vehicle ran over and crushed a very small tortoise in the road. On August 20, 2011, UNEV reported the fifth tortoise mortality, a crushed desert tortoise on their ROW. The mortality report concluded that the mortality was caused by an unauthorized, private vehicle that illegally accessed the ROW.

On August 31, 2011, BLM requested a second reinitiation of consultation in response to the additional desert tortoise mortalities. On September 29, 2011, the USFWS issued a biological opinion for the UNEV pipeline project. The USFWS exempted incidental take of 12 desert tortoises through injury or mortality, including the five previously killed and 237 desert tortoises captured and moved from harm's way.

On March 21, 2012, the BLM submitted a memorandum to the USFWS describing a newly discovered infestation of Sahara mustard (*Brassica tournefortii*) in the ROW of the UNEV pipeline; a plan to treat the infestation; minimization measures to protect the desert tortoise during the treatment; and a post-application monitoring plan. The infestation occurred

approximately from Meadow Valley Wash in Clark County (milepost 371) to the Beaver Dam Slope (milepost 325) at the Nevada and Utah state line. This situation constituted emergency consultation; thus, consultation was reinitiated for the third time and resulted in the USFWS issuing a biological opinion for this emergency consultation on July 19, 2012 (USFWS File No. 84320-2012-F-0266).

K Road Moapa Solar Energy Project. In 2012, the USFWS issued a biological opinion (USFWS File No. 84320-2011-F-0430) to the BIA for the K Road Moapa solar energy project under the intra- USFWS PBO for the Proposed Muddy River MOA (File No. 1-5-05-FW-536, Tier 5). The project involved the Tribe leasing land to a private applicant for the construction of a PV solar generating station 30 miles northeast of Las Vegas in Clark County. The BIA approvals included the lease of Tribal land and grant of easement for ROW for the access road, 12-kV transmission line, and water pipeline. The BLM issued ROW grants for an up to 500-kV transmission line and improvement of an existing access road. The BLM ROW occurs within an existing utility corridor, of which 5.0 miles is located on the Reservation and 0.5 mile on BLM land just south of the Reservation boundary. The project area is located on approximately 2,241 acres of land within the Reservation and 12 acres on BLM land within the utility corridor (total of 2,153 acres). All components, with the exception of power transmission lines, access roads, firebreak, and water pipeline, will be developed within the fenced 2,000-acre solar facility. Power and water transmission lines include an approximate 5.5-mile electric transmission line corridor (200 feet wide), an approximate one-mile water pipeline corridor (25 feet wide), and an approximate three-mile 12-kV transmission line (25 feet wide) to the Moapa Travel Plaza. The project also includes a 6,000-acre site to receive displaced tortoises and two additional evaluation areas for short-term use (5 years or less) associated with translocation of the tortoises. The Tribe will conserve the established home ranges of most translocated tortoises, up to 6,000 acres, at least until the lease on the 2,000-acre solar site ends, and the USFWS determines that the site is available and suitable for habitation.

Desert tortoise pre-project surveys estimated that 25 to 103 adult and sub-adult desert and 20 to 83 hatchling and juvenile tortoises would occur in the 2,000-acre K Road solar facility boundary; thus, the biological opinion identified a threshold of l 03 adult and sub-adult and 83 hatchling and juvenile desert tortoises could be taken by capture within this area of the project. On April 13, 2013, the BIA reinitiated consultation for the project because 98 of the 103 sub-adult and adult desert tortoises had been captured in the solar facility boundary, and the final capture number was anticipated to exceed the identified 103 threshold. Based on the information in the reinitiation request, the USFWS revised the incidental take threshold and identified that no more than 120 adult and sub-adult tortoises would be captured and translocated from the solar facility boundary (File No. 84320-2011-F-0430.R001).

To date, the total incidental take is 167 desert tortoises with 54 being hatchlings or juveniles, and 113 being subadult or adults (BIA 2015). Biologists translocated these tortoises according to the translocation plan for the project in the spring of 2013. The biologists also monitored 18 large desert tortoises as controls or residents. Extremely high temperatures during the summer may have killed two or more large translocated desert tortoises. Predators likely killed eight small translocated desert tortoises. No resident or control desert tortoises died during monitoring.

Southern Nevada Intertie Project (SNIP). On November 7, 2014, the USFWS appended the SNIP (USFWS File No. 84320-2015-F-0034) to the Southern Nevada District BLM's programmatic biological opinion. The project involved a BLM ROW grant to construct, operate, and maintain a 60-mile, 500-kilovolt power transmission line between Harry Allen and Eldorado substations resulting in approximately 652 acres of desert tortoise habitat disturbance. The USFWS concluded that during construction two adult or subadult and three juvenile desert tortoises may be killed or injured; 45 desert tortoises captured and moved; and five desert tortoises could be temporarily penned. During operation and maintenance, the USFWS concluded one adult or subadult may be killed or injured for the life of the project; one juvenile may be killed or injured per year; five adult, subadult, or juveniles may be captured and moved; and one desert tortoise could be temporarily penned. To date, construction on the SNIP has not yet begun.

b. Habitat Conservation Plans

Since the Mojave population of the desert tortoise was first listed under the ESA in 1989, three regional-level habitat conservation plans (HCPs) have been implemented for development of desert tortoise habitat in Clark County, Nevada. Approximately 89 percent of Clark County consisted of public lands administered by the Federal government, thereby providing little opportunity for mitigation for the loss of desert tortoise habitat under an HCP on non-Federal lands. Alternatively, funds are collected under HCPs and spent to implement conservation and recovery actions on Federal lands as mitigation for impacts that occur on non-Federal lands. Lands managed by BLM are included in these areas where mitigation funds are used to promote recovery of the desert tortoise. Actions taken in relation to the HCPs mentioned here are taken in areas that overlap the action area addressed in this biological opinion.

On November 22, 2000, the USFWS issued an incidental take permit (Permit TE-034927) to Clark County, Nevada, including cities within the County and Nevada Department of Transportation (NDOT). This HCP is the only regional HCP in place that overlaps the action area. The incidental take permit allows incidental take of desert tortoise for a period of 30 years on 145,000 acres of non-Federal land in Clark County, and within NDOT rights-of-way, south of the 38th parallel in Nevada. The MSHCP and Environmental Impact Statement (RECON 2000), serves as the permittees' HCP and details their proposed measures to minimize, mitigate, and monitor the effects of covered activities.

As partial mitigation under the MSHCP, the County purchased a conservation easement from the City of Boulder City in 1994. The term of the BCCE is for 50 years and it will be retained in a natural condition for recovery of the desert tortoise and conservation of other species in the area. Certain uses shall be prohibited within the BCCE including motor vehicle activity off designated roads, livestock grazing, and any activity that is inconsistent with the purposes of the BCCE. Much of the BCCE is also designated desert tortoise critical habitat. Within the boundary of the BCCE, Boulder City reserved the Solar Energy Zone for energy development projects in addition to adjacent energy generation facilities described previously.

III. Effects of the Proposed Action on the Desert Tortoise and its Designated Critical Habitat

1. Desert Tortoise

Direct effects are the immediate, often obvious effect of the proposed action on the desert tortoise or its designated critical habitat. Indirect effects are those that are caused by the proposed action and are later in time but still reasonably certain to occur (50 CFR § 402.02). In contrast to direct effects, indirect effects can often be more subtle and may affect desert tortoise populations and habitat quality over an extended period of time, long after project activities have been completed. Indirect effects are of particular concern for long-lived species such as the desert tortoise because project-related effects may not become evident in individuals or populations until years later. Measures proposed by BLM are expected to be implemented as proposed and should ensure the potential effects described are minimized or avoided.

Habitat Removal

The proposed project would result in the removal and disturbance of desert tortoise critical habitat and non-critical habitat in Clark and Lincoln Counties (Table 1). Approximately 364 acres of designated critical habitat for desert tortoise would be disturbed during construction of the TWE transmission line and its associated facilities, 286 acres in the Mormon Mesa CHU and 72 acres in the Beaver Dam Slope CHU (Table 1). Approximately 1,382 acres of non-critical desert tortoise habitat would be disturbed during construction of the proposed project. A subset of this disturbance would remain cleared during operation and maintenance of the Project (Table 1).

Removal of habitat and the activities associated with that disturbance within the home range of a desert tortoise would likely result in stress that could lead to loss of health for some individuals, increased risk of predation, reduced reproduction, and death. Measures proposed by BLM should ensure these potential effects are minimized or avoided, which include: (1) flagging native vegetation for avoidance, (2) locating towers and spur roads to avoid sensitive resources, (3) marking or flagging work areas, and restricting work activities to these areas, (4) avoiding damage to perennial vegetation where possible, (5) restoring disturbed habitat, and (6) providing project oversight through monitors, biologists, and field contact representatives (FCRs).

Table 1. Project-related impacts to desert tortoise habitat and designated critical habitat units from construction and operation of the TWE transmission line, Southern Terminal, and Southern Ground Electrode facility and line by County and jurisdictional ownership, Clark and Lincoln Counties, Nevada.

County	Desert Tortoise Habitat	Jurisdiction	Total Disturbance - Transmission Line and Access Roads (acres)		Transmission Line Length (miles)	Total Disturbance - Southern Terminal and Interconnections (acres)		Total Disturbance - Southern Ground Electrode Facility and Line (acres)		Grand Total (acres)
			Constr.	Operation[1]		Constr.	Operation[1]	Constr.	Operation[1]	
Lincoln	Beaver Dam Slope Critical	Federal	72	16	5.3	0	0	0	0	
	Mormon Mesa Critical	Federal	109	17	8.4	0	0	0	0	
	Non-Critical	Federal	215	44	16.9	0	0	0	0	
		Private	1	1	0	0	0	0	0	
Clark	Mormon Mesa Critical	Federal	177	29	14.7	0	0	6	0	
	Non-Critical	Federal	782	171	63.8	0	0	0	0	
		Private	94	19	6.5	234	156	0	0	
		State	0	0	0	0	0	56	4	
Total	Critical	All	358		28.4	0		6		364
	Non-Critical		1092		87.2	234		56		1382

[1] Disturbance from operation and maintenance activities represents long-term disturbance that is a subset of the original construction disturbance.

Mortality, Injury, or Harassment from Construction

Project activities could result in direct mortality, injury, or harassment of individual desert tortoises. Such effects may result from direct encounters with vehicles or heavy equipment. During the construction period, there would be heavy traffic, including small and large trucks, bulldozers, and other construction vehicles on access and spur roads, at tower sites, and at pulling and tensioning sites. Any tortoises near the project area during construction would be at risk for take. Desert tortoises may occur on access roads, under vegetation and in burrows in areas that will be cleared and graded, under parked vehicles being used as shelter, and if undetected, these tortoises may be killed, injured, and harassed when vehicles or equipment are moved. Undetected desert tortoises or their eggs may be crushed or entombed in burrows. Studies suggest that differences in the extent of the threat are related to the scale of the project, the ability of crews to avoid disturbing burrows, and the timing of construction to avoid peak activity periods of tortoises (Boarman 2002).

Other potential direct effects to desert tortoises include the following. Individual desert tortoises may be collected or vandalized. Open excavations for tower foundations or trenches for underground fiber-optic installation may create a trap hazard for tortoises. Construction or operation of facilities may disrupt behavior due to noise or vibrations from heavy equipment; could lead to injury or mortality from encounters with workers' pets that are brought onsite; and may attract predators such as ravens and coyotes from trash or other attractants left in the action area. Desert tortoises may also be attracted to the construction area by application of water to control dust or for other project-related activities, placing them at higher risk of injury or mortality. Construction debris and hazardous materials products that come in contact with desert tortoises could have serious or fatal effects. Construction activities and operation and maintenance activities could result in accidental fires that spread into adjacent desert tortoise habitat. Accidental fires associated with project construction, such as those resulting from discarded smoking materials or equipment-induced fires, could occur and be fatal to or result in loss of forage and shelter for desert tortoises. Desert tortoises observed in harm's way will be moved a safe distance that would still be considered within its home range (less than 305 meters (1,000 feet)) but will not be translocated as a result of the project. Pertinent BLM-proposed minimization measures that are expected to reduce or remove potential direct effects to the tortoise include: (1) requiring workers to attend a worker education and awareness program (WEAP), (2) providing project oversight through monitors, biologists, and FCRs, (3) preconstruction clearance surveys, (4) speed limits, (5) covering trenches and other excavations, (6) checking underneath vehicles, (7) not allowing water to pool and repairing leaks on water trucks, (8) containing trash or removing trash, (9) requiring tubular, self-supporting structures through desert tortoise critical habitat, (10) installing perch deterrents for all structure types; and (11) implementing a raven management plan.

Capture and Removal of Desert Tortoises from Construction Areas

Capturing, handling, and moving desert tortoises from harm's way would result in harassment and may also result in death or injury. Desert tortoises may die or be injured by relocation if these methods are performed improperly, particularly during extreme temperatures, or if they void their bladders. Averill-Murray (2002) determined that desert tortoises that voided their bladders during handling had significantly lower overall survival rates (0.81 to 0.88) than those that did not void (0.96). If multiple desert tortoises are handled by biologists without the use of

appropriate protective measures and procedures, such as reusing latex gloves, pathogens may be spread among the desert tortoises. If burrows are not properly excavated, desert tortoises may be killed or injured. Measures proposed by BLM should ensure these potential effects are minimized or avoided, which include: (1) USFWS -approved guidelines are followed when desert tortoises are handled or removed from burrows, and (2) authorized desert tortoise biologists will be responsible for handling tortoises.

Predation

Over the last several decades, common raven populations in the Mojave Desert have expanded in response to human-provided resources with increases of over 1,000 percent in some areas (Boarman *et al.* 2006). Since ravens were scarce in the Mojave Desert prior to 1940, the current level of raven predation on juvenile desert tortoises is considered to be an unnatural occurrence (BLM 1990). Research indicates common ravens can be a large source of desert tortoise predation (Boarman 1992, McCullough Ecological Systems 1995, Berry *et al.* 2013, LaPre 2015). As described in the desert tortoise recovery plan, "predation pressure by ravens is increased through elevated raven populations as a result of resource subsidies associated with human activities" (USFWS 2011). Utility towers provide additional substrates to subsidize raven nesting (Boarman *et al.* 2006) and perching; thus, altering or increasing natural or existing predation rates. While perch deterrents on transmission line poles do not preclude common ravens from using the poles (Lammers and Collopy 2007, Prather and Messmer 2010), research has shown that deterrents reduce the use of or amount of time ravens spend perching on transmission line poles (Lammers and Collopy 2007, HawkWatch International, Inc. 2008).

Biologists have documented evidence of raven predation on desert tortoises along lattice tower transmission lines in southern Nevada. An investigation of raven predation on juvenile desert tortoises in Eldorado and Piute Valleys was conducted in 1995 and repeated in 2011. The survey protocol involved systematically surveying for skeletal and other body parts of desert tortoises at the bases of 205 towers along 56.3 miles of transmission line (McCullough Ecological Systems 1995). Towers were also investigated for evidence of use as avian perch sites and nest sites. Biologists documented 78 and 18 total number of carcasses in 1995 and 2011, respectively (Table 2). Carcasses were concentrated under a relatively small number of towers – 23 in 1995 and 14 in 2011 although predator sign was documented at all the towers in 1995 and at over 50 percent of the towers in 2011 (Table 2).

Compared to the 1995 study, evidence of raven predation of juvenile Mojave desert tortoises in the vicinity of electrical transmission lines in Eldorado and Piute valleys decreased (Table 2). This decrease may be due to one or more reasons. First, more transmission lines have been developed, thus avian predation of juvenile desert tortoises could have 'spread out' and is not as concentrated or easily detectable as it may have been in 1995 with less power line sites. And second, the long-term presence of power lines, or other separate or cumulative anthropogenic induced impacts may have negatively impacted desert tortoises in Eldorado and Piute Valleys and there simply are less desert tortoises in these areas available to ravens. Considering the number of intact raven nests more than doubled since 1995, it is more likely the number of desert tortoises has decreased and not the number of ravens. Currently, no similar investigation along monopole or v-type pole structures has been conducted.

Table 2. Comparison of 1995 and 2011 data. Predator sign includes the presence of a nest, bird perched, bird flying, or feathers or avian fecal on the ground below the tower.

	1995	2011	Change
Total no. of carcasses	78	18	-80%
No. of towers with carcasses	23	14	-39%
Highest no. of carcasses at single tower	17	4	-77%]
No. of towers with predator sign	205	128	-38%
No. of intact nests	6	13	+216%

Based on our current understanding of the threat ravens pose to desert tortoises, using a tower design that reduces opportunities (e.g., elevated perches, potential nesting platforms and sites) for raven nesting and perching, such as a tubular monopole, should reduce increase in ravens and therefore reduce potential predation of tortoises. This is especially important in areas without existing transmission lines and throughout desert tortoise critical habitat. Several measures the BLM proposes are expected to minimize impacts from ravens along the Project: (1) implementing a Raven Management Plan; (2) requiring tubular, self-supporting structures through desert tortoise critical habitat; and (3) installing perch deterrents for all structure types.

We recognize that the use of tubular monopoles requires additional surface disturbance compared to other tower designs (BLM third BA Addendum; BLM 2016b). However, the increase is relatively small (an additional 60 acres of disturbance in desert tortoise critical habitat) compared to the use of other tower types and is expected to result in a relative reduction in the occurrence of common ravens. Thus, over the life of the project, the use of tubular monopoles is anticipated to result in a greater benefit than cost to desert tortoises. In addition where possible, the USFWS recommends driving and crushing habitat to install tower structures rather than blading the entire tower pad. This would further reduce habitat disturbance.

The project may also result in an increased threat to desert tortoises from other predators. Human activities may provide food in the form of trash and litter or water that attracts desert tortoise predators such as the common raven, desert kit fox, feral dog, and coyote (BLM 1990, Berry 1986). Feral dogs have emerged as significant predators of the tortoise. Feral dogs may range several miles into the desert and have been observed digging up and killing desert tortoises (Evans 2001, USFWS 2011). Domestic dogs brought to the project site by visitors may harass, injure, or kill desert tortoises, particularly if allowed off leash to roam freely in occupied desert tortoise habitat (Evans 2001, USFWS 2011). BLM proposes to implement a WEAP, prohibit roaming pets, and remove trash and food from work areas to minimize this threat.

Increased Access and Nonnative Species

Roads and other linear construction projects can negatively affect desert populations beyond those of many point sources of impacts (Boarman 2002, Boarman and Sazaki 2006). In addition to the discrete disturbance points formed by towers and lines, maintenance roads and repeated operations can (1) introduce continuous sources of disturbance and (2) provide potential sites for invasion of nonnative species.

Following construction, the public may use project access roads which may result in adverse effects to tortoise populations. New access roads or tower spurs could increase access to tortoise

habitat by the public. Humans use the desert for off-road exploration, casual shooting and target practice, personal or commercial collection of animals and plants, searches and digging for minerals and gems, geocaching (GPS-guided stash hunts), and even the production of illegal drugs. Increased public access and use of desert tortoise habitat could result in tortoises being harassed, crushed, collected, or collapsed in burrows; in the compaction and erosion of soils; and proliferation of weeds, including grasses that can fuel wildfires. Measures proposed by BLM should ensure these potential effects are minimized or avoided, which include: (1) requiring workers to attend WEAP training, (2) restoring temporary disturbances, and (3) implementing an Invasive Weed Management Plan.

Weeds can be introduced to desert tortoise habitat by project vehicles involved with construction and O&M activities and following construction by the public accessing the area. Invasion of non-native plants can affect the quality and quantity of plant foods available to desert tortoises, and thereby affect nutritional intake (USFWS 2011). Weeds that are introduced may include grasses that can fuel wildfires. Wildfires likely remove the native plant community and provide suitable conditions for colonization by non-native invasive plant species, which could compete with native plant species of value to tortoise for forage and cover, and may increase the risk of fires (Brooks *et al.* 2003). Measures proposed by BLM should ensure these potential effects are minimized or avoided, which include: (1) requiring workers to attend WEAP training, (2) restoring temporary disturbances, and (3) implementing an Invasive Weed Management Plan.

Proposed Minimization

To offset the loss of desert tortoise habitat and designated critical habitat and the associated effects, BLM will require the Applicant to provide compensation for all new acres of habitat disturbance following Hastey *et al.* (1991). This compensation will be used to support desert tortoise recovery actions identified by the Desert Tortoise Recovery Implementation Teams (RITs) and approved by the Desert Tortoise Management Oversight Group or priorities mutually agreed to by BLM and the USFWS. Actions may include the following:

- Habitat restoration and recovery;
- Monitoring habitat, populations, and effectiveness of conservation and recovery actions;
- Benefitting conservation and recovery through applied research;
- Public outreach;
- Predator management; and
- Other actions identified and recommended by the Desert Tortoise RITs.

2. Critical Habitat

The TWE transmission line will pass through approximately 28.4 miles of desert tortoise critical habitat, 23.1 miles in the Mormon Mesa CHU and 5.3 miles in the Beaver Dam Slope CHU (Table 1). The entirety of the line in the Mormon Mesa CHU will be collocated with approved ROWs and existing linear disturbances, and 3.3 miles of the proposed line in the Beaver Dam Slope CHU will be collocated with approved ROWs and existing linear disturbance. A total of 364 acres of critical habitat will be disturbed, 292 acres in the Mormon Mesa CHU and 72 acres

in the Beaver Dam Slope CHU. Both CHUs occur in the Northeastern Mojave Recovery Unit for the desert tortoise, which is the only recovery unit currently showing an upward trend in tortoise densities (USFWS 2014b).

The TWE project will result in adverse effects to critical habitat for the desert tortoise through the removal of 364 acres of habitat. Although fragmentation of critical habitat will occur due to this loss of habitat, anticipated habitat disturbance is less than 0.01 percent of the area in the Mormon Mesa Slope CHU and less than 0.01 percent of the area in the Beaver Dam Slope CHU. Thus, the remaining undisturbed portions of the CHUs will still provide sufficient space to support viable populations of desert tortoise (PCE 1), areas of sufficient quality and quantity of forage species and proper soil conditions for growth of these species (PCE 2), suitable substrates for burrowing nesting, and overwintering (PCE 3), and areas with sufficient vegetation for shelter (PCE 4). Specifically related to PCE 1, the project is not expected to preclude desert tortoise movement, dispersal, and gene flow across the action area because tortoises are commonly encountered crossing roads and other linear disturbances.

Construction, and routine use and maintenance of roads and transmission lines generally degrade the quality of all primary constituent elements in the area adjacent to the linear disturbances. Generally, the amount of degradation decreases with distance from the transmission line or road and is less intense along less heavily used roads. Linear projects such as roads and transmission lines also adversely affect the amount of habitat protected from disturbance and increase the potential for human-caused mortality to occur (PCE 5; see *Effects to the Species* for detailed discussion).

The TWE project may result in adverse effects to PCEs 2, 3, and 4 from project equipment compacting soils and weeds being transported into the project area. Compacted soils may negatively affect the growth of proper forage species and number of burrows for tortoises. If weeds are established, the capability of critical habitat to serve its role for recovery of the tortoise may be reduced. Additionally, the introduction of noxious weeds may lead to increased wildfire risk (Brooks *et al.* 2003).

As defined in the ESA, critical habitat is the geographic area(s) that contain the features essential for the conservation of threatened or endangered species. Therefore, extra effort should be taken to avoid, minimize, and offset adverse effects to critical habitat. BLM proposed multiple measures and design features that are expected to reduce or remove adverse effects (as described above) to critical habitat for the desert tortoise from the construction, operation, and maintenance of the TWE project. The following are of particular note: (1) requiring workers to attend WEAP training, (2) marking or flagging work areas, and restricting work activities to these areas (3) locating towers and spur roads to avoid sensitive resources, (4) flagging native vegetation for avoidance and avoiding damage to perennial vegetation where possible, (5) restoring disturbed habitat, (6) providing project oversight through monitors, biologists, and field contact representatives (FCRs), (7) implementing an Invasive Weed Management Plan, (8) removing trash and food from work areas, (9) implementing a raven management plan, (10) installing perch deterrents for all structure types, and (11) requiring tubular, self-supporting structures through desert tortoise critical habitat.

3. Effect on Recovery

The proposed project would result in temporary and permanent displacement of desert tortoises occurring in the project footprint and action area; injury or mortality of desert tortoises; and impacts to desert tortoise habitat including critical habitat. However, we do not anticipate the proposed project to appreciably diminish the likelihood of recovery of the desert tortoise for several reasons. First, most of the project effects would be temporary and highest when construction or operation and maintenance activities are occurring. Longer term effects (for example, an increase in ravens or noxious weeds) would be minimized by BLM's implementation of specific management plans to address the source of the effect. We anticipate that few, if any, adult desert tortoises (see Incidental Take Statement for specifics) will be lost due to project actions because the BLM's proposed conservation measures (SSWS-4 in Attachment 2 to this memo) are expected to be implemented effectively. Given the difficulty in detecting eggs and hatchlings, we anticipate that most eggs and hatchlings in the areas to be disturbed would be lost due to project activities. However, we do not expect these impacts to impede the recovery potential of the species.

Second, the size and scope of the proposed action and its footprint are relatively small when compared to the range of the species. Furthermore, the majority of the TWE project occurring in desert tortoise habitat and designated critical habitat is collocated with approved ROWs and previous linear disturbance, which avoids new fragmentation of desert tortoise habitat. In addition, monopole structures are proposed throughout critical habitat to reduce potential increases of common ravens and predation on tortoises. The project would result in disturbance of 364 acres of desert tortoise critical habitat, 238 acres in the Mormon Mesa CHU and 72 acres in the Beaver Dam Slope CHU (Table 1). The PCEs of critical habitat that provide forage, shelter, and nesting conditions for tortoises will be removed from the disturbed portion of the action area; however, if proposed restoration is successful and precipitation levels are sufficient to promote vegetation growth, these PCEs should return in 5 to 10 years. If precipitation is below average levels, the PCEs may not return for decades. Substantial adverse effects to critical habitat essential for movement, dispersal, and gene flow are not expected because desert tortoises readily move across dirt access and spur roads beneath utility lines, and ample adjacent suitable habitat is available along the transmission and telecommunication line alignments. Third, less than 0.01 percent of the Mormon Mesa CHU and less than 0.01 percent of the Beaver Dam Slope CHU will be impacted[1]; thus, this loss is not expected to impede the recovery potential of the species.

IV. Cumulative Effects

Cumulative effects are those effects of future non-Federal (State, tribal, local government, or private) activities that are reasonably certain to occur in the action area considered in this

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[1] Critical habitat for the desert tortoise consists of approximately 6.4 million acres in portions of the Mojave and Colorado deserts. The designation includes primarily federal lands in southwestern Utah, northwestern Arizona, southern Nevada, and southern California (59 FR 5820). The Mormon Mesa CHU in Nevada is approximately 427,900 acres and the Beaver Dam Slope CHU in Utah, Nevada, and Arizona is approximately 427,900 acres.

biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Increased development would cause continued habitat loss, degradation, and fragmentation for the local desert tortoise population; as well as increased harm and harassment of individual desert tortoises, contributing to the cumulative degradation of the area. Planned future actions such as future industrial solar power plants would likely continue this trend. However, we know of no specific proposal by any non-Federal entity in the action area. The USFWS determined that most other future actions in the action area would likely require section 7 consultation since the majority of the action area is managed by BLM, a Federal agency.

V. Conclusion

After reviewing its status, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the desert tortoise nor is likely to adversely modify designated critical habitat for the desert tortoise. We have reached this conclusion because of the following:

- o Numerous measures will be implemented by BLM to ensure that most tortoises are located and moved out of harm's way and potential desert tortoise injury and mortality is minimized on project work sites (for example conducting clearance surveys, using authorized desert tortoise biologists and desert tortoise monitors, etc.).
- o The number of desert tortoises to be injured and killed as a result of the project will likely be small (see Incidental Take Statement below) relative to the number of desert tortoises that occur across the range of the species.
- o No tortoises will be moved beyond their home ranges, and those moved from harm's way should remain in the wild with only short-term adverse effects.
- o A raven management plan will be implemented to reduce the potential for increased predation by common ravens.
- o The potential spread of non-native plant species will be minimized through a proposed invasive weed management plan.
- o This project would not result in a substantial increase in fragmentation of desert tortoise habitat; sufficient habitat will remain to provide connectivity of tortoise habitat.
- o PCEs of critical habitat will be adversely affected but not to the extent they will no longer function within the affected CHUs or reduce the capability of the CHUs to support the current number of tortoises in the CHUs; temporary disturbances will be restored.
- o Compensation requirements of the BLM will result in a beneficial effect to the desert tortoise and will result in an increase in the quantity and quality of habitat managed for the conservation of the desert tortoise including restoration of lost or degraded habitat within these areas.

Incidental Take Statement

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the USFWS as intentional or negligent actions that create the likelihood of injury to listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the Terms and Conditions of an incidental take statement.

The measures described below are nondiscretionary and must be implemented by BLM, or other jurisdictional Federal agencies, so that they become binding conditions of any project, contract, grant, or permit issued by BLM as appropriate, in order for the exemption in section 7(o)(2) to apply. The USFWS's evaluation of the effects of the proposed actions includes consideration of the measures developed by BLM, and repeated in the *Description of the Proposed Action* portion of this biological opinion, to minimize the adverse effects of the proposed action on the desert tortoise. Any subsequent changes in the minimization measures proposed by BLM, or other jurisdictional Federal agencies, may constitute a modification of the proposed action and may warrant reinitiation of formal consultation, as specified at 50 CFR § 402.16. These Reasonable and Prudent Measures are intended to clarify or supplement the protective measures that were proposed by BLM as part of the proposed action.

BLM, and other jurisdictional Federal agencies, have a continuing duty to regulate the activities covered by the Incidental Take Statement in the biological opinion. If BLM , or other jurisdictional Federal agencies, fail to include the Terms and Conditions of this Incidental Take Statement as enforceable conditions of its discretionary action, the protective coverage of section 7(o)(2) may lapse. To monitor the effect of incidental take, BLM must report the progress of its action and its effects on the desert tortoise to the USFWS as specified in the Incidental Take Statement [50 *Code of Federal Regulations* 402.14(i)(3)].

I. Amount or Extent of Take Anticipated

Based on the scope of the proposed action, the pre-Project desert tortoise survey data, analysis of impacts provided above, measures proposed by BLM, the anticipated project duration, and the incidental take reported on other transmission line projects, the USFWS anticipates that the following take could occur as a result of the proposed action:

- wAll desert tortoises in harm's way may be taken by capture then moved from harm's way. During construction of the project, we estimate 47 adult (greater than 180 millimeters; or approximately seven inches in length) and sub-adult (100 to 180 millimeters or approximately four to seven inches in length) desert tortoises will be captured and moved

to a safe location. If the number of tortoises encountered and moved reaches our estimate, BLM shall notify the USFWS at which time we will evaluate the risk of injury and mortality to tortoises and determine if any additional measures are appropriate. We anticipate desert tortoises moved from harm's way will remain in their home range as part of the affected tortoise population.

During each calendar year of operation and maintenance activities, we estimate up to five desert tortoises will be captured and moved. If the number of tortoises captured and moved exceeds our estimate, BLM will notify the USFWS, and the USFWS will evaluate the risk of injury and mortality to tortoises and determine if any additional measures are appropriate.

We anticipate all captured desert tortoises will be handled and moved from harm's way in accordance with procedures in the Desert Tortoise Field Manual (USFWS 2009) and remain in their home range with no long-term effects.

- mDuring project construction, we will consider the amount or extent of take to be exceeded any adult desert tortoises or more than four juvenile desert tortoises are killed or injured as a direct or indirect result of project activities.
  During operation and maintenance activities including travel on access roads, we will consider the amount or extent of take to be exceeded if any adult desert tortoise or more than one juvenile desert tortoise is killed or injured as a direct or indirect result of project activities within any calendar year or more than a total of three juvenile desert tortoises are killed or injured for all activities during the term of this biological opinion. Nevertheless, any undetected animals may be killed or injured during construction.

- mAn unknown number of desert tortoises will be taken in the form of indirect mortality through predation by ravens or other subsidized predators drawn to the project area; however, the USFWS estimates that the potential increase in ravens and other subsidized predators will be minimized by litter-control measures.

- mAn unknown number of tortoise eggs and hatchlings may be destroyed due to difficulty in detecting these life phases.

II. Effect of Take

In the accompanying biological opinion, the USFWS has determined that this level of anticipated take will not jeopardize the continued existence of the desert tortoise.

Our evaluation of the proposed action includes consideration of the protective measures described in the Description of the Proposed Action section of the accompanying biological opinion. Consequently, any changes in these protective measures may constitute a modification of the proposed action that causes an effect to the desert tortoise that was not considered in the biological opinion and requires reinitiation of consultation, pursuant to the implementing regulations of the section 7(a)(2) of the Act (50 CFR § 402.16).

III. Reasonable and Prudent Measures with Terms and Conditions

The BLM, Western, and the Applicant will implement numerous measures as part of the proposed action to minimize the incidental take of desert tortoises. Any proposed changes to the proposed measures or in the conditions under which project activities were evaluated may constitute a modification of the proposed action. If this modification causes an effect to desert tortoises not considered in this biological opinion, reinitiation of formal consultation pursuant to the implementing regulations of section 7(a)(2) of the Act (50 CFR § 402.16) may be warranted.

To be exempt from the prohibitions of section 9 of the Act, the BLM, Western, and Applicant, and all agents, consultants, and contractors, must comply with the proposed measures (SSWS-4) in the conservation measures Attachment 2 to this memo, incorporated into this incidental take statement by reference. Collectively, these measures are intended to minimize the impact of incidental take on the desert tortoise. These measures are non-discretionary. No additional RPMs or terms and conditions are provided in this incidental take statement.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The USFWS suggests the following conservation recommendations:
Deseret milkvetch: We recommend that the BLM and the Applicant consider: (1) funding monitoring for the species for a minimum of 5 years to document current population trends; and (2) acquiring in-perpetuity conservation easements on private lands for the in-perpetuity protection of habitat for the species.
Mojave desert tortoise: We recommend that the BLM continue to protect and manage desert tortoise ACECs and critical habitat for recovery and equally protect and conserve habitat that connects these important areas

Reinitiation/Closing Statement

This concludes formal consultation on the actions outlined in the April 8, 2015, BA ; October 26, 2015, BA addendum; January 20, 2016, second BA addendum; and April 8, 2016 third BA addendum request for the Project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this BO; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical

habitat not considered in this BO; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the specific action(s) causing such take shall be subject to reinitiation expeditiously.

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APPENDIX 1. DESERT TORTOISE HANDLING AND TAKE REPORT

If a desert tortoise is killed or injured, immediately contact the U.S. Fish and Wildlife Service and BLM, by phone at the numbers below and complete Section 1 of the form.
Completed forms should be submitted to the BLM and Fish and Wildlife Service:
Bureau of Land Management
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130
702-515-5000 \

U.S. Fish and Wildlife Service
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130
702-515-5230

Project Name:	Report Date:
USFWS File No.- 84320-	
Authorized Desert Tortoise Biologist: _____ Employed by:	
Section 1: Complete all information below if a desert tortoise is injured or killed in addition to initial contact described above.	
If tortoise was injured ☐ or killed ☐ (check appropriate box):	
Date and time found: _____ Found by: _____ GPS location (NAD 83): easting: _____ northing: _____ No. of photos taken: _____ Disposition: _____ _____ _____ _____ Attach report with photos that describe in detail, the circumstances and potential cause of injury or mortality. For injuries include name of veterinarian and detailed assessment of injuries.	

Section 2: Complete all information below for each desert tortoise handled.

All instances of desert tortoise handling must be reported in this section and be included in the quarterly, annual, and final project reports.

Desert tortoise number: _____

Date and time found: _____ Sex of tortoise: _____

Air temperature when found: _____ Air temperature when released: _____

Tortoise activity when found: _____

Handled by: _____ Approx. carapace length _____

GPS location (NAD 83) found: easting: _____ northing: _____

GPS location released: easting: _____ northing: _____

Approximate distance moved: _____

Did tortoise void bladder; if so state approximate volume and actions taken:

_____

_____

_____

Post handling or movement monitoring and observations:

_____

_____

_____

_____

Section 3: Complete for each tortoise burrow penned.

All instances of desert tortoise penning must be reported in this section and be included in the quarterly, annual, and final project reports.

Date and time of pen construction:

Began: _____ Completed: _____

Date and time pen removed:

_____

Pen constructed by:

_____

Why was tortoise penned?

_____

How frequently was pen monitored?

_____

Observations of desert tortoise behavior including time and date of observation:

_____

_____

_____

_____

_____

_____

Include photos of pen and burrow with report.

APPENDIX 2: NEVADA BLM SECTION 7 LAND DISTURBANCE FEE PAYMENT FORM

Biological Opinion File Numbers:	06E130002014F0052 84320-2015-F-0610
Biological Opinion Issued By:	Wyoming Field Office, Cheyenne, Wyoming Southern Nevada Fish and Wildlife Office, Las Vegas, Nevada
Species:	Mojave Desert Tortoise (*Gopherus agassizii*)
Project Name:	TransWest Express Transmission Line
Project Proponent:	TransWest Express LLC
Phone Number:	

Payment Calculations:	Clark County		Lincoln County		
	Critical habitat (4:1)	Non-critical habitat	Critical habitat (5:1)	Critical habitat (4:1)	Non-critical habitat
# acres anticipated to be disturbed on federal land	183	838	83	98	216
Fee rate (per acre)	$3,396	$849	$4,245	$3,396	$849
Sub-total	$621,468	$711,462	$352,335	$332,808	$183,384
Total cost per county	**$1,332,930**		**$868,527**		

Total payment required (all counties): **$2,201,457**

Amount paid:	Date:	Check/Money Order #:	
Authorizing agencies:	Bureau of Land Management,	Las Vegas, Nevada	
Make check payable to:	Bureau of Land Management		
Deliver check to:	Physical Address	PO Box	
	Bureau of Land Management	Bureau of Land Management	
	Attn: Information Access Ctr	Attn: Information Access Ctr	
	1340 Financial Blvd.	PO Box 12000	
	Reno, NV 89502	Reno, NV 89520-0006	

For BLM Public Room Process check to:	
Contributed Funds-All Other WBS: LVTFF1000800 7122 FLPMA All other Res. Dev. Project and Management	Please provide a copy of this completed payment form and the payment receipt to NV-930, Attn: T&E Program Lead
Remarks: LLNV9300000 L71220000.JP0000 LVTFF1000800 Desert Tortoise Conservation Program	***T&E Program Lead will provide a copy to the appropriate District Office(s)*

Attachment 2

Conservation Measures for the TransWest Express Transmission Line Project

TransWest Express Transmission Line Project
Species-specific Conservation Measures, General Conservation Measures, and Applicant-committed Measures and Design Features

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I. Species-specific conservation measures

From the third version of Attachment D of the BA addendum, revised April 1, 2016. These conservation measures apply to all lands, regardless of ownership, as they are committed to in the section 7 consultation with the USFWS.

Desert Tortoise

SSWS-4: BLM, Western, and others designated to act as agents of BLM propose to implement the following measures during construction to avoid and minimize effects to desert tortoises and their habitat:

1. c *Field Contact Representative* – TransWest will designate one Field Contact Representative (FCR) (also called a Compliance Inspection Contractor) for each contiguous stretch of construction activity or isolated work area. The FCR will serve as an agent of BLM and be responsible for overseeing compliance with protective measures for the desert tortoise and reporting all instances of non-compliance or incidental take. BLM has discretion over approval of potential FCRs; however, those also acting as authorized desert tortoise biologists must be determined as qualified by the USFWS. All FCRs will report directly to BLM. All FCRs and supporting authorized biologists and desert tortoise monitors will have copies of all stipulations when work is being conducted on the site and will be responsible for overseeing compliance with terms and conditions of the ROW grant, including those for listed species. The FCRs, authorized desert tortoise biologists, and desert tortoise monitors will have authority to halt any activities that are in violation of the stipulations in the biological opinion for the Project. The FCR will be onsite year-round during all project construction activities. The presence of an FCR is not typically required for operation and maintenance activities.

   Within three days of employment or assignment, TransWest and the BLM will provide the USFWS with the names of the FCR(s).

2. c *Authorized desert tortoise biologist* – All authorized desert tortoise biologists (and monitors) are agents of BLM and shall concurrently report directly to BLM and the USFWS regarding all compliance issues related to this biological opinion and take of desert tortoises; this includes all draft and final reports of non-compliance or take. The initial draft report shall be provided to the BLM and USFWS within 24 hours of the observation of take or non-compliance.

An authorized desert tortoise biologist will be assigned to each piece or group of large equipment engaged in activities that may result in take of desert tortoise (for example, clearing, blasting, grading, backfilling, re-contouring, and reclamation activities) and other work areas that pose a risk to tortoises. BLM has discretion on whether to require a monitor instead of an authorized desert tortoise biologist to monitor equipment that is low risk to tortoises.

Authorized desert tortoise biologists, monitors, and the FCR (see SSWS-4.1) shall be responsible for ensuring compliance with all conservation measures for the project. This responsibility includes: (1) enforcing the litter-control program; (2) ensuring that desert tortoise habitat disturbance is restricted to authorized areas; (3) ensuring that all equipment and materials are stored within the boundaries of the construction zone or within the boundaries of previously-disturbed areas or designated areas; (4) ensuring that all vehicles associated with construction activities remain within the proposed construction zones; (5) ensuring that no tortoises are underneath project vehicles and equipment prior to use or movement; (6) ensuring that all monitors (including the authorized desert tortoise biologist) have a copy of the required measures in their possession, have read them, and they are readily available to the monitor when on the project site.

An authorized desert tortoise biologist will serve as a mentor to train desert tortoise monitors and will approve monitors if required. An authorized desert tortoise biologist is responsible for errors committed by desert tortoise monitors.

An authorized desert tortoise biologist is responsible for recording and reporting each desert tortoise handled. Information will include the following: location (GPS), date and time of observation, whether the desert tortoise was handled, general health and whether it voided its bladder, location desert tortoise was moved from and location moved to, unique physical characteristics of each tortoise, and effectiveness and compliance with the desert tortoise protection measures. This information will be provided directly to the BLM and USFWS.

Potential authorized desert tortoise biologists must submit their statement of qualifications to the USFWS's Southern Nevada Fish and Wildlife Office in Las Vegas for approval, allowing a minimum of 30 days for USFWS response. The statement form is available on the internet at: *http://www.fws.gov/nevada/desert_tortoise/auth_dt_form.htm.*

Prior to final approval to begin work on the project, the authorized desert tortoise biologists will have read the required measures (terms and conditions and other stipulations) and have a copy of the measures available at all times while on the project site. BLM shall provide

the appropriate agency contact for the project to the USFWS and the USFWS will include the forms with approval letters. Biologists and monitors should be visibly identifiable on the project site, which may include use of a uniquely designated hardhat or safety vest color.

3. • *Desert tortoise monitor* – Desert tortoise monitors assist an authorized desert tortoise biologist during surveys and serve as apprentices to acquire experience. Desert tortoise monitors ensure proper implementation of protective measures, and record and report desert tortoises and sign observations in accordance with the recording and reporting requirements for authorized desert tortoise biologists specified in SSWS-4.2, above. They will report incidents of noncompliance to the authorized desert tortoise biologist or FCR. No monitors shall be on the project site unless supervised by an authorized desert tortoise biologist or approved by the BLM.

   If a desert tortoise is in immediate harm's way (for example, certain to immediately be crushed by equipment), desert tortoise monitors may move the desert tortoise then place it in a designated safe area until an authorized desert tortoise biologist assumes care of the animal.

   Desert tortoise monitors may not conduct field or clearance surveys or other specialized duties of an authorized desert tortoise biologist unless directly supervised by an authorized desert tortoise biologist or approved to do so by the USFWS; "directly supervised" means an authorized desert tortoise biologist has direct sight and voice contact with the desert tortoise monitor (within approximately 200 feet of each other).

   Within 3 days of employment or assignment, the project proponent and BLM shall provide the USFWS with the names of desert tortoise monitors who would assist an authorized desert tortoise biologist.

4. • *Coordination* – TransWest will coordinate with the BLM and USFWS to ensure that an appropriate number of authorized biologists and tortoise monitors are onsite during construction to ensure the protection of desert tortoises. Project activities will not begin until authorized biologists and tortoise monitors have been approved. Replacement of authorized biologists and tortoise monitors will require BLM and USFWS approval. Authorized biologists will be assigned to monitor each area of activity where conditions exist that may result in take of desert tortoise (for example, clearing, construction, grading, recontouring, and reclamation activities). The BLM and TransWest will ensure that a tortoise monitor or authorized biologist will be assigned to each piece or group of large equipment. All authorized biologists and tortoise monitors will be responsible for determining compliance with terms and conditions of the biological opinion, the Project ROD, and other applicable agreements. With input from authorized biologists and tortoise

monitors, the FCR(s) will maintain a detailed record of all desert tortoises encountered during Project surveys and monitoring.

5. x *Timing of Construction* – The BLM shall ensure that when possible, the project proponent schedules and conducts construction, operation, and maintenance activities within desert tortoise habitat during the less-active season (generally October 31 to March 1) and during periods of reduced desert tortoise activity (typically when ambient temperatures are less than 60 or greater than 95°F). All vehicles and equipment that are not in areas enclosed by desert tortoise exclusion fencing will stop activities in desert tortoise habitat during rainfall events in the more-active season (generally March 1 to October 31), and if temperatures are above 60 but below 95°F for more than 7 consecutive days. The FCR or designee will determine, in coordination with the BLM and USFWS, when it is appropriate for project activities to continue.

6. x *Desert Tortoise Education Program* – A desert tortoise education program shall be presented to all personnel on site during construction activities by an agency or authorized desert tortoise biologist. The USFWS, BLM, and appropriate state agencies shall approve the program. At a minimum, the program shall cover desert-specific Leave-No-Trace guidelines, the distribution of desert tortoises, general behavior and ecology of this species, sensitivity to human activities, threats including introduction of exotic plants and animals, legal protection, penalties for violation of State and Federal laws, reporting requirements, and project measures in this biological opinion). All field workers shall be instructed that activities must be confined to locations within the approved areas and their obligation to walk around and check underneath and vehicles and equipment before moving them (or be cleared by an authorized desert tortoise biologist). In addition, the program shall include fire prevention measures to be implemented by employees during project activities. The program shall instruct participants to report all observations of desert tortoise and their sign during construction activities to the FCR and authorized desert tortoise biologist.

7. x *Vehicle Travel* – Project personnel shall exercise vigilance when commuting to the project area to minimize risk for inadvertent injury or mortality of all wildlife species encountered on paved and unpaved roads leading to and from the project site. Speed limits will be clearly marked, and all workers will be made aware of these limits. Onsite, personnel shall carpool to the greatest extent possible.

During the desert tortoise less active season (generally November through February), vehicle speed on project-related access roads and in the work area will not exceed 25 mph. All vehicles and construction equipment will be tightly grouped.

During the more active season (generally March through October), and if temperatures are above 60°F but below 95°F for more than 7 consecutive days, vehicle speed on project-related access roads and in the work area will not exceed 15 mph. All vehicles and construction equipment will operate in groups of no more than three vehicles. An

authorized desert tortoise biologist and desert tortoise monitor will escort or clear ahead of vehicles and equipment for ROW travel. The escort will be on foot and clear the area of tortoises in front of each traveling construction equipment group (see *Desert tortoise clearance*). The escort will use a recreational vehicle with ground visibility (for example, UTV); however, at least one authorized desert tortoise biologist and one desert tortoise monitor must ride together and survey both sides of the vehicle. The pace will be determined by an authorized desert tortoise biologist and shall be slow enough to ensure adequate inspection.

New access and spur road locations will be sited to avoid potentially active tortoise burrows to the maximum extent practicable.

All construction vehicle movement outside of the ROW will be restricted to pre designated access, contractor acquired access, or public roads. Any routes of travel that require construction or modification will have an authorized biologist or desert tortoise monitor survey the area for tortoises prior to modification or construction of the route.

Off-road travel by vehicles and equipment will generally be prohibited. However, where impacts to native vegetation can be minimized (i.e., where creation of new access roads and blading of existing access roads can be avoided) through use of drive and crush methods, this mode of access is preferred provided that it is conducted in accordance with SSWS-4.9 and all other applicable desert tortoise impact avoidance and habitat impact minimization measures stated herein.

8. , *Unauthorized Access* – BLM will ensure that unauthorized personnel, including the public and off-duty project personnel, do not travel on project-related temporary access roads, to the greatest extent practicable.

   During the more active season (generally March through October), and if temperatures are above 60 but below 95°F for more than 7 consecutive days, project- and non-project-related activities on all access roads that intersect the ROW will be monitored and logged. During construction, the ROW will be fenced at public roads that intersect the ROW. Signs will say that access on the ROW is strictly prohibited except by authorized personnel and that violators will be prosecuted.

9. , *Parked Vehicles* – Whenever a vehicle or construction equipment is parked within desert tortoise habitat, whether the engine is engaged or not, the ground around and underneath the vehicle will be inspected for desert tortoises prior to moving the vehicle. If a desert tortoise is observed, the vehicle will not be moved and an authorized biologist will be contacted. If possible, the tortoise will be left to move on its own. If necessary, the tortoise will be removed and relocated by the authorized biologist in accordance with the tortoise

handling procedures, as presented in the Desert Tortoise Field Manual (USFWS 2009), which TransWest will include or incorporate by reference in the POD.

10. *Construction Work Area* – The area of construction activity will be pre-determined with removable flagging and all activities will be confined to these areas. All construction sites and access roads will be clearly marked or flagged at the outer limits prior to the onset of any surface-disturbing activity. All personnel will be informed that their activities must be confined within the marked or flagged areas. No permanent paint or other marking agents will be applied to vegetation or rocks.

    All desert tortoise burrows and pallets that fall outside of, but within 50 feet of, the construction work area will be flagged for avoidance. Desert tortoise burrows will not be marked in a manner that facilitates poaching or provides a cue for predators. Avoidance flagging will be designed to be easily distinguished from access route or other flagging, and will be designed in consultation with experienced construction personnel and authorized biologists. All flagging will be removed immediately following construction activities.

    Any construction pipe, culvert, or similar structure with a diameter greater than 3 inches left above ground on the construction site for one or more nights will be inspected for tortoises before the material is moved, buried, or capped. As an alternative, all structures may be capped before being stored on the construction site.

    In construction work areas where re-contouring is not required, vegetation will be left in place wherever possible and original contours will be maintained to avoid excessive root damage and allow for re-sprouting.

    Constructed road berms will be less than 12 inches in height and have slopes of less than 30 degrees. Where road berms consist primarily of rocks, gaps will be opened to allow for tortoise passage.

    To prevent mortality, injury, and harassment of desert tortoises and damage to their burrows and cover sites, no pets will be permitted in any Project construction work area.

    All vehicles and equipment that are not in areas enclosed by desert tortoise exclusion fencing will stop activities in desert tortoise habitat during rainfall events in the more-active season (generally March 1 to October 31), and if temperatures are above 60°F but below 95°F for more than 7 consecutive days. The FCR or designee will determine, in coordination with the BLM and USFWS, when it is appropriate for Project activities to continue.

11. *Desert tortoise clearance* – Prior to surface-disturbing activities, authorized desert tortoise biologists potentially assisted by desert tortoise monitors, shall conduct a clearance survey to locate and remove all desert tortoises from harm's way including areas to be disturbed using techniques that provide full coverage of all areas (USFWS 2009). During the more active season, clearance surveys will be conducted either the day prior to, or the day of, any surface-disturbing activity. During the less active season, clearance surveys will be conducted within 7 days prior to any surface-disturbing activity. No surface-disturbing activities shall begin until two consecutive surveys yield no individuals.

    An authorized biologist shall excavate all burrows that have characteristics of potentially containing desert tortoises in the area to be disturbed with the goal of locating and removing all desert tortoises and tortoise eggs. During clearance surveys, all handling of desert tortoises and their eggs and excavation of burrows shall be conducted solely by an authorized desert tortoise biologist in accordance with the most current USFWS-approved guidance (currently USFWS 2009). If any active tortoise nests are encountered, the USFWS must be contacted immediately, prior to removal of any tortoises or eggs from those burrows, to determine the most appropriate course of action. Unoccupied burrows shall be collapsed or blocked to prevent desert tortoise entry. Outside construction work areas, all potential tortoise burrows and pallets within 50 feet of the edge of the construction work area shall be flagged. If the burrow is occupied by a tortoise during the less active season, the tortoise shall be temporarily penned (see SSWS-4.14). No stakes or flagging shall be placed on the berm or in the opening of a desert tortoise burrow. Desert tortoise burrows shall not be marked in a manner that facilitates poaching. Avoidance flagging shall be designed to be easily distinguished from access route or other flagging, and shall be designed in consultation with experienced construction personnel and authorized biologists. All flagging shall be removed following construction activities.

    An authorized desert tortoise biologist will inspect areas to be backfilled immediately prior to backfilling.

12. *Desert Tortoise in Harm's Way* – Any project-related activity that may endanger a desert tortoise shall cease if a desert tortoise is seen on the project site. Project activities may resume after an authorized desert tortoise biologist or desert tortoise monitor (see restrictions in SSWS-4.3) removes the desert tortoise from danger or after the tortoise has moved to a safe area on its own.

    During the more active season and if temperatures are above 60 but below 95°F for more than 7 consecutive days, at least one monitor shall be assigned to observe spoil piles prior to excavation and covering.

13. *Herbicide Use* – The use of herbicides within USFWS-designated critical habitat, ACECs, and general desert tortoise habitat (USGS model rating of 0.6 or higher [Nussear et al. 2009]) will be prohibited without prior approval from the USFWS, BLM, and applicable state wildlife agency.

14. *Handling of Desert Tortoises* – Desert tortoises shall only be moved by an authorized desert tortoise biologist or desert tortoise monitor (see restrictions in SSWS-4.3) solely for the purpose of moving the tortoises out of harm's way. During construction, operation, and maintenance, an authorized desert tortoise biologist shall pen, capture, handle, and relocate desert tortoises from harm's way as appropriate and in accordance with the most current USFWS-approved guidance. No tortoise shall be handled by more than one person. Each tortoise handled will be given a unique number, photographed, and the biologist will record all relevant data on the Desert Tortoise Handling and Take Report to be provided to BLM in accordance with the project reporting requirements.

    Desert tortoises that occur aboveground and need to be moved from harm's way shall be placed in the shade of a shrub, 150 to 1,640 feet from the point of encounter.

    If desert tortoises need to be moved at a time of day when ambient temperatures could harm them (less than 40°F or greater than 95°F), they shall be held overnight in a clean cardboard box. These desert tortoises shall be kept in the care of an authorized biologist under appropriate controlled temperatures and released the following day when temperatures are favorable. All cardboard boxes shall be discarded after one use and never hold more than one tortoise. If any tortoise active nests are encountered, the USFWS must be contacted immediately, prior to removal of any tortoises or eggs from those burrows, to determine the most appropriate course of action.

    Desert tortoises located in the project area sheltering in a burrow during the less active season may be temporarily penned in accordance with SSWS-4.14 at the discretion of an authorized desert tortoise biologist. Desert tortoises should not be penned in areas of moderate to heavy public use; rather they should be moved from harm's way in accordance with the most current USFWS-approved guidance (currently USFWS 2009).

    Desert tortoises shall be handled in accordance with the most current USFWS-approved guidance (currently USFWS 2009). Equipment or materials that contact desert tortoises (including shirts and pants) shall be sterilized, disposed of, or changed before contacting another tortoise to prevent the spread of disease. All tortoises shall be handled using disposable surgical gloves and the gloves shall be disposed of after handling each tortoise. An authorized desert tortoise biologist shall document each tortoise handling by completing the Desert Tortoise Handling and Take Report.

The authorized biologist will document each tortoise encounter or handling with the following information, at a minimum: a description of the situation; vegetation type; date of observation; weather conditions; condition and health; any apparent injuries and state of healing; if moved, the GPS location from which it was captured and the location in which it was released; map locations; whether the animal voided its bladder; and identifying markings (that is, identification numbers marked on lateral scutes or attached transmitters).

15. *Penning* – Penning shall be accomplished by installing a circular fence, approximately 20 feet in diameter to enclose and surround the tortoise burrow. The pen should be constructed with 1-inch horizontal by 2-inch vertical, galvanized welded wire. Steel T-posts or rebar should be placed every 5 to 6 feet to support the pen material. Pen material will extend 18 to 24 inches aboveground. The bottom of the enclosure will be buried 6 to 12 inch or bent towards the burrow, have soil mounded along the base, and other measures implemented to ensure zero ground clearance. Care shall be taken to minimize visibility of the pen by the public. An authorized desert tortoise biologist or desert tortoise monitor shall check the pen at a frequency to ensure that the desert tortoise is secure and not stressed. No desert tortoise shall be penned for more than 48 hours without written approval by the USFWS. Because this is a new technique, all instances of penning or issues associated with penning shall be reported to the USFWS within 3 days.

16. *Wildlife Escape Ramps* – Any excavated holes or trenches related to transmission line construction (e.g., tower foundations, ground electrode wells) left open overnight will be covered or tortoise-proof fencing will be installed to prevent the possibility of tortoises falling into the open holes. Earthen plugs, with wildlife escape ramps on either side of the plug, will be provided in open trench segments at no greater than every 0.25 mile. These distances will be reduced if the FCR and authorized desert tortoise biologist determine that the plug and escape ramp spacing is insufficient to facilitate animal escape from the trench. Any tortoise that is found in a trench or excavation shall be promptly removed by an authorized desert tortoise biologist in accordance with the most current USFWS-approved guidance. If the authorized desert tortoise biologist is not allowed to enter the excavation or trench for safety reasons, the alternative method of removal must have prior approval by the USFWS. All excavations will be inspected for tortoises before filling.

17. *Temporary Tortoise-Proof Fencing* – All construction areas, including open pipeline trenches, hydrostatic testing locations, and tie-in work will be fenced with temporary tortoise-proof fencing or inspected by an authorized desert tortoise biologist periodically throughout and at the end of the day and immediately the next morning. BLM and the USFWS will determine the appropriate length of open trench that will be allowed on the project.

    Fencing will be designed in a manner that reduces the potential for desert tortoises and hatchlings to access the construction areas. Thus, the lower 6 to 12 inches of fencing will be folded outward (away from the construction area and towards the direction a tortoise would approach the work area), and covered with sufficient amount of soil, rocks, and

staking to maintain zero ground clearance and secure the bottom section of material. An authorized desert tortoise biologist will check the integrity of the fencing every 2 hours and ensure that there are no breaches in the fencing and no desert tortoises pacing the fence. After the fencing is erected and secure, the inside will be cleared by an authorized desert tortoise biologist. The fencing must remain closed during any construction activities.

18. *Permanent Tortoise-Proof Fencing* – Tortoise-proof fencing will be installed around the perimeters of the Southern Terminal, southern ground electrode site, and any other permanent aboveground facilities that require regular monitoring and maintenance. Fence specifications will be consistent with those approved by the USFWS (USFWS 2009). Tortoise guards shall be placed at all road access points where desert tortoise-proof fencing is interrupted, to exclude desert tortoises from the facility. Gates shall provide minimal ground clearance and deter ingress by desert tortoises. Permanent tortoise-proof fencing along the facility area shall be appropriately constructed, monitored, and maintained. Fencing shall be inspected in accordance with Table SSWS-4.1 and reports prepared in accordance with SSWS-4.34 unless modified by the USFWS. Monitoring and maintenance shall include regular removal of trash and sediment accumulation and restoration of zero ground clearance between the ground and the bottom of the fence, including re-covering the bent portion of the fence if not buried.

Table SSWS-4.1 Desert tortoise fence inspection requirements

Fence Inspections Immediately After Installation	
Condition	**Minimum Requirements**
First two weeks following fence installation if tortoise burrows or tortoises are located and cleared within the fenced area during the tortoise more active season	Inspect fence perimeter, tortoise guards, and gates once per day, timed to occur when tortoises may be pacing the fenceline.
First two weeks following fence installation if tortoise burrows with tortoises are located and cleared within the fenced area during the tortoise less active season	Inspect fence perimeter, tortoise guards, and gates once per day.
If no tortoises or tortoise burrows are located within the fenced area (regardless of tortoise more or less active season)	Implement standard fence inspections (see below).
Standard Fence Inspections	
Condition	**Minimum Requirements**
Following major storm event, tortoise more active season	Inspect fence perimeter, tortoise guards, and gates within 48 hours.
Following major storm event, tortoise less active season	Inspect fence perimeter, tortoise guards, and gates within 72 hours.
Breach in fence observed, tortoise guard or gate requires maintenance, tortoise more active season	Repair within 48 hours of breach occurrence.
Breach in fence observed, tortoise guard or gate requires maintenance, tortoise less active season	Repair within 1 week of breach occurrence.

19. *Dust Control* – Water applied for dust control will not be allowed to pool outside of desert tortoise fenced areas, as this can attract desert tortoises. Leaks from water trucks or water tanks will be promptly repaired to prevent pooling water. An authorized biologist or desert tortoise monitor will be assigned to patrol each area being watered. This individual will patrol the area immediately after the water is applied and at approximate 60-minute intervals until the ground is no longer wet enough to attract tortoises if conditions favor tortoise activity. No dust palliatives (e.g., calcium or magnesium chlorides, dust oils, plant or animal extracts, enzymes, synthetic polymers, etc.) other than water are approved for use in desert tortoise habitat.

20. *Blasting* – If blasting is required in desert tortoise habitat, detonation shall only occur after the area has been surveyed and cleared by an authorized desert tortoise biologist. A 200-foot radius area around the blasting site will be surveyed and all desert tortoises located aboveground within this 200-foot radius of the blasting site will be moved 500 feet from the blasting site, placed in an unoccupied burrow, and temporarily penned (see SSWS-4.14) to prevent tortoises that have been temporarily relocated from returning to the site. Tortoises in burrows will be left in their burrows. All burrows, regardless of occupied status, will be stuffed with newspapers, flagged, and location recorded using a GPS unit. Immediately after blasting, newspaper and flagging will be removed. If a burrow or cover site that could be occupied has collapsed, it will be excavated to ensure that no tortoises have been buried and are in danger of suffocation.

21. *Raven and Raptor Perching* – To limit the potential for predation of desert tortoise by corvids and raptors, TransWest will construct self-supporting tubular monopole towers with perch discouragers throughout USFWS-designated critical habitat for the Mojave desert tortoise.

22. *Raven Management* – To limit the potential for predation of desert tortoise by corvids, TransWest will follow the BLM Southern Nevada District's Raven Management Plan (or a similar plan as coordinated among TransWest, BLM, and USFWS) that outlines active adaptive management strategies for controlling raven predation and nesting within the Project ROW, including post-construction monitoring for ravens and removal of raven nests, consistent with the restrictions implemented by the Migratory Bird Treaty Act. If evidence of raven nesting is observed in the ROW, the USFWS will be notified within three calendar days.

23. *Litter Control* – To limit the potential for predation of desert tortoise by corvids, coyotes, feral dogs, and other opportunistic predators, TransWest will require all construction waste to be contained and removed from the Project area in a manner that does not attract corvids to the Project area (as per the BLM Southern Nevada District's Raven Management Plan). All trash and food items will be placed in raven-proof containers and removed daily.

24. *Habitat Impact Compensation Fees* – For disturbance of desert tortoise critical habitat on Federal and State lands in Nevada, compensation rates are determined by the formula described in the "Compensation for the Desert Tortoise" (Hastey et al. 1991), where

compensation for disturbance of critical habitat starts at a 1:3 ratio from the base rate of $849 for an acre of disturbance in non-critical habitat (this is the rate as of March 1, 2016, and will be reassessed in 2017). Compensation rates can range up to a 1:6 ratio based on several factors. For 83 acres of disturbance of critical habitat in Lincoln County, two points were added to the 1:3 ratio - one point for the term of effect which is expected to be long term (greater than 10 years) and one point for existing disturbance on site which is little or none. Therefore the compensation for these 83 acres of disturbance will be assessed at a 1:5 ratio ($849 x 5 = $4,245) for a total of $352,335. For the remainder of disturbance in critical habitat in Lincoln (98 acres) and Clark (183 acres) Counties, only one point would be added for the term of effect which is expected to be long term (greater than 10 years); the second point for existing disturbance is not being added since the project components will be collocated or adjacent to existing ROWs or disturbance. This results in a 1:4 ratio ($849 x 4 = $3,396). Therefore, the compensation for the 98 acres of disturbance in Lincoln County will be $332,808, and for the 183 acres of disturbance in Clark County, it will be $621,468. The remainder of the disturbance will occur in non-critical habitat and is therefore assessed at the base compensation rate of $849. For Lincoln County, 216 acres at $849 equals $183,384. For Clark County, 838 acres at $849 equals $711,462. The total compensation for disturbance of desert tortoise critical habitat and non-critical habitat in Lincoln and Clark Counties is therefore $2,201,457.

With regard to Project-related impacts to Mojave desert tortoise habitat on private lands in Clark County, Nevada, TransWest has elected to comply with the terms and conditions of the section 10(a)(1)(B) incidental take permit for the Clark County Multiple Species Habitat Conservation Plan (MSHCP) for the 328 acres of project disturbance that would occur on these lands during construction. Accordingly, TransWest has agreed to pay appropriate mitigation fees to comply with the Clark County MSHCP. TransWest will provide proof of adherence to the provisions of the permit and MSHCP through enforceable terms that the BLM adds to the applicant's ROW grant. The BLM will retain such proof of adherence in the project ROW file. Proof of adherence refers to payment receipts for mitigation fees assessed under the MSHCP prior to any surface-disturbing activity within the proposed action area. By complying with the section 10(a)(1)(B) incidental take permit and MSHCP, effects of the proposed action on private land will be minimized and mitigated through implementation of measures administered through MSHCP activities and programs.

25. *Disposition of dead or injured desert tortoises* – In the event that a dead or injured desert tortoise is found within the action area for the TWE project, the BLM and Western must include the following notification procedures in their respective incidental take permit and ROW grant.
    - ~ The applicant must notify the Southern Nevada Fish and Wildlife Office and BLM by telephone (702 515-5230) or email within 24 hours of locating any dead or injured desert tortoises or the next business day thereafter. The report must

include the date, time, and location of the carcass, a photograph, cause of death, if known, and any other pertinent information.

- Š Transport injured desert tortoises to a qualified veterinarian for treatment. Contact the USFWS regarding their final disposition if any injured desert tortoises survive.
- Š Handle dead specimens to preserve biological material in the best possible state for later analysis, if such analysis is needed. The USFWS will make this determination when the BLM or the applicant provides notice that a desert tortoise has been killed by project activities.

To avoid and minimize potential Project effects on desert tortoises during power line operation and maintenance activities, BLM, Western, and others designated to act as agents of BLM and Western will implement the following measures:

26. *Coordination* – TransWest will submit a list of planned maintenance activities involving vegetation clearing or ground disturbance by name, category, location, and approximate start date to the BLM Las Vegas and Caliente FOs. BLM also will forward the list of activities to the USFWS and state agencies. The agencies will have 30 days following receipt of the report to consider the proposed action. In the event of a rejection, TransWest will work with the agencies to resolve issues. Agency approval of the proposed list of projects is valid for one year after agency acceptance.

27. *Routine Maintenance* – The following measures will apply to normal maintenance Š activities that do not result in new disturbance. Š
    a. Š All TransWest employees and its contractors involved with transmission line ROW inspection and maintenance activities will be required to take a tortoise education program described previously (Measure SSWS-4.5).
    b. ŠIf desert tortoises or their burrows occur in the work area, TransWest will implement appropriate measures described previously.
    c. ŠUpon completion of each maintenance activity in the ROW, all used material and equipment will be removed from the site. This condition does not apply to fenced sites.
    d. ŠRoutine road surface maintenance activities on existing access or patrol roads will be conducted during the inactive season of the desert tortoise, unless accompanied by an authorized biologist. Localized repair of major damage may take place throughout the year.

28. *Less-Active Season* – All mitigation measures stipulated for construction activities during the construction phase for the desert tortoise in the less-active season will be applicable to operation and maintenance activities that result in surface disturbance during the less-active season.

29. *More-Active Season* – All mitigation measures stipulated for construction activities during the construction phase for the desert tortoise in the more-active active season will be

applicable to operation and maintenance activities that result in surface disturbance during the more-active season.

30. *Use of Heavy Equipment* – All maintenance activities in critical tortoise habitat that use heavy equipment (whether there is surface disturbance or not) will require an authorized desert tortoise biologist to be on-site during the more-active season and on-call during the less-active season.

31. *Work Outside ROW* – The following measures will apply to maintenance activities that may extend outside the transmission line ROW corridors.
    a. In addition to measures (30b) and (30c), TransWest will implement appropriate measures for operations and maintenance activities described for construction-phase activities (Measures 1-24, above);
    b. For maintenance activities that result in surface disturbance during the more-active season of the desert tortoise: the width of the activity corridor will be determined prior to the onset of ground-disturbing activities. Work areas will be restricted to the narrowest possible corridors and generally will not be expected to extend beyond the Project ROW; and
    c. TransWest will contact the BLM if activities may extend outside of the transmission line ROW in all or in part; re-initiation of section 7 consultation may be required for activities that extend beyond the ROW.

32. *Emergency repairs* – For emergency situations during the operation and maintenance phase of the Project, TransWest will notify the appropriate local BLM field office (Las Vegas Field Office or Caliente Field Office, as appropriate) and the USFWS Southern Nevada Field Office within 48 hours. As a part of this emergency response, the BLM and USFWS may require specific measures to protect desert tortoises. During cleanup and repair, the agencies also may require measures to recover damaged habitats.

Reporting Requirements:

33. *Non-compliance*—Any incident occurring during project activities that was considered by the FCR, authorized desert tortoise biologist, or biological monitor to be in non-compliance with this biological opinion shall be immediately documented by an authorized desert tortoise biologist. Documentation shall include photos, GPS coordinates, and details on the circumstances of the event. The incident will be included in the annual report and post-project report and will be reported as described above (measure 25) if the incident resulted in harm, injury, or death of a desert tortoise.

34. *Fence inspection*—Quarterly reports (January-March, April-June, July-September, and October –December) for monitoring and repair of tortoise-proof fencing as specified in Table 1, shall be submitted to the USFWS's Southern Nevada Fish and Wildlife Office in Las Vegas. Reports are due within the first 30 days following each quarter. For example, the report for quarter January-March is due April 30).

35. TP *Project Construction* – Upon completion of construction, a thorough inspection of the site will be conducted by the FCR(s) and authorized biologists to determine the extent of compliance with the conditions of USFWS's biological opinion, including agreements between TransWest and the agencies. Annual and comprehensive final Project reports will be submitted to BLM and the USFWS Southern Nevada Fish and Wildlife Office in Las Vegas. Project reports will document the numbers and locations of desert tortoises encountered, all instances of tortoise take resulting from harassment, harm, injury, or mortality, their disposition, effectiveness of protective measures, practicality of protective measures, recommendations for future measures that allow for better protection or more workable implementation, and the number of acres disturbed. Annual reports will cover the calendar year and are due April 1 of the following year (e.g., the annual report for calendar year 2016 is due April 1, 2017). Final project reports are due within 60 days following completion of project construction and must include shapefiles depicting actual disturbance in desert tortoise non-critical and critical habitat.

36. TP *Project Operation and Maintenance*—A written assessment report shall be submitted annually to the USFWS outlining the operation and maintenance activities that occurred over the past year. Report to include the following: (1) frequency of implementation of minimization measures, biological observations, (2) general success of each of the minimization measures, and (3) summary all deaths, injuries, and illnesses of desert tortoises within the project area, whether associated with project activities or not. The report is due April 1 of each year.

37. *Restoration Monitoring* – Vegetation restoration success shall be monitored by TransWest and reported to the BLM and USFWS. Monitoring will include both qualitative and quantitative data collection and analysis. Monitoring frequency and parameters for restoration success will be described in the required restoration and reclamation plan.

In addition, the action agencies have proposed to use tubular self-supporting structures along the 28.4 miles of the TWE line that would occur in designated critical habitat for the desert tortoise; and installing perch deterrents for all structure types (S. Knowlton, email message and attachment, February 5, 2016)

Greater Sage-grouse

SSWS-5: To avoid or minimize Project-related impacts to greater sage-grouse and its habitat, the BLM and Western have coordinated with applicable federal and state land and wildlife management agencies and other stakeholders to develop a suite of mitigation measures for this species. In addition, TransWest has developed a Habitat Equivalency Analysis (HEA) to quantitatively determine an appropriate level of compensatory mitigation that will be implemented to offset unavoidable impacts to sage-grouse habitat. Applicant-committed measures proposed as part of the HEA process are further discussed in Section 3.8.6.3. The BLM and Western support the implementation of the TransWest's HEA process and compensatory

mitigation measures in conjunction with the following impact avoidance and minimization measures developed through the NEPA process.

General Measures: To reduce impacts to greater sage-grouse from construction and operation of the proposed Project, TransWest, in consultation with the BLM, Western, and applicable federal and state land and wildlife management agencies, will be required to implement the following general design features:

1. Placement of Project structures and access roads will maximize use of topographic features to visually screen Project facilities from high quality greater sage-grouse habitat (i.e., Wyoming –within sage-grouse core habitat and within 4 miles of active leks; Colorado – within preliminary priority habitat; Utah – within occupied habitat and within 4 miles of active leks.

2. To minimize fragmentation of suitable sage-grouse breeding, brood-rearing, and wintering habitats, the approved transmission line ROW will use existing roads, create no new permanent roads, be accessed via drive and crush wherever possible, and be micro-sited in coordination with applicable state and federal wildlife management.

3. To limit corvid predation on greater sage-grouse, TransWest will develop a Raven Management Plan that outlines active adaptive management strategies for controlling raven predation and nesting within the Project ROW and includes post–construction monitoring for ravens and removal of raven nests.

4. To limit disturbance to lekking and nesting activity, disruptive construction and maintenance activities within 4 miles of occupied/active leks will be prohibited between March 1 and June 30. Activities determined to be non-disruptive by the BLM, Western, and applicable federal and state land and wildlife management agencies will be permitted between March 1 and June 30.

5. To limit the potential for adverse impacts resulting from contact with construction equipment, vehicles, and personnel, TransWest will implement a vehicle speed limit of 15 mph on roads without posted speed limits in areas of occupied sage-grouse habitat.

6. Under Applicant Committed Design Feature TWE-26, TransWest has committed to developing a Noxious Weed Management Plan in accordance with existing BLM Pesticide Use Plan requirements. Control of noxious weeds will minimize the potential for weed-related degradation of occupied sage-grouse habitat. Prior to the use of chemical weed control agents, herbicide applications will be reviewed by agency wildlife biologists to ensure consistency with state and local greater sage-grouse conservation goals.

Site Specific Measures: In addition to requiring implementation of the general mitigation measures discussed above, the BLM and Western will consider requiring additional impact avoidance and minimization measures on a site-specific basis in areas of greater sage-grouse habitat located within areas that meet all of the following state-specific criteria:

- n Areas within 4 miles of active leks and within Wyoming Core Areas designated under EO 2011-05;
- n Areas within 4 miles of active leks and within areas of PPH in Colorado; and
- n Areas within 4 miles of active leks and within areas of designated brood-rearing habitats and winter concentration areas in Utah.

Identification of additional greater sage-grouse mitigation measures to be implemented in local areas will be completed prior to finalization of the POD in coordination with TransWest, BLM, Western, and local interdisciplinary teams comprised of applicable federal and state land and wildlife management agency staff. Criteria for determining site-specific measures could include, but will not be limited to: existing vegetation communities, existing fragmentation, proximity to active leks, visibility of the proposed transmission line and towers from active lek locations, presence of noxious and invasive weed species, topography, proximity to USFWS PACs, proximity to designated winter concentration areas, proximity to nesting habitat, proximity to brood rearing habitat, proximity to available water sources, proximity to other anthropogenic sources of disturbance, and co-location with existing transmission infrastructure.

Additional measures identified by the BLM and Western for consideration on a site-specific basis in coordination with appropriate federal and state agencies will include:

1. Installation of alternative structure types consisting of self-supporting tubular steel monopole structures to reduce the potential for perching and nest construction by avian predators of greater sage-grouse.

2. Installation of perch deterrents on transmission structures to reduce the potential for perching by avian predators of greater sage-grouse.

3. In areas determined to be unsuitable for the installation of self-supporting tubular steel monopoles, TransWest may be required to install agency-approved guy wire marking devices on all transmission tower guy lines to increase the visibility of each wire and reduce the risk of collision by flying greater sage-grouse.

4. nOutfit all newly constructed fencing with agency–approved bird diverters/wire markers.

Western Yellow-billed Cuckoo

SSWS-6: To avoid or minimize impacts to the western yellow-billed cuckoo and its habitat, including proposed critical habitat, TransWest will coordinate with the USFWS, applicable state and federal land management agencies and private landowners (as appropriate) to implement the following conservation measures during construction, operation, and maintenance:

1. Prior to final engineering and design of the transmission line and initiation of construction activities (e.g., geotechnical borings), TransWest will conduct a habitat assessment, including field verification, to delineate all areas of suitable western yellow-billed cuckoo habitat within 0.5 mile of the proposed edge of Project disturbance. Results of the habitat assessment will be provided to the lead and local USFWS Ecological Services Field Offices for review.

2. No surface disturbing activity (i.e. towers, permanent and temporary project facilities, new access roads) will occur within field-verified suitable habitat and proposed critical habitat.

a. For existing access roads within field-verified suitable habitat and proposed critical habitat for western yellow-billed cuckoo, TransWest will avoid upgrades that require clearing and pruning riparian vegetation.

b. Where it is necessary for TransWest to cross field-verified suitable habitat and proposed critical habitat for the western yellow-billed cuckoo, TransWest will design and locate tower structures outside of these habitats in a way that will minimize the need to clear or prune riparian vegetation within these habitats.

c. Should riparian vegetation management be required within proposed critical habitat and field-verified suitable habitat for the western yellow-billed cuckoo, TransWest Will:Submit a preliminary vegetation management proposal to USFWS that outlines the location, methods, and extent of the proposed activity;

i. Submit a preliminary vegetation management proposal to USFWS that outlines the location, methods, and extent of the proposed activity;

ii. Conduct a pre-construction site visit with USFWS and applicable state and federal land management agencies and private landowners (as appropriate) to evaluate the proposal and determine additional site-specific approaches to protect riparian function and nesting habitat; and

iii. Submit a final vegetation management proposal to USFWS that outlines the location, methods, and extent of the proposed activity and any site-specific approaches or modifications determined at the site visit to demonstrate that the effects are not more than

insignificant or discountable. If these effects are not insignificant or discountable, then consultation on the western yellow-billed cuckoo would be reinitiated.

3. TransWest will avoid surface disturbing and disruptive activities (i.e. vegetation management, broadcast herbicide spraying, helicopter assisted construction, use of existing roads) within 0.5 miles of proposed critical habitat and field-verified suitable habitat during the western yellow-billed cuckoo breeding season (June 1 to August 31).

a. When surface-disturbing or other disruptive activities cannot be avoided within 0.5 miles of field-verified suitable habitat and proposed critical habitat, TransWest will conduct protocol breeding-season surveys prior to any disturbance unless species occupancy and distribution information is complete, available, and supports a conclusion that the species is not present; or unless otherwise agreed to by the USFWS and BLM in response to mitigating factors such as existing disturbance, screening, or site-specific habitat conditions. All surveys much be conducted by surveyors operating under a recovery permit. All survey results will be submitted to the Service prior to initiation of construction activities in field-verified suitable habitat or proposed critical habitat.

b. If protocol surveys document presence of western yellow-billed cuckoo, surface-disturbing or other disruptive activities will not be permitted within 0.5 miles of occupied habitat during the breeding season (June 1 to August 31). If protocol surveys do not document presence of western yellow-billed cuckoo, construction will be allowed to proceed as scheduled.

c. TransWest may perform noxious weed control efforts during the western yellow-billed cuckoo breeding season (June 1 to August 31) in the form of spot treatments and hand-cutting of weeds in conformance with label requirements to minimize habitat degradation.

Utah Prairie Dog

SSWS-7: To avoid or minimize impacts to the Utah prairie dog, TransWest will implement the following measures:

1. Pre-construction surveys during the active season, will be conducted according to approved methods, at a minimum of 2 weeks prior to surface disturbance within suitable habitat (as determined during 2013 and 2014 surveys), unless species occupancy and distribution information is complete, current, and available through coordination with local agencies (BLM, UDWR, and USFWS). Surveys will be conducted by USFWS-certified Utah prairie dog surveyors. In the event species occurrence is verified, consultation with USFWS will be re-initiated and TransWest may be required to modify operational plans, at the discretion of the

authorized officer, to include additional appropriate protection measures for the minimization of impacts on the Utah prairie dog and its habitat.

2. All Project employees will be informed of the occurrence of the Utah prairie dog in the general area, and of the threatened status of the species. They will be informed of activities that constitute "take," and the potential penalties (up to $200,000 in fines and 1 year in prison) for taking Utah prairie dogs, which are listed under ESA.

3. Project-related vehicle maintenance activities will be conducted in maintenance facilities. Should it become necessary to perform vehicle or equipment maintenance on-site, these activities will avoid identified Utah prairie dog colonies, or will be conducted outside of a 350-foot buffer surrounding the colonies. Precautions will be taken to ensure contamination of maintenance sites by fuels, motor oils, grease, etc., does not occur, and such materials are contained and properly disposed of off-site. Inadvertent spills of petroleum based, or other toxic materials will be cleaned up and removed immediately.

4. Construction equipment and materials extending beyond one breeding season (i.e., laydown yards) will not be staged within 0.5 mile of an occupied Utah prairie dog colony. Temporary laydown yards (that do not extend beyond more than one breeding season) may be approved within 350 feet of identified Utah prairie dog colonies; however, to ensure Utah prairie dogs do not move into these areas additional conservation measures such as silt fencing and barriers will be applied.

5. Reclamation and restoration efforts in suitable Utah prairie dog habitat will be conducted in accordance with the Vegetation Composition Guidelines for Utah Prairie Dog Habitat using native seed, unless otherwise specified in coordination with the USFWS and BLM.

6. Project personnel will not be permitted to have firearms (except for law enforcement) or pets in their possession while on the Project site within Utah prairie dog habitat.

7. If a dead or injured Utah prairie dog is located, initial notification will be made to the USFWS Division of Law Enforcement, Utah FO at (801) 975-3330, to the Southern Region UDWR at (435) 865-6100, and to the BLM Authorized Officer at (435) 865-3000. Instruction for proper handling and disposition of such specimens will be issued by the Division of Law Enforcement. Care will be taken in handling sick or injured animals to ensure effective treatment, and care and in handling dead specimens to preserve biological material in the best possible state.

8. To limit the potential for adverse impacts resulting from contact with construction equipment, vehicles, and personnel, TransWest will implement a Project vehicle speed limit of 15 miles per hour (mph) on new Project access roads or roads without an established, posted speed limit within areas of suitable habitat identified by the USFWS, BLM, and UDWR.

Southwestern willow flycatcher

SSWS-8: To avoid or minimize impacts to the southwestern willow flycatcher, TransWest will coordinate with the USFWS, applicable state and federal land management agencies and private landowners (as appropriate) to implement the following conservation measures during construction, operations and maintenance:

1. Prior to final engineering and design of the transmission line and initiation of construction activities (e.g., geotechnical borings), TransWest will conduct a habitat assessment, including field verification, to delineate suitable southwestern willow flycatcher habitat within 0.5 mile of the proposed edge of Project disturbance. Results of the habitat assessment will be provided to the lead and local USFWS Ecological Services Field Offices for review.

2. TransWest will avoid all vegetation clearing, broadcast herbicide spraying, and/or other surface disturbing activities within 0.5 mile of field-verified suitable habitat for southwestern willow flycatcher.

3. If field-verified suitable southwestern willow flycatcher habitat cannot be avoided by 0.5 mile, prior to implementation of vegetation clearing or ground-disturbing activities, southwestern willow flycatcher protocol surveys will be conducted within suitable habitat that falls within 0.25 mile of the Project disturbance footprint.

4. Ground disturbing activities will be avoided within 0.25 mile of known occupied southwestern willow flycatcher habitat. If occupied southwestern willow flycatcher habitat cannot be avoided by 0.25 mile, TransWest will conduct protocol surveys to determine current year activity. If southwestern willow flycatchers are determined to be present, ground-disturbing activities will not occur between May 1 and August 15 (the southwestern willow flycatcher breeding period).

5. Any ground disturbing activities in occupied southwestern willow flycatcher habitat will be monitored to ensure that adverse impacts to southwestern willow flycatcher and the occupied habitat are avoided or minimized.

6. Within field-verified suitable southwestern willow flycatcher habitat, reclamation and reseeding practices and development of seed mixes will be determined in coordination with the land management agency and USFWS. Native species will be preferred over non-native species for revegetation of habitat in disturbed areas.

Black-footed Ferret

SSWS-9: Prior to final engineering design, TransWest will conduct a habitat assessment and, if necessary, species-specific surveys for black-footed ferrets using a USFWS-approved survey protocol. Survey results will be used to avoid siting Project infrastructure (e.g., towers and access roads) within suitable black-footed ferret habitat (i.e., active white-tailed prairie dog colonies that are greater than 200 acres in area) the black-footed ferret analysis area.

To limit potential Project-related increases in raptor predation on black-footed ferrets and associated prey populations, TransWest will be required, subject to consultation with the BLM, USFWS, Western, and applicable state wildlife agencies, to use alternative structure types (e.g., tubular monopoles) with perch discouragers on segments of the proposed Project located within the black-footed ferret analysis area.

Canada lynx

SSWS-11

1. Limit disturbance to and within suitable habitat by staying on approved access routes.

2. Limit new access routes created by the Project.

3. Dirt and gravel roads traversing lynx habitat (particularly those that could become highways) should not be paved or otherwise upgraded (e.g., straightening of curves, widening of roadway, etc.) in a manner that is likely to lead to significant increases in traffic volume, traffic speed, increased width of the cleared ROW, or would foreseeably contribute to development or increases in human activity in lynx habitat.

Federally Listed Fish

SSS-2 (Avoidance of Water Withdrawal and Entrainment/Impingement Effects for Federally Listed Fish Species): Where critical habitat for the Colorado River federally endangered fish species cannot be avoided as water sources for construction purposes, TransWest will be required to obtain approval from the USFWS and state or federal agencies responsible for managing the land and critical habitat areas. Agency approval will ensure that water withdrawal methods will avoid or minimize entrainment or impingement effects to early life stages of endangered fish species. Requirements for water pumping in critical habitat areas will include: 1) avoidance of pumping between approximately April 1 through August 31, with specific dates dependent upon the water year; 2) intake hoses will be screened with 3/32-inch mesh size; 3) intake velocity will not exceed 0.33 feet/second in an area where larval stages of the federally endangered fish may be present; and 4) pumping from off-channel locations (i.e., no connection to the river during high spring flows) will use an infiltration gallery constructed in a USFWS-approved location. Additional guidance on pumping methodology is provided in the NMFS's (1997) document entitled Fish Screening Criteria for Anadromous Salmonids.

SSS-4 (Avoidance of Impacts to Critical Habitat for Federally Listed Fish Species): Implementation of the following measures will avoid or minimize impacts to designated critical habitat (i.e., the 100-year floodplain) for the Colorado pikeminnow and razorback sucker where the proposed action will cross the Yampa and Green Rivers:

1. No permanent structures or new roads will be constructed in critical habitat for the j Colorado pikeminnow and razorback sucker along the Green River. j

2. Any temporary disturbance to soils within the 100-year floodplain of the Yampa and Green Rivers during construction, including temporary river crossings by vehicles, will be minimized to the extent possible and disturbed areas will be promptly stabilized and reclaimed to minimize the potential for erosion.

3. TransWest will avoid siting temporary facilities such as staging areas, material stockpiles, fly yards, and wire pulling and tensioning sites in designated critical habitat.

4. No construction equipment will operate in or cross the actively flowing channel of the Yampa and Green Rivers.

5. Where the transmission line crosses designated critical habitat, it will be micro-sited to minimize the need for riparian vegetation disturbance (e.g., shrub and tree removal, cutting, or pruning) in the 100-year floodplain during the construction, operation, and maintenance phases of the Project. In areas where riparian vegetation disturbance is expected due to constraints in micro-siting, TWE will coordinate with the USFWS and BLM.

6. For any activities within the 100-year floodplain of the Yampa River, the following measures will apply:

a. Construction and maintenance of Project facilities located in the floodplain of the Yampa River will take place during seasonal low flows.
b. Ground disturbance and vegetation clearing will be located in areas that avoid or minimize impacts on the PCEs of Colorado pikeminnow critical habitat.
c. Ground disturbance and vegetation clearing will be minimized in the Yampa River floodplain. Drive-and-crush access and construction techniques will be used to the extent feasible. In areas where drive-and-crush access and construction techniques are not feasible, the least impactful technique will be used. In areas where vegetation clearing is necessary, vegetation will be trimmed with the root balls left intact and in place wherever possible.
d. No new permanent roads will be constructed within the 100-year floodplain. Any grading activities will be conducted in a way that avoids altering seasonal flow regimes.
e. Soil stabilization and erosion control measures will be implemented during construction and through completion of reclamation activities. Specific erosion control measures will be developed in coordination with the USFWS and identified in the Stormwater Pollution Prevention Plan, which is a component of the POD.

7. Prior to any vegetation removal in critical habitat for the Colorado pikeminnow and razorback sucker, a preconstruction site visit will be attended by the BLM, USFWS, TransWest, and construction representatives to discuss implementation of measures designed to protect riparian function and critical habitat PCEs for these species.

8. Refueling and storing potentially hazardous materials will not occur within a 328-foot radius of the Yampa and Green Rivers and their perennial tributaries. Spill-prevention practices and containment measures will be incorporated into the Water Resources Protection Plan, Appendix W of the POD.

SSS-6: (Approval of Water Use from June Sucker Habitat Areas): Any water use from the Utah Lake drainage basin, including the Provo and Spanish Fork Rivers, will originate from an existing water right that is currently perfected (developed and in use). If this condition cannot be met, TransWest will consult with USFWS under section 7 of the ESA based on the location and methods for diversion and the amount of water proposed for depletion.

SSS-13: (Herbicide Use in Vicinity of Endangered Colorado River Fishes Habitat): No aerial or broadcast herbicide treatments will be applied for vegetation management within 2,500 feet of bonytail, Colorado pikeminnow, humpback chub, or razorback sucker designated critical habitat. For noxious weed control within 2,500 feet of listed Colorado River fishes' designated critical habitat, the following restrictions apply:

1. Herbicides will not be applied over surface water.

2. Only agency-approved herbicides registered for use near water will be used within 328 feet of surface water or in areas with a high leaching potential.

3. For spot treatments, minimum herbicide spray distances (buffers) from live water are as follows:

   a. Backpack spraying operations – 20 feet.
   b. Other mechanized applications (e.g., truck or all-terrain vehicle mounted equipment) – 50 feet.

Ute Ladies'-tresses Orchid

SS-2: To avoid or minimize impacts to the Ute ladies'-tresses orchid and its habitat, including proposed critical habitat, TransWest will coordinate with the USFWS, applicable state and federal land management agencies and private landowners (as appropriate) to implement the following conservation measures during construction, operations and maintenance:

1. Field habitat assessments will be conducted to identify areas of potentially suitable Ute ladies tresses habitat in the Project area where surveys will be conducted. Field habitat assessments:

   a. Must be conducted by qualified individual(s) approved by the BLM and USFWS.
   b. Will occur during the growing season.

c. Will occur within 300 feet of any planned disturbance or areas likely to experience hydrology changes resulting from Project activities.
d. Will identify habitat meeting the criteria described in 1992 Interim Survey Requirements for Ute ladies'-tresses Orchid (USFWS 1992) and Rangewide Status Review of Ute Ladies'-Tresses (Spiranthes diluvialis) (Fertig et. al 2005).

e. Will exclude habitats meeting the indicators of non-habitat listed in Attachment C.

2. Surveys to determine Ute ladies'-tresses habitat occupancy will be conducted in suitable habitat. The following requirements for inventories apply:

a. Must be conducted by qualified individual(s) and according to 1992 Interim Survey Requirements for Ute ladies'-tresses Orchid (FWS 1992).
b. Will not occur in areas where existing roads will be used without improvement.
c. Will be conducted at a time when the plant can be detected and during appropriate flowering periods.
d. Will be conducted for at least 1 year prior to any temporary disturbance in suitable habitat (e.g., overland travel to access geotechnical boring location). Two additional years of surveys will be conducted after the temporary disturbance for a total of 3 years of surveys.
e. Three consecutive years of surveys will be required prior to any permanent disturbance (e.g., road widening, new road construction, placement of other infrastructure).

3. For any activities associated with the geotechnical investigation the following requirements apply:

a. All work within 300 feet of occupied Ute ladies' tresses habitat will be moved or abandoned.
b. All work within 300 feet of suitable habitat will be monitored by a biological monitor to ensure compliance with all applicable conservation measures.
c. Existing access roads within 300 feet of suitable Ute ladies'-tresses habitat may be used, but not improved.

4. Design Project infrastructure to minimize direct or indirect impacts on suitable habitat both in and downstream of the Project area:

a. Alteration and disturbance of hydrology will not be permitted.
b. Disturbance footprint size shall be reduced to the minimum needed, without ~ compromising safety. ~
c. New access routes for the Project shall be limited.

d. Roads and utilities shall share common right-of-ways where possible.
e. Rights-of-way widths shall be reduced and the depth of excavation needed for the road bed shall be minimized.
f. Construction and right-of-way management measures shall avoid soil compaction that will impact Ute ladies' tresses habitat.
g. Offsitc impacts or indircct impacts shall bc avoidcd or minimized (i.e., install berms or catchment ditches to prevent spilled materials from reaching occupied or suitable habitat through either surface or groundwater).
h. Signage shall be placed to limit off-road travel in sensitive areas.
i. Vehicles and equipment shall be made to stay on designated routes and other m cleared/approved areas. m
j. All disturbed areas will be revegetated with species approved by USFWS and BLM botanists.

5. Project-related construction activities will avoid individual plants by a minimum of 300 feet. In proximity to occupied habitat, Project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts on populations and to individual plants:

a. Follow recommendations for Project design in suitable habitats.
b. Create designs that will avoid altering site hydrology and concentrating water flows or sediments into occupied habitat.
c. Minimize the disturbed area through interim and final reclamation. Reclaim m disturbance following construction to the smallest area possible. m

6. In proximity to occupied habitat, all construction activities will be overseen by a biological monitor to ensure compliance with all applicable conservation measures. The biological monitor will also:

a. Make areas for avoidance visually identifiable in the field (e.g., flagging, temporary fencing, rebar, etc.) before and during construction.
b. Provide the USFWS and BLM with a post-construction report of compliance, impacts, and extent of impacts on Ute ladies'-tresses no later than 4 months upon Project completion.

7. The following restrictions apply to herbicide use in suitable or occupied Ute ladies'-tresses habitat:

a. No aerial or broadcast herbicide treatments will be applied for vegetation management within 2,500 feet of suitable or occupied Ute ladies'-tresses habitat.
b. For noxious weed control within 2,500 feet of suitable or occupied Ute ladies'-tresses habitat, manual spot treatments (i.e. backpack sprayers) shall be used.

c. All those involved in the herbicide application shall be accompanied by a qualified botanist/ecologist familiar with Ute ladies'-tresses to help herbicide applicators identify Ute ladies'-tresses and avoid impacts on individual plants.
d. Treatments will not be done when wind speeds exceed 6 miles per hour.
e. Drift reducing agents shall be used when practical.
f. A reduced application rate will be used.
g. Pump pressure will be reduced, per label instructions.
h. Droplet size will be increased to the largest size possible while still effectively covering the target vegetation. This could be accomplished using larger nozzles or reduced pressure. Notify the USFWS immediately if any Ute Ladies' tresses are located during surveys or monitoring. In the event that Ute Ladies tresses are located, additional discussions between the BLM and USFWS will be conducted to review site plans and ensure that the appropriate avoidance measures are implemented.
i. Herbicides shall be stored in spill proof containers away from special status plant habitats.

8. Notify the USFWS immediately if any Ute Ladies' tresses are located during surveys or monitoring. In the event that Ute Ladies tresses are located, additional discussions between the BLM and USFWS will be conducted to review site plans and ensure that the appropriate avoidance measures are implemented.

Deseret Milkvetch

SS-7: Due to the known locations of Deseret milkvetch within the agency-preferred route and access roads, complete avoidance of impacts to Deseret milkvetch plants through modification of engineering design and access routes does not appear to be feasible. TransWest Express will commit to the following conservation measures to avoid and minimize impacts to Deseret milkvetch to the extent feasible and compensate for impacts where direct loss or damage to Deseret milkvetch plants cannot be avoided as identified below. The following Project-related conservation measures will minimize effects to Deseret milkvetch from Project-related activities identified in Section 2.3 of the BA TransWest will coordinate with the USFWS, applicable state and federal land management agencies and private landowners (as appropriate) to implement appropriate conservation measures during construction and operation. These measures will include but not be limited to the following:

1. A field habitat assessment will be conducted prior to any Project-related vegetation clearing or ground-disturbing activities to determine whether suitable habitat is present within 300 feet (400 feet if Project activities are located upslope of habitat) of the proposed edge of disturbance where the Project traverses the Desert milkvetch consultation boundary. If the Project can avoid all field-verified suitable habitat and associated 300-foot buffer (400 feet if upslope), no species-specific surveys are necessary.

2. If avoidance of field-verified suitable habitat and surrounding 300-foot buffer (400-foot if Project is located upslope of habitat) is not possible, Deseret milkvetch surveys will be conducted within portions of the Project disturbance footprint that fall within 300 feet (400 feet if upslope) of field- verified suitable habitat to determine occupancy prior to implementation of vegetation clearing or ground-disturbing activities.

3. If species-specific surveys are necessary, they will be performed by qualified individual(s) and according to USFWS-accepted survey protocols. Surveys will be conducted during the flowering and/or fruiting period when the plant can be detected and correctly identified. Surveys will be valid for one calendar year.

4. Following completion of the species-specific surveys, a final report and data will be provided to BLM, USFS, and USFWS for additional coordination with TransWest to inform Project engineering and design and to discuss the application and implementation of site-specific avoidance and minimization measures.

5. To the extent feasible based on inter-agency coordination, no new development or permanent ground disturbance, including but not limited to roads, poles, pads, towers, etc., will occur within a 300- foot buffer of occupied Deseret milkvetch habitat. If construction activities occur upslope of suitable or occupied habitat, the buffer may be increased to 400 feet to prevent additional erosion within the habitat.

6. Wire will be strung between towers aerially with no ground disturbance (e.g., no pulling and tensioning sites) in field-verified suitable habitat or within 300 feet of occupied Deseret milkvetch habitat.

7. To the extent feasible based on inter-agency coordination, no new roads will be established within a 300-foot buffer of field-verified suitable or occupied Deseret milkvetch habitat. If construction activities are to occur upslope of suitable or occupied habitat, the buffer may be increased to 400 feet to prevent additional erosion within the habitat. Adjustments will be considered in coordination with USFWS.

8. Blind Canyon Road, the existing access road to the north of Birdseye, contains plants alongside the road and within 300 feet of the road edge. This road will not be used unless TransWest can demonstrate that the road will be used in its existing condition, without upgrades that increase the footprint of the road. If Blind Canyon road will be used, the Project commits to the following conservation measures:

a.Road widening will not occur with 300 feet of Deseret milkvetch plants or known occurrences

b. Road realignment will not occur within 300-feet of Deseret milkvetch plants or known occurrences. The one exception is the USFWS-recommended realignment of the existing

road to avoid use of one hairpin turn as identified by the USFWS. This recommended realignment will reduce future road use within Deseret milkvetch occupied habitat.
c. All construction vehicles will be power-washed to remove weed seed before entering the road to avoid or minimize weed introduction into Deseret milkvetch habitat.
d. This road will not be used during the flowering period of Deseret milkvetch, between May 1 and June 30 to minimize the impact of dust on pollination and reproduction.
e. This road may be used during the active growing season, outside the flowering period: March 1 -April 30 and July 1 -August 31. During these time periods, dust abatement will be employed during all phases of construction, maintenance, and operation. Only water (no chemicals, reclaimed production water, or oil field brine) will be used for dust abatement measures).
f. Vehicle speeds on this road will be restricted to no more than 15 miles per hour in order to reduce fugitive dust during the time of the year when Deseret milkvetch plants are most vulnerable to dust-related impacts (March through August).
g. Prior to use of this road, project managers will inform construction crews, weed crews and new staff of the conservation measures for the species and provide them with maps that depict Deseret milkvetch habitat.
h. Weed control monitoring along Blind Canyon Road will be performed within 50-feet of the road for 2 consecutive years following completion of construction. Weeds will be treated using manual methods (i.e. hand-pulled, removed with tools such as shovels or pulaskis) and removed from the area. For weeds where manual methods are not an effective treatment method, see conservation measure m, below.

9. Existing access roads that avoid occupied habitat will be utilized to the extent practicable to limit additional fragmentation from new road development within the species' habitat. To the extent feasible, the same measures identified in conservation measure SS-7.8, above, will be applied to other existing access roads near the known population of Deseret milkvetch, if plants are found within 300 feet of those roads. If plants are found within 300 feet of those roads, the Project TransWest will document the extent of Project compliance with conservation measure SS-7.8 in a post-construction compliance report to USFWS (see measure SS-7.10f, below).

10. If Deseret milkvetch plants are determined to be present within 300 feet of the proposed surface disturbance and the Project cannot maintain the 300 foot buffer, the following measures will be implemented:

a. A qualified biologist or botanist must be on-site pre-construction to clearly mark or flag avoidance areas so they are visible during construction. The same qualified personnel will be present during construction and installation of erosion control measures, if appropriate. The same qualified personnel will be present during construction to monitor avoidance of these areas and document impacts.

b. Proposed activities will be designed to have the least impact on Deseret milkvetch habitat by incorporating design features that reduce surface impact:

i. Reduce size of surface disturbance to the minimum amount needed for construction while maintaining a safe working environment (e.g., site transmission structures in unsuitable habitat to the extent possible);

ii. No stockpiling of materials in occupied or suitable habitat;

iii. Remove all construction material after construction is complete;

iv. Avoid clearing of low stature vegetation around work areas and limit disturbance to the native vegetation community to the extent that is practicable and will provide a safe working environment;

v. Minimize disturbance needed for new access roads and use drive and crush methods to the extent feasible. Use mechanical clearing only for larger stature vegetation such as trees.

c. If fill material is needed, fill materials will not be sourced from areas identified during pre-construction surveys as field-verified suitable or occupied Deseret milkvetch habitat. If fill material is brought in to the construction site, it will be free of waste, pollutants, and noxious weeds/seeds.

d. Where the Project cannot avoid direct loss or damage of Deseret milkvetch plants, the Project will commit to the following seed transplant minimization measure: Seeds will be collected (as per Center for Plant Conservation Guidelines) from all plants anticipated to be directly impacted prior to construction by a qualified botanist and provided to a permitted institution to propagate individual plants. The institution will propagate the species to collect a minimum of 100 seeds per lost individual plant. Intact seeds will be transplanted into high-quality suitable habitat or occupied habitat in coordination with USFWS.

e. Monitoring will be performed to evaluate plant survival after construction that will include plants within 300 feet of new surface disturbance, control sites, and any transplant sites that are necessary. The monitoring plan will be coordinated with USFWS and will be performed for a minimum of 5 years.

f. Post-construction reports will be prepared by the botanist and submitted to the BLM at the end of construction at each site that identifies compliance with the conservation measures, the areal extent of impacts to occupied habitat, the number of plants impacted and the nature of those impacts, and locations identified on maps. These construction survey reports will be submitted to USFWS at the end of each quarter by the BLM. At the end of construction activities for all projects, a final survey and impact report will be prepared and submitted to the SLM by the botanist. Once the report is deemed complete, BLM will submit this report to USFWS. This report will identify the full extent of impacts to Deseret milkvetch during construction and will include: impacts to individual plants, an accounting of acreage impacts within occupied habitat, and locations identified on maps. NOTE: Impact areas presented in this BA are a preliminary estimate. Final areas will be

determined post-construction and submitted to USFWS to comply with the Section 7 of the ESA.

11. Following completion of construction, TransWest will provide a GIS shapefile or documentation of new and upgraded access routes to the appropriate emergency fire operations personnel with the State of Utah, the BLM, the USFS, and USFWS, as well as a notification statement that there is a federally listed plant species within the area of Birdseye, Utah. This information will be provided no later than one year post-construction of this specific transmission line segment.

12. No vegetation treatments will be performed within 300 feet of occupied Deseret milkvetch habitat.

13. Herbicide use in and adjacent to Deseret milkvetch habitat:

a. No aerial or broadcast herbicide treatments will be applied for vegetation management within 2500 feet of suitable or occupied Deseret milkvetch habitat.
b. For noxious weed control within 2500 feet of suitable or occupied Deseret milkvetch habitat, manual spot treatments (e.g., using backpack sprayers or mechanical controls) will be used and the following measures will be implemented:
i. All those involved in herbicide application will be accompanied by a qualified botanist/ecologist familiar with Deseret milkvetch to help herbicide applicators identify Deseret milkvetch and avoid impacts on individual plants.
ii. Treatments will not be done when wind speeds exceed 6 miles per hour. At lower wind speeds, drift reducing agents will be used when practicable, the application rate and/or pump pressure will be reduced per herbicide label instructions, and droplet size will be increased to the largest size possible while still effectively covering the target vegetation. This could be accomplished using larger nozzles or reduced pressure.
iii. Herbicides will be stored in spill-proof containers away from special status plant habitats.
iv. Short-residual herbicides such as glyphosate will be prioritized for use in occupied habitat over other equally effective herbicides for the target weed species.
v. The following two herbicides will not be used in occupied or suitable habitat: Sulfometuron and Chlorsulfuron

14. Permanent Project disturbance within known occupied habitat (217.7 acres) will not exceed 1 percent cumulatively (21.8 acres) from the TWE Project.

Clay Phacelia

SS-8: To avoid or minimize impacts to the clay phacelia, TransWest will coordinate with the USFWS, applicable state and federal land management agencies and private landowners (as appropriate) to implement the following conservation measures during construction, operations and maintenance:

1. A field habitat assessment will be conducted prior to final engineering and design to: (a) ground-truth the U.S. Forest Service's August 2013 clay phacelia habitat model, and (b) determine whether suitable habitat is present within a 650-foot buffer surrounding modeled habitat where this area is traversed by the proposed right-of-way or where suitable habitat has potential to be affected by other Project-related disturbance including geo-technical testing sites, fly yards, access roads, etc. Results of habitat assessments will be provided to the BLM, USFS, and USFWS for review. TransWest will coordinate with the federal agencies immediately following the completion and review of habitat assessments.

2. Following the habitat assessment and agency coordination, TransWest will conduct 100 percent clearance surveys during the clay phacelia flowering season (typically late June-July) where Project-related disturbance will occur within 650 feet of field-verified suitable habitat. Surveys will be completed in accordance with USFWS-approved protocols prior to final engineering and design. TransWest will provide survey results and coordinate with the BLM, USFS, and USFWS. If occupied clay phacelia habitat is found within 650 feet of proposed Project disturbance, TransWest will coordinate with the BLM, USFS, and USFWS to discuss final engineering and design options in relation to the survey results.

3. Project-related vegetation clearing and surface-disturbing activities will avoid all occupied clay phacelia habitat, including that found during field surveys, by 650 feet. If individual clay phacelia plants cannot be avoided by 650 feet, then TransWest will coordinate with the SLM, USFS, and USFWS to discuss site-specific characteristics of the occupied habitat in relation to Project activities and a determination will be made to re-initiate consultation as appropriate.

4. Only water (no chemicals, reclaimed production water, or other) will be used for dust abatement measures within field-verified suitable clay phacelia habitat.

5. Dust abatement will be employed during maintenance activities in field-verified suitable clay phacelia habitat over the life of the Project during the time of the year when the plant is most vulnerable to dust-related impacts (March through August).

6. No aerial or broadcast herbicide treatments will be conducted for purposes of vegetation management within 2,500 feet of occupied clay phacelia habitat. If aerial or broadcast

spraying of herbicides for noxious weed control must be conducted within 2,500 feet of individual clay phacelia plants, then consultation will be reinitiated.

7. Within field-verified suitable clay phacelia habitat, reclamation and reseeding practices and development of seed mixes will be determined in coordination with the BLM, USFS, and USFWS botanists.

II. General conservation measures

As defined in the ROD POD (conservation measures were transmitted to USFWS on February 16, 2016). These conservation measures are required only on lands administered by the BLM, though may be applied elsewhere as determined by the applicant and its operators.

General wildlife

WLF-1 To minimize disturbance to migratory birds during the breeding and nesting season, no vegetation clearing or trimming, blasting, or other new surface-disturbing activities would occur during the avian breeding season as defined by TWE Project Region and illustrated in Figures 3.22-5, 3.22-8, and 3.22-13 of the Final EIS. If avoidance of vegetation clearing during the nesting season is not possible, then a qualified biologist would conduct nest searches no more than 7 days prior to clearing and trimming activities. Active nests would be identified and protected in accordance with the TWE Project Avian Protection Plan.

WLF-2 To minimize disturbance to nesting raptors, no vegetation clearing or trimming, blasting, or other new surface-disturbing activities would occur within the appropriate spatial buffer for an occupied nest during the breeding season of the species using it. Raptor breeding seasons vary widely based on species, weather conditions, prey availability, latitude, elevation, and other factors. Figures 3.22-5, 3.22-8, and 3.22-13 of the Final EIS present approximate raptor breeding seasons by species and TWE Project region. If surface-disturbing activities within the appropriate spatial buffer cannot be avoided during the associated raptor nesting season, preconstruction raptor nest surveys and monitoring using agency-approved protocols would be performed to identify and protect occupied nests.

Spatial avoidance buffers and seasonal restrictions would be applied as required by applicable BLM and USFS land and resource management plan stipulations (See Appendix C of the Final EIS) on lands administered by these agencies. Seasonal and spatial raptor nest buffers recommended by the USFWS and the appropriate state wildlife agency that are more restrictive than the applicable, required BLM and USFS plan stipulations would be applied at the discretion of these land management agencies (See Table 3.22-4 of the Final EIS). Additionally, raptor seasonal and spatial buffers recommended by USFWS and the appropriate state wildlife agency

would be applied to all other land jurisdictions in coordination with TransWest and respective landowners whose lands would be crossed by the TWE Project.

WLF-4 For the protection of migratory birds, TransWest would be required to install dark-sky lighting at all terminals, sub-stations, and series compensation facilities that is fully shielded to keep light from extending above the horizontal plane and is designed to provide the minimum amount of illumination necessary for safety and security purposes.

WLF-5 In Audubon Important Bird Areas crossed by the 250-foot-wide transmission line Right of Way, TransWest would follow the recommendations in Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012). In addition, vegetation management Level 3, as described in the TWE Project ROW Preparation and Vegetation Management Plan, would be employed at the discretion of the appropriate BLM Field Office Manager in Audubon Important Bird Areas crossed by the 250-foot-wide transmission line Right of Way.

WLF-6 BLM, in coordination with state wildlife officials, will identify forested and woodland habitats of particular importance to wildlife on BLM-administered lands. To minimize fragmentation impacts on these lands, TransWest would employ vegetation management Level 3 (as described in the TWE Project ROW Preparation and Vegetation Management Plan), as determined necessary by the appropriate BLM Field Office Manager. At the discretion of the appropriate BLM Field Office Manager, TransWest may also be required to leave downed woody debris greater than 3 inches in diameter (not including merchantable timber) in place to provide habitat for insects, small mammals, and other small prey species utilized by owls, raptors, and other predators.

WLF-7 In Bird Habitat Conservation Areas crossed by the 250-foot-wide transmission line Right of Way, TransWest would follow the recommendations in Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012). In addition, vegetation management Level 3, as described in the TWE Project ROW Preparation and Vegetation Management Plan, would be employed at the discretion of the appropriate BLM Field Office Manager in Bird Habitat Conservation Areas crossed by the 250-foot-wide transmission line Right of Way.

WLF-8 To minimize collision potential for avian species, TransWest would design the TWE Project to meet the standards described in the Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012).

WLF-9 To minimize collision potential for avian species, prior to construction TransWest would conduct a site-specific risk assessment consistent with Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012) in all areas of priority migratory bird habitats, including Audubon Important Bird Areas, Bird Habitat Conservation Areas, riparian crossings, and other sensitive habitats identified in coordination with land management, USFWS, and applicable state wildlife agencies. Based upon the results of the site-specific risk assessment and following the recommendations described in APLIC 2012, TransWest would install avian flight diverters on guy wires as needed. TransWest would also be required to install flight diverters on guyed structures at tower locations identified by post construction monitoring as having high collision potential as recommended by APLIC 2012.

WLF-10 To avoid or minimize long-term disturbance to wildlife associated with public use of the ROW and new access roads during Project operation, these roads would be closed or rehabilitated using methods and monitoring developed through consultation with the landowner or land management agency. Depending on facility and ROW maintenance needs, methods for closure could include gates, obstructions such as berms or boulders, or partial or full restoration to natural contour and vegetation.

Special status wildlife

SSWS-15 If evidence of an Endangered Species Act (ESA) protected wildlife species not previously identified or known is found in the construction area, the Contractor would immediately notify the appropriate land management agencies and provide the location and nature of the findings. Construction in the vicinity of the newly located ESA protected wildlife species would be halted and would resume when a biologist from the appropriate agency determines that the species would not be affected by continued construction.

SSWS-16 To reduce impacts to federally listed wildlife species, TransWest would be required to obtain approval from the applicable land management agency prior to applying dust palliatives to construction areas located within areas designated as suitable habitat for federally listed species.

Aquatic biological resources

AB-1 (Fish Passage): When avoidance of perennial streams with fish populations is not feasible and a culvert is required during construction, flow would be maintained in a portion of the stream to allow unrestricted fish passage. Any plan for dewatering the stream at the culvert site must be approved by the appropriate federal and state agencies. Culvert size and type would be selected to facilitate the continued and long-term connectivity and movement of target aquatic species. If the culvert is proposed to be in place during project operation, approval must be obtained from the federal or state agency management authority. An alternative crossing method may be required.

AB-2 (Avoid Game Fish Spawning Periods): If spawning areas for game fish species are known to occur at streams proposed for vehicle crossing or culvert construction, instream disturbance would be scheduled to avoid the spawning period. The exact dates for avoidance would be determined through discussions with WGFD, CPW, UDWR, or USFS. All disturbed areas would be restored to pre-construction conditions prior to the next spawning season.

AB-3 (Invasive Aquatic Species Protection): It is assumed that any waterbody could contain aquatic invasive species and invasive weed species. If work occurs in or near a waterbody, all equipment would be decontaminated. Decontamination would occur before arrival at a TWE Project site to avoid the transfer of aquatic invasive species from a previous work site in or near water. Decontamination would consist of either of these actions: 1) Drain all water from equipment and compartments; clean equipment of all mud, plants, debris, and aquatic organisms; and dry equipment for specified time by season (5 days in June through August, 18 days in March through May, and 3 days in December through February when temperatures are at or below freezing); or 2) Use a high pressure (2,500 psi) hot water (140°F) pressure washer to thoroughly clean equipment and flush all compartments that may hold water. A field monitor would be present to ensure that the cleaning was completed prior to vehicle and equipment moving to other streams and drainages.

AB-4 As part of vegetation management, TransWest would prepare a noxious weed management plan. The Plan would identify a list of approved herbicides that may be used as well as locations of areas that may be treated. Licensed herbicide applicators would be used in the treatment process. All herbicides would be used in accordance with label instructions for the chemical. The Plan also would discuss compliance with applicable federal, state, and local agencies.

Special status aquatic resources

SSS-1 (Sediment Protection for Streams with Special Management Fish Species): Mitigation measure WR-3 would be applied to perennial streams providing habitat for fish species requiring special management as mandated by existing federal land use plans.

SSS-3 (Avoidance of Water Withdrawal and Entrainment/Impingement Effects for Conservation Agreement Fish Species): Where waterbodies containing conservation agreement fish species (bluehead sucker, Bonneville cutthroat trout, Colorado River cutthroat trout, flannelmouth sucker, least chub, southern leatherside chub, and Virgin River spinedace) and other special status fish species cannot be avoided as construction water sources, approval must be obtained from appropriate federal, state, and/or land management agencies regarding water withdrawal sites and methods. A site-specific withdrawal plan will be prepared by TransWest for review/approval by the agencies. Requirements for water pumping in habitat for Conservation Agreement Fish Species would include: 1) avoidance of pumping between approximately April 1 through August 31, with specific dates dependent upon the water year; 2) intake hoses would be screened with 3/32-inch mesh size; 3) intake velocity would not exceed 0.33 feet/second in an area where larval stages of fish may be present; and (4) pumping from off-channel locations (i.e., no connection to the river during high spring flows) would use an infiltration gallery constructed in an agency-approved location.. Additional requirements include the use of private, off-stream water sources if possible; withdrawal sites must reviewed/approved by applicable agencies; and approval should include provisions to maintain adequate instream flows to protect conservation agreement fish species and their habitat.

SSS-11 (No Vehicle Crossings or New Roads in the Muddy River): No vehicle crossings or new roads would be constructed across the Muddy River (T15S, R66E, Mount Diablo Meridian). This measure would protect habitat for special status fish species (Virgin River chub, Moapa speckled dace, Moapa White River springfish, Meadow Valley Wash desert sucker, and Meadow Valley Wash speckled dace) in the Muddy River.

Water resources

WR-3 As part of the Right of Way Grant and prior to the final agency authorization for construction, TransWest would consult with federal agencies having land jurisdiction regarding location and design of access roads and temporary work areas near impaired streams to avoid erosion and sedimentation effects. The proposed design and location of new and upgraded access roads and temporary work areas within watersheds (HUC10) containing sediment- or ion-impaired waters (according to 303(d) lists) would be provided by TransWest to the agencies upon completion of conceptual design of these facilities. The agencies would coordinate and

provide input (as deemed applicable by the agencies) to TransWest for modification of locations and designs within TransWest's final engineering schedule to prevent the TWE Project from contributing additional sediment to impaired waters.

Vegetation and wetland resources

NX-1 The Noxious Weed Management Plan to be developed as part of the TWE Project Plan of Development would include the following:

1. Pre-construction surveys for noxious weeds in the footprints of the Right of Way, access roads, and ancillary facilities;

2. Pre-construction weed control;

3. Education of construction and operation personnel in each TWE Project region;

4. Washing of vehicles and equipment before entering and leaving the Right of Way;

5. Herbicide spraying; and

6. Annual monitoring and reporting.

Survey information collected during pre-construction surveys would include species name, GPS location of weed infestations, percent cover, and approximate size of weed infestations. Control of noxious and invasive species could include chemical, physical, and biological methods and would be developed in consultation with the land agencies and private landowners. The plan would identify species of concern for each BLM Field Office and USFS forest and would focus monitoring and control methods on these species. The plan would comply with the existing BLM, USFS, USFWS, state, and federal regulations concerning noxious weed management. Post construction annual monitoring would be determined with the appropriate land management agencies.

NX-2 Herbicide spraying would be conducted following all applicable state and federal laws regarding chemical use, adverse weather, chemical storage, and chemical drift. Further guidelines and protocols for herbicide spraying on BLM land are provided in the Final BLM Vegetation Treatment Using Herbicides Programmatic EIS (BLM Vegetation EIS) (BLM 2007b,c). Standard operating procedures for herbicide spraying include buffers for sensitive areas such as riparian and wetland areas and threatened and endangered species habitat, timing restrictions, and safety protocols. No aerial spraying of herbicides would be permitted within 500 feet of known sensitive species with hand-only application methods allowed.

NX-3 On lands managed by the BLM, an approved Pesticide Use Proposal (PUP) would be obtained from each BLM Field Office prior to herbicide spraying. PUPs would have site-specific information about the herbicides to be used. The PUPs and associated reporting requirements would be submitted in accordance with the schedule required for each BLM Field Office. Herbicide spraying in desert tortoise habitat in Nevada would require consultation with the BLM and USFWS.

NX-4 The cut-stumps of mature salt cedar stands that are cut as part of vegetation clearing would be immediately painted with herbicides. The specific control methods and herbicide to be used would be determined in consultation with the appropriate state or federal land-managing agencies. Additional control measures could include the planting of native or desired plant species following treatment to provide erosion control and the use of biocontrols.

VG-1 Native seed mixes to be used for reclamation would be developed in consultation with the land managers for the various regions crossed by the TWE Project. Seed mixes would meet the requirements of the individual agency Field Offices crossed by the TWE Project. Site-specific seed mixes for soils with LRP would be developed. The LRP seed mixes would be specifically designed for alkaline, saline, or sodic soils and would be used in areas where reclamation would potentially be difficult based on soil conditions. Additional soil amendments may be required in these areas, and would be implemented at the direction of the land manager. Reclaimed areas would be monitored annually by TransWest to ensure successful reclamation is occurring. The length of time for the annual monitoring and the definition of successful reclamation would be determined by the appropriate land management agency. Subsequent actions in areas without successful reclamation would be determined in consultation with the appropriate land management agency.

VG-3 A reclamation plan would be developed as part of the Plan of Development. The reclamation plan would define reclamation success for each vegetation type and management agency, list reclamation seed mixes, and detail reclamation monitoring for both interim and final reclamation. Interim and final reclamation success would be monitored annually, or at intervals as required in the reclamation plan, for at least 3 years, or until reclamation success as defined by the reclamation plan is achieved. Reporting of construction, reclamation progress, and monitoring results would be submitted to each land management agency per each office's reporting requirements.

VG-4 and VG-5 During vegetation clearing, masticated and chipped material spread in the Right of Way would not exceed a depth of 6 inches. Materials would be distributed in discontinuous patches that would not result in a continuous chip mat (less than 40 percent of surface covered up to 6 inches thick).

WET-1 Wetland surveys would be conducted at terminals, in the Right of Way, at ancillary facilities, and along proposed access roads corridors to identify wetlands, waters of the U.S., and riparian areas located in these areas. Survey information collected would include wetland type, type and cover of hydrophytic and riparian vegetation species present, soil characteristics, site hydrology, Global Positioning System (GPS) location of the wetland, and associated information required to determine jurisdictional status. Based on survey results, no surface disturbance including temporary and permanent facilities, the placement of fill material or vegetation clearing for storage, parking, construction activities, or construction work areas as feasible would occur within the avoidance buffer or surface use restriction defined in the resource management plan for each BLM Field Office and USFS national forest. If avoidance is not feasible, USACE, BLM, USFS, and USFWS crossing and construction techniques for wetlands and riparian areas would be employed. The wetland crossing and construction techniques would be approved by the USACE, BLM, USFS, and USFWS and will be outlined in the final Plan of Development.

WET-2 See Applicant-committed measure TWE-2.

WET-3 Access roads would be routed around riparian areas, wetlands, intermittent or perennial drainages, and ephemeral channels to the extent practical. If jurisdictional wetlands or waters of the U.S. cannot be avoided, USACE approved construction techniques for construction in wetlands and waters of the U.S. would be applied. BLM and USFS construction techniques for non-jurisdictional wetlands, riparian areas, intermittent drainages, and ephemeral channels would be applied on BLM and USFS lands, as appropriate. These include the use of timber mats, erosion controls, and the placement of equipment outside of the wetland, riparian area, intermittent drainage, and ephemeral channel boundaries.

Special status plant resources

SS-1 (Species-specific Surveys) – BLM Sensitive plant species requiring surveys would be identified by the BLM and Western in consultation with the appropriate agency. For the BLM Sensitive plant species that require surveys, site- and species-specific surveys would be conducted. The timing and methodology of the surveys would be determined by the BLM in consultation with Western and TransWest. Surveys would be conducted in areas identified as

potential habitat through models developed for the EIS or from agency-provided models for those specific plant species. If individuals or populations are identified during surveys in potential habitat areas, species-specific avoidance would be developed and implemented where practicable. For BLM Sensitive plant species that cannot be avoided, species-specific minimization and/or mitigation would be developed by BLM, Western, and TransWest. BLM Sensitive plant species-specific mitigation may include compensatory mitigation and transplanting of individuals. For federally listed plant species, the species-specific mitigation measures that may be adopted in the Record of Decision are identified in the TWE Project Biological Assessment and Biological Opinion.

SS-3 Construction would occur downslope of BLM Sensitive plant species where practicable. If surface disturbance must be sited upslope, erosion controls would be implemented at the direction of the BLM to prevent sedimentation and erosion from upslope surface disturbance. Where practicable, a minimum 300-foot buffer distance would be implemented between surface disturbing activities and BLM Sensitive plant species. Where the minimum 300-foot buffer is not practicable, species-specific minimization and/or mitigation would be developed by BLM, Western, and TransWest.

SS-5 The Dust Control and Air Quality Plan would include dust abatement measures to minimize impacts to special status plant species, including as appropriate use of slower speed limits on unpaved roads, gravel on roads in occupied habitat and avoidance areas, and the application of water for dust abatement.

SS-6 Prior to vegetation management activities, including vegetation removal, herbicide use, and off-road vehicle access, within federally listed plant species occupied habitat, the applicant will coordinate with the USFWS and BLM to minimize impacts to federally listed species.

III. Applicant-committed Avoidance and Minimization Measures

From Appendix C of the April 2015 final EIS. Unless specified within the measures themselves, these conservation measures apply to all lands, regardless of ownership, as they are committed to in the section 7 consultation with the USFWS.

General design features

TWE-1 The TWE Project will be planned, constructed, operated, and decommissioned in accordance with the agencies' Records of Decision (RODs), the BLM's ROW Grant stipulations, USFS Special Use Permit stipulations, and requirements of other permitting agencies.

TWE-2 The Applicant will comply with all applicable environmental laws and regulations. Applicable laws and regulations may include, but are not limited to, the Clean Water Act (CWA) Section 303(d) and Section 404; the Wild and Scenic Rivers Act, Section 3(a) or 2(a) ii; the Endangered Species Act (ESA), Section 7; the National Historic Preservation Act (NHPA), Section 106; and the Native American Graves Protection and Repatriation Act (NAGPRA). Compliance with all applicable laws and regulations will be documented in the Final Plan of Development (POD)/Construction, Operation, and Maintenance (COM) Plan.

TWE-3 The POD will include a mitigation monitoring plan that will address how each mitigation measure required by permitting agencies in their respective decision documents and permits will be monitored for compliance.

TWE-4 Prior to construction, all personnel will be instructed on the protection of cultural, paleontological, ecological resources, and other natural resources in accordance with the POD provisions. To assist in this effort, the construction contract would address (a) federal, state, and tribal laws regarding cultural resources, fossils, plants, and wildlife, including collection and removal; and (b) the importance of these resources and the purpose and necessity of protecting them.

Project design, access, and construction

TWE-5 The POD will display the location of Project infrastructure (i.e., towers, access roads, substations) and identify short-term and long-term land and resource impacts and the mitigation measures that will be implemented for site-specific and resource-specific environmental impacts.

TWE-6 The POD will include an Access Road Plan that incorporates relevant agency standards regarding road design, construction, maintenance, and decommissioning. The Access Road Plan will incorporate BMPs, stipulated by the agencies in their respective decision documents and permits.

TWE-7 The alignment of any new access roads will follow the designated area's landform contours where practical, providing that such alignment does not additionally impact resource values. This will minimize ground disturbance and reduce scarring (visual contrast).

TWE-8 Crossings of streams and waterways will be done in compliance with federal, state, and local regulations. Roads will be built as near as possible at right angles to the streams and washes (Arizona crossing). Culverts will be installed where necessary. All construction and maintenance activities will be conducted in a manner that will minimize disturbance to vegetation, drainage channels, and intermittent or perennial stream banks. In addition, road construction will include dust-control measures during construction in sensitive areas. All existing roads will be left in a condition equal to, or better than, their condition prior to the construction of the transmission line. Structures will be sited with a minimum distance of 200 feet from streams, wherever possible.

TWE-9 All construction vehicle movement outside the ROW normally will be restricted to pre-designated access or public roads.

TWE-10 The area limits of construction activities will normally be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents will be applied to rocks or vegetation to indicate survey or construction activity limits.

TWE-11 In construction areas where re-contouring is not required, vegetation will be left in place, wherever possible, and original contour will be maintained to avoid excessive root damage and to allow for re-sprouting.

TWE-12 Except for repairs necessary to make roads passable, no widening or upgrading of existing access roads will be undertaken in the area of construction and operation, where soils or vegetation are sensitive to disturbance. In designated areas, structures will be placed to avoid sensitive features such as, but not limited to, riparian areas, water courses and cultural sites, or to allow conductors to clearly span the features within limits of standard structure design. This will minimize the amount of disturbance to the sensitive feature or reduce visual contrast.

TWE-13 In construction areas (e.g., marshalling yards, structure sites, spur roads from existing access roads) where ground disturbance is significant or where re-contouring is required, surface restoration will occur as required by the landowner or land management agency. The method of restoration will normally consist of returning disturbed areas back to their natural contour, reseeding (if required), installing cross drains for erosion control, placing water bars in the road, and filling ditches.

TWE-14 The POD will show the location of borrow sites, from which material will be obtained. Borrow pits will be stripped of topsoil to a depth of approximately 6 inches. Stripped topsoil will be stockpiled and, upon completion of borrow excavation, spread to a uniform depth of 6 inches over areas of borrow pits from which removed. Before replacing topsoil, excavated surfaces will be reasonably smooth and uniformly sloped. The sides of borrow pits will be brought to stable slopes with slope intersection shaped to carry the natural contour of adjacent undisturbed terrain into the pit to give a natural appearance. When necessary, borrow pits will be drained by open ditches to prevent accumulation of standing water.

TWE-15 The POD will include a Flagging, Fencing, and Signage Plan. Except for permanent survey markers and material that locate proposed facilities, stakes, pins, rebar, spikes, and other material will be removed from the surface and within the top 15 inches of the topsoil as a part of final clean-up. Fences on ROW will be removed where necessary and replaced to the original condition or better when the work is finished. Where existing fences are removed to facilitate the work, temporary fence protection for lands adjacent to the ROW will be provided at all times during the continuation of the Contract. Such temporary fence protection will be adequate to prevent public access to restricted areas. Temporary fencing constructed on the ROW will be removed by the Contractor as part of the clean-up operations prior to final acceptance of the completed work.

TWE-16 Watering facilities (tanks, natural springs and/or developed springs, water lines, wells, etc.) will be repaired or replaced, if damaged or destroyed by construction activities, to their pre-disturbed condition as required by the landowner or land management agency.

Geology and soils

TWE-19 The POD will include an Erosion Control Plan as part of the Stormwater Pollution Prevention Plan (SWPPP). Grading will be performed to provide adequate drainage around

structure sites and sufficient clearance under conductors. Excavated material will be spread around the site where it was excavated. Topsoil will be piled separately and replaced after work completion.

Groundwater, surface water, and wetlands

TWE-20 As part of the CWA 404 Permit for the TWE Project, the COM Plan will include a Water Resources Protection Plan, which will incorporate measures to avoid and minimize impacts to wetlands and waters of the U.S (WUS). to the extent practical. The POD will include a SWPPP. The Applicant will identify all streams in the vicinity of the proposed project sites that are listed as impaired under Section 303(d) of the CWA and develop a management plan to avoid, reduce, and/or minimize adverse impacts to those streams.

TWE-21 The Applicant will obtain a National Pollutant Discharge Elimination System (NPDES) permit from the U.S. Environmental Protection Agency (USEPA) prior to construction.

TWE-22 Runoff from excavated areas, construction materials or wastes (including truck washing and concrete washes), and chemical products such as oil, grease, solvents, fuels, and pesticides will be controlled. Excavated material or other construction material will not be stockpiled or deposited near or on stream banks, lake shorelines, ditches, irrigation canals, or other areas where runoff could impact the environment.

TWE-23 Washing of concrete trucks or disposal of excess concrete in any ditch, canal, stream, or other surface water will not be permitted. Concrete wastes will be disposed of in accordance with all federal, state and local regulations.

TWE-24 Vehicle refueling and servicing activities will be performed in designated construction zones located more than 100 feet from wetlands and intermittent streams and more than 500 feet from perennial streams. Spill prevention and containment measures or practices will be incorporated as needed.

TWE-25 A dewatering permit will be obtained from the appropriate agencies if required for construction dewatering activities.

Vegetation and soils management

TWE-26 The POD will include a Reclamation Plan and a Noxious Weed Management Plan. The Reclamation Plan will address plant removal and selective clearing. The Noxious Weed Management Plan will be developed in accordance with appropriate land management agencies' standards, consistent with applicable regulations and agency permitting stipulations for the control of noxious weeds and invasive species (Executive Order [EO] 13112). Included in the Noxious Weed Management Plan will be stipulations regarding construction, restoration, and operation (use of weed-free materials, washing of equipment, etc.).

TWE-27 In construction areas where re-contouring is not required, vegetation will be left in place wherever possible and original contour will be maintained to avoid excessive root damage and allow for re-sprouting.

TWE-28 Clearing will be performed so as to minimize marring and scarring the countryside and preserve the natural beauty to the maximum extent possible. Except for danger trees, no clearing will be performed outside the limits of the ROW.

Ecological resources

TWE-29 The POD will include a Wildlife and Plant Conservation Measures Plan, which will identify important, sensitive, or unique habitats and BLM sensitive, USFS sensitive and state-listed species in the vicinity of the TWE Project. The POD will identify measures to be taken to avoid, minimize, or mitigate impacts to these habitats and species.

TWE-30 In applicable areas, the TWE Project will be designed to meet or exceed the raptor safe design standards described in the Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 (Avian Power Line Interaction Committee [APLIC] 2006).

TWE-31 Mitigation measures that will be developed during the consultation period with the BLM and the USFWS under Section 7 of the ESA will be adhered to, along with mitigation developed in conjunction with state authorities.

TWE-32 Seasonal restrictions may be implemented in certain areas to mitigate impacts on wildlife. With the exception of emergency repair situations, the activities of ROW construction,

restoration, maintenance, and decommissioning will be modified or discontinued in designated areas during sensitive periods (e.g., nesting and breeding periods) for candidate, proposed or listed threatened and endangered, or other sensitive animal species, as required by permitting agencies. Potential seasonal restrictions and avoidance buffers for nesting raptors will be identified in the Draft EIS. The Wildlife and Plant Conservation Measures Plan will incorporate the seasonal restrictions and stipulations contained in the federal agency RODs.

TWE-33 Prior to the start of construction, the Applicant will provide training to all Contractor and Subcontractor personnel and others involved in construction activities where/if there is a known occurrence of protected species or habitat in the construction area. Sensitive areas will be considered avoidance areas. Prior to any construction activity, avoidance areas will be marked on the ground and maintained through the duration of the Contract. The Applicant will remove markings during or following final inspection of the Project.

TWE-34 If evidence of a protected species not previously identified or known is found in the Project area, the Contractor will immediately notify the appropriate land management agencies and provide the location and nature of the findings.

Land use and visual resources

TWE-45 Structures and/or shield/ground wire will be marked with high-visibility devices where required by governmental agencies (Federal Aviation Administration [FAA]). Structure heights will be less than 200 feet, where feasible, to minimize the need for aircraft obstruction lighting.

TWE-46 The Applicant will comply with federal permitting agency stipulations regarding visual resources.

Air quality

TWE-47 The POD will include a Dust Control and Air Quality Plan. Requirements of those entities having jurisdiction over air quality matters will be adhered to and dust control measures will be developed. Open burning of construction trash will not be allowed unless permitted by local authorities.

Public health and safety

TWE-53 The POD will include a Blasting Plan, which will identify methods and mitigation measures to minimize the effects of blasting, where applicable. The Blasting Plan will document the proposed methods to achieve the desired excavations, proposed methods for blasting

warning, use of non-electrical blasting systems, and provisions for controlling fly rock, vibrations, and air blast damage.

Hazardous materials, waste, and wastewater management

TWE-57 As part of the POD, the Applicant will provide a Spill Prevention and Response Plan. The Plan will address compliance with all applicable federal, state, and local regulations, and will include: spill prevention measures, notification procedures in the event of a spill, employee awareness training, and commitment of manpower, equipment, and materials to respond to spills, if they occur.

TWE-58 As part of the POD, the Applicant will provide a Pesticide Use Plan as a component of the Noxious Weed Management Plan. The Plan will address compliance with all applicable federal, state, and local regulations.

TWE-59 As part of the POD, the Applicant will provide a Hazardous Materials Management Plan that has been approved by applicable federal, state or local environmental regulatory agencies. The plan will address on-site excavation of contaminated soils and debris and will include identification of contaminants, methods of excavation, personnel training, safety and health procedures, sampling requirements, management of excavated soils and debris, and disposal methods.

TWE-60 No non-biodegradable debris will be deposited in the ROW. Slash and other biodegradable debris will be left in place or disposed of in accordance with agency requirements.

TWE-61 As part of the POD, the Applicant will provide a Hazardous Materials Management Plan. Hazardous materials will not be drained onto the ground or drainage areas. Totally enclosed containments will be provided for all trash. All construction waste including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials will be removed to a disposal facility authorized to accept such materials.

TWE-62 If a reportable release of hazardous substance occurs at the work site, the Contractor will immediately notify the Applicant and all environmental agencies, as required by law. The Contractor will be responsible for the clean-up.

Fire protection

TWE-64 The POD will include a Fire Protection Plan. The Applicant or its Contractor(s) will notify the BLM of any fires and comply with all rules and regulations administered by the BLM and USFS concerning the use, prevention, and suppression of fires on federal lands, including any fire prevention orders that may be in effect at the time of the permitted activity. The Applicant or its Contractor(s) may be held liable for the cost of fire suppression, stabilization, and rehabilitation. In the event of a fire, personal safety will be the first priority of the Applicant or its Contractor(s). The Applicant or its Contractor(s) will:

- Operate all internal and external combustion engines on federally managed lands per 36 CFR 261.52(j), which requires all such engines to be equipped with a qualified spark arrester that is maintained and not modified;

- Carry shovels, water, and fire extinguishers that are rated at a minimum as ABC-10 pound on all equipment and vehicles. If a fire spreads beyond the suppression capability of workers with these tools, all workers will cease fire suppression action and leave the area immediately via pre-identified escape routes;

- Initiate fire suppression actions in the work area to prevent fire spread to or on federally administered lands. If fire ignitions cannot be prevented or contained immediately, or it may be foreseeable that a fire would exceed the immediate capability of workers, the operation must be modified or discontinued. No risk of ignition or re-ignition will exist upon leaving the operation area;

- Notify the appropriate fire center immediately of the location and status of any escaped fire;

- Review weather forecasts and the potential fire danger prior to any operation involving potential sources of fire ignition from vehicles, equipment, or other means. Prevention measures to be taken each workday will be included in the specific job briefing. Consideration will be given to additional mitigation measures or temporary discontinuance of the operation during periods of extreme wind and dryness;

- Operate all vehicles on designated roads. Vehicle parking to be restricted to areas free of vegetation, on roads, or within the permitted ROW and designated work areas;

- Operate welding, grinding, or cutting activities in areas cleared of vegetation within range of the sparks for that particular action. A spotter will be required to watch for ignitions; and

- Use only diesel-powered vehicles in areas where excessive heat from vehicle exhaust systems could start brush or grass fires.

IV. References

U.S. Fish and Wildlife Service (USFWS). 1992. Interim Survey Requirements for Ute Ladies'-tresses Orchid (Spiranthes Diluvialis). November 23, 1992. 9pp. Accessed online on October 22, 2015 at:

http://www.fws.gov/mountain-prairie/endspp/protocols/UteLadiesTress1992.pdf.

Appendix E

Mitigation Measures

Table E-1 Additional Mitigation Measures Required On Bureau of Reclamation Managed Lands

NUMBER	MITIGATION MEASURE
CLIMATE AND AIR QUALITY	
AQ-3	The Clark County nonattainment area is located in both Region III and Region IV. No new concrete batch plants are to be located within the nonattainment area; concrete required for structure foundations and other construction are to be acquired from existing local vendors.
GEOLOGICAL, PALEONTOLOGICAL, AND MINERAL RESOURCES	
GE-1	In areas with geologic hazards (e.g., ground shaking, liquefaction, landslides, subsidence from karst, groundwater withdrawal, underground mining, and historic mining) and active mining; placement of structures and other TWE Project related disturbance would be avoided to the extent practical. Where avoidance is not possible a site-specific geotechnical investigation and engineering design would be completed following publication of the Record of Decision and prior to construction. Depending on the type of potential geologic hazards, the designs may vary and should address specific needs for enhanced structural supports. Site specific assessment of geologic hazards shall include review of available information concerning areas of mapped hazards and consultation with appropriate governmental agency (USFS, BLM, Utah Geological Survey, USGS) personnel who are knowledgeable about the hazards. Assessment also shall include, if necessary, field surveys and gathering of geotechnical information to determine what engineering design methods would mitigate or lessen potential risks. If active mines cannot be avoided, TransWest will conduct similar due diligence in regard to hazards from underground and historic mining to ensure that TWE Project facilities will not hinder access to mineral resources or create dangers to mining activities.
SOIL RESOURCES	
S-1	Where permanent facilities or structures would be located, the entire topsoil horizon would be salvaged for use in reclamation, prior to surface disturbance. Topsoil would be spread evenly around the permanent structure (not left in piles) and revegetated for future use.
S-2	Construction, excavation, or re-spreading with frozen or saturated soils would be prohibited.
S-3	During reclamation of temporary work areas and temporary construction access roads, compacted areas (typically any area that receives repeated traffic or 3 or more passes by heavy equipment) would be decompacted, to the depth of compaction, as necessary by subsoiling, paraplowing, or parabolic ripping on the contour to the depth of compaction. This would help prepare the seed bed, encourage infiltration and help to prevent accelerated runoff and erosion. Scarification would only be used on shallow soils. The need for decompaction and the compaction depth would be determined on a case by case basis, by a qualified environmental inspector or soil scientist.
S-4	During decommissioning, where a soil sterilizer has been applied, sterile soils would be removed prior to the replacement of topsoil and seeding.
S-5	Surface activities would be prohibited when soils or road surfaces become saturated to a depth of 3 inches or less if mixing of the topsoil and subsoil would occur or the soil surface becomes unsafe for vehicular travel.
S-6	During construction, erosion control measures would be inspected after every storm event and maintained.

Table E-1 Additional Mitigation Measures Required On Bureau of Reclamation Managed Lands

NUMBER	MITIGATION MEASURE
S-7	Lands managed by federal agencies would be subject to any restrictions related to construction on steep slopes or sensitive soils under the applicable federal land use plans. For lands not subject to such restrictions, permanent access roads would not be constructed on slopes over 25 percent unless TransWest provides an engineering design and associated Best Management Practices to ensure slope stability and erosion control to be reviewed and approved by the appropriate land management agency or land owner.
S-8	Newly constructed access roads would be gated to restrict motorized use by the public at the land management agency or landowner's discretion. In some instances, other methods may need to be employed to prevent public access. After construction is complete, permanent access roads would remain gated at the land management agency or landowner's discretion. If the road is no longer needed for operations, it would be reclaimed with the following procedures or in accordance with the land-managing agencies direction: 1. Remove all stream crossings and restore stream banks to natural contours; 2. Reestablish natural drainage patterns; 3. Decompact the road surface by subsoiling along the entire disturbed length; 4. Recontour the road prism to the original land contours; 5. Seed with an agency or landowner approved seed mixture; and 6. Gates and closure signage should be left in place until adequate regeneration/rehabilitation occurs.
S-9	Excess subsoil that is excavated for foundations would not be spread on the soil surface (on top of topsoil) or on access roads. Excess subsoil would be disposed of in accordance with federal, state, and local requirements.
S-10	Prime farmlands would be avoided to the extent practicable for permanent TWE Project facilities and structure foundations.
S-11	Permanent erosion control measures would be installed on all project access roads used for operations and maintenance. Erosion control measures would be inspected and maintained at least annually or as required by the applicable state Stormwater Pollution Prevention Plan.
S-13	Follow-up seeding using native seed or corrective erosion control measures would be required on areas of surface disturbance that experience reclamation failure.
WATER RESOURCES	
WR-1	Existing stream crossings would be utilized to maximum extent practicable as requested by agencies. This would be determined on a site-specific basis through finalization of the Plan of Development. Stream crossings would be maintained as appropriate.
WR-2	When existing crossings were not used, drive through (Arizona) crossings would not be utilized when un-protected (bare soil) streambeds are wet or when the stream is flowing water.

Table E-1 Additional Mitigation Measures Required On Bureau of Reclamation Managed Lands

NUMBER	MITIGATION MEASURE
WR-3	As part of the Right of Way Grant and prior to the final agency authorization for construction, TransWest would consult with federal agencies having land jurisdiction regarding location and design of access roads and temporary work areas near impaired streams to avoid erosion and sedimentation effects. The proposed design and location of new and upgraded access roads and temporary work areas within watersheds (HUC10) containing sediment- or ion-impaired waters (according to 303(d) lists) would be provided by TransWest to the agencies upon completion of conceptual design of these facilities. The agencies would coordinate and provide input (as deemed applicable by the agencies) to TransWest for modification of locations and designs within TransWest's final engineering schedule to prevent the TWE Project from contributing additional sediment to impaired waters.
WR-4	As part of the Stormwater Pollution Prevention Plan, TransWest would include monitoring of erosion and sedimentation effects that would be recorded as part of the construction stormwater permits. In the event that the agencies deem erosion control measures ineffective, the agencies and TransWest would coordinate to develop additional measures for TransWest to implement for erosion control.
VEGETATION	
NX-1	The Noxious Weed Management Plan to be developed as part of the TWE Project Plan of Development would include the following: 1. Pre-construction surveys for noxious weeds in the footprints of the Right of Way, access roads, and ancillary facilities; 2. Pre-construction weed control; 3. Education of construction and operation personnel in each TWE Project region; 4. Washing of vehicles and equipment before entering and leaving the Right of Way; 5. Herbicide spraying; and 6. Annual monitoring and reporting. Survey information collected during pre-construction surveys would include species name, GPS location of weed infestations, percent cover, and approximate size of weed infestations. Control of noxious and invasive species could include chemical, physical, and biological methods and would be developed in consultation with the land agencies and private landowners. The plan would identify species of concern for each BLM Field Office and USFS forest and would focus monitoring and control methods on these species. The plan would comply with the existing BLM, USFS, USFWS, state, and federal regulations concerning noxious weed management. Post construction annual monitoring would be determined with the appropriate land management agencies.
NX-2	Herbicide spraying would be conducted following all applicable state and federal laws regarding chemical use, adverse weather, chemical storage, and chemical drift. Further guidelines and protocols for herbicide spraying on BLM land are provided in the Final BLM Vegetation Treatment Using Herbicides Programmatic EIS (BLM Vegetation EIS) (BLM 2007b,c). Standard operating procedures for herbicide spraying include buffers for sensitive areas such as riparian and wetland areas and threatened and endangered species habitat, timing restrictions, and safety protocols. No aerial spraying of herbicides would be permitted within 500 feet of known sensitive species with hand-only application methods allowed.

Table E-1 Additional Mitigation Measures Required On Bureau of Reclamation Managed Lands

NUMBER	MITIGATION MEASURE
NX-3	On lands managed by the Bureau of Reclamation, an approved Pesticide Use Proposal (PUP) would be obtained from the Bureau of Reclamation prior to herbicide spraying. PUPs would have site-specific information about the herbicides to be used. The PUPs and associated reporting requirements would be submitted in accordance with the schedule required by the Bureau of Reclamation. Herbicide spraying in desert tortoise habitat in Nevada would require consultation with the Bureau of Reclamation and USFWS.
NX-4	The cut-stumps of mature salt cedar stands that are cut as part of vegetation clearing would be immediately painted with herbicides. The specific control methods and herbicide to be used would be determined in consultation with the appropriate state or federal land-managing agencies. Additional control measures could include the planting of native or desired plant species following treatment to provide erosion control and the use of biocontrols.
VG-1	Native seed mixes to be used for reclamation would be developed in consultation with the land managers for the various regions crossed by the TWE Project. Seed mixes would meet the requirements of the individual agency Field Offices crossed by the TWE Project. Site-specific seed mixes for soils with LRP would be developed. The LRP seed mixes would be specifically designed for alkaline, saline, or sodic soils and would be used in areas where reclamation would potentially be difficult based on soil conditions. Additional soil amendments may be required in these areas, and would be implemented at the direction of the land manager. Reclaimed areas would be monitored annually by TransWest to ensure successful reclamation is occurring. The length of time for the annual monitoring and the definition of successful reclamation would be determined by the appropriate land management agency. Subsequent actions in areas without successful reclamation would be determined in consultation with the appropriate land management agency.
VG-3	A reclamation plan would be developed as part of the Plan of Development. The reclamation plan would define reclamation success for each vegetation type and management agency, list reclamation seed mixes, and detail reclamation monitoring for both interim and final reclamation. Interim and final reclamation success would be monitored annually, or at intervals as required in the reclamation plan, for at least 3 years, or until reclamation success as defined by the reclamation plan is achieved. Reporting of construction, reclamation progress, and monitoring results would be submitted to each land management agency per each office's reporting requirements.
VG-5	During vegetation clearing, masticated and chipped material spread in the Right of Way would not exceed a depth of 6 inches. Materials would be distributed in discontinuous patches that would not result in a continuous chip mat (less than 40 percent of surface covered up to 6 inches thick).
WET-1	Wetland surveys would be conducted at terminals, in the Right of Way, at ancillary facilities, and along proposed access roads corridors to identify wetlands, waters of the U.S., and riparian areas located in these areas. Survey information collected would include wetland type, type and cover of hydrophytic and riparian vegetation species present, soil characteristics, site hydrology, Global Positioning System (GPS) location of the wetland, and associated information required to determine jurisdictional status. Based on survey results, no surface disturbance including temporary and permanent facilities, the placement of fill material or vegetation clearing for storage, parking, construction activities, or construction work areas as feasible would occur within the avoidance buffer or surface use restriction defined by the Bureau of Reclamation. If avoidance is not feasible, USACE, Bureau of Reclamation, and USFWS crossing and construction techniques for wetlands and riparian areas would be employed. The wetland crossing and construction techniques would be approved by the USACE, Bureau of Reclamation, and USFWS and will be outlined in the final Plan of Development.

Table E-1 Additional Mitigation Measures Required On Bureau of Reclamation Managed Lands

NUMBER	MITIGATION MEASURE
WET-3	Access roads would be routed around riparian areas, wetlands, intermittent or perennial drainages, and ephemeral channels to the extent practical. If jurisdictional wetlands or waters of the U.S. cannot be avoided, USACE approved construction techniques for construction in wetlands and waters of the U.S. would be applied. Bureau of Reclamation construction techniques for non-jurisdictional wetlands, riparian areas, intermittent drainages, and ephemeral channels would be applied on applicable Bureau of Reclamation lands, as appropriate. These include the use of timber mats, erosion controls, and the placement of equipment outside of the wetland, riparian area, intermittent drainage, and ephemeral channel boundaries.
SPECIAL STATUS PLANT SPECIES	
SS-1	(Species-specific Surveys) –Sensitive plant species requiring surveys would be identified by the Applicant in consultation with Bureau of Reclamation. For the sensitive plant species that require surveys, site- and species-specific surveys would be conducted. The timing and methodology of the surveys would be determined by the Bureau of Reclamation in consultation with Western and TransWest. Surveys would be conducted in areas identified as potential habitat through models developed for the EIS or from agency-provided models for those specific plant species. If individuals or populations are identified during surveys in potential habitat areas, species-specific avoidance would be developed and implemented where practicable. For sensitive plant species that cannot be avoided, species-specific minimization and/or mitigation would be developed by Bureau of Reclamation, Western, and TransWest. Sensitive plant species-specific mitigation may include compensatory mitigation and transplanting of individuals. For federally listed plant species, the species-specific mitigation measures that may be adopted in the Record of Decision are identified in the TWE Project Biological Assessment and Biological Opinion.
SS-2	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to Ute ladies'-tresses orchids and habitat.
SS-3	Construction would occur downslope of BLM Sensitive plant species where practicable. If surface disturbance must be sited upslope, erosion controls would be implemented at the direction of the BLM to prevent sedimentation and erosion from upslope surface disturbance. Where practicable, a minimum 300-foot buffer distance would be implemented between surface disturbing activities and BLM Sensitive plant species. Where the minimum 300-foot buffer is not practicable, species-specific minimization and/or mitigation would be developed by BLM, Western, and TransWest.
SS-4	Please refer to the TWE Project Biological Assessment and Biological Opinion for the measures that may be adopted in the Record of Decision to avoid, minimize, and mitigate impacts to federally listed plants.
SS-5	The Dust Control and Air Quality Plan would include dust abatement measures to minimize impacts to special status plant species, including as appropriate use of slower speed limits on unpaved roads, gravel on roads in occupied habitat and avoidance areas, and the application of water for dust abatement.
SS-6	Prior to vegetation management activities, including vegetation removal, herbicide use, and ORV access, within federally listed occupied plant habitat, TransWest will coordinate with the USFWS and BLM to minimize impacts to federally listed and candidate plant species.

Table E-1 Additional Mitigation Measures Required On Bureau of Reclamation Managed Lands

NUMBER	MITIGATION MEASURE
WILDLIFE AND MIGRATORY BIRDS	
WLF-1	To minimize disturbance to migratory birds during the breeding and nesting season, no vegetation clearing or trimming, blasting, or other new surface-disturbing activities would occur during the avian breeding season as defined by TWE Project Region and illustrated in Figures 3.22-5, 3.22-8, and 3.22-13 of the Final EIS. If avoidance of vegetation clearing during the nesting season is not possible, then a qualified biologist would conduct nest searches no more than 7 days prior to clearing and trimming activities. Active nests would be identified and protected in accordance with the TWE Project Avian Protection Plan.
WLF-2	To minimize disturbance to nesting raptors, no vegetation clearing or trimming, blasting, or other new surface-disturbing activities would occur within the appropriate spatial buffer for an occupied nest during the breeding season of the species using it. Raptor breeding seasons vary widely based on species, weather conditions, prey availability, latitude, elevation, and other factors. Figures 3.22-5, 3.22-8, and 3.22-13 of the Final EIS present approximate raptor breeding seasons by species and TWE Project region. If surface-disturbing activities within the appropriate spatial buffer cannot be avoided during the associated raptor nesting season, preconstruction raptor nest surveys and monitoring using agency-approved protocols would be performed to identify and protect occupied nests. Spatial avoidance buffers and seasonal restrictions would be applied as required by applicable BLM and USFS land and resource management plan stipulations (See Appendix C of the Final EIS) on lands administered by these agencies. Seasonal and spatial raptor nest buffers recommended by the USFWS and the appropriate state wildlife agency that are more restrictive than the applicable, required BLM and USFS plan stipulations would be applied at the discretion of these land management agencies (See Table 3.22-4 of the Final EIS). Additionally, raptor seasonal and spatial buffers recommended by USFWS and the appropriate state wildlife agency would be applied to all other land jurisdictions in coordination with TransWest and respective landowners whose lands would be crossed by the TWE Project.
WLF-3	To ensure wildlife access to existing wildlife water developments (e.g., “guzzlers”), TransWest would avoid impacts to these developments to the extent possible during final project siting and development. TransWest would be required to offset the loss of any permanently impacted wildlife water developments by installing new developments of equal capacity, in coordination with the appropriate state wildlife agency.
WLF-4	Please refer to mitigation measure VR-8 for mitigation of impacts to migratory birds from lighting
WLF-5	In Audubon Important Bird Areas crossed by the 250-foot-wide transmission line Right of Way, TransWest would follow the recommendations in Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012). In addition, vegetation management Level 3, as described in the TWE Project ROW Preparation and Vegetation Management Plan, would be employed at the discretion of the appropriate BLM Field Office Manager in Audubon Important Bird Areas crossed by the 250-foot-wide transmission line Right of Way.

Table E-1 Additional Mitigation Measures Required On Bureau of Reclamation Managed Lands

NUMBER	MITIGATION MEASURE
WLF-6	BLM, in coordination with state wildlife officials, will identify forested and woodland habitats of particular importance to wildlife on BLM-administered lands. To minimize fragmentation impacts on these lands, TransWest would employ vegetation management Level 3 (as described in the TWE Project ROW Preparation and Vegetation Management Plan), as determined necessary by the appropriate BLM Field Office Manager. At the discretion of the appropriate BLM Field Office Manager, TransWest may also be required to leave downed woody debris greater than 3 inches in diameter (not including merchantable timber) in place to provide habitat for insects, small mammals, and other small prey species utilized by owls, raptors, and other predators.
WLF-7	In Bird Habitat Conservation Areas crossed by the 250-foot-wide transmission line Right of Way, TransWest would follow the recommendations in Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012). In addition, vegetation management Level 3, as described in the TWE Project ROW Preparation and Vegetation Management Plan, would be employed at the discretion of the appropriate BLM Field Office Manager in Bird Habitat Conservation Areas crossed by the 250-foot-wide transmission line Right of Way.
WLF-8	To minimize collision potential for avian species, TransWest would design the TWE Project to meet the standards described in the Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012).
WLF-9	To minimize collision potential for avian species, prior to construction TransWest would conduct a site-specific risk assessment consistent with Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012) in all areas of priority migratory bird habitats, including Audubon Important Bird Areas, Bird Habitat Conservation Areas, riparian crossings, and other sensitive habitats identified in coordination with land management, USFWS, and applicable state wildlife agencies. Based upon the results of the site-specific risk assessment and following the recommendations described in APLIC 2012, TransWest would install avian flight diverters on guy wires as needed. TransWest would also be required to install flight diverters on guyed structures at tower locations identified by post construction monitoring as having high collision potential as recommended by APLIC 2012.
WLF-10	To avoid or minimize long-term disturbance to wildlife associated with public use of the ROW and new access roads during Project operation, these roads would be closed or rehabilitated using methods and monitoring developed through consultation with the landowner or land management agency. Depending on facility and ROW maintenance needs, methods for closure could include gates, obstructions such as berms or boulders, or partial or full restoration to natural contour and vegetation.
SPECIAL STATUS WILDLIFE SPECIES	
SSWS-12	To reduce impacts to the banded Gila monster from the construction and operation of the TWE Project, TransWest would be required to implement measures outlined in the NDOW 2012 Gila Monster Status, Identification, and Reporting Protocol for Observations.
SSWS-13	To prevent impacts to bald eagles, TransWest would be required to avoid disturbance within 0.25 mile of an active winter roost site (0.5 mile if there is a direct line of sight to disturbance) from November 15 to March 15, and avoid disturbance within 0.5 mile of communal winter roosts from November 1 to April 1. Construction of above-ground structures would be restricted within 0.5 mile of bald eagle nests and communal winter roost sites through the implementation of BLM Field Office Resource Management Plan timing restrictions. This measure applies only where there are no specific measures to prevent impacts to bald eagles in the applicable BLM Field Office Resource Management Plan.

Table E-1 Additional Mitigation Measures Required On Bureau of Reclamation Managed Lands

NUMBER	MITIGATION MEASURE
SSWS-15	If evidence of an Endangered Species Act (ESA) protected wildlife species not previously identified or known is found in the construction area, the Contractor would immediately notify the appropriate land management agencies and provide the location and nature of the findings. Construction in the vicinity of the newly located ESA protected wildlife species would be halted and would resume when a biologist from the appropriate agency determines that the species would not be affected by continued construction.
SSWS-16	To reduce impacts to federally listed wildlife species, TransWest would be required to obtain approval from the applicable land management agency prior to applying dust palliatives to construction areas located within areas designated as suitable habitat for federally listed species.
AQUATIC BIOLOGICAL RESOURCES	
AB-1	(Fish Passage): When avoidance of perennial streams with fish populations is not feasible and a culvert is required during construction, flow would be maintained in a portion of the stream to allow unrestricted fish passage. Any plan for dewatering the stream at the culvert site must be approved by the appropriate federal and state agencies. Culvert size and type would be selected to facilitate the continued and long-term connectivity and movement of target aquatic species. If the culvert is proposed to be in place during project operation, approval must be obtained from the federal or state agency management authority. An alternative crossing method may be required.
AB-2	(Avoid Game Fish Spawning Periods): If spawning areas for game fish species are known to occur at streams proposed for vehicle crossing or culvert construction, instream disturbance would be scheduled to avoid the spawning period. The exact dates for avoidance would be determined through discussions with WGFD, CPW, UDWR, or USFS. All disturbed areas would be restored to pre-construction conditions prior to the next spawning season.
AB-3	(Invasive Aquatic Species Protection): It is assumed that any waterbody could contain aquatic invasive species and invasive weed species. If work occurs in or near a waterbody, all equipment would be decontaminated. Decontamination would occur before arrival at a TWE Project site to avoid the transfer of aquatic invasive species from a previous work site in or near water. Decontamination would consist of either of these actions: 1) Drain all water from equipment and compartments; clean equipment of all mud, plants, debris, and aquatic organisms; and dry equipment for specified time by season (5 days in June through August, 18 days in March through May, and 3 days in December through February when temperatures are at or below freezing); or 2) Use a high pressure (2,500 psi) hot water (140°F) pressure washer to thoroughly clean equipment and flush all compartments that may hold water. A field monitor would be present to ensure that the cleaning was completed prior to vehicle and equipment moving to other streams and drainages.
AB-4	As part of vegetation management, TransWest would prepare a noxious weed management plan. The Plan would identify a list of approved herbicides that may be used as well as locations of areas that may be treated. Licensed herbicide applicators would be used in the treatment process. All herbicides would be used in accordance with label instructions for the chemical. The Plan also would discuss compliance with applicable federal, state, and local agencies.

Table E-1 Additional Mitigation Measures Required On Bureau of Reclamation Managed Lands

NUMBER	MITIGATION MEASURE
SPECIAL STATUS AQUATIC SPECIES	
SSS-1	(Sediment Protection for Streams with Special Management Fish Species): Mitigation measure WR-3 would be applied to perennial streams providing habitat for fish species requiring special management as mandated by existing federal land use plans.
SSS-3	(Avoidance of Water Withdrawal and Entrainment/Impingement Effects for Conservation Agreement Fish Species): Where waterbodies containing conservation agreement fish species (bluehead sucker, Bonneville cutthroat trout, Colorado River cutthroat trout, flannelmouth sucker, least chub, southern leatherside chub, and Virgin River spinedace) and other special status fish species cannot be avoided as construction water sources, approval must be obtained from appropriate federal, state, and/or land management agencies regarding water withdrawal sites and methods. A site-specific withdrawal plan will be prepared by TransWest for review/approval by the agencies. Requirements for water pumping in habitat for Conservation Agreement Fish Species would include: 1) avoidance of pumping between approximately April 1 through August 31, with specific dates dependent upon the water year; 2) intake hoses would be screened with 3/32-inch mesh size; 3) intake velocity would not exceed 0.33 feet/second in an area where larval stages of fish may be present; and (4) pumping from off-channel locations (i.e., no connection to the river during high spring flows) would use an infiltration gallery constructed in an agency-approved location.. Additional requirements include the use of private, off-stream water sources if possible; withdrawal sites must reviewed/approved by applicable agencies; and approval should include provisions to maintain adequate instream flows to protect conservation agreement fish species and their habitat.
CULTURAL RESOURCES	
CUL-1	Please refer to the TWE Project Programmatic Agreement for the procedure that will be implemented to determine effects to historic properties from the TWE Project, including effects to the Old Spanish National Historic Trail, the California Wagon Road, and other historic trails in Wyoming, Colorado, Utah, and Nevada. Following the determination of effects, the procedures in the Programmatic Agreement will be used to avoid, minimize, and mitigate adverse effects to historic properties including, as appropriate, direct, indirect, and cumulative effects under the National Environmental Policy Act and as required by the National Trails System Act.
CUL-2	Please refer to the TWE Project Programmatic Agreement for the procedure that will be implemented to determine effects to historic properties from the TWE Project, including effects to the Gypsum Cave Traditional Cultural Property in Nevada and other historic properties in Wyoming, Colorado, Utah, and Nevada. Following the determination of effects, the procedures in the Programmatic Agreement will be used to avoid, minimize, and mitigate adverse effects to historic properties including, as appropriate, direct, indirect, and cumulative effects under the National Environmental Policy Act.
CUL-3	Please refer to mitigation measure CUL-1 for the procedures that will be implemented to avoid, minimize, and mitigate effects to historic trails from the TWE Project, including the Old Spanish National Historic Trail, the California Wagon Road, and other historic trails in Wyoming, Colorado, Utah, and Nevada.
CUL-4	Please refer to mitigation measure CUL-2 for the procedure that will be implemented to avoid, minimize, and mitigate effects to historic properties from the TWE Project, including historic properties in Wyoming, Colorado, Utah, and Nevada.

Table E-1 Additional Mitigation Measures Required On Bureau of Reclamation Managed Lands

NUMBER	MITIGATION MEASURE
VISUAL RESOURCES	
VR-1	Remove pinyon-juniper woodlands only as necessary for construction and maintenance of transmission towers and access roads (vegetation management Level 3, as described in the TWE Project ROW Preparation and Vegetation Management Plan) for foreground-middleground and background views from linear or stationary KOPs on BLM lands and within Class A Scenic Quality areas within BLM VRM Class 1 and 2 areas, as appropriate.
VR-2	Use BLM environmental colors (Standard Environmental Colors, Color Chart CC-001, 2008) for surface coatings of permanent buildings, gates, and tanks at terminal sites. Color selection is based on a site-specific assessment. Paint grouped structures the same color to reduce visual complexity and color contrast.
VR-3	Locate structures, roads, and other project elements as far back from road, trail, and river crossings (linear KOPs) as possible, and, where feasible, employ terrain and vegetation to screen views from crossings.
VR-4	In areas with no existing transmission lines, move the transmission line (alignment) away from the immediate foreground of stationary (non-linear) KOPs to a distance of 0.5 mile or more in locations where it would not conflict with other resource values and where practicable. Where feasible, approach and cross at right angles to linear KOPs such as roads, trails, and rivers
VR-5	Materials and surface treatments of structures and land disturbances (e.g., Permeon) should repeat and/or blend with the existing form, line, color, and texture of the landscape and have little or no reflectivity (non-specular).
VR-6	Where paralleling an existing transmission line of a similar voltage class, where practicable, place the structures to match the locations of structures in the existing line where it would not conflict with other resource values.
VR-7	Where practicable, position roads at the toe of a slope, at the edge of vegetation openings, and perpendicular with the line of sight.
VR-8	Minimize lighting at terminals, substations, series compensation stations and construction facilities by installing dark-sky lighting to the extent permitted by Occupational Safety and Health Administration (OSHA) and down-shield lights to reduce night glare and light pollution.
VR-9	Where practicable as determined by TransWest, in tree-covered steep terrain, perform construction operations for towers and conductors with helicopters to reduce the need for access roads and laydown clearings.
VR-10	TransWest would implement vegetation management Level 3, as described in the TWE Project ROW Preparation and Vegetation Management Plan, in the foreground-middleground distance zone from linear and stationary KOPs on BLM lands
RECREATION RESOURCES	
REC-1	Where practicable, operation phase vegetation maintenance activities within dispersed Recreation Areas or key hunting locales such as Wildlife Habitat Management Areas/Wildlife Management Areas/State Wildlife Areas would not occur during big game hunting seasons.

Table E-1 Additional Mitigation Measures Required On Bureau of Reclamation Managed Lands

NUMBER	MITIGATION MEASURE
REC-2	Within designated recreation management areas, access shall be limited to existing roads whenever practicable. If new and improved access cannot be avoided within these areas, access roads shall be closed or rehabilitated through methods and monitoring developed through consultation with the landowner or land management agency. Methods for closure could include gates, obstructions such as berms or boulders, or partial or full restoration to natural contour or vegetation.
REC-3	If designated corridors exist within the Recreation Areas, new roads and ancillary construction areas shall only be located within designated utility corridors unless otherwise directed by the land-managing agency.
REC-4	Where practicable, construction activities within key hunting locales such as Wildlife Habitat Management Areas/Wildlife Management Areas/State Wildlife Areas would not occur during big game hunting seasons
REC-5	Construction activities within 1 mile of developed recreation sites would cease: (1) after 5:00 p.m. on weeknights; (2) on weekends and holidays; and (3) on the opening day of big game hunting seasons.
REC-6	Construction zones will be sited such that access to high use recreational areas and trails is not impeded. If public safety concerns are such that current access or use cannot be maintained, TransWest will work with the appropriate land manager to develop alternative access points or redirect users to alternative existing points of access.
REC-7	Ancillary construction areas would not be located within 1 mile of developed Recreation Areas (trails, trailheads, campgrounds, etc.)
REC-12	TransWest shall plan construction activities to occur outside of specially permitted event areas or times; or work with organizers to ensure adequate access and use. The feasibility of this mitigation measure would be dependent on TransWest being given adequate notice of permit timing.
REC-13	TransWest shall consider the view from key recreational areas in its placement of the transmission line Right of Way to locate the line where it best blends in with the surrounding environment, and/or is co-located with other existing transmission lines.
LAND USE	
LU-1	TransWest would develop an approved POD and coordinate with land owners, land managers, and agencies with jurisdictional authority on final structure placement, including all aboveground components, access roads, and permanent disturbance areas, to ensure optimal compatible land use with valid existing land uses and rights. If this coordination results in alternative routing or impacts outside of the scope of this EIS analysis, additional analysis and/or NEPA disclosure may be required.
LU-2	On private lands, access shall be limited to existing roads whenever practicable or as desired by the landowner. If new and improved access cannot be avoided on private lands, access roads shall be closed or rehabilitated at the direction of the landowner and through methods and monitoring developed in consultation with the landowner. Methods for closure could include gates, obstructions such as berms or boulders, or partial or full restoration to natural contour and/or vegetation.
TRANSPORTATION AND ACCESS	
	No additional mitigation measures

Table E-1 Additional Mitigation Measures Required On Bureau of Reclamation Managed Lands

NUMBER	MITIGATION MEASURE
SOCIAL AND ECONOMIC RESOURCES	
SOCIO-2	TransWest should encourage its contractors to purchase materials, equipment and supplies locally, have non-locally purchased materials and supplies delivered to the counties in which the materials would be utilized, and complete all sales and use reports regarding taxable purchases in a timely manner so that proper attribution of sales and use tax revenues to the local jurisdictions can occur.
SOCIO-3	TransWest should conduct annual coordination meetings with local emergency management officials (law enforcement, fire, health care, state prison, etc.) to review and update emergency coordination and situation management.
SOCIO-4	If not required by existing regulations or included in the various operations plans to be developed (see Section 2.4 of the Final EIS), TransWest should develop and implement a plan for on-going communications with local county and municipal governments to inform them of construction schedules and progress, specifically as they relate to the anticipated timing of activity across each spread, or other about other aspects of the TWE Project that could affect local communities and service providers.
PUBLIC HEALTH AND SAFETY	
PH-1	Develop, implement, and maintain a noise complaint reporting and review process to deal with potential queries and issues as they arise. This would include a toll-free telephone number for receiving question or complaints during TWE Project construction and a public liaison person before and during TWE Project construction to respond to concerns over noise.

Table E-1 Additional Mitigation Measures Required On Bureau of Reclamation Managed Lands

NUMBER	MITIGATION MEASURE
WILDLAND FIRE	
FR-1	The fire protection plan to be developed as part of the TWE Project Plan of Development, in addition to the items outlined in TWE-64, would include the following: - TransWest would implement line patrols to inspect the Right of Way for hazard trees, damage to any component of the TWE Project, and other potentially unsafe conditions that could increase wildland fire ignition risk. - TransWest would develop a wildland fire traffic control plan which would stipulate mechanisms through which narrow roads shall be kept passable for emergency service providers in a wildland fire emergency situation; designate the point of contact to administer the wildland fire traffic control plan and facilitate emergency service providers access; identify vehicle parking for construction and maintenance vehicles during wildland fire emergencies; and identify alternative routes for large equipment and vehicle evacuation during wildland fire emergencies. - TransWest would outline communication methods to ensure that immediate reporting of fires during construction activities and maintenance activities is feasible. Each crew member would carry a laminated card listing pertinent telephone numbers for reporting fires and defining immediate steps to take if a fire starts. The cards would be updated as needed, and redistributed to crew members. - In consultation with land management agencies, TransWest would identify when and where construction and maintenance work would cease in response to Red Flag Warning events as issued daily by the National Weather Service. Overland drive-and-crush travel would be prohibited or limited (at land management agencies' discretion) during times of high fire risk. - TransWest would develop its fire protection plan in consultation with the appropriate land management agencies.
FR-2	No open trash burning would occur, unless specifically permitted by the appropriate authorities.
FR-3	Activities that could generate a spark such as refueling, smoking, blasting, and welding would only occur on areas that have been cleared. A spotter would be used for welding and other similar activities. The spotter would be equipped with water and tools to quickly extinguish any sparks.
FR-4	All engines used in the Right of Way would have an approved spark arrestor.
FR-5	TransWest would consult with the land management agencies to ensure vegetation management activities are in line with land management agencies fire management objectives.
FR-6	Where appropriate and feasible, micro-siting of the route would occur in recently burned areas.

Appendix F

Alternatives Eliminated from Detailed Analysis

Table F-1 Alternatives Considered but Eliminated from Detailed Analysis

Alternative	Rationale for Elimination from Detailed Analysis
Sweetwater and Carbon County Pipeline Corridor (Region I)	Provides no benefits beyond those provided by the existing range of alternatives; equal or greater impacts to alternatives being retained for detailed analysis: • This was TransWest's original proposed action (January 2010 SF 299 ROW application). It was subsequently withdrawn and replaced by a revised ROW application (August 2011) reflecting their current proposed action in Alternative I-A. This alternative was retained in the Draft EIS as Alternative I-B because it would follow an existing utility corridor (underground-only designation), thereby reducing the proliferation of new corridors. However, Alternative I-C, which is retained in the Final EIS, is within an existing utility corridor that is designated for both aboveground and underground utilities. Therefore, Alternative I-B from the Draft EIS has been removed and replaced. • Land Use: Although the alignment would be located within an existing utility corridor, it would conflict with the underground-only designation and require a plan amendment to allow overhead utilities.
Tuttle Ranch Micro-siting Option 2 (Region I)	Provides no benefits beyond those provided by the existing range of alternatives; equal or greater impacts to alternatives being retained for detailed analysis: • Land Use: This option was an attempt to avoid both the Tuttle Ranch Conservation Easement and the NPS Dinosaur National Monument's Deerlodge Road by passing between the easement abutments on the east side and the NPS road intersection on the west side of US-40; however, this option would not have avoided either area because of the 250-foot-wide transmission line ROW.
Wyoming Alternative Connectors (multiple short segments-Region I)	Provides no benefits beyond those provided by the existing range of alternatives; equal or greater impacts to alternatives being retained for detailed analysis. The following alternative connectors included in the Draft EIS were removed from further consideration because they did not provide any resource benefits, and caused additional impacts in some cases as noted by public comments received on the Draft EIS: • Mexican Flats Alternative Connector – Provided no additional benefit; greater transmission line length and resulting disturbance. • Baggs Alternative Connector – Increased visual impacts from the Town of Baggs; greater transmission line length and resulting disturbance. • Fivemile Point North Alternative Connector – Increased visual impacts from the Town of Baggs; greater transmission line length and resulting disturbance. • Fivemile Point South Alternative Connector – Increased visual impacts from the Town of Baggs; greater transmission line length and resulting disturbance.

Table F-1 Alternatives Considered but Eliminated from Detailed Analysis

Alternative	Rationale for Elimination from Detailed Analysis
Western Wyoming: Rock Springs (Region I)	Provides no benefits beyond those provided by the existing range of alternatives; equal or greater impacts to alternatives being retained for detailed analysis: • Land Use: Crossing of ROW exclusion area (Red Creek ACEC). Not compliant with Wyoming Governor's Executive Order (EO) 2011-5. • Visual Resources: Visibility from Dinosaur National Monument and Flaming Gorge National Scenic Byway. • Special Designations: Proximity to multiple areas with wilderness characteristics, ACECs, and crossed the upper Green River in a segment eligible for Wild and Scenic status.
Wyoming-Colorado: Craig, Meeker, Rifle, Parachute, Grand Junction, and connector to the west (Region I)	Provides no benefits beyond those provided by the existing range of alternatives; equal or greater impacts to alternatives being retained for detailed analysis: • Land commitment: Greater transmission line length and resulting disturbance. • More disturbance to private lands. • Visual Resources: Overall visibility to the public in the Grand Valley. • Siting: Requires construction across steep side slope terrain in narrow valleys.
Fruitland Area Options, Duchesne and Wasatch Counties, Utah: micro-siting option crossing Strawberry River (Region II)	Provides no benefits beyond those provided by the existing range of alternatives; equal or greater impacts to alternatives being retained for detailed analysis.
Emery County, Utah: multiple corridors near the San Rafael Swell (Region II)	Provides no benefits beyond those provided by the existing range of alternatives; equal or greater impacts to alternatives being retained for detailed analysis: • Cultural Resources: Old Spanish NHT impacts. • Visual Resources: Scenic quality and setting changes to historic sites.
Emery, Sanpete, and Juab counties Utah: two U.S. Fish and Wildlife Service proposed re-routes (Region II)	Provides no benefits beyond those provided by the existing range of alternatives; equal or greater impacts to alternatives being retained for detailed analysis : • Land Use: Eastern reroute bisects IRAs for approximately 15 miles and western reroute deviates from designated utility corridor and crosses private lands, including center-pivot irrigated agricultural lands. • Visual Resources: Eastern reroute passes through relatively undisturbed areas noted for scenic quality. • Biological Resources: Stated intent was to avoid mapped sage-grouse habitat; however existing alternatives to the south avoid said habitat.
Cedar Knoll IRA Micro-siting Option 2 (Region II)	The Cedar Knoll IRA Micro-siting Option 2 was eliminated from detailed analysis because of its potential direct and indirect impacts to the federally threatened Deseret milkvetch. Cedar Knoll IRA Micro-siting Option 1 from the Draft EIS has been incorporated as part of Alternative II-A/II-E/II-F.

Table F-1 Alternatives Considered but Eliminated from Detailed Analysis

Alternative	Rationale for Elimination from Detailed Analysis
Far west corridor between Delta, Utah, and US-93 crossing, Nevada (Region III)	Provides no benefits beyond those provided by the existing range of alternatives; equal or greater impacts to alternatives being retained for detailed analysis: • Land commitment: Greater length relative to other corridors near I-15. • Visual Resources: Large section in western Utah where no other transmission lines or other utilities currently exist. • Visual Resources: Greater visibility from the Great Basin National Park.
West side of Las Vegas (Region IV)	Provides no benefits beyond those provided by the existing range of alternatives; equal or greater impacts to alternatives being retained for detailed analysis: • Land Use: No available buffer to avoid both residential lands and Red Rocks National Conservation Area.
Ground Electrode System Alternatives (Region I)	Provides no benefits beyond those provided by the existing range of alternatives; equal or greater impacts to alternatives being retained for detailed analysis: • Little Snake East – Greater impacts to areas identified as greater sage-grouse preliminary priority habitat. • Little Snake West – Greater impacts to areas identified as greater sage-grouse preliminary priority habitat. • Shell Creek – Greater potential impacts to Adobe Town wilderness study area and Monument Valley Special Management Area.