RECLAMATION

Managing Water in the West

DRAFT ENVIRONMENTAL ASSESSMENT

Coachella Valley Water District
Mid-Canal Storage Project



BUREAU OF RECLAMATION

Interior Region 8 – Lower Colorado Basin
Arizona, California, Nevada
Yuma Area Office
Yuma, Arizona
March 2023

Mission Statements

The U.S. Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about these resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

ENVIRONMENTAL ASSESSMENT

Coachella Valley Water District

Mid-Canal Storage Project

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Acronyms and Abbreviations

APE	Area of Potential Effects
APN	Assessor's Parcel Number
BLM	Bureau of Land Management
BMPs	Best Management Practices
BOR	Bureau of Reclamation
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CFS	Cubic Feet Per Second
CMAGR	Chocolate Mountains Aerial Gunnery Range
CVWD	Coachella Valley Water District
CVWMP	Coachella Valley Water Management Plan
CWA	Clean Water Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESA	Environmental Site Assessment (Hazardous Materials)
FONSI	Finding of No Significant Impact
IID	Imperial Irrigation District
IS	Initial Study
ITAs	Indian Trust Assets
LCR	Lower Colorado River
MND	Mitigated Negative Declaration
MSHCP	Multi-Species Habitat Conservation Program
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOA	Notice of Availability
NOI	Notice of Intent
NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
O&M	Operation and Maintenance
OHWM	Ordinary High-Water Mark
PCN	Preconstruction Notification
POLs	Petroleum, Oil, and Lubricants
QSA	Quantification Settlement Agreement
Reclamation	Bureau of Reclamation
RMP	Coachella Canal Area Resource Management Plan
SHPO	State Historic Preservation Office
SLRIWA	San Luis Rey Indian Water Authority
SSAB	Salton Sea Air Basin
SWPPP	Stormwater Pollution Prevention Plan
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
YAO	Yuma Area Office

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Chapter 1: Purpose and Need for Proposed Action

1.1 Introduction

The Coachella Canal is a branch of the All-American Canal that imports Colorado River water into the Imperial and Coachella Valleys. The Coachella Canal is owned by the U.S. Bureau of Reclamation (Reclamation) and operated and maintained by the Coachella Valley Water District (CVWD) for distribution of water for agricultural irrigation. The canal was constructed between 1937 and 1949 to support groundwater replenishment and agricultural irrigation. The canal extends 123.5 miles from its diversion from the All American Canal ("Drop 1") to its terminus at Lake Cahuilla in the Coachella Valley. Elevation of the canal drops approximately one foot per mile which provides hydraulic head for gravity flow through the entire length of the canal. Only the northern 38 miles were concrete lined for the original canal, with the remaining 85 miles constructed as earthen canal. To control seepage losses, a new parallel concrete lined canal was constructed in 1979 to 1980 to replace the first 49 miles of the Coachella Canal. (Trover, 2016)

The Coachella Canal Lining Project (CCLP) is a water conservation project constructed between 2004 and 2007 that was completed under an agreement between Reclamation, the San Diego County Water Authority (SDCWA) and the San Luis Rey Indian Water Authority (SLRIWA), the project proponents. CCLP construction was completed in 2007 consisting of a parallel 36.5-mile-long segment between Siphon 7 (mile post 49.3) and Siphon 32 (mile post 86.1). The CCLP is a new parallel concrete lined canal that replaced the adjacent earthen portion of the Coachella Canal as a means of reducing seepage losses to conserve water and make that water available for transfer to SDCWA. CVWD and SDCWA are applying for Reclamation's approval and will enter into an agreement for the Mid-Canal Storage Project involving modifications to a 4.9-mile segment of the canal to reduce CCLP maintenance problems with the concrete lining, and to create a small storage reservoir allowing greater operational flexibility. The change would join the concrete lined canal with the original earthen canal to create a single wider channel as a linear reservoir between siphons 11 and 14, with a capacity of up to 728 acre-feet.

Both Reclamation and CVWD have discretionary authority for project approval, triggering requirements of the National Environmental Policy Act (NEPA) for Reclamation and requirements of the California Environmental Quality Act (CEQA) for CVWD. Reclamation has prepared this Environmental Assessment (EA) to evaluate potential impacts associated with the proposed storage project, ("project" or "proposed action"). Reclamation will not rely on CVWD's CEQA document in its decision making. Preparation of the two documents has been coordinated by the agencies to ensure consistency in findings and mitigation requirements.

The EA has been prepared in accordance with NEPA (42 UCS 4321 et seq.), the Council on Environmental Quality regulations (40 CFR 1500-1508) for implementing NEPA, and the Department of the Interior's NEPA Regulations (43 CFR Part 46), and Reclamation Manual NEPA Policy (ENV P03). Reclamation is the lead federal agency pursuant to NEPA. The project would modify Reclamation facilities (Coachella Canal) and introduce new facilities (storage cells) within Reclamation's right-of-way. Reclamation must review and approve the project as it constitutes a change to Reclamation-owned facilities, as provided for in CVWD's contract and in Reclamation's Directives and Standards CMP 10-05, dated March 6, 2020.

1.2 Location

The canal segment proposed to be modified is located in Imperial County east of the Salton Sea and the community of Wister. The proposed storage reservoir extends from Siphon 11 (Mile Post 54.6) to Siphon 14 (Mile Post 59.5). The storage reservoir location is shown in figures 1, 2 and 3 and the electrical circuit route map is shown in Figure 4.

1.3 Purpose and Need

The primary purpose and need of the project is to provide water storage capacity upstream of CVWD's water service areas to compensate for lost storage capacity that occurred with the CCLP to improve operational and water management efficiency within a 4.9 mile segment of the existing Coachella Canal. A secondary benefit and purpose of the project is to reduce excessive maintenance repairs of the CCLP concrete canal lining caused by underlying heavy clay soils. As explained in detail in **Section 1.3** below, the project consists of removal of the existing berm between the original canal channel and newer lined canal segment to create an in-line storage pool. Burial of the existing concrete lining with a new clay liner will eliminate the need for ongoing repairs to the concrete liner caused by underlying soil conditions that are unique to this canal segment. Enhanced water storage capacity in this canal segment will resolve Coachella Canal operations issues which are challenging for several reasons, including:

- Long distances from source of water to delivery areas.
- Lengthy delays to get flow changes downstream.
- Lack of operating storage.
- Coordination with Reclamation and IID for water orders.

Construction of the CCLP created a loss of in-canal storage due to the reduction in size of the concrete lined canal section compared to the older earthen canal section, resulting in additional operational difficulties. In 2015 a study was conducted to evaluate hydraulic operations and water storage possibilities (see Appendix D: *Feasibility Study to Investigate Storage Requirements for the Coachella Canal* by Dahl Consultants and Rogers Engineering Hydraulics Inc.). The study reported the following conclusions:

- Water storage is necessary to manage large, rapid delivery flow changes that affect Coachella Canal operations.
- The reduced canal prism size and the restrictions imposed by drawdown limitations both resulted in significantly less operational storage in the middle portion of the canal system.
- A number of off-canal sites in the area of North Shore were evaluated but none were found feasible due to construction cost, and operational limitations since an affordable all-gravity system could not be identified.
- Alternative methods of using storage exist, including active management of canal water levels to use in-canal storage and diverting canal water to or from reservoirs near the canal (off-canal storage).
- Lake Cahuilla at the northern terminus of the canal should continue to be used to provide storage for major imbalances between total canal inflow and total canal outflows. However, the canal's capacity limits how much excess flow can be routed all the way to Lake Cahuilla, and storage at this location has no ability to supply shortages upstream.

- Additional storage near the middle of the Coachella Canal length would be valuable to spread out large flow changes over several hours and reduce peak flows through the canal. Mid-system storage can also attenuate large flow changes that might otherwise exceed drawdown criteria or exceed capacity near the canal's downstream end.

Figure 1 - Regional Location Map

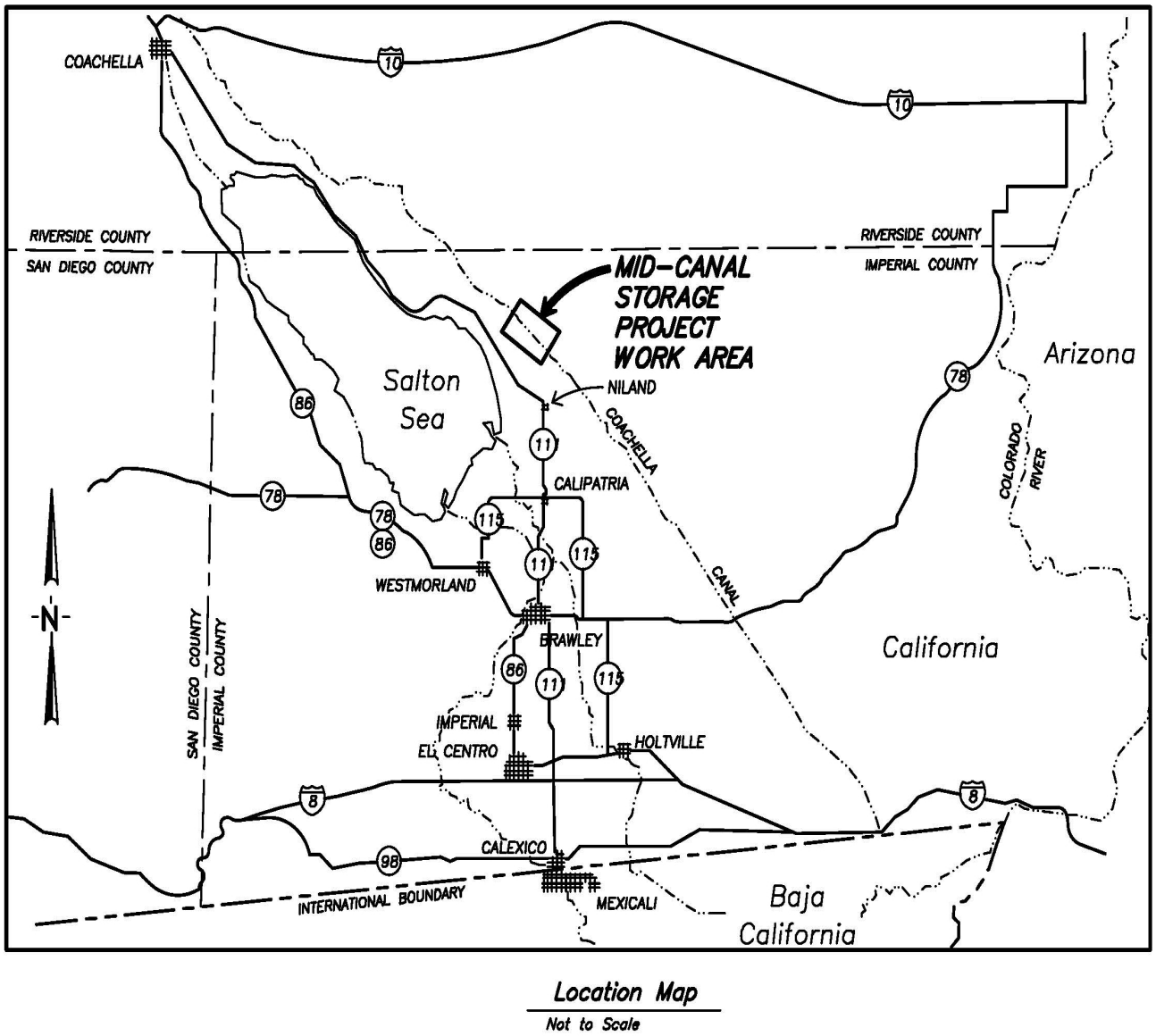
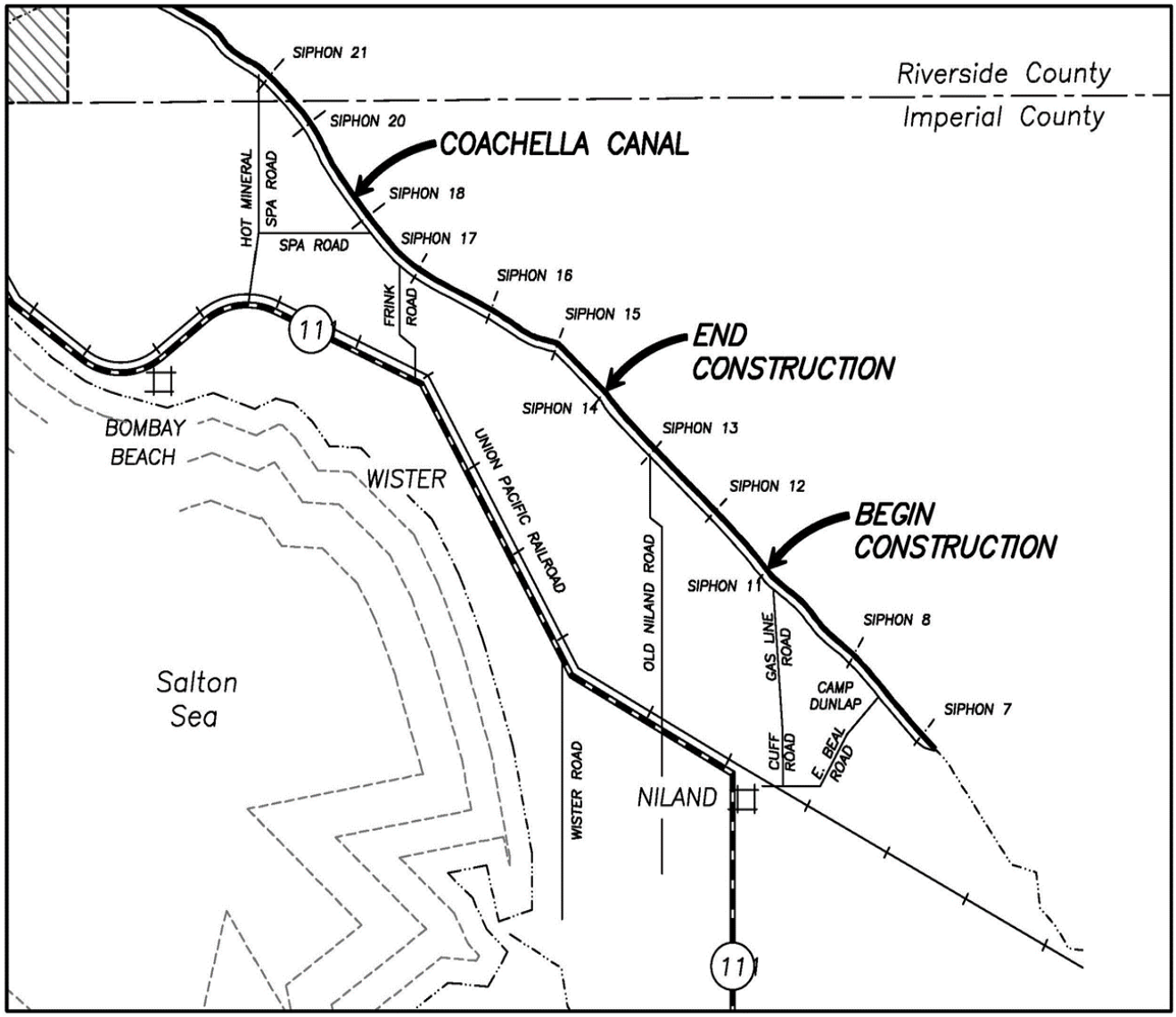


Figure 2 - Project Site Location Map



Vicinity Map
Not to Scale

Figure 3 - Project Storage Reservoir Configuration



WATER DISTRICT / DAHL consultants	COACHELLA VALLEY WATER DISTRICT FEASIBILITY STUDY FOR STORAGE OF COLORADO RIVER WATER	DATE MARCH 2019
	SITE MAP	FIGURE NUMBER 1

Figure 4 - Electrical Circuit Route Map



The 2015 Feasibility Study used a computer model that was developed to study hydraulic operations and water storage for the Coachella Canal. Building upon that model, a subsequent 2019 investigation (*Draft Feasibility Study for Storage of Colorado River Water*, July 2019 by Dahl Consultants and Rogers Engineering Hydraulics Inc.) used similar methods to quantify storage volumes and how these volumes would provide either additional supply or space to contain excess water during events that create a flow mismatch in the canal system.

The Mid-Canal Storage Reservoir will create direct improvements to water management and canal operations resulting in significant cost efficiency. Converting the Coachella Canal to in-line regulatory storage at this location will include the following benefits:

- Elimination of Recurring Lining Repairs - Reconstructing canal pools between Check 11 and Check 14 will eliminate recurring maintenance activities for damage to the concrete lining that presently occurs in this section of the canal. The heavy clay soils in this area are largely responsible for ongoing lining damage and resulting maintenance activities cause restrictions to canal operations. The reservoir will eliminate most of the concrete canal lining in this segment, which has been the area most prone to expensive repairs, exceeding four million dollars to date (2007-2021).
- It will also help prevent similar problems in the lined canal upstream and downstream from the reservoir by smoothing operations and decreasing water level fluctuations that can cause damage to the concrete lining.
- Normal Operational Benefits, including:
    - Water storage to help manage large, rapid delivery flow changes that affect Coachella Canal operations during times of high demand.
    - An increased amount of operational storage in the project to help compensate for loss of in-channel storage caused by the CCLP.
    - The Mid-Canal Reservoir will be able to supply shortages in the middle and lower ends of the Coachella Canal delivery system and will help attenuate large flow changes that might otherwise exceed drawdown criteria or exceed capacity near the canal's downstream end.
- Reduction in Potential for CVWD Water Allocation Losses – At times when significant emergency cuts to CVWD orders are required (such as large rainfall events), valuable water supply can by lost to the CVWD system.
- Frost Events – Although difficult to quantify, CVWD's ability to draw from this new source of stored water could significantly reduce potential crop damage – commonly estimated as a very high potential loss.
- Allow CVWD to utilize a portion of its' full water allocation currently lost as underrun.
- Provide increased water management resiliency in consideration of climatic change, and uncertain Colorado River water allocation in the future.

1.3.1 Proposed Action

The Mid-Canal Storage Project is proposed as a 4.9–mile long inline reservoir between Check 11 (Mile Post 54.6) and Check 14 (Mile Post 59.5). The reservoir will be formed by removing the existing embankment between the existing lined canal with the original earthen canal section to form a single wide trapezoidal section. The average width of the reservoir will be approximately 220 feet. The materials removed will be used to construct more gradual canal side slopes (3:1) and raise the invert (6 inches higher). Existing check structures and siphons will remain in place and utilized to continue operating flows through the canal section. Check 11 will serve as the inlet control structure and Check 14 will be the outlet control structure.

The siphons constructed as a part of the CCLP project (11, 12, & 13) will continue to be used to convey flow through the reservoir cells, with siphons 12 and 13 dividing the reservoir into three cells. No changes will be made to the existing siphon tunnels or the overlying desert wash channels. Rock armoring will be added at the siphon inlets. The siphon transition structure walls will be raised 1 to 3 feet to create freeboard above maximum capacity pool levels within the reservoir with no effects on the underlying tunnels. All work to complete these siphon inlet and outlet modifications will occur entirely within the existing parallel canal boundaries. No excavation is required that could affect the siphon tunnels, or the existing desert wash channels.

This ±4.9-mile segment of the lined canal crosses heavy clay soils that shrink and swell seasonally resulting in cracked panels of the concrete lining that have required significant maintenance. For the Mid-Canal Storage Project, a portion of the concrete lining through the segments between siphon 11 and siphon 14 will be removed solving the maintenance problems, and the berm between the original earthen canal and the new canal will be removed to create a storage reservoir. The estimated total footprint of the storage system to be developed is approximately 120 acres, with storage capacity of approximately 728 acre-feet.

This location was selected for several reasons:

- It is situated upstream of CVWD's canal delivery system and can provide stored water storage that can be delivered as needed throughout the system.
- Readily adaptable existing facilities:
  - Relatively new check structures are already in place.
  - Large cross section geometry, combining the old canal and the new canal to provide ample storage volume.
- Flow regulation using gravity flow both into and out of the reservoir.
- Soils in this reach of the Coachella Canal contain impermeable clay, so the reservoir lining can be constructed with material excavated from the site without a need for a PVC or concrete liner.
- Retirement of the concrete canal lining will reduce future potential lining replacement costs for this reach of the canal.

All work will be confined within the existing federal canal right-of-way (ROW), including the fence line on the western perimeter and the existing O&M road just outside the fence line on the eastern side. Two other elements of the area of potential effects outside of the existing ROW include:

1. An existing staging area near the northern end of the project developed for the canal lining project, a portion of which is still in use by CVWD as an equipment storage yard;
2. The existing and regularly used county road that parallels the canal that will be used for transport from the staging area to the work site; and

Embankments will be raised with onsite materials since much of the canal is in cut and there will be an abundance of material from the removal of the center berm. Raising the water surface three feet above the present canal design water elevation at Check 14 creates about 250 acre-feet of additional storage.

The existing concrete liner in the bottom and east bank will be moved to the bottom of the channel, with the west bank portion left in place to be covered by the new clay liner. Following approximately three feet of over-excavation of some portions of this segment to remove alluvium, the existing clay throughout this canal segment, including clay in the central berm that separates the two canal channels, will be spread across the

bottom of the new reservoir channel. Depth of the clay liner is a minimum of 2.8 feet which is intended to minimize seepage losses to be no greater than occurs with the three-inch concrete lining.

Six large mammal "drinkers" that were constructed in the bottom of the original canal as part of the CCLP will be replaced with earthen ramps in the same locations extending to the reservoir to the water surface, with fencing to prevent animals from getting into the flowing reservoir. During construction temporary wildlife water troughs will be installed outside of the construction area in the same approximate location of the existing drinkers, to be filled daily by the on-site water truck. Three large mammal "drinkers" on the west side of the canal will not be modified.

The new reservoir will be lined using the existing lake deposit clays that now form the berm between the two canal channels. Analysis of the available clay material was conducted by the project engineering team and reported in a July 2021 Technical memorandum. Their analysis provided the following details regarding seepage losses in concrete lined segments, and those expected with the new clay liner as follows:

> Reclamation has established an acceptable loss rate for concrete lining of 0.07ft3/ft2/day, (USBR, Lining for Irrigation Canals, 1963). The CCLP concrete canal lining has performed exceptionally well for the portion of the project downstream of Siphon 16 and may have a loss rate less than 0.07ft3/ft2/day. However, the portion of the CCLP between Siphon 7 and Siphon 14 has experienced significant cracking since construction and its loss rate in some areas is likely to be well above 0.07ft3/ft2/day.

The seepage control assessment concludes that:

- *Project design and use of the clay liner in this canal segment and for the proposed in-line storage reservoir will control seepage losses consistent with the previous analyses presented in the 2001 Final EIS/EIR Geohydrology Appendix.*
- *Laboratory testing of the lake deposit clays shows extremely low coefficients of permeability (5x10-7 cm/sec). Thus, there is little to no seepage in areas where the canal is cut into the lake deposit clays.*
- *The clay material existing within the proposed project footprint is suitable for and can be used to create an effective and economical liner to prevent seepage comparable to and even better than the concrete lined section.*

(Source: Dahl Consultants, *Draft Technical Memorandum No. 1, Coachella Valley Water District (CVWD) Mid-Canal Storage Project Seepage Control Methodology for Conversions of Pools 11, 12, and 13 to an In-line Canal Reservoir*, July 7, 2021)

A supporting geotechnical investigation was prepared by Landmark Geo-Engineers and Geologists to conduct laboratory testing of soils within the middle embankment and evaluation of engineering properties to develop recommendations for construction of the clay liner. Their analysis concluded that:

> The middle embankment was found to have uniform soil conditions at each location where slope excavations occurred. Soil changes were found to occur along the length (reach) of the embankment from Siphon 11 to Siphon 14. The soil materials (sands, gravelly sands, and clayey soils) will need to be visually segregated during construction of the reservoir.

> The in-line reservoir is anticipated to be lined with a compacted clay liner consisting of the middle embankment and east embankment soils to retard seepage. The native clay soils at the site are expected to have low permeability and are considered suitable for use as a clay liner. Following mixing and recompaction to 90% (ASTM D1557), the clays are anticipated to have a permeability of less than 1x10-5 cm/sec.
>
> The liner material should be free from deleterious material such as organic matter, construction debris, rocks, or other debris. The clay liner material should be pulverized/disced to less than ¾ inch maximum clod size uniformly moisture conditioned to optimum plus 4 to 8% and placed in 6 inch maximum lifts to a minimum of 90% ASTM D1557 maximum density.

Source: Landmark Geo-Engineers and Geologists, *Geotechnical Review, In-Line Water Storage Reservoir – Phase 1 Evaluation, Coachella Canal – Siphon 11 to Siphon 14, Niland, California, LCI Report No. LE19012*, March 6, 2019.

The resulting design depth of the clay liner is a minimum of 2.8 feet, selected as a very conservative depth which is intended to minimize seepage losses to be no greater than seepage losses with the three-inch concrete lining (0.07ft3/ft2/day). (The minimum calculated depth of the clay liner to achieve the required seepage control was 1.08 feet. (Source: Dahl Consultants.). The completed reservoir will have a bottom width of 90 feet and will be approximately 230 feet wide from the western fence line to the eastern fence line, with a water surface approximately 150 feet wide at maximum water level.

A new electrical line will be extended to Check 14 to power operations of the gate, and for operation of the Supervisory Control and Data Acquisition (SCADA) system allowing remote control of the system. The electrical line will replace an existing solar panel battery system that has been subjected to regular vandalism and theft. As shown in **Figure 4** above, the line will be 12kV and will be pole mounted, extending from an existing IID circuit approximately 3.5 miles west of Check 14 along English Road (also labelled Old Niland Road on some maps), an existing County road right-of-way (ROW) northeast to the canal road ROW and then north to Check 14. The poles and electric circuit will be routed entirely within the existing County and canal road rights-of-way terminating at the canal within the existing federal ROW for the canal.

IID's initial plan to service the project would include the following circuit details:

- A Distribution Circuit Study on the feasibility to accommodate CVWD's project electrical load via a 200amp 120/240v single-phase electrical panel that will serve a water gate and a SCADA building from the existing P-63 Circuit of Niland Substation. Any circuit upgrades deemed necessary to serve the project will be the financial responsibility of the CVWD. Line capacitors may be required as part of the plan to be determined by IID's Distribution Planning Unit.

- A tentative plan of service would be to extend a single-phase overhead primary line approximately 3.5 miles from existing IID pole #67891-40' along English Road rights-of-way, which is an Imperial County road, up to the intersection of the Coachella Canal Road rights of way utilizing 40 feet and 45 feet distribution-rated wood poles and associated guying anchors. The new single-phase primary line extension will cross under IID's existing "KN&KS" 230kV and "N" 161kV transmission lines and then proceed in a north westerly direction along the north side of the Coachella Canal Road right-of-way, to the Coachella Canal Siphon 14 location. IID would dead end the single-phase primary line, hang a single-phase pole mounted transformer and run an overhead secondary service to CVWD's 200 amp 120/240V customer meter pole.

1.3.2 Operations and Maintenance

Reservoir water level will be controlled at Check 14, much the same as controlling a checked water surface in the canal. A minimum water depth must be maintained at this point to pass flow into canal Pool 15 downstream. This minimum allowable water depth depends on canal flow rate. Most of the time, water level in Pool 15 will be the normal depth for the present flow rate. At low flows, Pool 15 will operate at a relatively low water level. Therefore, the water level upstream of Check 14 can be correspondingly low. At high flows, water depth in Pool 15 will be higher and reservoir water level must also be higher to push water through Check 14. This restriction will reduce the amount of available regulatory storage in the reservoir during high flow periods. A high checked water level at Check 18 can also affect the depth in Pool 15 during high-flow conditions, but typical operations at Check 18 will not significantly affect the minimum reservoir depth.

Error! Reference source not found. shows the minimum allowable water depth required in the reservoir at varying flow rates for conveyance to Pool 15. **Error! Reference source not found.** also shows the resulting amount of available reservoir storage above the minimum reservoir depth. For most normal operating conditions, the minimum reservoir level will be between three and six feet deep, and the amount of usable storage will be from 500 to 700 acre-feet.

The reservoir will provide volume to store excess water or to supply water into the canal when needed. A given volume in the reservoir equates to an inflow or outflow rate for a particular length of time.

Tables 2, 3 and 4 show how much time it takes to fill or drain volumes from the reservoir, and therefore how the reservoir level will change over time. Differential volume is shown for one-foot increments of depth, for the useful operating range in the reservoir. Reservoir level will rise at a rate that is proportional to the net rate of *inflow* into the reservoir or will fall at a rate that is proportional to the net *outflow* from the reservoir.

Long term operation of the reservoir will be essentially the same as current operations, with routine maintenance of gates and fencing, and periodic bank grooming following major storms or wind events. For the reservoir, a dragline may be periodically used to remove sediment. The need for sediment removal is estimated to occur about every ten years.

1.3.3 Construction Sequencing

Construction is expected to take a total of 6 to 8 months. Figures 5 through 8 show the sequence for construction. A sheet pile barrier will be installed so that the canal will continue to be used to convey normal deliveries throughout the earthwork operations. Work will be staged so that all earthwork occurs in the dewatered canal segments, and never within the flowing water of the canal.

Equipment to be used for earthwork to create the storage reservoir will include standard heavy equipment for earth moving construction projects such as: pickup trucks, water trucks, large excavators, backhoes, dump trucks, front-end loaders, vibratory compactors, bulldozers, a 25 kVA portable generator(s), and a dewatering pump system, and possibly others to be determined in final engineering design and construction planning. All equipment will access the construction site via the existing county and canal maintenance roads, and all work will be done within the existing fence lines of the two canals.

Table 1 - Minimum Reservoir Depth and Usable Storage Volumes

Canal Flow Rate (cfs)	Minimum Reservoir Depth (feet)	Usable Storage Volume (acre-feet)
25	0.5	728
50	0.8	728
100	1.2	728
200	1.8	718
400	2.8	660
600	4.4	570
800	5.8	490
1000	7.1	395
1200	8.3	305

Table 2 - Time (in hours) to Increase Reservoir Level vs. Net Inflow Rate

Reservoir Depth (feet)	Differential Volume (acre-feet)	Net flow into reservoir (cfs):					
		50	100	200	400	600	800
		Time (in hours) to increase reservoir level by 1 foot					
12	**88**	21.3	10.6	5.3	2.7	1.8	1.3
11	**84**	20.3	10.2	5.1	2.5	1.7	1.3
10	**81**	19.6	9.8	4.9	2.5	1.6	1.2
9	**78**	18.9	9.4	4.7	2.4	1.6	1.2
8	**74**	17.9	9.0	4.5	2.2	1.5	1.1
7	**71**	17.2	8.6	4.3	2.1	1.4	1.1
6	**68**	16.5	8.2	4.1	2.1	1.4	1.0
5	**64**	15.5	7.7	3.9	1.9	1.3	
4	**61**	14.8	7.4	3.7	1.8	1.2	
Totals:	**669 AF**	**132 hr.**	**88 hr.**	**44 hr.**	**21hr**	**13 hr.**	**8 hr.**
Average time for a 1-foot change in level (hrs.)		**19 hr.**	**9 hr.**	**5 hr.**	**2.4 hr.**	**1.6 hr.**	**1.2 hr.**

Table 3 - Time (in hours) to Decrease Reservoir Level vs. Net Outflow Rate

Reservoir Depth (feet)	Differential Volume (acre-feet)	Net flow out of reservoir (cfs):					
		50	100	200	400	600	800
		Time (in hours) to decrease reservoir level by 1 foot					
12	**88**	21.3	10.6	5.3	2.7	1.8	1.3
11	**84**	20.3	10.2	5.1	2.5	1.7	1.3
10	**81**	19.6	9.8	4.9	2.5	1.6	1.2
9	**78**	18.9	9.4	4.7	2.4	1.6	1.2
8	**74**	17.9	9.0	4.5	2.2	1.5	1.1
7	**71**	17.2	8.6	4.3	2.1	1.4	1.1
6	**68**	16.5	8.2	4.1	2.1	1.4	1.0
5	**64**	15.5	7.7	3.9	1.9	1.3	
4	**61**	14.8	7.4	3.7	1.8		
Totals:	**669 AF**	**132 hr.**	**88 hr.**	**44 hr.**	**21hr**	**12 hr.**	**8 hr.**
Average time for a 1-foot change in level (hrs.)		**19 hr.**	**9 hr.**	**5 hr.**	**2.4 hr.**	**1.6 hr.**	**1.2 hr.**

Table 4 - Summary of Storage Use vs. Time

When the flow through Siphon 14 is:		400 cfs (low flow)	1000 cfs (high flow)
Usable storage volume is:		660 acre-feet	395 acre-feet
Differential flow (filling or draining)	Average time to change level by 1 foot	Time to drain/fill entire usable volume of 660 acre-feet	Time to drain/fill entire usable volume of 395 acre-feet
50 cfs	18 hr.	160 hr.	96 hr.
100 cfs	9 hr.	80 hr.	48 hr.
200 cfs	5 hr.	40 hr.	24 hr.
400 cfs	2.3 hr.	20 hr.	12 hr.
600 cfs	1.5 hr.	13 hr.	8 hr.
800 cfs	1 hr.	10 hr.	6 hr.

It is anticipated that construction would begin in late summer 2023 and be completed by late winter or early Spring 2024. The construction sequence includes:

Step 1 – Earthwork in the original earthen canal (completed during summer/fall)

- Clear, scarify, and compact subgrade from Siphon 11 to 14
- Remove portion of existing left embankment
- Construct compacted right embankment using removed material from left embankment
- Work completed for all reaches without disrupting service in existing canal

Step 2 – Diversions (completed during winter low-flow period)

- Coordinate temporary shutdown with CVWD
- Construct temporary plugs in the canal to isolate Siphons 11 (downstream only), 12, 13, and 14 (upstream only)
- Complete structural modifications at Siphons 12 and 13 and Check 14
- Construct temporary transitions to divert flow into the original canal

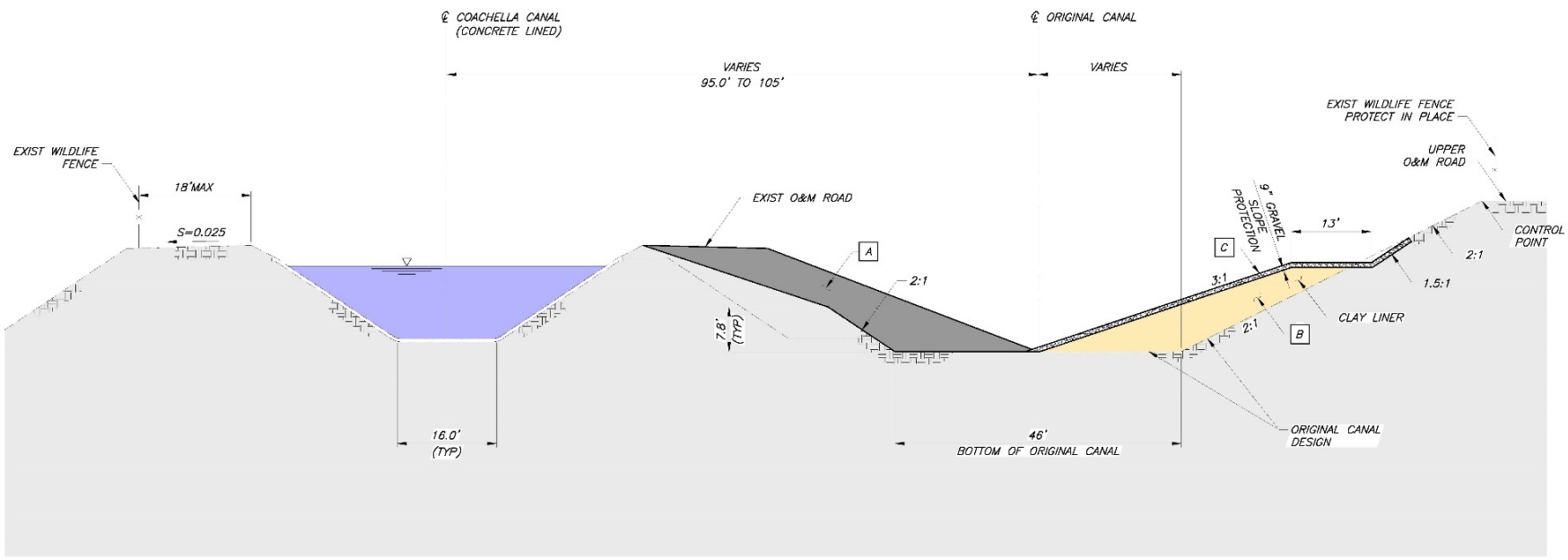
Step 3 – Earthwork in lined canal (completed during winter low-flow period)

- Dewater existing lined canal pools
- Remove portion of canal-right concrete lining and place on new canal invert
- Remove portion of existing canal right embankment and use it to construct compacted clay liner over the canal left embankment and invert concrete lining

Step 4 – Complete final reservoir section (completed during late winter low-flow period)

- Use remaining embankment between old and new canals to construct finished reservoir left embankment
- Any excess material can be spoiled on reservoir invert
- Construct final transitions
- Resume normal water deliveries in the Coachella Canal, including the new Mid-Canal Storage Reservoir

Figure 5 - Mid-Canal Storage Project Profile and Sequence



STEP 1

STEP 1:

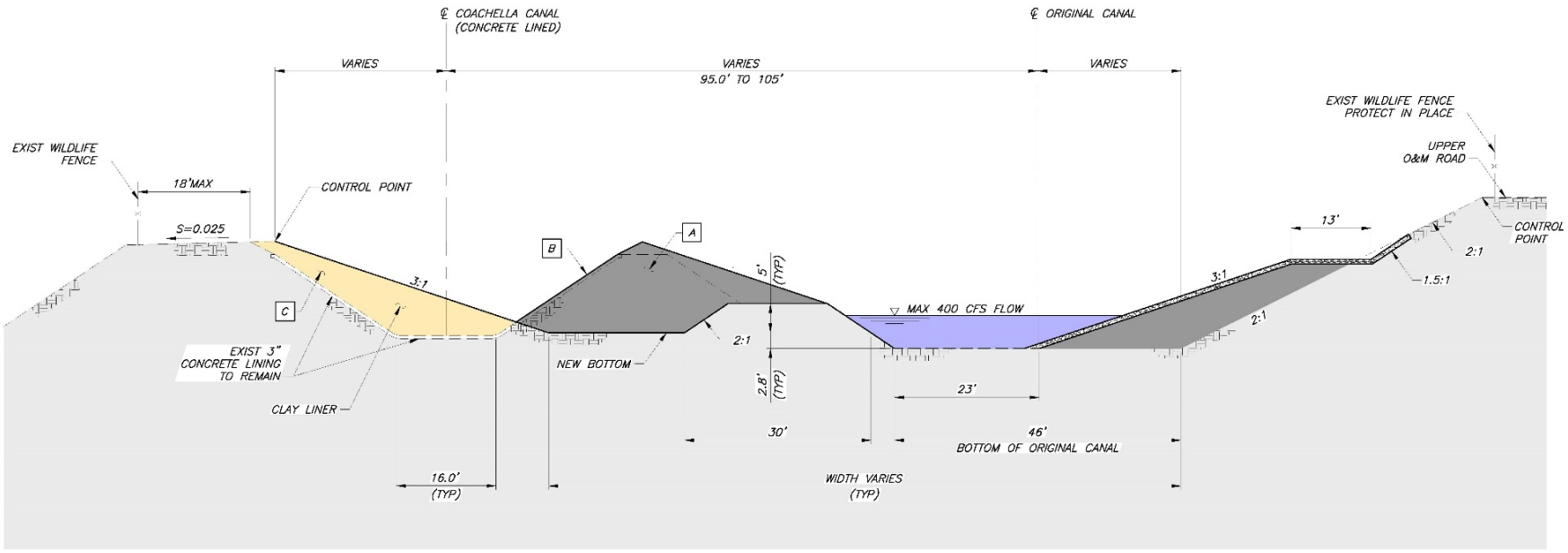
A. REMOVE PORTION OF EXISTING EMBANKMENT.

B. CONSTRUCT COMPACTED EMBANKMENT ALONG OLD CANAL (RIGHT) USING THE MATERIAL FROM THE EXISTING EMBANKMENT.

C. FURNISH AND PLACE 9-INCH-THICK ROCK PROTECTION ALONG EASTERLY SLOPE.

D. WORK SHALL BE COMPLETED FOR ALL CELLS WITHOUT DISRUPTING SERVICE TO THE EXISTING CANAL.

Figure 6 - Mid-Canal Storage Project Profile and Sequence



STEP 2

A. COORDINATE TEMPORARY SHUTDOWN WITH CVWD TO DIVERT FLOW INTO THE OLD CANAL.

B. CUT AND REMOVE EXISTING LINING ON CANAL RIGHT TO INVERT.

C. REMOVE PORTION OF EXISTING EMBANKMENT TO CONSTRUCT COMPACTED EMBANKMENT ALONG LINED CANAL (LEFT) USING THE MATERIAL FROM THE EXISTING EMBANKMENT.

D. WORK SHALL BE COMPLETED FOR ALL CELLS WITHOUT DISRUPTING SERVICE TO THE OLD CANAL.

Figure 7 - Mid-Canal Storage Project Profile and Sequence

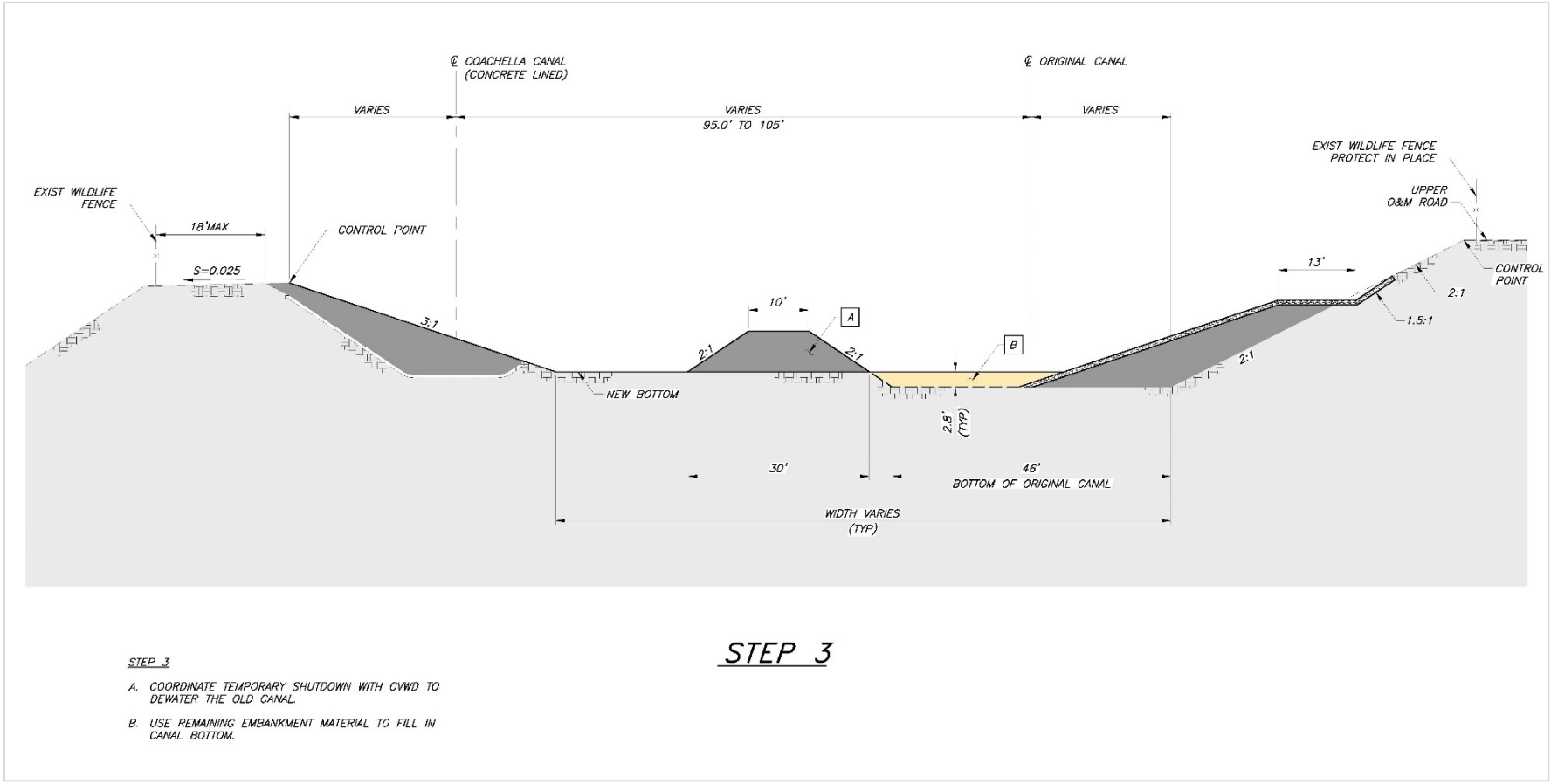
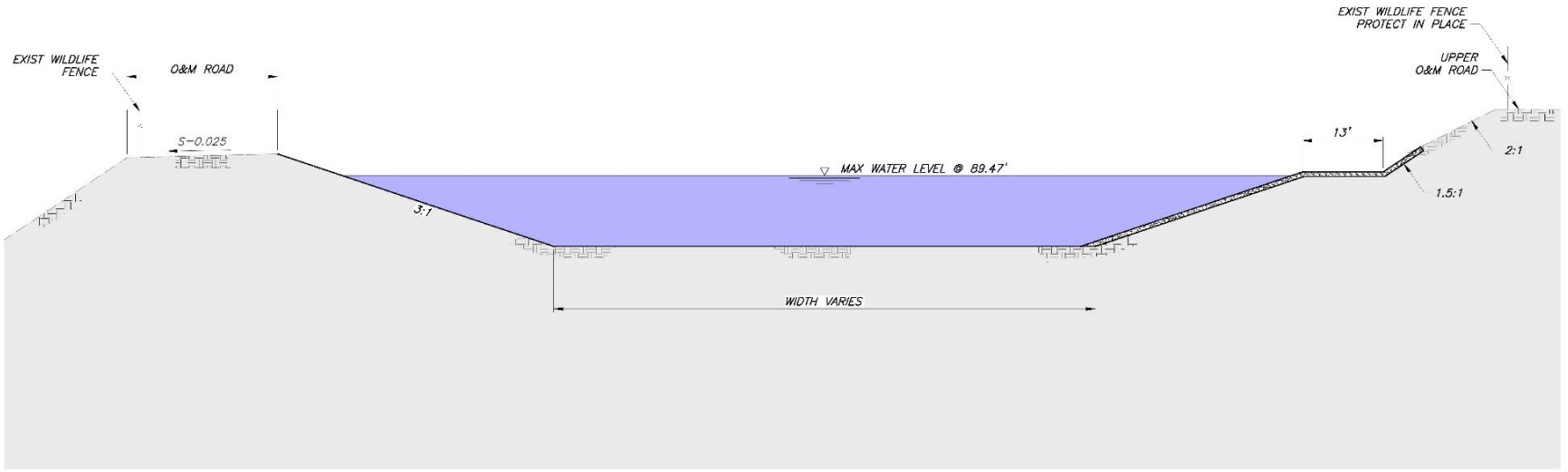


Figure 8 - Typical Section with Finished Storage Reservoir



1.3.4 Environmental Setting

The linear Coachella Canal segment proposed to be modified to create an inline reservoir, is located east of the community of Wister, in Imperial County, situated in Township 9 South, Range 14 East, east ½ of Section 36; southwest ¼ of southwest ¼ of Section 31; east ½ of Section 6; southwest 1/4 of Section 5; northeast ¼ of Section 8; south ½ of Section 9; northwest ¼ of Section 15, on the U.S. Geological Survey (USGS) 7.5' Wister quadrangle. The approximately 120-acre project site is located within Assessor's Parcel Numbers (APNs) 003-050-018, 003-050-025, 003-120-014, 003-120-022, 003-130-006, 003-200-047, and 003-210-001, and is bordered by Gasline Road to the east and Coachella Canal Road to the west. The project public land survey and coordinates are:

- Township and Range:
  - Siphon 11: Section 16, T 10 S, R 14 E, SBBM
  - Siphon 14: Section 36, T 9 S, R 13 E, SBBM
- Latitude and Longitude:
  - Siphon 11: 33° 18′ 05.75″ N, 115° 30′ 30.03″ W
  - Siphon 14: 33° 21′ 04.60″ N, 115° 34′ 03.81″ W

The canal segment proposed to be modified is located in Imperial County east of the Salton Sea and the community of Wister, California (see **Figure 1 - Regional Location Map**). Both parallel canals are constructed in the upland slope and convey water entirely by gravity flow, with electrical power needed only to operate the control gates at the checks. The existing concrete lined canal will be combined with the original earthen canal prism to create a wide section that will serve as an inline reservoir, with all work to be completed within the existing outer boundaries of the canal channels and fencing.

The western boundary of the U.S. Navy's Chocolate Mountains Aerial Gunnery Range lies to the east of the project site. West of site are desert lands extending to the eastern shore of the Salton Sea with a variety of land uses including irrigated agriculture, residences, and open land crossed by numerous unpaved roads. The site is located outside of Critical Habitat designated by the U.S. Fish and Wildlife Service (USFWS) and outside of other lands targeted for conservation under the Coachella Valley Multiple Species Habitat Conservation Plan (MSHCP) or other regional plans.

The immediate surrounding area is undeveloped and comprised of desert scrub and generally unvegetated desert washes. Agricultural lands are located approximately half a mile to the west of the study area, followed by the East Highline Canal, State Route 111, the Imperial National Wildlife Refuge, and the Salton Sea occurring further west. Lands to the north and east appear to remain undeveloped but are part of the Navy's Chocolate Mountains Aerial Gunnery Range. Interstate 10 and State Route 78 occur further to the north and east. The Imperial National Wildlife Refuge occurs approximately five miles west of the site. The nearest critical habitat unit designated by the USFWS is for desert tortoise (*Gopherus agassizii*), approximately 12.5 miles to the east of the site, on the eastern side of the Chocolate Mountains.

1.4 Reclamation Authority, Policy, and Resource Management Plan

The Canal is owned by the Bureau of Reclamation with operations and maintenance (O&M) to be managed by CVWD. The District has requested that Reclamation approve CVWD's request to modify a segment of the Canal to construct the Mid-Canal Storage Project. It will be CVWD's responsibility to adhere to guidance and conservation measures detailed in Reclamation's EA/FONSI concerning implementation, and to provide funding, labor and materials to implement and maintain the proposed water conveyance system.

Reclamation has prepared this environmental assessment of the proposed project to satisfy requirements of NEPA and support its decision making.

1.5 Relationship to Other Projects and Activities

1.5.1 Quantification Settlement Agreement

CVWD's Colorado River water entitlement is being augmented as a part of implementation of the 2003 Quantification Settlement Agreement (QSA), which will ultimately provide an additional 94,000 acre-feet to CVWD. The District is committed to maximizing beneficial use of this water, and the Mid-Canal Storage Project will allow greater operational flexibility and reduced losses in fulfillment of objectives adopted in its 2010 Coachella Valley Water Management Plan Update (CVWMP). Additional storage near the middle of the Coachella Canal length would be valuable to spread out large flow changes over several hours and reduce peak flows through the canal. Mid-system storage can attenuate large flow changes that might otherwise exceed drawdown criteria or exceed capacity near the canal's downstream end.

1.6 Determinations to be Made

This EA will be distributed to appropriate decision-makers within Reclamation for review to determine whether a Finding of No Significant Impact (FONSI) is appropriate. This decision will be based on a determination that potential impacts are either not significant or can be reduced to less than significant levels through the implementation of mitigation measures. If any potential impacts are considered significant and cannot be avoided or reduced to less than significant levels, the preparation and processing of an Environmental Impact Statement (EIS) is required.

1.6.1 Scoping Process and Issues

As part of the NEPA process and to engage public agencies, stakeholders, Tribal governments, organizations, and the members of the public in the project development process, a Scoping letter informing agencies, Tribes and interested parties of the preparation of the Environmental Assessment (EA) for the Proposed Action was issued on June 6, 2022. No written comments were received, but Reclamation did conduct a phone meeting with the California Department of Fish and Wildlife in June 2022 to discuss the project. (PersComm., Mr. Charley Land, Supervisor, Environmental Scientist and Ms. Tonya Marshall, Salton Sea Program Manager, on June 28, 2022.)

Chapter 2: Alternatives Considered

This chapter describes the alternatives considered for the proposed project. It includes the No Action and Proposed Action alternatives. It also includes an overview of CVWD's alternatives assessment that was completed over several years to identify other storage alternatives that were considered but subsequently eliminated for detailed analysis, and lead to its selection of the Proposed Action.

2.1 No Action Alternative

NEPA guidelines require that an EA evaluate the "No Action" alternative in addition to the Proposed Action. The No Action Alternative provides a basis for comparison of the environmental consequences of the Proposed Action. In this EA, the No Action Alternative assumes that the Mid-Canal Storage Project would not be developed, and the current configuration of this canal segment would remain in place and operate as they do at present. Under the No Action alternative, periodic repairs to the concrete lining in the new canal would also continue to occur as they do at present.

2.2 Proposed Action

The Proposed Action Alternative is described in detail in Chapter 1 and was developed after the evaluation of other potential alternatives described above failed to identify a cost-effective solution for a location upstream of the primary CVWD service territory. The Proposed Action has the benefit of creating the desired storage capacity and improved operational flexibility and solving the ongoing maintenance problems with the concrete lined canal in this upstream location. The Proposed Action consists of removal of the existing berm between the original canal channel and newer lined canal segment to create an in-line storage pool. Burial of the existing concrete lining with a new clay liner will eliminate the need for ongoing repairs to the concrete liner caused by underlying soil conditions that are unique to this canal segment. The Proposed Action would also allow for greater and more efficient operational flexibility to spread out large flow changes over several hours and reduce peak flows through the canal. Mid-system storage can also attenuate large flow changes that might otherwise exceed drawdown criteria or exceed capacity near the canal's downstream end.

2.3 Actions Considered but Eliminated for Detailed Analysis

The Proposed Action was identified by CVWD following years of detailed assessments of other potential storage alternatives. The Coachella Canal Lining Project (CCLP) was completed in 2006. The completed project resulted in a new smaller canal prism that required new operational criteria for the rate of drawdown which reduced the volume of storage previously available for canal operations. Prior to lining the canal, CVWD would draw down the unlined section of the Coachella Canal to meet downstream demands. Essentially, and to the extent practicable, CVWD operated this section of the canal as a reservoir.

The lining project was planned and funded without a storage replacement component. The storage deficiency was identified during preliminary design of the CCLP; however, its impact was not fully realized by CVWD until the new canal was put into operation. The new operational restrictions were troublesome for CVWD and a plan to address the issue was needed to close out the project. An agreement was reached between CVWD and the other stakeholders (including Reclamation and SDCWA) to settle the storage and

other close out issues. One of the principles of the agreement involved a change in Reclamation's historical water order protocols that had been in place since the mid-1900s.

With this change, CVWD water orders can be made utilizing five-hour turn times rather than the longstanding 15-hour requirement. However, even though an agreement was reached, there is still a net loss in operational storage because of the CCLP. This loss of storage becomes more difficult to manage as CVWD conveys increased water volumes from its Colorado River QSA allocation.

CVWD explored the feasibility of constructing a regulating reservoir somewhere in the vicinity of the community of North Shore located in the vicinity of the northeast side of the Salton Sea near the northern end of the CCLP. CVWD anticipated the cost for this facility to be in the range of five-million dollars for a 500 AF capacity reservoir. This equates to about $10,000 per acre-foot (AF) and is based on other recently constructed CVWD reservoirs. The storage would be used to return CVWD's capability to respond to frost warnings, rainy weather flow reductions, and flow mismatches resulting from weekend demand changes. The weekend changes are the most problematic, consisting of excess water on Friday afternoon and shortages for startup on Monday mornings.

Assuming that a typical weekend demand reduction is somewhat predictable, headworks flow reduction can precede the turnout reductions, so the canal flow is already reducing when turnout demands decrease. If the quantity and timing of the headworks flow change has been predicted accurately, a small volume of water will need to be stored. However, a single flow reduction at the canal's upstream end cannot reach all downstream locations at the optimal time, causing temporary flow mismatches, potentially large flows that exceed canal capacity, and drawdown in the canal from sudden flow reductions. In-canal storage can help alleviate these problems if it is managed optimally, but it is difficult to manage small amounts of storage in numerous different locations without exceeding maximum depth and drawdown limits. Storage in one or two mid-system reservoirs would help with all the above issues.

The objectives for alternatives investigation included the following:

- Determine present and prospective future storage capacity needs to review historical flow mismatches
- identify and evaluate potential locations for off channel reservoir sites;
- screen potential sites, and develop cost estimates to narrow site selection
- recommend a reservoir site location
- recommend a reservoir storage solution that would be constructible within CVWD's budget; and
- preferably, a reservoir that can be operated by gravity flow (in and out).

Another consideration was whether a storage solution would require involvement of the California Division of Safety of Dams (DSOD). DSOD reviews and approves plans and specifications for the design of dams and oversees dam construction to ensure compliance with the approved plans and specifications. Per Division 3 of the California Water Code defined in Section 1.4, Definitions, DSOD has jurisdiction over dams that either (a) have barriers that are 25 feet or more in height or (b) have impounding capacities of 50 AF or more. The Coachella Canal is owned by Reclamation which must be consulted regarding any change in the canal facilities and generally prefers not to add facilities that come under DSOD jurisdiction that could involve conflicts between a Federal and a State agency.

Initially, it was thought that a reservoir located in the general area near the community of North Shore would provide the most operational benefit. While the steps for siting a reservoir of this nature should be straightforward, the general ground slope of topography in this area along the Coachella Canal is relatively

steep making it challenging for economically constructing and maintaining a large volume reservoir. At the commencement of the investigation of alternative reservoir sites, a number of potential locations were thought to be good candidates. These are summarized below and shown on figures 9, 10 and 11.

Figure 9 - New Regulating Reservoir Site Alternatives Considered



Existing Settling Basin - CVWD has a settling basin located at the beginning of its distribution system. This settling basin could take water out of the Canal at Mile Point 88.6 and return it to the Canal at Mile Point 91.4. This facility was constructed to settle the silt from the Canal, but it also provides approximately 800 acre-feet of active storage. The total capacity is approximately 1,000 acre-feet, but it was filled with sands and sediment from a large storm in-flow which occurred in 1983. The facility has not been cleaned or rehabilitated. CVWD personnel suggested that cleaning out the facility, sealing the bottom, and installing flood protection facilities, could offer a replacement for lost storage. In addition, the settling basin may prove beneficial in removing silt.

Siphon 27 to Siphon 32 of the Old Earthen Canal Section - During construction of the CCLP, Siphon 27 through Siphon 32 were left open with the idea that this length of the old canal could be used for a future regulating reservoir. Water would be turned out by gravity at Siphon 27 and returned to the Canal at Siphon 32.

Potential Upslope Sites - The addition of a reservoir upslope of the Canal and located near the beginning of the distribution system would prove beneficial to CVWD. If a reservoir was thusly located, pumping would be required to place surplus water deliveries into the reservoir. Water would return to the system by gravity with a large range of flow capability. An operation of this type becomes more economical as the value of water increases. Consideration could also be given to the installation of hydroelectric facilities upon return of the water to the Canal. A generating facility would return one-half to two-thirds of the power used for pumping. However, during the initial screening none of these sites proved feasible for locating a reservoir in the North Shore area or relying upon storage in Lake Cahuilla.

For the North Shore area, sites were rejected because traditional “rules of thumb” for estimating the cost of reservoirs cannot be relied on if the reservoir site is situated on relatively steep terrain. Based on cost constraint criteria a reservoir located on the relatively steep slopes along the Coachella Canal in the North Shore area is not feasible. Historically, including past CVWD projects, a budget number that has been fairly reliable for estimating the construction cost during the planning phase for future reservoirs is $10,000 per AF. The alternatives assessment concluded that costs could be as high as $36,000 per AF. Understanding that excavation and slope lining quantities have the biggest impact on reservoir construction costs, it is obvious that reservoir configurations that minimize the quantities for these two items will result in the best economy. It was assumed that reservoirs with square dimensions result in the best economy since the properties of a square figure produce the maximum area for a given perimeter length. Therefore, it was assumed that rectangular reservoirs generally cost more than square reservoirs. For example, the estimated costs per acre-foot for the long and narrow reservoirs (Site 1 and Site 2) included in this study are very high.

The natural slope of the topography along the Canal is calculated to be about 3.4 percent which is relatively steep but its effect on cost was unknown. To evaluate this, a series of reservoir sizes and shapes were evaluated using “generic” surfaces for a flat and a sloped (3.4%) computer surface model. The reservoirs modeled on the flat surface were laid out to be within California Department of Safety of Dams (DSOD) standards for non-jurisdictional. The two reservoir types modeled on the sloped surface were, (1) meets DSOD standards, and (2) Exceeds DSOD standards by 6 feet (12 feet above adjacent ground). All reservoirs had a capacity of 300 AF and a design water depth of 12 feet. The results of the study are shown in the figures below.

Site 1 - Siphon 27 to Siphon 32

During construction of the CCLP, siphons 27 through 32 were left open for the possible use of this length of the old canal for a future regulating reservoir. Water would be turned out by gravity at Siphon 27 and returned to the Canal at Siphon 32. Preliminary design modeling determined that this site should be eliminated from further consideration for reasons of excessive cost.

Site 2 – Parallel in Settling Basin

Following construction of the Canal, CVWD made provisions to divert water out of the Coachella Canal at Mile Point 88.6 into the borrow channel that was excavated to construct the levee and return it to the Canal at Mile Point 91.4. The purpose for these added facilities was to settle the silt from the Canal, but as detailed above, it would also provide approximately 800 acre-feet of active storage. The analysis concluded that the should site be eliminated from further consideration because excavation of over 1.5 million cubic yards of sediment would be required to provide sufficient volume for construction of a 300 AF reservoir, there was no obvious solution to disposal of the excavated material, this alternative had a high cost, and the reservoir would need to accept all stormwater runoff from the contributing watershed with a risk that a large flood similar to the 1983 event would fill in the reservoir with sediment.

Site 3 – Upslope Pumped Reservoir

The addition of a reservoir upslope of the Canal and located near the beginning of the distribution system could prove beneficial to CVWD. Pumping would be required to place surplus water deliveries into the reservoir. Water would return to the system by gravity with a large range of flow capability. An operation of this type becomes more economical as the value of water increases. An ideal site for a reservoir of this type would be just downstream from the MP 88.6 Drop Structure. There is a 6-foot differential in the water surface above and below the drop structure. However, it concluded this site should be eliminated from further consideration because the reservoir would be constructed upstream of the flood levee and it would take up a significant amount of the remaining detention volume, and there is readily foreseeable risk that a large flood similar to the 1983 event could cause significant damage to the facility.

Site 4 – Inline Reservoir with Bypass

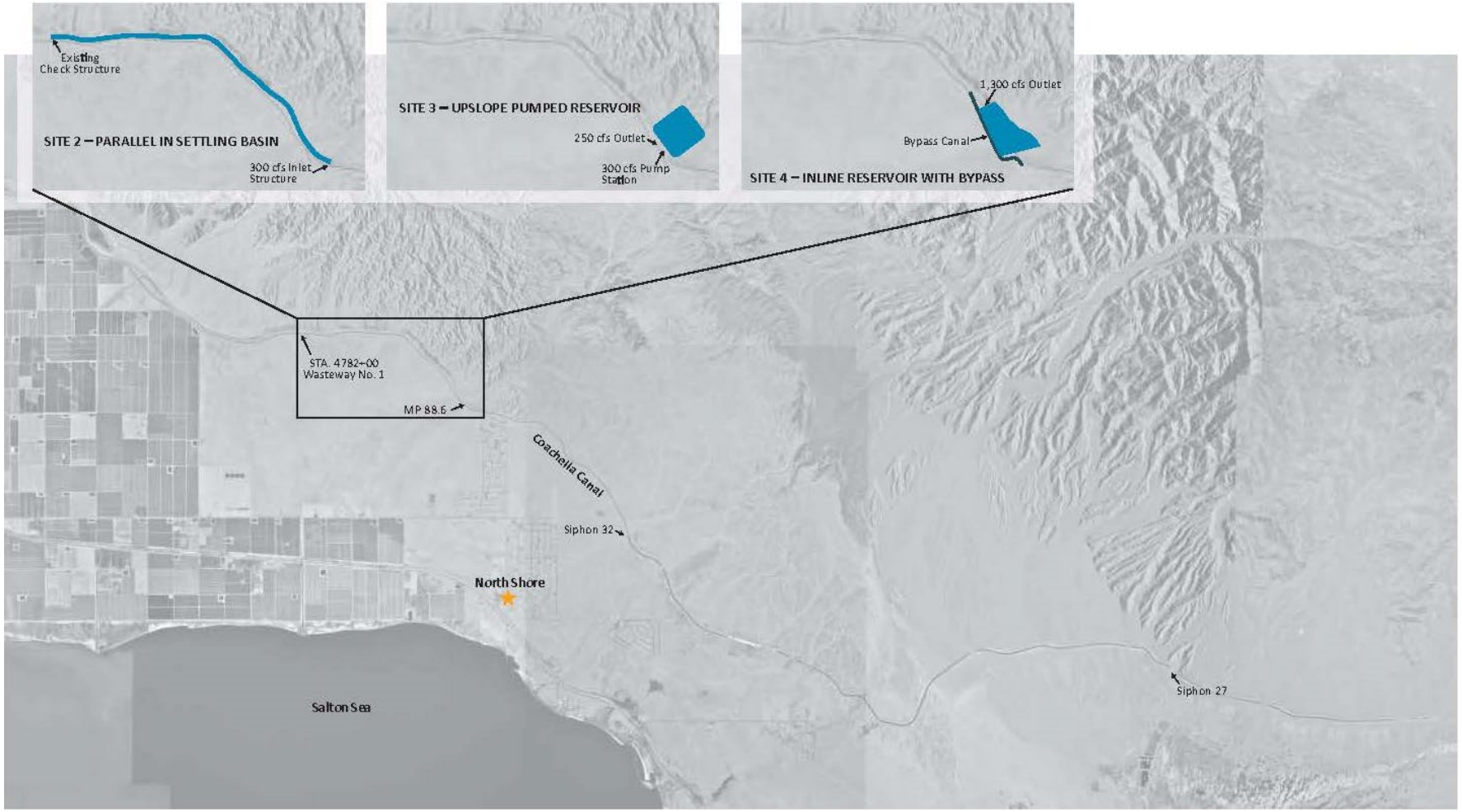
Siting the reservoir at this location would provide full use of the available water surface differentials above and below the drop structure at MP 88.6. However, the existing canal and flood levee would have to be relocated and reconstructed as a new levee upslope from the current location and a new bypass canal located downslope from its current location. It was concluded that this site be eliminated from further consideration because the reservoir would require removal and reconstruction of the flood levee as well as relocation of the canal which would involve significant cost, it would take up a significant amount of the remaining detention volume and it may in fact restrict stormwater flow along the outside of the flood levee, the risk that a large flood similar to the 1983 event could cause significant damage to the facility was too high.

Site 5 – Parallel Reservoir West of Canal

Utilizing the results of the evaluation of generic reservoirs constructed on ground slopes of 3.4%, a reservoir length of 4,300 feet was selected for this site. The longer length minimizes the width of the reservoir to further minimize the elevation differential between the design water surface and the ground elevation at the outside toe of slope. See **Figure 11**.

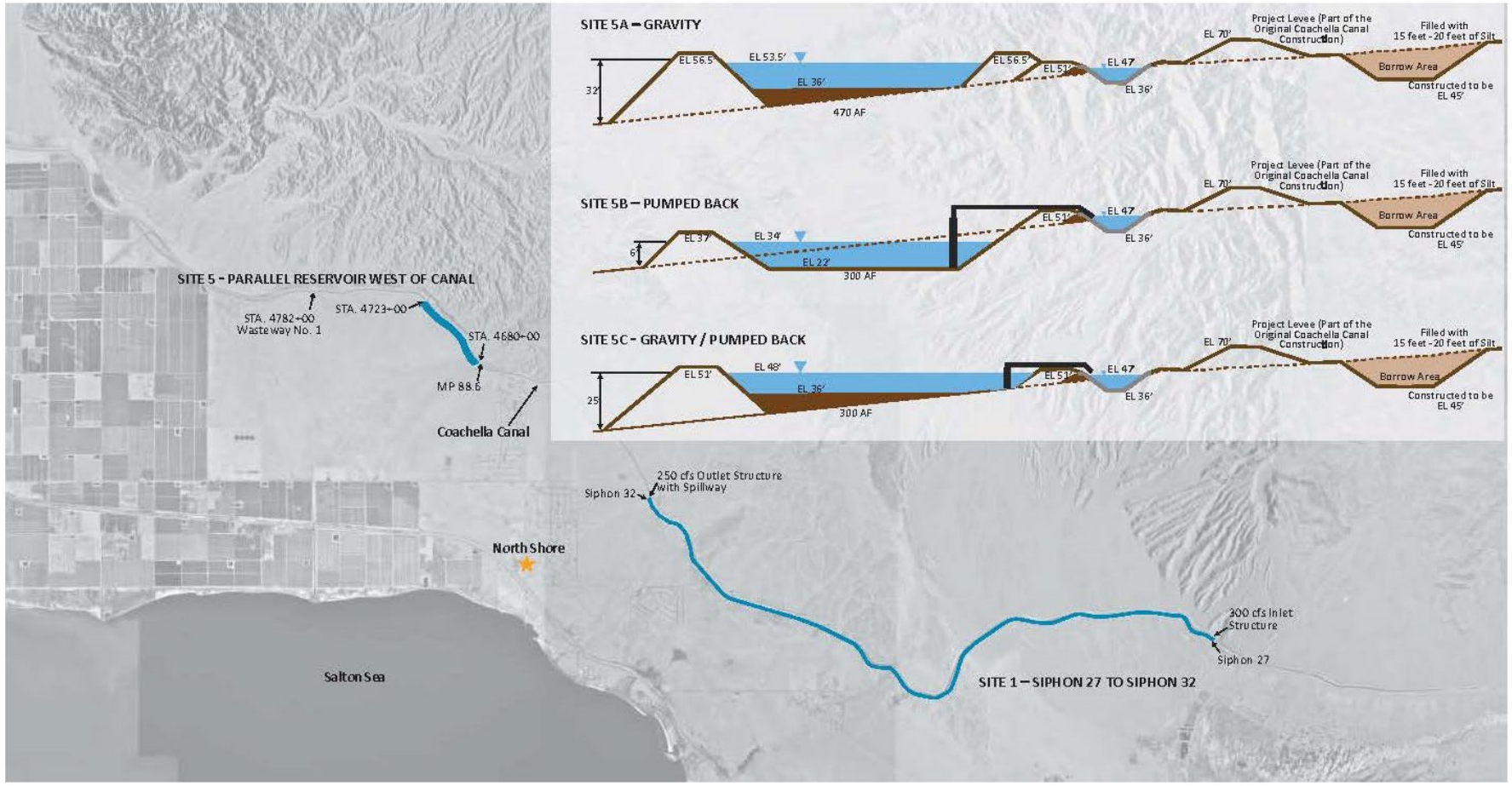
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Figure 10 - New Regulating Reservoir Site Alternatives Eliminated from Consideration



Like Site 4, this alternative would incorporate the existing facilities at MP 88.6. The de-mossing structure would be converted to a 300 cfs (or more) capacity turnout to the new regulating reservoir. Three options were considered for this site, including "Site 5A - Gravity" that could make full use of the available head at MP 88.6 for a total storage volume of 470 AF. The "Site 5B - Pumped Back" alternative positions the reservoir so that inflow into the reservoir would be by gravity but the outflow would be pumped. The alternative includes a 300 cfs pump station that would be located at the downstream end of the reservoir. The "Site 5C - Gravity / Pumped Back" alternative was developed to be approximately intermediate between Site 5A and Site 5B. The inflow into the reservoir would be by gravity and the outflow would be partly by gravity with the remainder being pumped. The alternative includes a 300 cfs pump station that would be located at the downstream end of the reservoir. The analysis concluded that this site be eliminated from further consideration because the cost was too high, and it was likely that DSOD requirements would be triggered.

Figure 11 - New Regulating Reservoir Site Alternatives Eliminated from Consideration



Chapter 3: Affected Environment, Environmental Consequences, and Management and Mitigation Measures

This section describes the existing environmental resources in the project area that may be affected by the Proposed Action and the No Action Alternative, if implemented. It also serves as the baseline for comparison of alternatives.

The following critical elements of the human environment are not present or would not be affected by the alternatives and will therefore not be addressed in more detail in this EA:

Housing and Population: The Proposed Action and No Action alternatives have no potential to create a need for additional housing, alter existing housing, or cause any change in location of any population. The Proposed Action is intended to eliminate the need for recurring costly repairs to the concrete liner in this canal segment, and to provide regulatory storage that the District needs to optimize water use and water deliveries within its service territory. No further analysis of potential effects to housing and population is required.

Land Use: The Proposed Action and No Action alternatives have no potential to create a change in land use or status within the Wister or Niland area, or within the District's service territory and no further analysis of land use related effects is required.

Noise: The Proposed Action and No Action alternatives have no potential to create a source of noise that could have any effects on any noise-sensitive receptors such as residences, schools, and hospitals and similar facilities. The nearest residence to the proposed pipeline route is more than five miles away, and typical construction noise for excavation and grading would not generate any unusual noise levels. There is no noise associated with long-term operation of the canal and proposed storage reservoir. The Proposed Action does not have the potential to generate excessive noise, and no further analysis of noise impacts is required.

Recreation: There are no recreational facilities in the vicinity of the Proposed Action, and neither the Proposed Action nor the No Action alternative has any potential effect on existing or planned recreational facilities or activities. Reclamation and the District do not allow any recreational use such as fishing or swimming in the Canal, and no further analysis of potential effects on recreation is required.

3.1 Air Quality

3.1.1 Affected Environment

The Coachella Canal segment to be modified to create the storage reservoir is located within the Imperial Valley, subject to jurisdiction of the Imperial Valley Air Pollution Control District (IVAPCD). The Imperial Valley air basin extends from the international border of the U.S. and Mexico north to the Coachella Valley and lies between the coast range mountains on the west and the Chocolate Mountains on the east.

3.1.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, construction of the new water storage reservoir would not take place, and no new construction related air emissions would be generated. Air emissions would continue to be produced

from the construction equipment for concrete lining repair operations. This equipment includes 2 to 3 pickup trucks, a concrete truck, a crane for placement of coffer dams, a grader and excavator, and a roller for grooming the side slopes. Typical repair operations require use of this equipment for a period of 6 to 8 weeks annually.

Proposed Action

The assessment of potential air quality effects of the project was performed based upon a complete site reconnaissance and understanding of the proposed project including short-term effects of construction activities and potential long-term effects of canal and reservoir operations. The RCH Group conducted air quality modeling using the California Emissions Estimator Model (CalEEMod) program recommended by the Imperial County Air Pollution Control District (ICAPCD). The results of the modeling are presented in Appendix E and summarized below and confirm that the Air District's air quality emissions thresholds will not be exceeded. The project's potential emissions are related only to construction for which alternative equipment and methods are not available. Long-term operations are by gravity flow and produce negligible emissions related to electricity used to operate the gate at Siphon 14 to control water levels in the upstream reservoir. Mitigation measures are identified to address and minimize construction emissions to the extent feasible.

The project area is located in the Imperial Valley region of the Salton Sea Air Basin (SSAB). The Imperial Valley region is under the regulatory jurisdiction of the Imperial County Air Pollution Control District ICAPCD. The ICAPCD monitors air pollutant levels to ensure the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) are met and, if they are not met, develops strategies to meet the standards. Air pollution in the project area is monitored at stations located in Mecca and Indio.

The NAAQS, which are required to be set by the United States Environmental Protection Agency (U.S. EPA) under the Clean Air Act, provide public health protection, including protecting the health of sensitive populations such as asthmatics, children, and the elderly (U.S. EPA 2016). Similarly, the CAAQS are established by the California Air Resource Board to protect health of the most sensitive groups and are mandated by State law. U.S. EPA has set NAAQS for six pollutants, which are called "criteria pollutants": carbon monoxide (CO), lead, nitrogen dioxide (NO2), ozone (O3), particulate matter (PM10 and PM2.5), and sulfur dioxide (SO2). California has added three additional criteria pollutants: hydrogen sulfide, visibility reducing particles, and vinyl chloride. In addition, California regulates about 200 different chemicals, referred to as toxic air contaminants (TACs) (CARB 2021).

Air emissions from the proposed project will occur only during construction with gasoline and diesel emissions from workers travelling to and from the site daily, and from the earthwork equipment that will be used in grading. Construction of the proposed project would occur over approximately 6 to 8 months. Post-construction operations of the canal and reservoir do not produce any air emissions.

Table 5 and **Table 6** provide the estimated unmitigated and mitigated maximum daily construction emissions, respectively, that would be associated with the project and compares those emissions to the ICAPCD's significance thresholds for construction emissions. Construction emissions were estimated using the CalEEMod Version 2020.4.0.1

[1] California Air Pollution Control Officers Association (CAPCOA), *California Emissions Estimator Model User's Guide Version 2020.4.0*, May 2021.

Table 5 - Estimated Unmitigated Maximum Daily Construction Emissions (pounds)

Condition	ROG	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO
Maximum Daily Construction Emissions	8.0	79.8	0.1	492.3	62.0	54.0
Significance Threshold	75	100	N/A	150	N/A	550
Potentially Significant (Yes or No)?	No	No	No	Yes	No	No

SOURCE: CalEEMod Version 2020.4.0.

Table 6 - Estimated Mitigated Maximum Daily Construction Emissions (pounds)

Condition	ROG	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO
Maximum Daily Construction Emissions	8.0	79.8	0.1	16.8	8.9	54.0
Significance Threshold	75	100	N/A	150	N/A	550
Potentially Significant (Yes or No)?	No	No	No	No	No	No

SOURCE: CalEEMod Version 2020.4.0.

Mitigation Measure AQ-1 would reduce fugitive dust (PM10) emissions to a less-than-significant level. The project would also be required to comply with ICAPCD Regulation VIII – Fugitive Dust Control Measures and all other applicable ICAPCD rules and regulations.

Temporary emissions to complete construction would not pose a conflict with or obstruct implementation of ICAPCD's applicable Air Quality Plans. The construction contractor will be required to obtain a Construction Permit from the ICAPCD prior to initiating grading and earthwork. To ensure that construction operations minimize the potential for adverse air quality impacts, mitigation measures AQ-1 through AQ-3 are recommended to be as conditions of project approval. Therefore, the proposed project would have a less-than-significant impact with mitigation.

3.1.3 Management and Mitigation Measures

Mitigation measures AQ-1 through AQ-3 below include standard air quality protection measures that will be imposed as conditions of project approval.

Mitigation Measure AQ-1 – Dust Control

The Construction Contractor will obtain a Construction Permit from the IVAPCD for a fugitive dust control program. This program shall include, but not be limited to the following:

- Water or a stabilizing agent shall be applied at least three times daily, preferably in the mid-morning, afternoon, and after work is done for the day, to exposed surfaces including graded and disturbed areas in sufficient quantity to prevent generation of dust plumes.
- Traffic speeds on unpaved roads shall be limited to 25 miles per hour.
- Operations on unpaved surfaces shall be suspended when winds exceed 25 miles per hour.
- On-site stockpiles shall be covered or watered at least twice per day.

Mitigation Measure AQ-2 – Equipment Maintenance

The construction contractor shall ensure that heavy-duty diesel trucks and other construction equipment are properly tuned and maintained in accordance with the manufacturer's specifications to ensure minimum emissions under normal operations.

Mitigation Measure AQ-3 – Equipment Idling Times

All construction vehicles, both on- and off-site, and construction equipment idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations). The construction contractor shall provide awareness training to equipment operators regarding this idling limit.

It is concluded that with implementation of mitigation measures AQ- 1, 2 and 3, the proposed project would have no adverse effects on air quality.

3.2 Biological Resources

A biological resources assessment was completed for the project by HELIX Environmental Planning, Inc. (HELIX), and is included as Appendix B to this report. The findings of the biological assessment are summarized below. Prior to conducting field surveys, a thorough review of relevant maps, databases, and literature pertaining to biological resources known to occur within the project vicinity was performed. Recent and historical aerial imagery (Google 2022), topographic maps (U.S. Geological Survey 2021), soils maps (U.S. Department of Agriculture [USDA] 2019), and other maps of the project site and vicinity were acquired and reviewed to obtain updated information on the natural environmental setting.

In addition, a query of sensitive species and habitats databases within five miles of the project site was conducted, including the U.S. Fish and Wildlife Service (USFWS) Critical Habitat Portal (2021a), USFWS species status lists (USFWS 2022b), USFWS Information for Planning and Consultation database (IPaC; Attachment F; USFWS 2022a), California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB; CDFW 2022a), California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB; CDFW 2022a), and California Native Plant Society (CNPS) Electronic Inventory (CNPS 2022). The USFWS' National Wetlands Inventory (NWI) was also reviewed (USFWS 2021b) to obtain information regarding sensitive biological resources known to occur within the vicinity of the study area. The EIS/EIR for the Coachella Canal Lining Project was also referenced (Reclamation and CVWD 2001).

The electrical circuit route was unknown at the time the original survey was conducted. Therefore, the Principal Biologist conducted a directed, general biological survey of the electrical circuit component on February 10, 2023 as a follow-up to the previous general biological survey conducted on January 6, 2022. The survey included the planned alignment for the electrical circuit component and immediate vicinity. The alignment is characterized by disturbed lands associated with the previously graded, bladed, and maintained rights-of-way associated with English Road and Coachella Canal Road near Siphon 14 of the Coachella Canal. The alignment itself, including associated direct impact areas for the installation of eight-inch diameter poles, are to be restricted to the previously graded, bladed, and maintained disturbed lands within the rights-of-way. These disturbed areas are unvegetated and situated in compacted uplands located outside of suitable habitat for federally listed species, designated critical habitat, suitable nesting habitat for birds protected under the Migratory Bird Treaty Act (MBTA), and federally protected wetlands and other waters of the U.S.

As such, no effects on these resources are anticipated as a result of the electrical circuit component. As with other components of the project, portions of the electrical circuit direct impact areas occur immediately adjacent to disturbed, native desert creosote bush scrub habitat, some of which contains trees and shrubs that provide suitable nesting habitat for common, non-listed birds protected under the MBTA. As required for the entirety of the project, the applicant shall implement pre-construction nesting bird surveys and avoidance measures during construction, as necessary and prescribed in mitigation measure BIO-1. With the implementation of the pre-construction surveys and avoidance measures, the project would have no effect on MBTA-protected nesting birds.

3.2.1 Affected Environment

The Mid-Canal Storage Project study area is characterized by disturbed and developed land, which has been graded during the construction of the canal and the existing operations and maintenance roadway to the east of the canal. The study area includes the original earthen and the newer lined portion of the Coachella Canal, canal facilities, wildlife drinkers (shallow lined ponds providing water for wildlife), and the road. The original and lined canals and facilities are enclosed by perimeter fencing. Between the aboveground sections of the canal, check structures allow canal water to flow through siphons beneath desert washes. These open areas between the fenced, aboveground canal sections have been subjected to disturbance from vehicle traffic and erosion. Evidence of heavy disturbance was observed throughout the study area, including grading and/or vegetation removal within the original earthen canal, and vehicle traffic on the existing roads and across the underground canal siphons.

Except for the Coachella canal, which extends north and south from the study area, and Coachella Canal Road that parallels the west side of the canal, the immediate surrounding area is undeveloped and comprised of desert scrub and generally unvegetated desert washes. Agricultural lands are located approximately half a mile to the west of the study area, followed by the east highland canal, State Route 111, the Imperial National Wildlife Refuge (Wister Unit), and the Salton Sea occurring further west. Lands to the north and east appear to remain undeveloped but are part of the Chocolate Mountains Aerial Gunnery Range. Interstate 10 and State Route 78 occur further to the north and east. The Imperial National Wildlife Refuge occurs approximately five miles west of the site. The nearest critical habitat unit designated by the USFWS is for desert tortoise (*Gopherus agassizii*), approximately 12.5 miles to the east of the site, on the eastern side of the Chocolate Mountains.

Two vegetation communities and land cover types were mapped within the study area during the general biological survey: disturbed habitat and urban/developed land. Disturbed habitat includes land cleared of vegetation (e.g., dirt roads); land containing a preponderance of non-native plant species, such as non-native grasses and forbs, ornamentals, or other weedy exotic species that take advantage of previously cleared disturbed land, or land showing signs of past or present usage that removes any capability of providing viable habitat. This includes areas that have been physically disturbed and are no longer recognizable as a native or naturalized vegetation association.

Within the study area, disturbed habitat includes the original earthen canal, the berm between the original and current canals, the graded area alongside the canals, the existing operations and maintenance road outside of CVWD fencing, and the gaps between canal sections. Most of this vegetation community was bare except for patches of short salt cedar (*Tamarisk* sp.) in the bottom of the original earthen canal in the northern half of the study area. Scattered Russian thistle (*Salsola tragus*) and very few native plants were present in the upper slopes of the original canal: burrobush (*Ambrosia salsola*), sweetbush (*Bebbia juncea* var. *aspera*), brittlebush (*Encelia farinosa*), and desert holly (*Atriplex hymenelytra*). Few, small patches of immature cattails

(*Typha* sp.), Mexican sprangle-top (*Leptochloa fusca* ssp. *uninervia*), and dock (*Rumex* sp.) were present in the original channel, generally near the artificial wildlife drinkers, which are human-made shallow lined ponds that provide an artificial water source for wildlife.

Urban/developed land includes land that has been constructed upon or otherwise physically altered to an extent that vegetation is no longer supported or limited to non-native ornamental plantings. Urban/developed land is characterized by permanent or semi-permanent structures, pavement or hardscape, and landscaped areas that often require irrigation. Areas where no natural land is evident due to a large amount of debris or other materials being placed upon it may also be considered developed. Within the study area, urban/developed land includes the existing lined portion of Coachella Canal, facilities, and the wildlife drinkers.

The study area is generally disturbed and does not provide high-quality habitat for animal species. Overall, animal activity during the general survey was very low. Animal species observed or otherwise detected in the study area consisted of four bird species: red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), American crow (*Corvus brachyrhynchos*), and black phoebe (*Sayornis nigricans*).

3.2.2 Environmental Consequences

Sensitive Biological Resources

Sensitive Natural Communities

For the purposes of this assessment, sensitive natural communities include land that supports federally listed endangered, threatened, and candidate species. USFWS-designated Critical Habitat is also included here as a sensitive community overlay type. The project site is composed of disturbed habitat and urban/developed land. Neither of these land cover types meets the definition of sensitive. No sensitive natural communities occur within the study area.

USFWS Critical Habitat

No USFWS-designated Critical Habitat occurs on or immediately adjacent to the project site. The nearest Critical Habitat is mapped for the federally threatened desert tortoise (*Gopherus agassizii*) approximately 12.5 miles east of the site, on the eastern side of the Chocolate Mountains (Attachment A).

Special-Status Plant and Animal Species

Special-Status Plant Species

Special-status plant species are those listed as federally threatened or endangered, or proposed candidates for listing by the USFWS. No special-status plant species were known to occur in the region (i.e., recorded within five miles of the study area, identified within the IPaC for the study area, and listed within the EIS/EIR for the CCLP), and no special-status plant species were observed during the general biological survey (Attachments C and I). The study area has poor habitat conditions for plant species. The study area is characterized by an existing roadway that is regularly used and maintained, a lined canal, the original earthen canal that was disturbed during construction of the lined canal and is no longer supplied by a water source, and disturbed washes crossing the project alignment (over the canal) that are not vegetated and are subject to vehicle disturbance and scouring. Construction of the canals and roadway, as well as ongoing disturbances (i.e., vehicle use and erosion), have modified the landscape, soil, and vegetation composition of the study area, such that the appropriate vegetation community makeups and hydrology regimes associated with special-status plant species do not exist. As such, additional focused and rare plant surveys are not warranted, and the project is anticipated to have no impact on special-status plant species.

Special-Status Animal Species

Special-status animal species are those listed as threatened or endangered, proposed for listing, or candidates for listing by the USFWS, and USFWS birds of conservation concern.

A total of 22 special-status animal species known to occur in the region (i.e., recorded within five miles of the study area, identified within the IPaC for the study area, and listed within the EIS/EIR for the CCLP), were evaluated for their potential to occur in the study area (Attachments C and J). Six of these species are federally endangered: desert pupfish (*Cyprinodon macularius*), razorback sucker (*Xyrauchen texanus*), bonytail chub (*Gila elegans*), least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii*), and Yuma Ridgway's rail (*Rallus obsoletus yumanensis*). Three of these species are federally threatened: desert tortoise (*Gopherus agassizii*), western snowy plover (*Charadrius 36lexandrines nivosus*), and yellow-billed cuckoo (*Coccyzus americanus*). One is a federal candidate species: monarch butterfly (*Danaus plexippus*).

No special-status animal species, including the nine federally listed species and candidate species, were observed during the general biological survey, and none of the 22 species evaluated have a moderate or high potential to occur within the study area. The potential for special-status animal species to occur within the study area is not likely or low due to development, poor habitat conditions for animals, and existing perimeter fencing. None were identified in the EIS/EIR for the Coachella Canal Lining Project as occurring within the study area.

The site is characterized by an existing roadway that is regularly used and maintained, a lined canal, the original earthen canal that was disturbed during construction of the lined canal and is no longer supplied by a water source, and disturbed washes crossing the project alignment (over the canal) that are not vegetated and are subject to vehicle disturbance and scouring. The road, canals, and washes provide limited opportunity for breeding, foraging, dispersal, and other life-history functions required by most animal species, although wildlife drinkers within the study area do provide access to water. The disturbances to the area have altered the vegetation, leaving limited shelter, breeding, and foraging opportunities for most animals.

Review of database search results of available special status species records reported from the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) confirm that there are no special status fish species records reported within the Coachella Canal. The search included the canal downstream, all the way to Indio, through the project reach and upstream to the U.S./Mexico border.

The only special status fish species reported to the area from historical occurrences appears to be the razorback sucker (Xyrauchen texanus), which is federally and State listed as endangered. The occurrences reported for sucker are not associated with the Coachella Canal and include an artificial impoundment known as Galleano Reservoir and historic occurrence (1974) from the East Highline Canal and associated ponds over 5.0 miles from the site. There are no records of the razorback sucker reported for the Coachella Canal. The Bureau of Reclamation's Record of Decision from 2002 for the canal lining project concluded that the species is presumed absent and highly unlikely to occur.
(See: http://www.riversimulator.org/Resources/LawOfTheRiver/HooverDamDocs/Supplements/2002RecordOfDecisionCoachellaCanalLiningProject.pdf).

Fish species reported from available fishing websites include common carp (Cyprinus carpio), flathead catfish catfish (*Pylodictis olivaris*), channel catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmoides*), and striped bass (*Morone saxatilis*). (Sources: www.fishbrain.com/fishing-reports, and www.bdoutdoors.com). All

are non-native, warmwater (game) fishes that are not afforded any special status or protections other than requiring a license/permit for capture (fishing license). No mitigation for these species is required.

Desert pupfish and razorback sucker are not likely to occur given that the canal is lined and lacks substrate for these species, and these species are not known to occur in the Coachella Canal. The lined canal is also unsuitable for the bonytail chub, which is restricted to the Colorado River System and hatchery populations. Least Bell's vireo, southwestern willow flycatcher, Yuma Ridgway's rail, and yellow-billed cuckoo are also not likely to occur due to lack of riparian habitat on or adjacent to the study area. The study area lacks beaches, dunes, and salt flats, which are habitat for western snowy plover. Monarch butterfly is not likely to occur due to the lack of tree groves and host plants (milkweed).

The desert tortoise was the only species evaluated as having a low potential to occur in the study area due to the presence of marginal habitat outside of canal fencing. These areas are where check structures allow canal water to flow beneath desert washes. These open areas have been subjected to previous disturbance from the construction of the original canal and the canal lining project, as well as ongoing disturbance from vehicles traveling between the existing operations and maintenance road (Gas Line Road) and Coachella Canal Road, and erosion. Vegetation is lacking in both the washes and on the operations and maintenance road to the east of the canals. The other portions of the study area are fenced, which would act as a barrier to desert tortoise. Areas compacted and/or lined for the canal are presumably unsuitable for tortoise. Although desert tortoise may occur in washes, the extensive disturbance in these areas significantly degrades the habitat conditions for the species and makes it unlikely that tortoise individuals would sustain on the site. Additionally, the study area occurs approximately 3.2 miles outside of this species' range. As such, additional focused and protocol-level surveys are not warranted, and the project is anticipated to have no impact on special-status animal species.

Nesting Birds and Raptors

Limited portions of the study area contain marginal nesting habitat (e.g., saltcedar shrubs, potential fossorial burrows, structures) for several common bird species, including raptors, protected under the MBTA. Nesting birds with potential to nest on or immediately adjacent to the site include common passerines (i.e., songbirds), such as black-tailed gnatcatcher (*Polioptila melanura*) and comment raptors (i.e., birds of prey), such as red-tailed hawk (*Buteo jamaicensis*).

Jurisdictional Waters and Wetlands

In the context of this assessment, jurisdictional waters and wetlands include waters of the U.S., including wetlands, regulated by the USACE pursuant to CWA Section 404. The current project occurs within the area previously evaluated for the Coachella Canal Lining Project (Reclamation and CVWD 2001). As part of the canal lining project' EIS/EIR analysis, the biological workgroup coordinated with the USACE and U.S. Environmental Protection Agency regarding the potential effect of the canal lining project on aquatic resources. At the conclusion of that process, the USACE advised Reclamation of its determination that the CCLP was not subject to its jurisdiction under Section 404 of the CWA. The USACE would have therefore made a jurisdictional determination that the Coachella Canal does not represent waters of the U.S. and that they do not regulate activities within the Coachella Canal pursuant to CWA Section 404.

The current regulatory guidance on the CWA Section 404 follows that which pre-dates the 2015 guidance. The CCLP was evaluated under the pre-2015 regulatory regime before the Navigable Waters Protection Rule of 2020 was adopted. On August 30, 2021, a court order in the case of *Pascua Yaqui Tribe v. U.S. Environmental Protection Agency* vacated and remanded the Navigable Waters Protection Rule. In October

2021, the U.S. District Court of the Northern District of California vacated the EPA's 2020 Clean Water Act Section 401 Certification Rule, which once again reinforced a return to a pre-2015 regulatory regime to be more consistent with the statutory text of the 1972 CWA (EPA 2022). Finally, on April 6, 2022, the U.S. Supreme Court issued a stay of the October 2021 order that applies nationwide; therefore, the current interpretation of waters of the U.S. is once again consistent with the pre-2015 definition (EPA 2021).

Guidance on the interpretation of the waters of the U.S. definition occurred subsequent to the CCLP, following multiple court cases. In 2001 and again in 2003, the agencies developed guidance to address the definition of "waters of the United States" under the CWA following the *Solid Waste Agency of Northern Cook County* (S*WANCC)* Supreme Court decision. This guidance indicates that CWA jurisdiction should not be asserted over isolated waters that are both intrastate and non-navigable, where the sole basis available for asserting CWA jurisdiction rests on any of the factors listed in the ''Migratory Bird Rule.'' CWA jurisdiction should be asserted over traditional navigable waters (and adjacent wetlands) and their tributary systems (and adjacent wetlands).

In 2007 and 2008 subsequent to the *Rapanos v. United States*, and *Carabell v. United States* Supreme Court decisions (Rapanos), the USACE and EPA provided additional guidance for implementing the definition of "waters of the United States" under the CWA. Guidance following SWANCC and Rapanos is not expected to change the regulatory framework for the USACE's previous determination on the Coachella Canal.

As it still stands, the Coachella Canal is an artificially created, serviceable facility created wholly within uplands. It is a controlled system whereby flows are regulated, and the entire system can be manipulated for the delivery of water for storage and distribution. It was not constructed to collect or convey natural flows. As such, it does not meet the definition of a relatively permanent water or tributary to a relatively permanent water. It also does not meet the definition of a traditional navigable water. Therefore, the Coachella Canal still does not meet the definition of waters of the U.S. and activities associated with the proposed project would not be expected to be regulated by the USACE pursuant to Clean Water Act Section 404.

Based on the current regulatory guidance, the Coachella Canal still does not represent waters of the U.S. and the proposed project's activities would not be regulated by the USACE pursuant to CWA Section 404.

Wildlife Corridors and Linkages

Wildlife corridors connect isolated habitat and allow the movement or dispersal of plant materials and animals. Local wildlife corridors allow access to resources such as food, water, and shelter within the framework of the wildlife's daily routine and life history. For example, animals can use these corridors to travel between their riparian breeding habitats and their upland burrowing habitats. Regional corridors provide these functions over a larger scale and link two or more large habitat areas, allowing the dispersal of organisms and the consequent mixing of genes between populations. A corridor is a specific route that is used for the movement and migration of species; it may be different from a linkage in that it represents a smaller or narrower avenue for movement. A linkage is an area of land that supports or contributes to the long-term movement of animals and genetic exchange by providing live-in habitat that connects to other habitat areas. Many linkages occur as stepping-stone linkages that are made up of a fragmented archipelago arrangement of habitat over a linear distance.

No known wildlife corridors or linkages are documented within the study area, as none were described in the EIS/EIR for the CCLP, which encompasses the project area, and the study area occurs to the south of the Coachella Valley MSHCP. Nevertheless, the canal and/or its wildlife drinkers are water sources that may attract wildlife. The canal may allow for the movement of fish, as filtration systems for the canal do not

exclude small fish from the canal. While the canal may allow for the movement of some wildlife up and down the canal, the canal and its surrounding fencing provide a physical barrier to most wildlife crossing the canal. Any wildlife moving toward the canal would either be deflected by the canal or pass through the gaps at the check structures. Construction of the proposed project is anticipated to take approximately a year, with interruptions to the canal flow to occur for two to three days. Thus, except for a short disruption in water flow during construction, none of these conditions would change because of the proposed project. Access to water would be retained on the east side of the canal during construction where wildlife drinkers are impacted by the proposed project. As a BMP during construction, temporary fencing will be placed between these temporary water sources and the project, to screen work activities from wildlife seeking to use water sources. Additionally, the completed project would retain wildlife access to water. Thus, the project site does not by itself serve as or contribute to any known or potential corridors or linkages.

Based on the findings of this biological assessment, activities affecting the biological resources determined to exist or have the potential to exist within the project site could be subject to the federal regulations discussed below.

Federal Endangered Species Act

Administered by the USFWS, the federal Endangered Species Act (ESA) provides the legal framework for the listing and protection of species identified as being endangered or threatened with extinction. Actions that jeopardize such species and their habitats are considered a "take" under the federal ESA.

Sections 7 and 10(a) of the federal ESA regulate actions that could harm or harass endangered or threatened species. Section 10(a) allows issuance of permits for "incidental" take of endangered or threatened species. The term "incidental" applies if the taking of the listed species is secondary to, and not the purpose of, an otherwise lawful activity. A conservation plan demonstrating how the take will be minimized and what steps taken would ensure the listed species' survival must be submitted for the issuance of Section 10(a) permits. Section 7 describes a process of federal interagency consultation for use when federal actions may adversely affect a listed species. A biological assessment is required for any major activity if it may affect listed species.

Migratory Bird Treaty Act

All migratory bird species that are native to the United States or its territories are protected under the federal MBTA as amended under the Migratory Bird Treaty Reform Act of 2004 (Federal Record [FR] Doc. 05-5127). The MBTA is generally protective of migratory birds but does not actually stipulate the type of protection required. In common practice, USFWS places restrictions on disturbances allowed near active raptor nests.

This section provides an analysis of the potential project effects relevant to against federal policy issues.

No Action Alternative

Under the No Action Alternative, the storage reservoir would not be constructed in this segment of the Coachella Canal, and there would be no new impacts to the biological resources discussed above. Annual inspection and repair operations would continue to occur, including mobilization and demobilization of construction equipment including 2 to 3 pickup trucks, a concrete truck, a crane for placement of coffer dams, a grader and excavator, and a roller for grooming the side slopes. Typical repair operations require use of this equipment for a period of 6 to 8 weeks annually.

Proposed Action

ISSUE 1: Federal Endangered Species Act, Section 7

Does the project involve any direct effects from construction activities, or indirect effects such as growth inducement that may affect federally listed threatened or endangered species or their critical habitat that are known, or have a potential, to occur on site, in the surrounding area, or in the service area?

No Effect. The project has been specifically sited and designed to occur primarily within the disturbed and developed footprint of the original and lined Coachella Canal, an existing operations and maintenance road for the reservoir, and along the outer ROW of existing roads for the electrical circuit. Federally listed species are also not expected to occur in these areas due to lack of suitable habitat, poor quality habitat conditions, range restrictions, and lack of observations (during HELIX's general biological survey and analysis conducted for the EIS/EIR for the CCLP). The heavy clays that cause the concrete panel cracking are dense and do not produce seepage losses that would contribute to downslope habitat conditions that could support endangered species. As such, no effect on federally listed threatened or endangered species is anticipated. Last, no portion of the action area occurs on or in the vicinity of USFWS-designated Critical Habitat; no adverse modification or other effects would occur. Additional analysis is provided below to support the no-effect recommendation.

Federally Listed Plant Species

No Effect. No federally listed endangered (FE) and federally listed threatened (FT) plant species were analyzed for their potential to occur. None were known to occur in the region (i.e., recorded within five miles of the study area, identified within the IPaC for the study area, and listed within the EIS/EIR for the CCLP). Therefore, no adverse direct or indirect effects on federally listed plant species are anticipated to occur as a result of the proposed action.

Federally Listed Animal Species

No Effect. The following federally listed endangered (FE), federally listed threatened (FT), and federal candidate endangered (CE) animal species were analyzed for their potential to occur:

- desert pupfish (*Cyprinodon macularius*) – FE
- razorback sucker (*Xyrauchen texanus*) – FE
- bonytail chub (*Gila elegans*) – FE
- desert tortoise (*Gopherus agassizii*) – FT
- Least Bell's vireo (*Vireo bellii pusillus*) – FE
- southwestern willow flycatcher (*Empidonax traillii extimus*) – FE
- western snowy plover (*Charadrius alexandrinus nivosus*) – FT
- yellow-billed cuckoo (*Coccyzus americanus*) – FT
- Yuma Ridgway's rail (*Rallus obsoletus yumanensis*) -FE
- monarch butterfly (*Danaus plexippus*) – CE

None of these ten federally listed and candidate species were observed in the study area during the general biological survey or identified as occurring within the study area in the EIS/EIR for the Coachella Canal Lining Project. None have the potential to occur within the project site due to poor habitat conditions for animals. As mentioned, the site is characterized by the existing lined Coachella Canal, the original canal that is no longer supplied with water, bare disturbed washes between the canal segments that are subject to vehicle disturbance and scouring, an existing operations and maintenance road that is regularly used and maintained, and existing roads that extend to the canal and then parallel the canal. These provide limited

opportunity for breeding, foraging, dispersal, and other life-history functions required by most animal species. The disturbances to the area have altered the vegetation, resulting in limited shelter, breeding, and foraging opportunities for most animals.

Desert pupfish and razorback sucker are not likely to occur given that the canal is lined and lacks substrate for these species, and these species are not known to occur in the Coachella Canal. The lined canal is also unsuitable for the bonytail chub, which is restricted to the Colorado River System and hatchery populations. Least Bell's vireo, southwestern willow flycatcher, Yuma Ridgway's rail, and yellow-billed cuckoo are also not likely to occur due to lack of riparian habitat on or adjacent to the study area. The study area lacks beaches, dunes, and salt flats, which are habitat for western snowy plover. Monarch butterfly is not likely to occur due to a lack of tree groves and host plants (milkweed).

Desert tortoise has low potential to occur in the study area. Although this species may occur in washes, there is historical and ongoing disturbance where the washes cross the study area between canal segments. These areas were disturbed by the construction of the canal and the CCLP and are subject to vehicle traffic between the existing operations and maintenance road (Gas Line Road) and Coachella Canal Road. The current range of tortoise occurs approximately 3.2 miles to the northeast of the study area. Therefore, the species is presumed to be absent from the action area and no effect on the species is anticipated.

Critical Habitat

No Effect. No USFWS-designated Critical Habitat occurs on or immediately adjacent to the project site. As such, no adverse modification or other effects would occur. The nearest Critical Habitat is mapped for the federally threatened desert tortoise approximately 12.5 miles east of the site, on the eastern side of the Chocolate Mountains.

ISSUE 2: Magnuson-Stevens Fishery Conservation and Management Act, Essential Fish Habitat

Does the project involve any direct effects from construction activities, or indirect effects such as growth inducement that may adversely affect essential fish habitat?

No Effect. The proposed project would be constructed within areas that lack marine resources and Essential Fish Habitat regulated under the Magnuson-Stevens Fishery Conservation and Management Act project (National Oceanic and Atmospheric Administration 2022). Therefore, the proposed project would not adversely affect Essential Fish Habitat and would be in conformance with the Magnuson-Stevens Fishery Conservation and Management Act.

ISSUE 3: Coastal Zone Management Act

Is any portion of the project site located within the coastal zone?

No Effect. No portion of the project site is located within the coastal zone (California Coastal Commission 2019). Therefore, the proposed project would have no effect on resources protected under the Coastal Zone Management Act.

ISSUE 4: Migratory Bird Treaty Act

Will the project affect protected migratory birds that are known, or have a potential, to occur on site, in the surrounding area, or in the service area?

No Effect. Compliance with the MBTA is a regulatory requirement of the project. Although only sparse vegetation is present within the project site, primarily in portions of the original earthen canal, construction of the project may require the removal of vegetation during the general passerine breeding season of

February 1 to August 31 (January 15 to July 15 for raptors). If avoidance measures are not implemented, these activities could directly and adversely affect an active nest in violation of the MBTA. Similarly, if avoidance measures are not implemented, the activities could indirectly and adversely affect an active nest during construction because of noise, such that the disturbance results in nest abandonment or nest failure. With the implementation of mitigation measure BIO-1 shown in section 3.2.3 below, the proposed action would have no effect on nesting birds, and the project would be in conformance with the MBTA.

ISSUE 5: Protection of Wetlands

Does any portion of the project boundaries contain areas that should be evaluated for wetland delineation or require a permit from the USACE?

No Effect. The proposed project consists of the modification of an existing canal that is an artificially created, serviceable facility created wholly within uplands, which crosses multiple desert washes. This section of the canal was not determined to be USACE jurisdictional when evaluated for the CCLP, and current regulatory guidance on the CWA Section 404 follows the same pre-2015 regulatory regime. Therefore, the project would have no impact on federally protected wetlands as defined by Section 404 of the federal CWA.

ISSUE 6: Wild and Scenic Rivers Act:

Is any portion of the project located within a wild and scenic river?

No Effect. None of the proposed project components are planned on or in the immediate vicinity of areas designated as Wild and Scenic Rivers (National Wild and Scenic Rivers System 2022). Therefore, the proposed project would result in no effects on any areas designated as Wild and Scenic Rivers and would be in conformance with the Wild and Scenic Rivers Act.

3.2.3 Management and Mitigation Measures

Compliance with the MBTA is a regulatory requirement. Mitigation measure BIO-1 shall be implemented as a condition of approval to ensure that no impacts occur to nesting birds. Mitigation Bio-2 requires development and implementation of a Worker Environmental Awareness Program (WEAP) to ensure that all workers on site are trained to protect biological resources.

MM-BIO-1: Preconstruction Surveys for Nesting Birds

Nesting bird surveys shall be performed by a qualified avian biologist no more than 3 days prior to vegetation removal or ground-disturbing activities. Pre-construction surveys shall focus on both direct and indirect evidence of nesting, including nest locations and nesting behavior. The qualified avian biologist will make every effort to avoid potential nest predation as a result of survey and monitoring efforts. If active nests are found during the pre-construction nesting bird surveys, a qualified biologist shall establish an appropriate nest buffer to be marked on the ground. Nest buffers are species specific and shall be at least 300 feet for passerines and 500 feet for raptors. A smaller or larger buffer may be determined by the qualified biologist familiar with the nesting phenology of the nesting species and based on nest and buffer monitoring results. Established buffers shall remain on-site until a qualified biologist determines the young have fledged or the nest is no longer active. Active nests and adequacy of the established buffer distance shall be monitored daily by the qualified biologist until the qualified biologist has determined the young have fledged or the Project has been completed. The qualified biologist has the authority to stop work if nesting pairs exhibit signs of disturbance.

No less than 60 days prior to the start of Project-related activities, a burrowing owl habitat assessment shall be conducted by a qualified biologist according to the specifications of the *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game, March 2012 or most recent version).

If the habitat assessment demonstrates suitable burrowing owl habitat, then a focused burrowing owl surveys shall be conducted by a qualified biologist according to the Staff Report on Burrowing Owl Mitigation. If burrowing owls are detected during the focused surveys, the qualified biologist shall provide appropriate distances for construction activity to stay away from occupied burrows, through the use of a no work zone or avoidance buffer. Biologist shall ensure If impacts to occupied burrows cannot be avoided, information shall be provided regarding adjacent or nearby suitable habitat available to owls along with proposed relocation actions. Proposed implementation of Burrowing Owl relocation should only be considered as a last resort, after all other options have been evaluated as relocation is not in itself an avoidance, minimization, or mitigation method and has the possibility to result in take. Prior to considering burrowing owl relocation the qualified biologist and project applicant shall consult with CDFW to confirm the location and determine if the Burrowing Owls are appropriate candidates for the relocation process. If no suitable habitat is available nearby, details regarding the creation of artificial burrows (numbers, location, and type of burrows) and management activities for relocated owls is to be reported to CDFW.

Preconstruction burrowing owl surveys shall be conducted no less than 14 days prior to the start of Project-related activities and within 24 hours prior to ground disturbance, in accordance with the Staff Report on Burrowing Owl Mitigation (2012 or most recent version). Preconstruction surveys should be performed by a qualified biologist following the recommendations and guidelines provided in the Staff Report on Burrowing Owl Mitigation. If the preconstruction surveys confirm occupied burrowing owl habitat, the qualified biologist shall develop a mandatory avoidance buffer and no work zones around the burrow location. If work must occur within the avoidance buffer, the qualified biologist will monitor the activity to ensure it does not affect the Burrowing Owl behavior. The qualified biologist will also consider the placement of visual and sound barriers if the avoidance buffer perimeter is reduced until adequate measures to prevent impacts to owls are put in place.

Mitigation measure BIO-1 would ensure no impacts to nesting birds occur pursuant to regulatory requirements.

MM BIO-2: Worker Environmental Awareness Program

A Worker Environmental Awareness Program (WEAP) shall be implemented to ensure that Project construction occurs within a framework of safeguarding environmentally sensitive resources. The WEAP shall include information on biological resources that may occur on the site, with emphasis on listed and special-status species. Education shall include, but not be limited to, ecology, natural history, endangerment factors, legal protection, site mitigation measures, and hierarchy of command. Site rules of conduct shall be identified, including but not limited to: speed limits, work areas that must be accompanied by a biological monitor, parking areas, looking under parked vehicles prior to moving them, trash deposition, off-site conduct in the area of the Project, and other employee response protocols. Teamwork will be emphasized, but it will be clear that willful non-compliance may result in sufficiently severe penalties to the contractor that the contractor may dismiss the offending employee.

The educational format will be a video, shown initially by the Project Biologist, and subsequently if needed for new employees, by trained and approved personnel. The Project Biologist also may be videotaped giving the first program, for assistance to subsequent instructors. All workers completing the education program

shall be given a wallet card with site "rules" and contact cell phone numbers, and a sticker to affix to their hard hat. Each shall sign a sheet attesting to completing the training program.

Mitigation measure BIO-2 would ensure no impacts to environmentally sensitive resources pursuant to regulatory requirements.

3.3 Cultural Resources

HELIX Environmental Planning, Inc. (HELIX) was contracted to prepare a cultural resources assessment for the Mid-Canal Storage Project (project). The Project's Area of Potential Effect (APE) is defined as the approximately 120-acre project area that contains the existing canal right-of-way (ROW), including the fence line on the western perimeter and the existing operations and maintenance (O&M) road just outside the fence line on the eastern side, an existing staging area near the northern end of the project developed for the 2006 canal lining project, and the existing and regularly used County road that parallels the canal. The intent of this assessment was to determine the potential ground disturbances associated with this project to affect historic properties (i.e., significant cultural resources).

The results of this assessment, which addresses both historic-era and prehistoric resources, is based on the results of an archival records search and research, Sacred Lands File search, Native American coordination, a site visit to the proposed project area, and an assessment of the significance of impacts to archaeological resources and historic-era structures. The report details the methods and results of the cultural resources study and has been prepared to comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. The full report is included as an appendix to this EA and is summarized below. Reclamation will complete consultation with the California SHPO and government-to-government consultation with Native American tribes under Section 106 prior to project authorization.

The electrical circuit route was unknown at the time the original survey was conducted. Therefore, a supplemental records search was undertaken and a site visit was performed by the Archaeological Project Manager on February 10, 2023, to determine the potential to impact significant cultural resources during construction of the proposed utility line. As a result of the site visit, it was determined that placement of the utility poles within the previously disturbed portions of English Road and Coachella Canal Road will serve to avoid impacts to significant cultural resources. A records search in preparation by the South Coastal Information Center will be utilized to ensure no previously recorded sites will be impacted by the proposed work and will also inform upon the sensitivity of the areas proposed for excavation, which will be limited to augured borings to accommodate utility poles. So long as the work is limited to previously graded areas within the ROW of the existing roads, the assessment concluded that the potential to impact significant cultural resources sites should be considered extremely low.

3.3.1 Affected Environment

Cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, and/or scientific importance. Significant resources are those resources that have been found eligible to the National Register of Historic Places (NRHP).

An archaeological records search, conducted at the South Coastal Information Center (SCIC) on December 07, 2021, indicated that 20 previous cultural resource studies occur within the records search limits, four of which overlap with the project area. The studies consist of cultural resource reviews, environmental impact reports, a biological survey, a mining and reclamation plan, resource inventory and evaluation reports, a

historic and archaeological resources protection (HARP) plan, archaeological and cultural resources surveys, history of local development, and a consultation report. The records search results also indicated that a total of 22 cultural resources have been previously recorded within one-half mile of the project area; one of which has been documented within the project site (P-13-007858/33-005705). P-13-007858/P-33-005705 is the National Register of Historic Places-eligible Canal, which was constructed between 1938 and 1948.

The field investigations included a site visit of the study area by a HELIX archaeologist, architectural historian, and a Native American monitor and Tribal Archaeologist from the Agua Caliente Band of Cahuilla Indians on January 6, 2022. The site visit did not result in the identification of any cultural material within the project area. However, the Canal itself is a historic property that is both an archaeological and historic built environment resource; it is eligible for, but not listed in, the National Register of Historic Places (NRHP).

Based on the results of the current study, the Mid-Coachella Canal Storage Project will have no adverse effect on historic properties. While the proposed work will essentially redesign the portion of the canal within the project area, the work is limited to the removal of an embankment between the original, unlined Coachella Canal and a parallel canal constructed when the original canal was lined in 2006. No historic features contributing to the significance of the Canal will be impacted by the work. The infilling of the unlined, old canal with water will serve to restore this portion of the feature to a use mirroring its original purpose as a water conveyance feature. Re-inundating the portion of the unlined canal will also help to preserve the portion of the unlined old canal between siphons 11 and 14, which is currently abandoned.

Regulatory Framework

National Historic Preservation Act

Federal regulations that would be applicable to the project consist of the National Historic Preservation Act (NHPA) and its implementing regulations (16 United States Code 470 et seq., 36 Code of Federal Regulations [CFR] Part 800). Section 106 of the NHPA requires Federal agencies to account for the effects of their undertakings on "historic properties", that is, properties (either historic or archaeological) that are eligible for the NRHP. To be eligible for the NRHP, a historic property must be significant at the local, state, or national level under one or more of the following four criteria:

1. associated with events that have made a significant contribution to the broad patterns of our history;
2. associated with the lives of persons significant in our past;
3. embodies the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; and/or
4. has yielded, or may be likely to yield, information important in prehistory or history.

Under Section 106 of the NHPA, actions that alter any of the characteristics that qualify a property for eligibility for listing in the NRHP "in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association" (36 CFR 800.5[a]) constitute an adverse effect to the historic property.

All resources that are eligible for listing in the NRHP must have integrity, which is the authenticity of a historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance. Resources, therefore, must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling,

and association. In an archaeological deposit, integrity is assessed with reference to the preservation of material constituents and their culturally and historically meaningful spatial relationships. A resource must also be judged with reference to the particular criteria under which it is proposed for nomination.

In accordance with the National Park Service, projects that comply with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* and *Secretary's Guidelines for Rehabilitation* (SOIS) are projects that retain the historic integrity of a resource. A project that complies with the SOIS is generally considered to be a project that will not cause a significant adverse impact to a historical resource.

The goal of the SOIS is to outline treatment approaches that allow for the retention of and/or sensitive changes to the distinctive materials and features that lend a historical resource its significance. The SOIS offer general recommendations for preserving, maintaining, repairing, and replacing historical materials and features. These standards also provide guidelines for rehabilitation, to facilitate designing and making alterations in order to ensure that there are no adverse impacts to historic properties.

Native American Heritage Values

Federal laws mandate that consideration be given to the concerns of contemporary Native Americans with regard to potentially ancestral human remains, associated funerary objects, and items of cultural patrimony. Consequently, an important element in assessing the significance of the study site has been to evaluate the likelihood that these classes of items are present in areas that would be affected by the proposed project.

Potentially relevant to prehistoric archaeological sites is the category termed Traditional Cultural Properties (TCP) in discussions of cultural resource management performed under federal auspices. According to Patricia L. Parker and Thomas F. King (1998), "Traditional" in this context refers to those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice. The traditional cultural significance of a historic property, then, is significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices. Cultural resources can include TCPs, such as gathering areas, landmarks, and ethnographic locations, in addition to archaeological districts. Generally, a TCP may consist of a single site, or group of associated archaeological sites (district or traditional cultural landscape), or an area of cultural/ethnographic importance.

3.3.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, construction of the new water storage reservoir would not take place and no new actions would occur that could result in adverse effects on cultural resources. Annual inspection and repair operations would continue to occur, including mobilization and demobilization of construction equipment for repair operations that extend for a period of 6 to 8 weeks annually. These operations do not involve excavation that could encounter subsoil layers beneath the canal that have not already been disturbed by past earthwork activities associated with completion of the CCLP and do not have the potential to result in adverse effects on cultural resources.

Proposed Action

Archaeological Resources

The entire APE has been disturbed by the development of the original Canal in the 1930s and 1940s, construction of the CCLP in the 2000s, and development of English Road and the Coachella Canal Road segments along which the electrical circuit will extend. Construction activities would have obliterated

archaeological sites present within the areas trenched or otherwise disturbed during canal development. However, the project is situated along the high-water shoreline of prehistoric Lake Cahuilla, which would have attracted humans prehistorically in this arid portion of the desert. Considerable evidence exists for prehistoric use of the area along the lake margins, predominantly in the form of habitation sites with associated fish bone (York n.d.).

The records search from SCIC identified 22 previously recorded cultural resources within a one-half-mile radius of the project; these consist of 16 prehistoric archaeological resources, four historic resources (including the Canal), one multi-component site, and one site of undetermined age. Of these sites, five are documented prehistoric habitations showing signs of considerable use, all of which were identified and documented during surveys and none of which has been evaluated for significance. While surface manifestations of archaeological resources may not be present within the project area, the project location along the high-water shoreline of Lake Cahuilla also indicates there is a potential for buried sites to occur along former shorelines used by humans as the lake receded. Further, while none of the prehistoric habitations have been excavated to date, the documentation prepared for the sites does mention the potential for buried deposits to occur. As such, the potential exists for intact cultural resources to be present within the undisturbed soils of the middle embankment between the original and the lined Canal that will be removed to create the reservoir.

The Coachella Canal is both an archaeological site and historic built environment resource. It should be noted that the prior replacement of the earthen Coachella Canal, which included dewatering of the trench that forms the canal, has the potential to affect the integrity of the site. Between wind and water erosion, the potential exists that over time, the unlined sand trench that makes up the original Coachella Canal will continue to be filled in while the slopes grading into the feature erode. As time passes, visible manifestations of the Canal may be slowly erased from the landscape. The introduction of water back into this portion of the Canal as a result of the project will restore this portion of the site to a use more consistent with its original purpose and will also preserve the integrity of the feature over time.

Historic Resources

The old Coachella Canal was formally determined eligible for the NRHP under Criterion A in 2004 for the part it played in bringing water for the development of agriculture in the Imperial and Coachella valleys. It was not determined eligible under Criterion C as a good example of an early-twentieth-century irrigation canal with distinctive characteristics of canal construction. Thus, the Canal's significance is at the broader level of contributions to the region's development history rather than for any physical features that are distinctive to canal construction. The portion of the canal that will be affected by the Project was dewatered and replaced by a parallel, lined canal segment completed with the CCLP in 2006. The only intact portions of the old canal that remain in the project area are the embankment separating it from the newer lined canal and on the east side, as well as the bottom of the canal.

The Canal continues to be a water conveyance resource and has been modified over time to ensure it is effective for that purpose; the current project intends to ensure efficient operation of the Canal. Therefore, the proposed further modifications to physical features of the Canal, which will remove the middle embankment and add material to the easterly embankment to provide water storage reservoir cells do not have the potential to adversely affect the NRHP eligibility of the Coachella Canal. This section of the original canal will once again be utilized for water conveyance and storage that will allow it to function in a manner more consistent with its historic use.

3.3.3 Management and Mitigation Measures

While no prehistoric archaeological or Native American cultural resources have been identified within the project area, the potential exists for sites to be uncovered when the project is developed in undisturbed soils. Because the original canal was built prior to the existence of CEQA and NHPA, no archaeological study was performed prior to its construction. Numerous archeological resources are documented within a one-half-mile radius of the project, including well-developed prehistoric habitation sites, three prehistoric trail segments, two sites made up of cleared circles, and numerous artifact scatters. In addition, the Canal is situated near the high-water shoreline of Lake Cahuilla, an area known for prehistoric archaeological resources associated with the use of the lake, primarily for fishing. As such, the potential exists that cultural deposits remain buried within the embankment separating the two canals. In addition, while no Native American cultural resources have been identified within the project area, there are important cultural resources within one-half mile of the project, including five prehistoric habitations.

Subsurface construction activities, such as grading associated with the project, have the potential to damage or destroy previously undiscovered archaeological resources or TCRs, resulting in a potentially significant impact. Archaeological resources can include both prehistoric and historic features and artifacts; tribal cultural resources may be archaeological in nature but have cultural significance that may not be obvious to the archaeologist or non-Native American observer. TCRs can also include cultural landscapes or other non-archaeological resources.

Due to this potential, it is recommended that a cultural resource monitoring program be implemented during grading or other ground- disturbing activities. The monitoring program would include attendance by the archaeologist at a pre-construction meeting with the grading contractor and the presence of archaeological monitors during initial ground-disturbing activities in undisturbed soils of the project site. Archaeological monitors would have the authority to temporarily halt or redirect grading and other ground-disturbing activity if cultural resources are encountered. If significant cultural material is encountered, the project archaeologist will coordinate with Reclamation staff to develop and implement appropriate site-specific treatment measures (e.g., avoidance, data recovery, capping).

The existing staging area near the northern end of the project, a portion of which is still in use as an equipment storage yard by CVWD, was developed for the canal lining project; it has been graded and maintained. No archaeological sites have been identified within this portion of the project. Because no ground disturbance is proposed for the staging area, no further archaeological study of this portion of the project is warranted.

Existing rock rubble piles located along the west side of the Canal ROW, north of the project site at Check 24, were placed in their location during the CCLP and are not a part of the original canal construction nor do they serve as a feature of the Canal. No additional study of this portion of the project is necessary.

Inadvertent Discoveries

In the event that cultural resources are exposed during ground-disturbing activities, construction activities (e.g., grading, grubbing, or vegetation clearing) will be halted in the immediate vicinity of the discovery. An archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards will be retained to evaluate the find's significance under Section 106 of the NHPA. If the discovery proves to be significant, the requirements of 36 CFR 800.13 for post-review discoveries of historic properties on federal land will be followed.

Discovery of Human Remains

Although there is no evidence to suggest the presence of human remains in the project area, their discovery is always a possibility during project construction. If such an event did occur, immediate telephone notification with written confirmation to the responsible Reclamation official must occur. If the discovery occurs in connection with an ongoing activity on Federal lands, the activity in the area of the discovery must stop. Additionally, the specific procedures outlined in 43 CFR Title 10.4 (d) of the Native American Graves Protection and Repatriation Act (NAGPRA) must be followed:

1. As soon as possible, but no later than three working days after receipt of the written confirmation of notification with respect to Federal lands described in § 10.4 (b), the responsible Federal agency official must:
   a. Certify receipt of the notification;
   b. Take immediate steps, if necessary, to further secure and protect inadvertently discovered human remains, funerary objects, sacred objects, or objects of cultural patrimony, including, as appropriate, stabilization or covering;
   c. Notify any known lineal descendants of a deceased Native American individual whose human remains and associated funerary objects were discovered of such discovery, and, with respect to a discovery of human remains, associated funerary objects, unassociated funerary objects, sacred objects, or objects of cultural patrimony, notify the Indian tribes or Native Hawaiian organizations likely to be culturally affiliated with the cultural items, the Indian tribe or Native Hawaiian organization that aboriginally occupied the area, and any other Indian tribe or Native Hawaiian organization known to have a cultural relationship to the cultural items. This notification must be by telephone with written confirmation and must include information about the kinds of human remains, associated funerary objects, unassociated funerary objects, sacred objects, or objects of cultural patrimony, their condition, and the circumstances of their discovery;
   d. Initiate consultation on the inadvertent discovery pursuant to § 10.5;
   e. If the human remains, funerary objects, sacred objects, or objects of cultural patrimony must be excavated or removed, follow the requirements and procedures in § 10.3 (b) of these regulations; and
   f. Ensure that disposition of all inadvertently discovered human remains, funerary objects, sacred objects, or objects of cultural patrimony is carried out following § 10.6.
2. Resumption of activity. The activity that resulted in the inadvertent discovery may resume 30 days after certification by the notified Federal agency of receipt of the written confirmation of notification of inadvertent discovery if the resumption of the activity is otherwise lawful. The activity may also resume, if otherwise lawful, at any time that a written, binding agreement is executed between the Federal agency and the affiliated Indian tribes or Native Hawaiian organizations that adopt a recovery plan for the excavation or removal of the human remains, funerary objects, sacred objects, or objects of cultural patrimony following § 10.3 (b)(1) of these regulations. The disposition of all human remains, funerary objects, sacred objects, or objects of cultural patrimony must be carried out following §10.6.

These requirements and development and implementation of a corresponding WEAP for Cultural Resources are specified in mitigation measures Cul-1-3.

MM CUL-1: Cultural Resources Worker Environmental Awareness Program Training

A Worker Environmental Awareness Program (WEAP) shall be implemented to ensure that Project construction occurs within a framework of safeguarding environmentally sensitive resources. The WEAP shall include information on cultural resources that may occur on the site, including the types and forms of artifacts

that occur in the region. Education shall include, but not be limited to, legal protection, site mitigation measures, the actions that must be taken should cultural finds be made, and the hierarchy of command.

The educational format will be a video, shown initially by the Principal Investigator or their assignee, and subsequently if needed for new employees, by trained and approved personnel. The Principal Investigator or their assignee also may be videotaped giving the first program, which can then be presented to new arrivals to the project. All workers completing the education program shall be given a wallet card with site "rules" and contact cell phone numbers, and a sticker to affix to their hard hat. Each shall sign a sheet attesting to completing the training program. All site workers will be required to complete the training prior to accessing the project.

MM CUL-2: Unanticipated Discovery of Cultural Resources

In the event that cultural resources are unearthed during project construction, CVWD's construction inspector and/or a project archaeologist shall temporarily suspend all earth disturbing work within a 100-foot radius of the discovery. A qualified professional archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards for prehistoric and historic archaeologist, shall be retained to evaluate the significance of the find, and shall have the authority to modify the no-work radius as appropriate, using professional judgment. The following notifications shall apply, depending on the nature of the find:

If the professional archaeologist determines that the find does not represent a cultural resource, work may resume immediately, and no agency notifications are required.

If the professional archaeologist determines that the find does represent a cultural resource from any time period or cultural affiliation, they shall immediately notify Reclamation and CVWD's Construction Inspector and Environmental Services Department. If the discovery appears to be significant, Reclamation will initiate consultation under Section 106 with the California SHPO and Native American tribes. Work may not resume within the no-work radius until Reclamation and CVWD, through consultation as appropriate, determines that the site either: 1) is not eligible for the National Register of Historic Places or California Register of Historical Resources; or 2) that the treatment measures have been completed to its satisfaction.

MM CUL-3 Unanticipated Discovery of Human Remains

Although there is no evidence to suggest the presence of human remains in the project area, their discovery is a possibility during project construction. If such an event did occur, immediate telephone notification with written confirmation to the responsible Reclamation official must occur. If the discovery occurs in connection with an ongoing activity on Federal lands, the activity in the area of the discovery must stop. Additionally, the specific procedures outlined in 43 CFR Title 10.4 (d) of the Native American Graves Protection and Repatriation Act (NAGPRA) must be followed:

1. As soon as possible, but no later than three working days after receipt of the written confirmation of notification with respect to Federal lands described in § 10.4 (b), the responsible Federal agency official must:
   a. Certify receipt of the notification;
   b. Take immediate steps, if necessary, to further secure and protect inadvertently discovered human remains, funerary objects, sacred objects, or objects of cultural patrimony, including, as appropriate, stabilization or covering;

c. Notify any known lineal descendants of a deceased Native American individual whose human remains and associated funerary objects were discovered of such discovery, and, with respect to a discovery of human remains, associated funerary objects, unassociated funerary objects, sacred objects, or objects of cultural patrimony, notify the Indian tribes or Native Hawaiian organizations likely to be culturally affiliated with the cultural items, the Indian tribe or Native Hawaiian organization that aboriginally occupied the area, and any other Indian tribe or Native Hawaiian organization known to have a cultural relationship to the cultural items. This notification must be by telephone with written confirmation and must include information about the kinds of human remains, associated funerary objects, unassociated funerary objects, sacred objects, or objects of cultural patrimony, their condition, and the circumstances of their discovery;
d. Initiate consultation on the inadvertent discovery pursuant to § 10.5;
e. If the human remains, funerary objects, sacred objects, or objects of cultural patrimony must be excavated or removed, follow the requirements and procedures in § 10.3 (b) of these regulations; and
f. Ensure that disposition of all inadvertently discovered human remains, funerary objects, sacred objects, or objects of cultural patrimony is carried out following § 10.6.

2. Resumption of activity. The activity that resulted in the inadvertent discovery may resume 30 days after certification by the notified Federal agency of receipt of the written confirmation of notification of inadvertent discovery if the resumption of the activity is otherwise lawful. The activity may also resume, if otherwise lawful, at any time that a written, binding agreement is executed between the Federal agency and the affiliated Indian tribes or Native Hawaiian organizations that adopt a recovery plan for the excavation or removal of the human remains, funerary objects, sacred objects, or objects of cultural patrimony following § 10.3 (b)(1) of these regulations. The disposition of all human remains, funerary objects, sacred objects, or objects of cultural patrimony must be carried out following §10.6.

3.3.4 Historical Resource Recommendations

While the project will not have an adverse effect on the Coachella Canal as a historic property, it may create the false impression that the reservoir was part of the Canal's original construction from the 1930s and 1940s. With the implementation of the recommendation proposed below, potential impacts to historical resources that may result from the project would be reduced to a less than significant level.

The Canal has been well-documented by past surveys and evaluations including a Historic American Engineering Record (HAER) document in 2003. Therefore, the recommendation is that CVWD complete drone flight recordings of the project area before construction commences, and after construction is completed once the reservoir cells are filled with water. The recordings will be stored and made available by CVWD and Reclamation for the public.

Mitigation Measure CUL-4

CVWD shall complete drone flight recordings of the project area before construction commences, and after construction is completed once the reservoir cells are filled with water. The recordings will be stored and made available by CVWD and Reclamation to the public.

3.4 Indian Trust Assets

3.4.1 Affected Environment

Indian Trust Assets (ITAs) are legal interests in property held in trust by the U.S. for Indian tribes or individuals, or property in which the U.S. is charged by law to protect for Indian tribes or individuals. In accordance with the Indian Trusts Fund Management Reform Act of 1994, as amended, all Department of the Interior agencies, including Reclamation, are responsible for protecting ITAs from adverse impacts resulting from their programs and activities. In cooperation with tribes, federal agencies must inventory and evaluate assets and mitigate or compensate for adverse impacts to the asset. While most ITAs are located on reservation lands, they may also be located off-reservation. Examples of ITAs include, but are not limited to, land, minerals, rights to hunt, fish, and gather, and water rights.

Water from the Colorado River has been a major source of supply for the Coachella Valley since 1949 when the Coachella Canal was first placed into service. This water is used for agricultural and non-urban purposes, as well as groundwater recharge. The Colorado River is managed and operated in accordance with the "Law of the River", a complicated collection of interstate compacts, federal and state legislation, various agreements and contracts, an international treaty, a U.S. Supreme Court decree, and federal administrative actions that govern the rights to use of Colorado River water within the seven Colorado River Basin states.

CVWD, under its contract with Reclamation, serves the greater project area, and multiple tribes have lands within the CVWD service area. Torres-Martinez Desert-Cahuilla Indians Tribal reservation lands are located throughout the North Shore and western Salton Sea area. Further to the north in eastern Indio the Cabazon Band of Mission Indians also has significant tribal reservation lands.

3.4.2 Environmental Consequences

No Action

Under the No Action Alternative, construction of the new water storage reservoir would not take place. Annual inspection and repair operations would continue to occur, including mobilization and demobilization of construction equipment for work that is completed entirely within the existing canal ROW. Therefore, no change to federal actions would occur that could result in adverse effects on ITAs.

Proposed Action

The Proposed Action is not located on or adjacent to any Trust Lands and would not prevent the use or management of any tribal or Trust Lands. The Proposed Action would not result in a change to any tribal water rights, or to the diversion or delivery of tribal water entitlements. The Proposed Action also has no potential to interfere with any hunting, fishing or gathering rights which could be exercised by any tribe.

Reclamation departmental policy requires the agency to address potential impacts to ITAs even if impacts are found to be non-significant. No tribal reservation lands are in the vicinity of the Proposed Action.

Trust Lands

The Proposed Action is not located on ITA lands. The nearest tribal land, part of the Torres-Martinez Desert-Cahuilla Indians tribal reservation, is located approximately twenty miles away north and west of the project area. There are no tribal residences and/or facilities within the Proposed Action area.

Water Rights

The service area for water delivery under CVWD's contract with Reclamation is defined as Improvement District No. 1 (ID-1) which encompasses most of the East Valley and a portion of the West Valley north of Interstate 10. The nearest tribal land within CVWD's ID-1 belonging to the Torres-Martinez Desert-Cahuilla Indians, is served by CVWD as part of water rights contract with Reclamation.

Hunting, Fishing, and Gathering Rights

Colorado River water is currently delivered to the project vicinity via the Coachella Canal and is primarily used for non-potable uses such as agricultural, golf course irrigation, fish farming operations, duck clubs, and recreational lake uses. In addition, the Coachella Canal is concrete lined, and although a small number of fish are present, it is not a significant source of recreational or subsistence fishing. CVWD prohibits recreational fishing in the Coachella Canal.

3.4.3 Management and Mitigation Measures

The Proposed Action has no known potential to impact Indian Trust Assets. Grading and earthwork to construct the storage reservoir is not expected to cause a substantial adverse impact on Tribal resources, however, it is always possible that unforeseen artifacts could become uncovered during construction activities. In that event, Reclamation, CVWD and its contractors would be required to adhere to federal and State procedures regarding stoppage of work, handling of uncovered resources, and notification of proper authorities to ensure that the project would not have an adverse effect on such resources.

Mitigation measure Cult-2 included in the discussion of cultural resources above requires that an archaeological monitoring program should be conducted during project development, including presence of archaeological monitors during initial ground-disturbing activities on site. The archaeological monitors would have the authority to temporarily halt or redirect grading and other ground-disturbing activity in the event that cultural resources are encountered. If avoidance of a prehistoric cultural resources site found during construction is infeasible, the resources should be left in-situ, or reburied in a nearby area, after consultation with the Native American Heritage Commission (NAHC) and Tribes that have requested to be contacted by Reclamation. The Tribes should be contacted within 48 hours if any human remains or objects subject to provision of the Native American Graves Protection and Repatriation Act, or cultural resources such as sites, trails, or artifacts.

The Project site does not lie near any known cemeteries, and none were encountered during construction and grading for either the original earthen canal or subsequent concrete lined canal. Therefore, the potential for finding human remains on the site is highly unlikely. In the unlikely event that human remains are exposed during construction, California Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code Section 5097.98. If the human remains are determined to be Native American, the Coroner will notify the Native American Heritage Commission (NAHC) and all tribal organizations that have requested to be on the County's list will be consulted to determine and notify an MLD. The MLD shall complete the inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials. In addition, if at any time any human remains are discovered, Reclamation, the District and contractor are required to notify the Imperial County Planning and Development Department of the discovery in writing within 24 hours. Compliance with these requirements would ensure that impacts would be below a level of significance. These requirements are included as a mitigation measure (CUL-3) in the cultural resources section above.

3.5 Environmental Justice and Socioeconomic Conditions

3.5.1 Affected Environment

Executive Order (EO) 12898 requires federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low- income populations in the U.S. Minority populations include persons identified by the Census of Population and Housing to be of Hispanic or Latino Origin, as well as, non-Hispanic persons who are African American, American Indian and Alaska Native, Native Hawaiian or other Pacific Islander.

Low-income populations are those that fall within the annual statistical poverty thresholds from the U.S. Census Bureau for the 2020 Census. The definition of poverty is dependent upon the size of the family. The 2021 poverty threshold for a family of three is $21,196, and for a family of six is $38,767. According to the 2020 Census, Imperial County has a total population of 179,851, of which more than 85 percent of the population classified as Hispanic and more than 85 as other minorities, of which more than 17 percent have incomes below poverty levels. (Source: www.census.gov/quickfacts/imperialcountycalifornia.)

The immediate project vicinity is vacant and contains no residences or inhabitants within at least three miles in any direction. There is a large representation of both minority and low-income populations within the broad vicinity of the Proposed Action. The City of Niland located nearest to the Proposed Action has a large percentage of minority residents. Estimated population of Niland is 681 in 2023 (www.WorldPopulationReview.com/us-cities/niland-ca-population) of which approximately 85% are identified as White/Hispanic and Black. Data for Brawley show a population of 26,854 (www.WorldPopulationReview.com/us-cities/brawley-ca-population) of which approximately 76% are White/Hispanic and 1% are Black. and for Imperial County indicate that about 84 percent are Hispanic or Latino, with an estimated poverty level of approximately 31.4% compared to 18.1% for the County as a whole.

3.5.2 Environmental Consequences

No Action

Under the No Action Alternative, the project would not take place. Annual inspection and repair operations would continue to occur, including mobilization and demobilization for work that is completed entirely within the existing canal ROW, and that does impact any nearby community. Therefore, no federal actions would occur that could result in a disproportionately high and adverse effect on the health or environment of minority or low-income populations.

Proposed Action

Implementation of the Proposed Action would not disproportionately affect the minority and impoverished population in the area. The Imperial Valley has a large Hispanic population in comparison with the State of California as a whole. Construction-related effects would be short-term only. The project location is isolated from any residences or other sensitive human habitation and would not affect any surrounding community or group, or disproportionately impact any disadvantaged community. The Proposed Action is not expected to significantly affect local socioeconomic conditions.

3.5.3 Management and Mitigation Measures

Based upon the analyses presented throughout this EA, changes resulting from implementing the Proposed Action would not result in disproportionately high or adverse impacts to the environment or to the health of low-income and minority populations. No mitigation measures are needed or proposed.

3.6 Geology and Soils

3.6.1 Affected Environment

The Proposed Action site lies within the Salton Trough, which comprises a portion of the Colorado Desert Geomorphic Province. The Salton Trough is characterized by its exposures of the San Andreas Fault and related faults that form the margin between the Pacific and North American tectonic plates. Originally the Salton Trough was formed as a result of crustal stretching and sinking from seismic activity during the Miocene period, 5 to 23 million years ago. The Salton Trough has continued to develop during the formation of the northern section of the Gulf of California rift basin for the last 12 to 15 million years. The Salton Sea is located with the Salton Trough. The nearest major fault is the San Andreas Fault Zone located approximately two miles west of the site.

3.6.2 Environmental Consequences

No Action Alternative

Under the No Action Alternative, construction of the new water storage reservoir would not take place and no actions would occur that could result in adverse effects on geology and soils. Annual inspection and repair operations would continue to occur, including mobilization and demobilization of construction equipment, removal of cracked panels and side slope grooming prior to pouring concrete for the replacement panels. These maintenance operations are a baseline condition and have no impacts on geology and soils at present.

Proposed Action

The majority of Southern California, including the Imperial and Coachella valleys, is considered a seismically active region and is subject to risk from earthquakes and related geologic effects that are triggered by earthquakes such as ground shaking, fault rupture, landslides, liquefaction, subsidence and seiches. The San Andreas Fault lies only a few miles to the west of the Coachella Canal alignment, and numerous related fault traces exist near the canal. Review of California Geological Survey fault line mapping for the Wister area in proximity to the Mid-Canal Storage Reservoir project site confirms that no known fault traces cross the canal in the project area. (https://maps.conservation.ca.gov/cgs/fam, search Wister, CA, 2022). Seismic hazards, including liquefaction, were also evaluated based upon information from the California Geological Survey. (Seismic Hazards Program, California Geological Survey, California Department of Conservation, Liquefaction, California Liquefaction Zones; California Liquefaction Zones | GIS Map Data | State of California | Koordinates.)

The nearest major fault is the San Andreas Fault Zone located approximately two miles west of the site. Impacts from fault rupture are limited to the immediate area of the fault zone where the fault breaks along the ground surface. Segments of the Coachella Canal to the north of the project site do cross the San Andreas Fault and related fault lineaments, but no fault lines cross the canal segments between siphons 11 and 14 to be modified to create the storage reservoir. Buildings intended for human occupancy are not a part of this project.

Damage from ground shaking can occur at great distances from the fault. The project is not located on or adjacent to an active fault but is located in close proximity to a very active seismic zone, and like every other built structure in the region, could be damaged by severe ground shaking. The project has been designed in conformance with seismic engineering standards to reduce potential damage in the event of ground shaking. Exposure to seismic ground shaking is an existing baseline condition for the Coachella Canal and will not be changed with development of the storage reservoir project within the footprint of the existing canal channels.

Liquefaction can occur under saturated conditions, but this area of the Coachella Canal the water table is generally deep below the ground surface, with some perched groundwater at shallower depth associated with the desert-dry washes. According to the project engineers, no shallow groundwater was encountered during construction of the siphons that cross these washes. The geotechnical investigation for the storage reservoir did trenching to four feet below the canal bottom and did not encounter any subsurface water, and the potential for liquefaction is considered to be low. Review of the California Geological Survey liquefaction map for Southern California confirmed that this region is not susceptible to liquefaction.
(California Geological Survey, Department of Conservation, Seismic Hazards Program, Liquefaction Zones Map, https://Koordinates.com/layer/97126-california-liquefaction-zones), updated 2019.)

Construction and operation of the proposed storage project includes modification of existing water conveyance structures excavated into the side slope of the base of the Chocolate Mountains and associated alluvial fans. The slope is less than 10 percent and the modification to create the storage reservoir by joining the two canal channels into a single channel has no potential to create additional exposure of people or structures to risk of loss, injury, or death involving landslides. Therefore, there is no seismic related potential impact of the project.

Construction of the storage reservoir will be done completely within the existing footprint of the west slope of the lined canal segment and the eastern slope of the original earthen canal segment and has no potential to create erosion hazards or any loss of topsoil. Flow velocities in the canal and future storage reservoir channel do not produce scour conditions that would result in erosion of the bed or banks. To reduce the potential for wind erosion during construction, regular watering is required during grading and earthwork to prevent soil erosion (see MM AQ-1 above). Thus, substantial soil erosion or loss of topsoil is not likely to result from construction or operation of the canal storage reservoir project.

The project area is located on low-gradient slopes that are not susceptible to on- or off-site landslides, liquefaction, or collapse. No fault tines cross the site, and the canal is not underlain by saturated sediments that would be susceptible to lateral spreading, subsidence, liquefaction, or collapse. Therefore, there are no potential impacts related to these geologic factors.

The existing clay soils in this canal segment are expansive and are likely responsible for the regular cracking of the concrete liner that has led to the excessive maintenance costs in this location, which is one of the project's objectives to remediate. After removal of the concrete liner, the heavy clay soils will be used as a construction material by spreading them across the bottom and sides of the storage reservoir to create an impermeable liner. The west-facing eastern slope of the storage reservoir will be armored with a rock layer over the clay liner to prevent wind-caused waves from eroding the bank.

Significant paleontological resources are fossils or assemblages of fossils that are unique, unusual, rare, uncommon, diagnostically or stratigraphically important, and those that add to an existing body of knowledge in specific areas, stratigraphically, taxonomically, or regionally. They include fossil remains of large to very small aquatic and terrestrial vertebrates, remains of plants and animals previously not represented in

certain portions of the stratigraphy, and assemblages of fossils that might aid stratigraphic correlations, particularly those offering data for the interpretation of tectonic events, geomorphologic evolution, paleoclimatology, and the relationships of aquatic and terrestrial species. The proposed project area is located on an upland portion of the Salton Trough, a large tectonic depression that includes the Coachella and Imperial Valleys of Southern California, and the western half of the Mexicali Valley and the Colorado River delta in Mexico. Over the past 4.5 million years, the lowlands of the Salton Trough have been periodically inundated with fresh and brackish waters, influenced by the Gulf of California, the Colorado River, and ancient Lake Cahuilla. Lake Cahuilla was a former freshwater lake that periodically occupied a major portion of the Salton Trough, approximately 10,000 to 240 years ago. These types of deep basin sedimentary deposits are highly sensitive for paleontological resources.

The project area is not constructed in deep basin sedimentary deposits, and the desert dry washes across the canal siphons that may include sedimentary deposits will not be disturbed by project construction or operations. No paleontological resources or unique geological features were detected during the geotechnical investigation undertaken in the preparation of this environmental assessment. The previous disturbance of the project site for construction of the original earthen canal and the newer lined canal segments renders the potential for finding fossils on the site highly unlikely, and potential impacts are determined to be less than significant.

3.6.3 Management and Mitigation Measures

The Proposed Action has no potential to impact geology and soils resources in the project area, and no management or mitigation measures are recommended.

3.7 Floodplain

3.7.1 Affected Environment

The project site is relatively level, with elevation of approximately 91-feet above mean sea level (AMSL) at the upstream siphon 11 project boundary and approximately 86-feet AMSL at the downstream siphon 14 project boundary. Soils are predominantly clay with some intervals of alluvium which consist of gravelly sand and pockets of fine sand. The entirety of the surface soils within the project site show signs of significant disturbance and alteration from their native state as a result of construction of the original earthen canal and the more recent lined canal, as well as vehicle use and maintenance for the adjacent roadway.

Desert dry washes exist across three locations of the storage reservoir route, under which siphons were installed for the canal lining project. All other segments of the Coachella Canal are built into the upland slope. No part of the project area is defined as being within a flood hazard area by the Federal Emergency Management Agency. As discussed in detail in the Biological Resources section 3.2 above, none of the proposed project components are planned within wetlands or other Waters of the U.S. that would require a permit from the USACE pursuant to the CWA. Therefore, the proposed project would result in no effects on any Waters of the U.S. and would be in conformance with the CWA.

3.7.2 Environmental Consequences

No Action

The No Action Alternative would not affect any floodplain or result in potential flood hazards. Annual inspection and repair operations would continue to occur, including mobilization and demobilization of

construction equipment, removal of cracked panels and side slope grooming prior to pouring concrete for the replacement panels. This maintenance work is a baseline condition and is completed entirely within the existing canal ROW and has no impact on any floodplain.

Proposed Action

Construction and operation of the Proposed Action would have no impact on any floodplain or result in potential flood hazards. No aspect of the storage reservoir project would expose people or structures to a significant risk of loss, injury, or death of flooding. The project site is approximately 310 feet above the water surface of the Salton Sea and is not subject to water level changes that may occur on the Sea in a major seismic event. Therefore, there are no impacts associated with flooding from tsunami or seiche. The property is not located within the 100-year floodplain of any local water body and there will be no potential for related flood hazard impacts.

3.7.3 Management and Mitigation Measures

The Proposed Action has no potential to impact floodplain conditions or resources in the project area, and no management or mitigation measures are recommended.

3.8 Hazardous Materials or Solid Waste

3.8.1 Affected Environment

The project site is located entirely within the footprint of the original earthen canal and the newer concrete lined canal and is not located on a site which is included on a list of hazardous materials sites compiled pursuant to California Government Code Section 65962.5. The site is not on any EnviroStor list maintained by the Department of Toxic Substances Control, (www.calepa.ca.gov/sitecleanup/corteselist/ and www.Envirostor.dtsc.ca.gov/public/search.asp accessed March 2022). There are six sites listed in Imperial County, in the cities of El Centro, Holtville and Brawley, none of which are in or near the Coachella Canal or the proposed storage reservoir project site.

The Imperial County Public Health Department and the State Regional Water Quality Control Board, Colorado River Region are the local environmental oversight agencies responsible for site contamination or activities relating to hazardous substances and hazardous waste sites. Because the property was not listed on any of the environmental agency databases reviewed, agencies would not be expected to have information regarding the presence or absence of adverse or negative environmental conditions at the site.

Hazardous materials routinely used during construction of the project will include petroleum hydrocarbons and their derivatives (for example, fuels, oils, lubricants, and solvents) required to operate the equipment used in the construction activities. These materials are those typical for operation and maintenance of heavy equipment and support vehicles, including gasoline, diesel fuels, and hydraulic fluids.

3.8.2 Environmental Consequences

No Action

Under this alternative, no ground disturbance or grading would occur, nor would construction vehicles be required on the project site. Annual inspection and repair operations would continue to occur, including mobilization and demobilization of construction equipment, removal of cracked panels and side slope grooming prior to pouring concrete for the replacement panels. This maintenance work is a baseline

condition and is completed entirely within the existing canal ROW. Therefore, no new impacts related to hazardous materials or solid wastes associated with construction activities and vehicles would occur under the No Action Alternative.

Proposed Action

Fuel and lubricants for the grading and earthwork construction equipment fueling and maintenance will be routinely transported to the site. The identification of building material staging areas is required by Construction General Permit (CGP) (Order No. 2009-0009-DWQ as amended by 2010-0014-DWQ and 2012-0006-DWQ) administered by the RWQCB which requires the development and implementation of a project-specific SWPPP for areas greater that one acre. Per the CGP, the project's SWPPP shall include comprehensive handling and management procedures for fuels and oils that have the potential to contaminate stormwater. Staging areas for fueling and servicing vehicles are also required to be identified in the SWPPP. When handled properly by trained individuals and consistent with the manufacturer's instructions and industry standards, the risks involved with handling these materials are reduced to a less than significant level. As a requirement of the CGP, the contractor will be required to identify all controlled staging areas within the project limits for storing hazardous materials and equipment.

To prevent a threat to surface water during construction, the management of fuels, lubricants and any other potentially hazardous materials will be regulated through the implementation of measures required in the SWPPP for the project. The SWPPP requires a list of potential pollutant sources and the identification of construction areas where additional control measures are necessary to prevent pollutants from being released on-site or off-site. Best management practices (BMPs) are required in the SWPPP for proper material delivery and storage; material use; and spill prevention and control. These temporary measures outline the required physical improvements and procedures to prevent impacts of pollutants and hazardous materials to workers and the environment during construction. For example, all construction materials, including paints, solvents, and petroleum products, must be stored in controlled areas and according to the manufacturer's specifications. The contractor will also be required to implement BMPs to assure that impacts are minimized and that any minor spills are immediately and properly remediated. **Mitigation Measure HAZ-1** requires the project contractor to develop and implement the SWPPP in compliance with the requirements of the Construction General Permit. With the implementation of the CGP and SWPPP, less than significant impacts are anticipated during construction.

Project construction has no foreseeable potential to impact the public or the environment through reasonably foreseeable upset and accident conditions, and there are no sensitive receptors in the vicinity of the project that could be affected by accidents on site. Long-term project operations have no potential to result in upset or accidents related to hazardous materials. The Project would not use acutely hazardous materials other than gasoline and diesel fuels and related lubricants that will be contained and dispensed in state-of-the-art tanks and pump equipment. There is no school within proximity of the site, with the nearest school located in the town of Niland approximately five miles south of the project site.

The Project site is not located within two miles of any airport, and therefore the project would not represent a safety hazard for people residing or working in the project vicinity. The project location does not have a private airport near the site, and the construction and operations of the proposed water storage project would not represent any related safety hazard for people residing or working in the area.

The project site is not used for emergency response to or evacuation from adjacent areas. The proposed storage project has no potential to impair implementation of or physically interfere with any adopted

emergency response plan or emergency evacuation plan by Imperial County. No related impacts would occur, and no mitigation related to hazards and hazardous materials is required.

The project is a water storage reservoir within an existing water conveyance system and will not include any aspects that would result in the generation of solid waste, impede any recycling and waste reduction goals, or affect the capacity of any local or regional waste management facilities. There are no federal, State or local regulations related to solid waste that are applicable to the project.

3.8.3 Management and Mitigation Measures

The project contractor will be required to develop and implement mitigation measure HAZ-1 to prevent any hazard to the public or the environment related to hazardous materials management and water quality protection.

MM HAZ-1: Construction General Permit and Stormwater Pollution Prevention Plan

The project contractor is required to comply with the most current Construction General Permit (CGP) (Order No. 2009-0009-DWQ as amended by 2010-0014-DWQ and 2012-0006-DWQ). Compliance with the CGP involves the development and implementation of a project-specific Stormwater Pollution Prevention Plan (SWPPP). The required plan will identify the locations and types of construction activities requiring BMPs and other necessary compliance measures to prevent soil erosion and stormwater runoff pollution. A Notice of Intent (NOI) to implement a SWPPP must be submitted through the Stormwater Multiple Application and Report Tracking System (SMARTS), in which a Waste Discharge Identification (WDID) number will be issued. The SWPPP and WDID must be kept on-site and used during the life of the project.

3.9 Traffic and Transportation

3.9.1 Affected Environment

The immediate project area is vacant and contains no residences and no transportation infrastructure, apart from the existing dirt roads outside of the canal fence lines (Coachella Canal Road to the west and Gas Line Road to the east), and the canal maintenance roads within the fence lines on either side of the lined and original earthen Coachella Canal. Construction traffic will include cars and pick-up trucks for workers. Equipment to be used for earthwork to create the storage reservoir will include standard heavy equipment for earth moving construction projects such as: pickup trucks, water trucks, large excavators, backhoes, dump trucks, front-end loaders, vibratory compactors, bulldozers, a 25 kVA portable generator(s), and a dewatering pump system, and possibly others to be determined in final engineering design and construction planning. All equipment will access the construction site via the existing county and canal maintenance roads, and all work will be done within the existing fence lines of the two canals.

3.9.2 Environmental Consequences

No Action

Annual inspection and repair operations would continue to occur, including mobilization and demobilization of construction equipment, removal of cracked panels and side slope grooming prior to pouring concrete for the replacement panels. This maintenance work is a baseline condition and is completed entirely within the existing canal ROW and has no impact on any local roadway. Under the No Action Alternative, no new construction would occur, and no new construction related traffic would occur.

Proposed Action

The project will generate traffic only for construction, and the project's remote location relative to the City of Niland or regional transportation systems precludes potential interference with any transport activity. This location precludes impacts to the regional circulation system, or to any transit, roadway, bicycle, or pedestrian facilities. Traffic will include equipment delivery for mobilization and demobilization, and daily trips by up to 18 construction workers for the 6-to-8-month duration to complete work. No traffic is generated as a result of reservoir operations.

Numbers of workers and the time required for construction of the project includes the following:

- Step 1 clear and grub – 10 workers for 16 days
- Step 1 earthwork – 18 workers for 28 days
- Diversions – 7 workers for 5 days
- Step 2 earthwork – 18 workers for 38 days
- Slope protection – 10 workers for 16 days
- Concrete – 4 workers for 10 days

Workers and construction equipment will access the site via Highway 111 (paved), approximately one mile east on Beal Road (paved) along the perimeter of the City of Niland, and north on Cuff Road / Gasline Road (unpaved) approximately three miles north to Coachella Canal Road (unpaved) that parallels the canal. Alternatively, the canal can be accessed from Highway 111 approximately five miles north of Niland traveling east on Winslow Road (unpaved) to north on Old Niland Road (unpaved) approximately six miles north to Coachella Canal Road.

There are no features of the project that would have any potential to create traffic hazards, conflict with any existing traffic flows or have any potential to interfere with emergency access. The two roads that parallel the canal segments – Gas Line Road to the east and Coachella Canal Road to the west – are both outside of the canal fence lines and will not be restricted for emergency vehicle access in any way.

3.9.3 Management and Mitigation Measures

There are no potential effects related to traffic and transportation resulting from the Proposed Action, and no management or mitigation measures are required.

3.10 Visual Resources

3.10.1 Affected Environment

The segment of the Coachella Canal to be modified is located in a non-urbanized desert setting east of the Salton Sea at the western edge of the Chocolate Mountains. The canal is not located along a designated scenic corridor but is within a visually scenic vista with views of the expansive Imperial Valley and Salton Sea. The project site is located entirely within the fence lines of the two existing canals and contains no unique visual resources such as large trees, unique vistas, rock outcroppings, or historic buildings.

3.10.2 Environmental Consequences

No Action

Annual inspection and repair operations would continue to occur, including mobilization and demobilization of construction equipment, removal of cracked panels and side slope grooming prior to pouring concrete for the replacement panels. This maintenance work is a baseline condition and is completed entirely within the existing canal ROW and has no aesthetic impact on any scenic vista or local unique visual resources. Under the No Action Alternative, no new construction would occur, and no new potential effects on visual resources would occur.

Proposed Action

Joining the two existing canal prisms into a single prism to create a storage reservoir will have no effect on any visual resources and will not be visible from any scenic location except to those traveling on the adjacent unpaved roads. The new 12kV electrical circuit is an extension from an existing line that will be constructed within the outer edge of the existing ROW of the existing English Road and Coachella Canal Road. It will pass under two existing large regional transmission lines (161 kV and 230 kV), and then parallel those lines along the Coachella Canal Road for the segment extending to the gates at Siphon 14. There are no publicly accessible vantage points that would be degraded, and the existing visual character will not be significantly changed. The proposed reservoir project and electrical circuit does not include any lighting and would not create a source of light or glare that would adversely affect day or night-time views in the project area.

3.10.3 Management and Mitigation Measures

It is concluded that the project would have no impact on a scenic vista or other visual resources, and no management or mitigation measures are required.

3.11 Water Resources

3.11.1 Affected Environment

The Coachella Canal is a branch of the All-American Canal that brings water from the Lower Colorado River into the Imperial and Coachella Valleys. Historically, CVWD received 330,000 acre-feet per year (AFY) of Colorado River water delivered via the Coachella Canal. The service area for water delivery under CVWD's contract with Reclamation is defined as Improvement District No. 1 (ID-1) which encompasses most of the East Valley and a portion of the West Valley north of Interstate 10. Under the 1931 California Seven Party Agreement, CVWD has water rights to Colorado River water as part of the first 3.85 million AFY of the total 4.4 million AFY allocated to California. CVWD is in the third priority position along with Imperial Irrigation District (IID).

CVWDs entitlement to Colorado River water is now being augmented under terms of the 2003 QSA, which will provide up to an additional 94,000 AFY to CVWD, with delivery to be ramped up over a period of about 15 years. One of CVWD's goals for the project is to create storage upstream of their water service area to improve water supply management and reduce losses to the downstream portions of the canal system.

3.11.2 Environmental Consequences

No Action

Under the No Action Alternative, the new storage reservoir to reduce maintenance in this segment of the canal and improve water supply management would not be built. This alternative would require costly ongoing repairs to the existing concrete canal lining and would fail to improve CVWDs water management capabilities.

Proposed Action

The proposed storage reservoir will not utilize or affect groundwater in any way, and the project has no potential to impact groundwater supplies or to interfere with groundwater recharge. There is no applicable sustainable groundwater management plan for this area of Imperial County. No existing drainages cross the canal segments to be modified to create the storage reservoir, and construction of the project will not add additional impervious surfaces to the project area or have any potential to produce scouring runoff that could result in erosion or siltation on adjoining lands. It would not impact the existing drainage pattern of the surrounding lands, and no stormwater runoff will be routed into the reservoir.

The existing concrete lining will be moved on the east side into the bottom of the canal, and on the west side it will be buried in place with the new 2.8-feet thick clay liner. The intent of the clay liner is that it will be impervious to provide the same level of seepage prevention as the intact concrete liner without the potential to crack and fail as has occurred with the concrete liner in this canal segment.

The new reservoir will be lined using the existing lake deposit clays that now form the berm between the two canal channels. Analysis of the available clay material was conducted by the project engineering team and reported in a July 2021 Technical memorandum. Their analysis provided the following details regarding seepage losses in concrete lined segments, and those expected with the new clay liner as follows:

> Reclamation has established an acceptable loss rate for concrete lining of 0.07ft3/ft2/day, (USBR, Lining for Irrigation Canals, 1963). The CCLP concrete canal lining has performed exceptionally well for the portion of the project downstream of Siphon 16 and may have a loss rate less than 0.07ft3/ft2/day. However, the portion of the CCLP between Siphon 7 and Siphon 14 has experienced significant cracking since construction and its loss rate in some areas is likely to be well above 0.07ft3/ft2/day.

The seepage control assessment concludes that:

- *Project design and use of the clay liner in this canal segment and for the proposed in-line storage reservoir will control seepage losses consistent with the previous analyses presented in the 2001 Final EIS/EIR Geohydrology Appendix.*
- *Laboratory testing of the lake deposit clays shows extremely low coefficients of permeability (5x10-7 cm/sec). Thus, there is little to no seepage in areas where the canal is cut into the lake deposit clays.*
- *The clay material existing within the proposed project footprint is suitable for and can be used to create an effective and economical liner to prevent seepage comparable to and even better than the concrete lined section.*

(Source: Dahl Consultants, *Draft Technical Memorandum No. 1, Coachella Valley Water District (CVWD) Mid-Canal Storage Project Seepage Control Methodology for Conversions of Pools 11, 12, and 13 to an In-line Canal Reservoir*, July 7, 2021.)

A supporting geotechnical investigation was prepared by Landmark Geo-Engineers and Geologists to conduct laboratory testing of soils within the middle embankment and evaluation of engineering properties to develop recommendations for construction of the clay liner. Their analysis concluded that:

> The middle embankment was found to have uniform soil conditions at each location where slope excavations occurred. Soil changes were found to occur along the length (reach) of the embankment from Siphon 11 to Siphon 14. The soil materials (sands, gravelly sands, and clayey soils) will need to be visually segregated during construction of the reservoir.
>
> The in-line reservoir is anticipated to be lined with a compacted clay liner consisting of the middle embankment and east embankment soils to retard seepage. The native clay soils at the site are expected to have low permeability and are considered suitable for use as a clay liner. Following mixing and recompaction to 90% (ASTM D1557), the clays are anticipated to have a permeability of less than 1x10-5 cm/sec.
>
> The liner material should be free from deleterious material such as organic matter, construction debris, rocks, or other debris. The clay liner material should be pulverized/disced to less than ¾ inch maximum clod size uniformly moisture conditioned to optimum plus 4 to 8% and placed in 6 inch maximum lifts to a minimum of 90% ASTM D1557 maximum density.

(Source: Landmark Geo-Engineers and Geologists, *Geotechnical Review, In-Line Water Storage Reservoir – Phase 1 Evaluation, Coachella Canal – Siphon 11 to Siphon 14, Niland, California, LCI Report No. LE19012*, March 6, 2019.)

The resulting design depth of the clay liner is a minimum of 2.8 feet, selected as a very conservative depth which is intended to minimize seepage losses to be no greater than seepage losses with the three-inch concrete lining (0.07ft3/ft2/day). (The minimum calculated depth of the clay liner to achieve the required seepage control was 1.08 feet. (Source: Dahl Consultants.). The completed reservoir will have a bottom width of 90 feet and will be approximately 230 feet wide from the western fence line to the eastern fence line, with a water surface approximately 150 feet wide at maximum water level (see **Figure 7**).

During earthwork activities, stormwater may fall within the banks of the existing canals. Because the disturbed area is greater than one-acre coverage must be obtained under the Statewide Construction General Order (2009-0009-DWQ). The Water Board requires a Stormwater Pollution Prevention Plan (SWPPP) to be prepared that identifies applicable stormwater Best Management Practices (BMPs) and defines how they are to be implemented. Prior to commencing construction, a SWPPP must be prepared that identifies applicable stormwater BMPs and defines how they are to be implemented. In this case, all of the grading required will be restricted within the outer banks of the newer lined canal and the original earthen canal with no potential to produce or change off-site stormwater runoff conditions. Typical BMPs include demarcation of approved

work limits, installation of temporary silt fencing, and placement of sand/gravel bags to prevent runoff outside of work limits. The BMPs will be designed so that runoff is controlled to prevent erosion during construction and during the post-construction period.

3.11.3 Management and Mitigation Measures

The project is required to conform with all applicable water quality protection requirements and will not conflict with or obstruct implementation of a water quality control plan. Mitigation measure HAZ-1 identified in the discussion of hazardous materials above includes water quality protection measures to be taken throughout project development. Therefore, no significant impacts are identified or anticipated related to water resources no additional management or mitigation measures are recommended.

3.12 Cumulative Effects of the Proposed Action

Cumulative effects are potential impacts on the environment that result from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

The most significant former project located within or in the vicinity of the planning area and having the potential to impact common resources as the Proposed Action is the original earthen Coachella Canal that will be incorporated in the new Mid-Canal storage project which will result in a net benefit for reduced maintenance in this segment of the canal and improved water supply management within CVWD.

The site has been disturbed for decades by construction of the parallel canals. The project site does contain habitat for fish and wildlife species. Considering the range of species impacted by the project and project potential impacts without mitigation, the potential impacts of the project are not severe enough to substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal. Mitigation measures BIO-1 and BIO-2 are included to prevent or minimize potential impacts to biological resources from the project. Existing wildlife drinkers will be maintained on the west side of the canal. The existing wildlife drinkers on the east side of the canal will be replaced with direct access to reservoir waters, and with safety fencing to prevent animals from getting into the reservoir. No other projects in the area or region would have effects on biological resources that could result in a cumulative adverse effect.

Subsequent long-term operations of the canal and storage reservoir will not cause any fish or wildlife population to drop below self-sustaining levels, or to eliminate a plant or animal community. As explained in detail in the Biological Resources section above, the project has no potential to reduce the number or restrict the range of a rare or endangered plant or animal since none of the special-status plant species known to occur in the region have the potential to occur on the project site, primarily due to very poor habitat conditions for plant species with the presence of the canal channels, berms and service roads.

The site does not contain any structures or other features that would be considered important examples of the major periods of California history or prehistory, except for a section of the Coachella Canal, which will be preserved and protected by the project, and there are no other projects in the area or region that could produce a cumulatively significant effect to these resources.

No related projects within CVWD or along or near the project site were identified that would contribute to potential environmental effects of combining the two existing canal channels into a single wider channel, therefore producing a cumulatively considerable effect. Modification of the canal segment to join the two canal prisms and create the Mid-Canal Storage reservoir would not contribute to any cumulative effects on the environment and will produce net benefits of improved water conveyance and efficient water use. No adverse cumulative effects are identified or foreseeable at this time. Mitigation measures have been identified for protection of air quality, biological and cultural resources, water quality and worker safety related to hazardous materials and Tribal cultural resources intended to minimize impacts of the proposed project and prevent contributions to cumulative adverse effects.

No negative social effects would be expected from implementation of the project, which has the potential to enhance the conveyance and delivery of water to agricultural users in the Coachella Valley which will contribute to CVWD's goals for improved long term water supply management and improved use of the District's QSA water supplies. Mitigation measures for air quality and hazardous materials are intended to prevent or minimize adverse effects that could have direct or indirect effects on human beings. Therefore, no additional significant adverse direct or cumulative impacts are identified or anticipated beyond those identified for individual resources topics addressed herein, and no additional mitigation measures are required.

Chapter 4: Consultation, Coordination and List of Preparers

4.1 Agencies Consulted

4.1.1 Scoping

As part of the NEPA process, YAO sent a Notice of Intent (NOI) to prepare this EA on June 6, 2022, with a scoping letter to the agencies listed below. No written comments on the NOI scoping letter were received by YAO.

4.1.2 Draft Environmental Assessment

An electronic copy of this EA has been posted for public viewing on Reclamation's YAO website at http://www.usbr.gov/lc/yuma/. Paper copies of the Notice of Availability memorandum and EA were also distributed to the following entities:

- Bureau of Land Management, Palm Springs - South Coast Field Office
- U.S. Fish and Wildlife Service, Palm Springs Fish and Wildlife Office
- County of Riverside, Transportation and Land Management Department
- California Department of Fish and Wildlife, Inland Deserts Region
- Torres-Martinez Desert-Cahuilla Indians
- Cabazon Band of Mission Indians
- Coachella Valley Water District
- San Diego County Water Authority

Consultation under Section 106 of the National Historic Preservation Act (NHPA) (36 Part 800) for an undertaking involving Federal facilities with the State Historic Preservation Office and Native American tribes will be conducted.

4.1.3 Final Environmental Assessment

Reclamation will consider and incorporate relevant comments from the Draft EA and publish a Final EA and FONSI if a determination is made that an EIS is not required and a FONSI is appropriate. Reclamation will make the final documents available on the YAO's Environmental Documents website at http://www.usbr.gov/lc/yuma/.

4.2 List of Preparers

Bureau of Reclamation, Yuma Area Office, Lower Colorado Region

- Cindy Flores, Manager, Water & Lands Contracts Group
- Julian DeSantiago, Supervisory Environmental Protection Specialist
- Nicholas Heatwole, Senior Environmental Protection Specialist
- Bryon Green, Senior Environmental Protection Specialist
- Andrea Kayser, Archaeologist

Harvey Consulting Group, Environmental Consultants

- Jeffrey Harvey, Ph.D., Principal & Senior Scientist
- Jennifer Reed, Production Specialist

Dahl Consultants, Inc.

- Wayne Dahl, P.E, PLS, Project Manager
- John Dahl, Construction Manager
- Susan Fox, P.E, Project Engineer

Landmark Consultants, Inc.

- Greg Chandra, P.E., M.ASCE

HELIX Environmental Planners, Inc.

- Karl Osmundson, Principal Biologist / Biology Group Manager
- Amy Mattson, Senior Biologist
- Mary Robbins-Wade, RPA, Principal Archaeologist
- Catherine Wright, Cultural Resource Specialist
- Teri Delcamp, Architectural Historian
- Trevor Gittelhough, Senior Archaeologist
- Theodore G. Cooley, Senior Archaeologist
- Camille Lill, Senior GIS Specialist

Chapter 5: References

The following general and project specific references were used in the preparation of this EA. The pertinent material is summarized throughout this Environmental Assessment where that information is relevant to the analysis of impacts of the project. References for supporting technical reports are included in each of the technical appendices and are not duplicated in this list.

California Air Pollution Control Officers Association (CAPCOA), *California Emissions Estimator Model User's Guide Version 2020.4.0*, May 2021.

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CAPCOA, Health Effects. http://www.capcoa.org/health-effects/, 2013

Dahl Consultants, Inc., *Coachella Valley Water District Draft Feasibility Study for Storage of Colorado River Water*, July 2019

Dahl Consultants, Inc., *Coachella Valley Water District, Feasibility Study to Investigate Storage Requirements for the Coachella Canal*, July 2015

Dahl Consultants, Inc., *Draft Technical Memorandum No. 1, Coachella Valley Water District (CVWD) Mid- Canal Storage Project Seepage Control Methodology for Conversions of Pools 11, 12, And 13 to an In-Line Canal Reservoir*, July 7, 2021

Department of Conservation, California Geological Survey, (fault line mapping for the Wister area in proximity to the Mid-Canal Storage Reservoir project site) (https://maps.conservation.ca.gov/cgs/fam, search Wister, CA, 2022).

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Trover, Ellen Lloyd, History, Development & Benefit Colorado River Supply & Irrigation System, prepared for the Coachella Valley Water District, 2016

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U.S. Department of the Interior, Bureau of Reclamation, Record of Decision for the Coachella Canal Lining Project, 2002;
(See: http://www.riversimulator.org/Resources/LawOfTheRiver/HooverDamDocs/Supplements/2002RecordOfDecisionCoachellaCanalLiningProject.pdf).

World Population Review, www.WorldPopulationReview.com/us-cities/niland-ca-population, and www.WorldPopulationReview.com/us-cities/brawley-ca-population, accessed February 2023

Appendix A:

Issue Scoping Request Letter

United States Department of the Interior

BUREAU OF RECLAMATION
Yuma Area Office
7301 Calle Agua Salada
Yuma, AZ 85364

IN REPLY REFER TO:
YAO-7200
2.1.4.13

06/06/2022

VIA ELECTRONIC MAIL ONLY

Subject: Issue Scoping Request for the Coachella Valley Water District Mid-Canal Storage Project

Dear Interested Party:

This letter is to inform you that the Coachella Valley Water District (CVWD) has applied for approval from the U.S. Bureau of Reclamation's (Reclamation) Yuma Area Office for modifying a segment of the Coachella Canal (Canal) for the purposes of construction and future operation and maintenance of a 728-acre-foot water storage reservoir within the existing Canal's prism. Project is located entirely on land subject to Reclamation's jurisdiction (see Enclosure 1 for project location). Because the Proposed Action is located on Reclamation-managed land it is subject to review and determination under NEPA (40 Code of Federal Regulations [C.F.R.] Parts 1500 et seq.) and Reclamation's NEPA Handbook (Reclamation February 2012). An Environmental Assessment is being prepared.

The Mid-Canal Storage Project is proposed as an inline reservoir between Check 11 (Mile Post 54.6) and Check 14 (Mile Post 59.5) of the existing Coachella Canal. The reservoir will be formed by removing the existing embankment between the existing lined canal with the original earthen canal section to form a single wide trapezoidal section. The materials removed will be used to construct more gradual canal side slopes (3:1) and raise the invert (2 feet higher). Existing check structures and siphons will remain in place. Check 11 will serve as the inlet control structure and Check 14 will be the outlet control structure. The newer siphons (11, 12, & 13) will continue to be used to convey flow through the reservoir, with siphons 12 and 13 dividing the reservoir into three cells (see Enclosure 2). This location was selected for several reasons:

- Well-situated in CVWD's canal delivery system, which will provide valuable regulatory storage that is easily used.
- Readily adaptable existing facilities –
  - Relatively new check structures already in place
  - Large cross section geometry, combining the old canal and the new canal to provide ample storage volume
- Flow regulation using gravity flow both into and out of the reservoir.
- Soils in this reach of the Coachella Canal contain impermeable clay, so the reservoir can be constructed with material excavated from the site without a PVC or concrete liner.
- Retirement of the concrete canal lining will reduce future potential lining replacement costs for this reach of the canal.
- Proposed project area will be located within previously disturbed areas and confined to the Canal's right-of-way.

The proposed Canal storage cells will be owned by the Bureau of Reclamation with operations and maintenance (O&M) to be managed by CVWD.

Project Objectives

CVWD has determined that the Mid-Canal Storage Project will significantly enhance water operations with direct operational and maintenance cost savings. Benefits will include:

- Elimination of recurring lining repairs that have exceeded $4M to date. It will also help decrease water level fluctuations that can cause lining damage.

- Normal Operational Benefits
  - Water storage to help manage large, rapid delivery flow changes.
  - Compensate for loss of in-channel storage caused by the Canal Lining Project.
  - Supply shortages in the middle and lower ends of the Coachella Canal delivery system and will help attenuate large flow changes that might otherwise exceed drawdown criteria or exceed capacity near the canal's downstream end.
- Reduction in potential for CVWD Water Allocation losses at times when significant emergency cuts to CVWD orders are required (such as large rainfall events).

Frost Events – Although difficult to quantify, CVWD's ability to draw from this new source of stored water could significantly reduce potential crop damage – commonly estimated as a very high potential loss.

As part of its Environmental Assessment (EA) process, Reclamation is inviting agencies, organizations, and the public that have an interest in this area to provide comments to help identify key issues of concern to address in the EA.

Attached are maps showing the project location and project features. If you have any questions or comments, or would like to be placed on the mailing list for this project, please contact Mr. Nicholas Heatwole, Environmental Protection Specialist, by telephone at (928) 343-8111 or by electronic mail at nheatwole@usbr.gov. Although comments are accepted throughout the NEPA process, we encourage written comments specific to this scoping letter be provided by July 8, 2022.

Individuals in the United States, who are deaf, deafblind, hard of hearing, or have a speech disability may dial 711 (TTY, TDD, or TeleBraille) to access telecommunication relay services. Individuals outside the United States should use the relay services offered within their country to make international calls to the point-of-contact in the United States.

Sincerely,

Christopher M. Wallis, Chief
Resources Management Office

Enclosures – 2

Identical Letter Sent To:

Mr. Tim Gilloon,
Field Manager
Bureau of Land Management
Palm Springs – South Coast Field Office
1201 Bird Center Drive
Palm Springs, CA 92262

Mr. Vincent James
Division Supervisor,
U.S. Fish and Wildlife Service
Colorado Desert Division
777 E. Tahquitz Canyon Way, Suite 208
Palm Springs, CA 92262

Ms. Chris Bogan
Right-of-Way Manager
Coachella Valley Water District
75-515 Hovley Lane East
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Mr. William Patterson
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Mr. Charles Land
California Department of Fish and Wildlife,
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Ms. Jacquelyn Barnum
Director of Planning and Development
Cabazon Band of Mission Indians
84-245 Indio Springs Parkway
Indio, CA 92203

Mr. Thomas Tortez
Tribal Chairperson
Torres-Martinez Desert Cahuilla Indians
P.O. Box 1160
Thermal, CA 92274

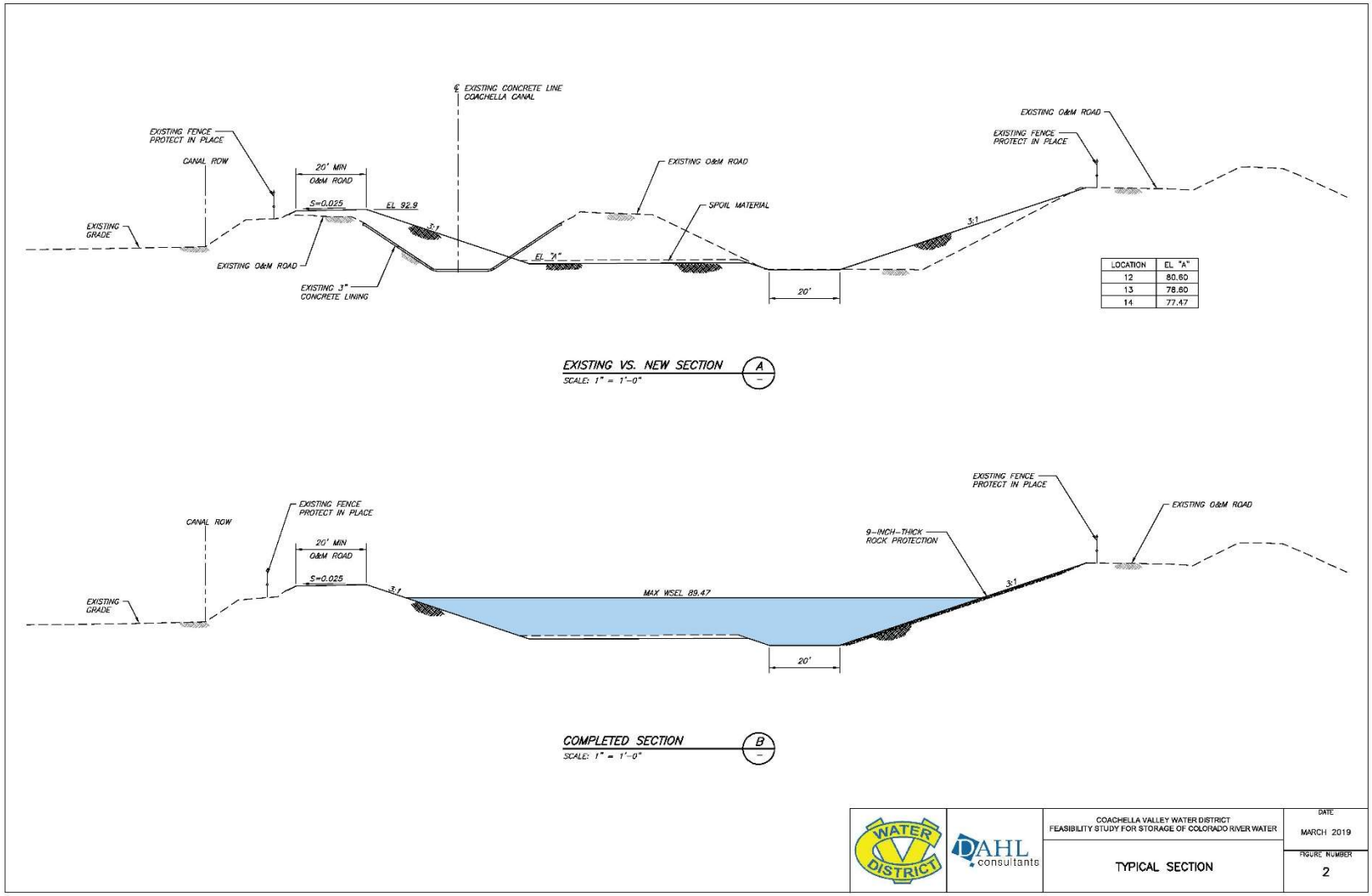
Mr. Mark Lancaster
County of Riverside,
Transportation and Land Management Department
4080 Lemon street, 8th Floor
Riverside, CA 92501

Ms. Mojgan Poursadighi
Project Manager
San Diego County Water Authority
4677 Overland Ave
San Diego, CA 92123

Enclosure 1: Mid-Canal Project Location Map



Enclosure 2: Mid-Canal Storage Project Existing and Proposed New Cross Section



Appendix B:

Biological Resources Assessment

HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
Suite 200
La Mesa, CA 91942
619.462.1515 **tel**
619.462.0552 **fax**
www.**helixepi**.com

August 2, 2022 03892.00010.001

Jeffrey G. Harvey, Ph.D.
Principal & Senior Scientist
Harvey Consulting Group
81776 Corte Valdemoro
Indio, California 92203

Subject: Biological Resources Report for the Coachella Canal Mid-Canal Storage Project

Dr. Harvey:

This report presents the results of a biological resources technical study completed by HELIX Environmental Planning, Inc. (HELIX) for the Coachella Canal Mid-Canal Storage Project (project) located east of the Salton Sea in the community of Wister in Imperial County, California (Figure 1, *Regional Location*). The project is a proposed expansion of the Coachella Canal by way of removing the berm between the original unlined canal and a more recently lined parallel canal. Once the berm has been removed, an approximate 120-acre water storage area comprised of three cells will be created along the length of the canal between Check 11 (MP 54.6) and Check 14 (MP 59.5). This report incorporates the biological analysis for the existing lined canal presented in its Environmental Impact Statement/ Environmental Impact Report (EIS/EIR; United States Department of the Interior, Bureau of Reclamation [Reclamation] and Coachella Valley Water District [CVWD] 2001). This report intends to summarize the existing biological resources within the project site or site and provide an analysis of the proposed impacts in accordance with the California Environmental Quality Act (CEQA) and other applicable federal, state, and local policies.

INTRODUCTION

Project Location

The project site, also referred to herein as the project area, is located in the community of Wister, in Imperial County (Figure 1). The approximately 120-acre project area is within Assessor's Parcel Numbers (APNs) 003-050-018, 003-050-025, 003-120-014, 003-120-022, 003-130-006, 003-200-047, and 003-210-001, and bordered by Gasline Road to the east and Coachella Canal Road to the west (Figure 2, *Aerial Photograph*). The project is located in Township 9S, Range 14E, East ½ of Section 36; SW ¼ of SW ¼ of Section 31; East ½ of Section 6; Southwest 1/4 of Section 5; Northeast ¼ of Section 8; South ½ of Section 9; Northwest ¼ of Section 15, on the U.S. Geological Survey (USGS) 7.5' Wister quadrangle (USGS 2021;

Figure 3, *USGS Topography*). The U.S. Navy's Chocolate Mountain Aerial Gunnery Range (CMAGR) sits adjacent to the eastern edge of the project. The project area is located outside of Critical Habitat designated by the U.S. Fish and Wildlife Service (USFWS) and outside of other lands targeted for conservation under the Coachella Valley Multiple Species Habitat Conservation Plan (MSHCP) or other regional plans.

Project Description

The Coachella Canal is a branch of the All-American Canal that brings water from the Lower Colorado River into the Imperial and Coachella valleys. The Coachella Canal is owned by the U.S. Bureau of Reclamation (Reclamation) and operated and maintained under contract by the CVWD. The Coachella Canal Lining Project (CCLP) is a water conservation project completed under an agreement between Reclamation, Coachella Valley Water District (CVWD), the San Diego County Water Authority (Water Authority) and the Indian Water Authority (IWA), (project applicants). CCLP construction was completed in 2006, consisting of a parallel 32-mile-long segment of a concrete-lined canal that replaced the adjacent original earthen canal as a means of reducing seepage losses to conserve water and make that water available for transfer to the Water Authority.

A ±4.5-mile segment of the lined canal between check structures 11 and 14 crosses heavy clay soils that shrink and swell seasonally, resulting in cracked panels of the concrete lining that have required significant maintenance. In addition, the canal has very limited operational flexibility due to its lack of storage capability. The purpose of the proposed project is to remove the concrete lining through the segments between check structure 11 and check structure 14 solving the maintenance problems, and to remove the berm between the original earthen canal and the lined canal to create a storage reservoir providing substantially improved operational flexibility. The estimated total footprint of the storage system to be developed is approximately 120 acres, with a storage capacity of approximately 728 acre-feet.

The project is proposed as an inline reservoir between Check 11 (Mile Post 54.6) and Check 14 (Mile Post 59.5). The reservoir will be formed by removing the existing embankment between the existing lined canal and the original earthen canal section to form single-wide trapezoidal sections. The materials removed will be used to construct more gradual canal side slopes (3:1) and raise the invert (two feet higher). Existing check structures will remain in place. Check 11 will serve as the inlet control structure and Check 14 will be the outlet control structure. The newer CCLP check structures (11, 12, & 13) will continue to be used to convey flow through the reservoir, with check structures 12 and 13 dividing the reservoir into three cells.

All work will be confined within the existing canal right-of-way (ROW), including the fence line on the western perimeter and the existing operations and maintenance road (Gas Line Road) just outside the fence line on the eastern side. Three other elements of the area of potential effects outside of the existing ROW include (1) an existing staging area near the northern end of the project developed for the CCLP, a portion of which is still in use as an equipment storage yard by CVWD; (2) the existing and regularly used County road that parallels the canal (Coachella Canal Road) that will be used for transport from the staging area to the work site; and (3) existing rock rubble piles located along the west side of the canal ROW north of the project area at check 24. That rock will likely be used as source material for bank armoring on the west-facing eastern edge of the original canal as it is converted into the storage

reservoir. If needed, additional rock will be obtained from a commercial source. For either source, the material will be transported to the project area via the existing County Road.

The existing lined canal will be combined with the old canal prism to create a wide section that will serve as an inline reservoir between Check 11 and Check 14. This will create a flow-through reservoir with all canal flow passing through the reservoir. Removing the existing embankment between the two canals provides significant storage volume.

Embankments near Check 14 will be raised to maximize the amount of useful storage and allow for a maximum reservoir level that is three feet higher than the present canal design water level. Since the new reservoir invert is approximately two feet higher than the existing concrete canal invert, the maximum water depth in the reservoir is 12 feet at Check 14. Modifications to check structures 12 and 13 and Check 14 will be required to accommodate the higher water levels and raised inverts.

The reservoir will have three cells separated by check structures 12 and 13. With no additional control structures added at these two check structure inlets, the water surface will be almost level and at about the same elevation in all three cells during low-flow conditions (<400 cfs). At higher flow rates, the water surface will step down from upstream cell to downstream cell due to head loss through the check structures. The size of these steps will increase with flow rate, up to about a six-inch drop between cells at maximum canal flow. The three-cell reservoir will resemble a wide canal with three pools, except the water surface within each cell will be almost horizontal due to the increased cell width, resulting in low flow velocity.

METHODS

Pre-Survey Investigation

Prior to conducting the general biological survey, HELIX performed a thorough review of relevant maps, databases, and literature pertaining to biological resources known to occur within the project vicinity. Recent and historical aerial imagery (Google 2022), topographic maps (U.S. Geological Survey 2021), soils maps (U.S. Department of Agriculture [USDA] 2019), and other maps of the project area and vicinity were acquired and reviewed to obtain updated information on the natural environmental setting. In addition, a query of sensitive species and habitats databases within five miles of the project area was conducted, including the USFWS Critical Habitat Portal (2021a; Attachment A), USFWS species status lists (USFWS 2022b; Attachments B and C), USFWS Information for Planning and Consultation database (IPaC; Attachment D; USFWS 2022a), California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB; CDFW 2022a; Attachments B and E), and California Native Plant Society (CNPS) Electronic Inventory (CNPS 2022; Attachment F). The USFWS' National Wetlands Inventory (NWI) was also reviewed (USFWS 2021b; Attachment G) to obtain information regarding sensitive biological resources known to occur within the vicinity of the project area. The EIS/EIR for the Coachella Canal Lining Project was also referenced (Reclamation and CVWD 2001).

General Biological Survey

A general biological survey of the study area, which encompassed the approximately 120-acre project area and immediate vicinity (approximately 100 feet beyond the project site), was completed by HELIX biologist Amy Mattson on January 6, 2022. The survey focused on inventorying existing vegetation communities and land cover types; qualifying habitat suitability and the potential for the occurrence of sensitive species, including federally-listed species protected under the Endangered Species Act; preliminarily identifying potential wetlands and other potential jurisdictional waters, including waters of the U.S. protected under the Clean Water Act (CWA); and identifying other sensitive biological resources, such as potential nesting habitat for bird species protected under the Migratory Bird Treaty Act (MBTA). Vegetation mapping was conducted during the general biological survey and mapped on one-inch equals 150 feet scale aerial imagery. Vegetation mapping was conducted using a minimum mapping unit of 0.1 acre for uplands and 0.01 acre for wetlands. The study area was surveyed from alongside the canal with the aid of binoculars and observed or detected plant and animal species were recorded in field notes. Locations of sensitive plant and animal species were recorded during the survey if detected. Animal identifications were made in the field by visual observation or detection of calls, burrows, tracks, scat, and other animal sign. Plant identifications were made in the field. Physical parameters assessed included vegetation and soil conditions, and presence of indicator plant and animal species, slope, aspect, and hydrology. Representative photos were taken and are included as Attachment H.

Preliminary Jurisdictional Delineation

Ms. Mattson completed a preliminary jurisdictional delineation of the study area concurrent with the general biological survey. The preliminary delineation focused on assessing ordinary high-water mark and other hydrology indicators, riparian and wetland vegetation, surface soils, topography, and other data, but did not include excavation of soil pits and establishment of wetland sampling points, with the intent to establish conservative limits of potential jurisdiction.

Prior to beginning fieldwork, HELIX reviewed aerial photographs (1"= 100' scale), topographic maps and data (1"= 100' scale), and National Wetlands Inventory maps to assist in determining the location of potential jurisdictional areas in the project area. The field delineations were conducted to identify and map potential water and wetland resources that could be subject to U.S. Army Corps of Engineers (USACE) jurisdiction pursuant to Section 404 of the CWA (33 USC 1344), Regional Water Quality Control Board (RWQCB) jurisdiction pursuant to CWA Section 401 or State Porter-Cologne Water Quality Control Act, and CDFW jurisdiction pursuant to Sections 1600 *et seq.* of the California Fish and Game Code (CFG Code). Areas generally characterized by depressions, drainage features, and riparian and wetland vegetation, were evaluated.

Survey Limitations

The lists of species identified are not necessarily comprehensive accounts of all species that occur or move through the site, as species that are nocturnal, secretive, or seasonally restricted may not have been observed.

Nomenclature

Nomenclature used in this report follows Baldwin et al. (2012) for Latin names of plants and Holland (1986) for vegetation communities. Animal nomenclature follows North American Butterfly Association (2020) for butterflies, CNDDB (2022c) for fish, Center for North American Herpetology (Taggart 2015) for reptiles and amphibians, American Ornithological Society (2021) for birds, and Bradley et al. (2017) for mammals. Sensitive plant and animal status is from the CDFW's CNDDB (2022a-c).

RESULTS

Existing Conditions

General Land Use and Disturbance

The study area is characterized by disturbed and developed land, which has been graded during the construction of the canal and the existing operations and maintenance roadway to the east of the canal. The study area includes the original earthen and the newer lined portion of the Coachella Canal, canal facilities, wildlife drinkers (shallow lined ponds providing water for wildlife), and the road. The original and lined canals and facilities are enclosed by perimeter fencing. Between the aboveground sections of the canal, check structures allow canal water to flow beneath desert washes. These open areas between the fenced, aboveground canal sections have been subjected to disturbance from vehicle traffic and erosion. Evidence of heavy disturbance was observed throughout the study area, including grading and/or vegetation removal within the original earthen canal, and vehicle traffic on the existing roads and across the underground portions of the canal.

Except for the Coachella canal, which extends north and south from the study area, and Coachella Canal Road that parallels the west side of the canal, the immediate surrounding area is undeveloped and comprised of desert scrub and generally unvegetated desert washes. Agricultural lands are located approximately half a mile to the west of the study area, followed by the east highland canal, State Route 111, the Imperial National Wildlife Refuge (Wister Unit), and the Salton Sea occurring further west. Lands to the north and east appear to remain undeveloped but are part of the CMAGR. Interstate 10 and State Route 78 occur further to the north and east. The Imperial National Wildlife Refuge occurs approximately five miles west of the site. The nearest critical habitat unit designated by the USFWS is for desert tortoise (*Gopherus agassizii*), approximately 12.5 miles to the east of the site, on the eastern side of the Chocolate Mountains.

Topography and Soils

The study area is a slight incline, with elevations between 85 to 95 feet above mean sea level. Soil mapping is not available for the study area (U.S. Department of Agriculture 2022). In general, prior to modern disturbance, the soils in the study area consisted of unconsolidated alluvium and colluvium derived from metamorphic bedrock or Cenozoic-age lacustrine and aeolian sedimentary formations (Morton 1977). These soils are mostly moderate to excessively drained sands, gravelly sands, sands with cobbles, fine sands, and silty clays in lacustrine basin areas. In some areas, a clay layer occurs, buried below a surface deposit of sand, gravel, or cobble materials. Soils in the study area may differ due to the construction of the canal.

Vegetation Communities/Habitat Types

Vegetation communities or habitat types are classified in this report according to Holland (1986), Oberbauer et al. (2008), and general classifications interpreted by HELIX. Two vegetation communities and land cover types were mapped within the study area during the general biological survey: disturbed habitat and urban/developed land (Figures 4a through 4c, *Vegetation Communities*). A brief description of each is provided below.

Disturbed Habitat

Disturbed habitat includes land cleared of vegetation (e.g., dirt roads); land containing a preponderance of non-native plant species, such as non-native grasses and forbs, ornamentals, or other ruderal (weedy) exotic species that take advantage of disturbance (previously cleared or abandoned landscaping); or land showing signs of past or present usage that removes any capability of providing viable habitat. This classification includes ruderal (weedy) areas dominated by species typical of highly disturbed sites. This includes areas that have been physically disturbed (by previous anthropogenic activity) and are no longer recognizable as a native or naturalized vegetation association but continue to retain a soil substrate (Oberbauer et al. 2008). Within the study area, disturbed habitat includes the original earthen canal, the berm between the original and current canals, the graded area alongside the canals, the existing operations and maintenance road outside of CVWD fencing, and the gaps between canal sections. Most of this vegetation community was bare except for patches of short saltcedar (*Tamarisk* sp.) in the bottom of the original earthen canal in the northern half of the study area. Scattered Russian thistle (*Salsola tragus*) and very few native plants were present in the upper slopes of the original canal: burrobush (*Ambrosia salsola*), sweetbush (*Bebbia juncea* var. *aspera*), brittlebush (*Encelia farinosa*), and desert holly (*Atriplex hymenelytra*). Few, small patches of immature cattails (*Typha* sp.), Mexican sprangle-top (*Leptochloa fusca* ssp. *uninervia*), and dock (*Rumex* sp.) were present in the original channel (generally near the artificial wildlife drinkers, which are human-made shallow lined ponds that provide an artificial water source for wildlife); however, these areas were below the threshold of the minimum mapping unit.

Urban/Developed Land

Urban/developed land includes land that has been constructed upon or otherwise physically altered to an extent that vegetation is no longer supported or limited to non-native ornamental plantings. Urban/developed land is characterized by permanent or semi-permanent structures, pavement or hardscape, and landscaped areas that often require irrigation. Areas where no natural land is evident due to a large amount of debris or other materials being placed upon it may also be considered developed. Within the study area, urban/developed land includes the existing lined portion of Coachella Canal, facilities, and wildlife drinkers (shallow lined ponds providing water for wildlife).

General Fauna

The study area is generally disturbed and does not provide high-quality habitat for animal species. Overall, animal activity during the general survey was very low. Animal species observed or otherwise detected in the study area consisted of four bird species: red-tailed hawk (*Buteo jamaicensis*), turkey

vulture (*Cathartes aura*), American crow (*Corvus brachyrhynchos*), and black phoebe (*Sayornis nigricans*).

Sensitive Biological Resources

Sensitive Natural Communities

Sensitive natural communities include land that supports unique vegetation communities or the habitats of rare or endangered species or subspecies of animals or plants as defined by Section 15380 of the CEQA Guidelines.

The study area does not support any sensitive natural communities. Furthermore, no natural community types occur in the study area, and no USFWS-designated Critical Habitat occurs on or immediately adjacent to the project site.

Special-Status Plant and Animal Species

Special-Status Plant Species

Special-status plant species are those listed as federally threatened or endangered by the USFWS; state listed as threatened or endangered or considered sensitive by the CDFW; and/or, are CNPS California Rare Plant Rank (CRPR) List 1A, 1B, or 2 species, as recognized in the CNPS's Inventory of Rare and Endangered Vascular Plants of California and consistent with the CEQA Guidelines.

A database query of special-status plant species records within five miles of the study area and/or occurring in the IPaC for the study area, CNPS plant species occurring within the Wister quadrangle, and species listed within the EIS/EIR for the CCLP generated records for 17 species (Attachments C, D, E, and F). These are presented in Attachment I.

No special-status plant species were observed during the general biological survey, and none of the 17 species evaluated have a moderate or high potential to occur within the study area due to very poor habitat conditions for plant species. The study area is characterized by an existing roadway that is regularly used and maintained, a lined canal, the original earthen canal that was disturbed during construction of the lined canal and is no longer supplied by a water source, and disturbed washes crossing the project alignment (over the canal) that are not vegetated and are subject to vehicle disturbance and scouring. Construction of the canals and roadway, as well as ongoing disturbances (i.e., vehicle use and erosion), have modified the landscape, soil, and vegetation composition of the study area, such that the appropriate vegetation community makeups and hydrology regimes associated with special-status plant species do not exist. As such, additional focused and rare plant surveys are not warranted and the project is anticipated to have no impact on special-status plant species.

Special-Status Animal Species

Special-status animal species are those listed as threatened or endangered, proposed for listing, or candidates for listing by the USFWS, USFWS birds of conservation concern, and considered sensitive animals by the CDFW. A database query of special-status animal species records within 5 miles of the

study area and/or occurring in the IPaC for the study area, and species listed within the EIS/EIR for the Coachella canal lining project generated records for 42 species (Attachments C, D, and E). These are presented in Attachment J.

No special-status animal species, including the nine federally listed species and candidate species, were observed during the general biological survey, and none of the 42 species evaluated have a moderate or high potential to occur within the study area. The potential for special-status animal species to occur within the study area is not likely or low due to development, poor habitat conditions for animals, and existing perimeter fencing. None were identified in the EIS/EIR for the CCLP as occurring within the study area.

As mentioned above, the study area is characterized by an existing roadway that is regularly used and maintained, a lined canal, the original earthen canal that was disturbed during construction of the lined canal and is no longer supplied by a water source, and disturbed washes crossing the project alignment (over the canal) that are not vegetated and are subject to vehicle disturbance and scouring. The road, canals, and washes provide limited opportunity for breeding, foraging, dispersal, and other life-history functions required by most animal species, although wildlife drinkers within the study area (east of the canal) do provide access to water. The disturbances to the area have altered the vegetation, leaving limited shelter, breeding, and foraging opportunities for most animals.

The federal and California State listed threatened desert tortoise was the only species evaluated as having a low potential to occur in the study area due to the presence of marginal habitat outside of canal fencing. These areas are where check structures allow canal water to flow beneath desert washes. These open areas have been subjected to previous disturbance from the construction of the original canal and the canal lining project, as well as ongoing disturbance from vehicles traveling between the existing operations and maintenance road (Gas Line Road) and Coachella Canal Road, and erosion. Vegetation is lacking in both of the washes and on the operations and maintenance road to the east of the canals. The other portions of the study area are fenced, which could act as a barrier to desert tortoise. Areas compacted and/or lined for the canal are presumably unsuitable for tortoise. Although desert tortoise may occur in washes, the extensive disturbance in these areas significantly degrades the habitat conditions for the species and make it unlikely that tortoise individuals would sustain on the site. Additionally, the study area occurs approximately 3.2 miles outside of this species' range.

As such, additional focused and protocol-level surveys are not warranted and the project is anticipated to have no impact on special-status animal species.

Nesting Birds and Raptors

Limited portions of the study area contain marginal nesting habitat (e.g., salt cedar shrubs, potential fossorial burrows, structures) for several common bird species, including raptors, protected under the MBTA and CFG Code. Nesting birds with potential to nest on or immediately adjacent to the site include common passerines (i.e., songbirds), such as black-tailed gnatcatcher (*Polioptila melanura*) and comment raptors (i.e., birds of prey), such as red-tailed hawk (*Buteo jamaicensis*).

Jurisdictional Waters and Wetlands

In the context of this assessment, jurisdictional waters and wetlands include waters of the U.S., including wetlands, regulated by the USACE pursuant to CWA Section 404; waters of the State regulated by the RWQCB pursuant to Section 401 of the CWA and State Porter-Cologne Water Quality Control Act (Porter-Cologne); and/or streambed and riparian habitat regulated by the CDFW pursuant to Sections 1600 et seq. of CFG Code.

Waters of the U.S.

The current project occurs within the area previously evaluated for the Coachella Canal Lining Project (Reclamation and CVWD 2001). As part of the canal lining project' EIS/EIR analysis, the biological workgroup coordinated with the USACE and U.S. Environmental Protection Agency regarding the potential effect of the canal lining project on aquatic resources. At the conclusion of that process, the USACE advised Reclamation of its determination that the CCLP was not subject to its jurisdiction under Section 404 of the CWA. The USACE would have therefore made a jurisdictional determination that the Coachella Canal does not represent waters of the U.S. and that they do not regulate activities within the Coachella Canal pursuant to CWA Section 404.

The current regulatory guidance on the CWA Section 404 follows that which pre-dates the 2015 guidance. The CCLP was evaluated under the pre-2015 regulatory regime, before the Navigable Waters Protection Rule of 2020 was adopted. On August 30, 2021, a court order in the case of *Pascua Yaqui Tribe v. U.S. Environmental Protection Agency* vacated and remanded the Navigable Waters Protection Rule. In October 2021, the U.S. District Court of the Northern District of California vacated the EPA's 2020 Clean Water Act Section 401 Certification Rule, which once again reinforced a return to a pre-2015 regulatory regime to be more consistent with the statutory text of the 1972 CWA (EPA 2022). Finally, on April 6, 2022, the U.S. Supreme Court issued a stay of the October 2021 order that applies nationwide; therefore, the current interpretation of waters of the U.S. is once again consistent with the pre-2015 definition (EPA 2021).

Guidance on the interpretation of the waters of the U.S. definition occurred subsequent to the CCLP, following multiple court cases. In 2001 and again in 2003, the agencies developed guidance to address the definition of "waters of the United States" under the CWA following the *Solid Waste Agency of Northern Cook County* (S*WANCC)* Supreme Court decision. This guidance indicates that CWA jurisdiction should not be asserted over isolated waters that are both intrastate and non-navigable, where the sole basis available for asserting CWA jurisdiction rests on any of the factors listed in the ''Migratory Bird Rule.'' CWA jurisdiction should be asserted over traditional navigable waters (and adjacent wetlands) and, generally speaking, their tributary systems (and adjacent wetlands).

In 2007 and 2008 subsequent to the *Rapanos v. United States*, and *Carabell v. United States* Supreme Court decisions (Rapanos), the USACE and EPA provided additional guidance for implementing the definition of "waters of the United States" under the CWA. Guidance following SWANCC and Rapanos is not expected to change the regulatory framework for the USACE's previous determination on the Coachella Canal.

As it still stands, the Coachella Canal is an artificially created, serviceable facility created wholly within uplands. It is a controlled system whereby flows are regulated and the entire system can be manipulated for the delivery of water for storage and distribution. It was not constructed to collect or convey natural flows. As such, it does not meet the definition of a relatively permanent water or tributary to a relatively permanent water. It also does not meet the definition of a traditional navigable water. Therefore, the Coachella Canal still does not meet the definition of waters of the U.S. and activities associated with the proposed project would not be expected to be regulated by the USACE pursuant to Clean Water Act Section 404.

Based on the current regulatory guidance, the Coachella Canal still does not represent waters of the U.S. and the proposed project's activities would not be regulated by the USACE pursuant to CWA Section 404.

Waters of the State

The State Water Resources Control Board (SWRCB) recently published their definition of waters of the State and procedures (collectively, "procedures") for determining whether an activity could be regulated pursuant to CWA Section 401, Porter-Cologne, and applicable sections of the California State Water Code (SWRCB 2019). In their procedures, the SWRCB asserts that aquatic resources "specifically identified in a water quality control plan as a wetland or other water of the State" would be considered waters of the State. These would include natural and artificial waters of the State that meet the definitions in the procedures. The Coachella Canal is an artificial feature identified in the Colorado River Basin Plan as a tributary to Lake Cahuilla, which serves as a storage reservoir to regulate irrigation water demands and is also used for recreational purposes. Therefore, although not considered to be a water of the U.S., according to the SWRCB procedures, Coachella Canal is expected to be considered an artificial water of the State and qualifying activities would be regulated exclusively pursuant to Porter-Cologne through Orders for Waste Discharge Requirements (WDRs).

The General Order for WDRs, Individual Order for WDRs, allow for exclusions to certain aspects of the procedures. The proposed project activities are expected to fit the exclusion for routine and emergency operation and maintenance activities conducted by public agencies, water utilities, or special districts that result in discharge of dredged or fill material to artificial, existing waters of the State. Meeting this exclusion means that the project proponent is not obligated to follow the specific application requirements in the procedures to request for enrollment into an Order for WDRs. However, as specified in the procedures, the project proponent would still be required to notify the RWQCB consistent with Water Code Section 13260 and avoid and minimize adverse impacts to aquatic resources and beneficial uses in implementing the activities. With the implementation of standard Best Management Practices (BMPs) and other avoidance and minimization measures incorporated into the project, the proposed activities within the concrete-lined Coachella Canal would not be expected to adversely affect waters of the State. Standard BMPs and avoidance and minimization measures may include restriction of work during dry conditions, demarcation of approved work limits, installation of temporary silt fence, sand/gravel bags, dust control, and other measures.

Streambed and Riparian Habitat

The Coachella Canal is a concrete-lined channel created specifically for the delivery and storage of water. No natural streambed or riparian habitat occurs that would meet the definitions presented in CFG Code Sections 1600 et seq. With the implementation of standard BMPs and other avoidance and minimization measures incorporated into the project, the proposed activities within the concrete-lined Coachella Canal would not be expected to adversely affect fish and wildlife resources or trigger the requirement for Notification of Lake or Streambed Alteration pursuant to CFG Code Sections 1600 et seq.

Wildlife Corridors and Linkages

Wildlife corridors connect isolated habitat and allow the movement or dispersal of plant materials and animals. Local wildlife corridors allow access to resources such as food, water, and shelter within the framework of the wildlife's daily routine and life history. For example, animals can use these corridors to travel between their riparian breeding habitats and their upland burrowing habitats. Regional corridors provide these functions over a larger scale and link two or more large habitat areas, allowing the dispersal of organisms and the consequent mixing of genes between populations. A corridor is a specific route that is used for the movement and migration of species; it may be different from a linkage in that it represents a smaller or narrower avenue for movement. A linkage is an area of land that supports or contributes to the long-term movement of animals and genetic exchange by providing live-in habitat that connects to other habitat areas. Many linkages occur as stepping-stone linkages that are made up of a fragmented archipelago arrangement of habitat over a linear distance.

No known wildlife corridors or linkages are documented within the study area, as none were described in the EIS/EIR for the CCLP, which encompasses the project area, and the study area occurs to the south of the Coachella Valley MSHCP. Nevertheless, the canal and/or its wildlife drinkers are water sources that may attract wildlife. The canal may allow for the movement of fish, as filtration systems for the canal do not exclude small fish from the canal. While the canal may allow for the movement of some wildlife up and down the canal, the canal and its surrounding fencing provide a physical barrier to most wildlife crossing the canal. Any wildlife moving toward the canal would either be deflected by the canal or pass through the gaps at the check structures. Construction of the proposed project is anticipated to take approximately a year, with interruptions to the canal flow to occur for two to three days. Thus, except for a short disruption in water flow during construction, none of these conditions would change as a result of the proposed project. Access to water would be retained on the east side of the canal during construction where wildlife drinkers are impacted by the proposed project. As a BMP during construction, temporary fencing will be placed between these temporary water sources and the project, to screen work activities from wildlife seeking to use water sources. Additionally, the completed project would retain wildlife access to water. Thus, the project site does not by itself serve as or contribute to any known or potential corridors or linkages.

APPLICABLE REGULATIONS

Based on the findings of this report, activities affecting the biological resources determined to exist or have the potential to exist within the project site could be subject to the federal, state, and local regulations discussed below.

Federal

Federal Endangered Species Act

Administered by the USFWS, the federal Endangered Species Act (ESA) provides the legal framework for the listing and protection of species identified as being endangered or threatened with extinction. Actions that jeopardize such species and their designated critical habitats are considered a "take" under the federal ESA. The project does not propose take of habitat for federally listed species.

Sections 7 and 10(a) of the federal ESA regulate actions that could harm or harass endangered or threatened species. Section 10(a) allows issuance of permits for "incidental" take of endangered or threatened species. The term "incidental" applies if the taking of the listed species is secondary to, and not the purpose of, an otherwise lawful activity. A conservation plan demonstrating how the take will be minimized and what steps taken would ensure the listed species' survival must be submitted for the issuance of Section 10(a) permits. Section 7 describes a process of federal interagency consultation for use when federal actions may adversely affect a listed species. A biological assessment is required for any major activity if it may affect listed species.

Migratory Bird Treaty Act

All migratory bird species that are native to the United States or its territories are protected under the federal MBTA of 1918, as amended under the Migratory Bird Treaty Reform Act of 2004 (Federal Record [FR] Doc. 05-5127). The MBTA is generally protective of migratory birds but does not actually stipulate the type of protection required. In common practice, USFWS places restrictions on disturbances allowed near active raptor nests.

State

California Endangered Species Act (CESA)

The CESA declares that deserving plant or animal species will be given protection by the state because they are of ecological, educational, historical, recreational, aesthetic, economic, and scientific value to the people of the state. The CESA establishes that it is state policy to conserve, protect, restore, and enhance endangered species and their habitats. Under state law, plant and animal species may be formally designated as rare, threatened, or endangered through an official listing by the California Fish and Game Commission. Listed species are given greater attention during the land use planning process by local governments, public agencies, and landowners than are species that have not been listed.

The CESA authorizes that "private entities may take plant or wildlife species listed as endangered or threatened under FESA and CESA, pursuant to a federal Incidental Take Permit (ITP) issued in

accordance with Section 10 of the FESA, if the CDFW certifies that the Incidental Take Statement (ITS) or ITP is consistent with CESA (Fish and Game Code Section 2080.1(a)).” Section 2081(b) and (c) of the CESA allows CDFW to issue an ITP for a state-listed threatened and endangered species only if specific criteria are met. These criteria can be found in Title 14 CCR, Sections 783.4(a) and (b). No Section 2081(b) permit may authorize the take of “fully protected” species and “specified birds.” If a project is planned in an area where a fully protected species or specified bird occurs, an applicant must design the project to avoid all take; the CDFW cannot provide take authorization under CESA.

The project does not propose take of habitat for State species. On private property, endangered plants may also be protected by the Native Plant Protection Act (NPPA) of 1977. Threatened plants are protected by CESA, and rare plants are protected by the NPPA; however, CESA authorizes that “Private entities may take plant species listed as endangered or threatened under the FESA and CESA through a federal ITP issued pursuant to Section 10 of the FESA, if the CDFG [California Department of Fish and Game; currently known as California Department of Fish and Wildlife] certifies that the ITS or ITP is consistent with CESA.” In addition, CEQA requires disclosure of any potential impacts on listed species and mitigation (or alternatives in the case of an EIR) that would avoid or reduce those impacts. The project is not expected to impact State listed species.

Porter-Cologne Water Quality Control Act

The State Porter-Cologne Water Quality Control Act (Porter-Cologne) provides for RWQCB regulation of features that support aquatic resources (i.e., hydrophytic vegetation, hydric soils, and wetland hydrology) but are isolated (i.e., lack downstream connectivity to traditional navigable waters of the U.S.).

California Fish and Game Code Sections 3503, 3503.5, and 3800

These sections of the California Fish and Game Code prohibit the take or possession of birds, their nests, or eggs. Disturbance that causes nest abandonment and/or loss of reproductive effort (killing or abandonment of eggs or young) is considered a take. Such a take would also violate federal law protecting migratory birds. ITPs are required from the CDFW for projects that may result in the incidental take of species listed by the state as endangered, threatened, or candidate species. The wildlife agencies require that impacts to protected species be minimized to the extent possible and mitigated to a level of insignificance.

SIGNIFICANCE OF PROJECT IMPACTS AND PROPOSED MITIGATION

This section provides a project-level biological resources impact analysis for the proposed project in support of environmental review. The issues addressed in this section are derived from Appendix G of the CEQA Guidelines. Mitigation, monitoring, and reporting requirements to eliminate or reduce project impacts to a less than significant level are also provided in this section.

CEQA Impact Significance: Special-Status Species

Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS?

Impact Analysis

Less than Significant with Mitigation. None of the special-status plant species known to occur in the region have the potential to occur on the project site, primarily due to very poor habitat conditions for plant species. The study area is characterized by an existing roadway that is regularly used and maintained; a lined canal; the original earthen canal that was disturbed during construction of the lined canal and is no longer supplied by a water source; and disturbed washes crossing the project alignment (over the canal) that are not vegetated and are subject to vehicle disturbance and scouring. Construction of the canals and roadway, as well as ongoing disturbances (i.e., vehicle use and erosion), have modified the landscape, soil, and vegetation composition of the study area, such that the appropriate vegetation community makeups and hydrology regimes associated with special-status plant species do not exist. Therefore, special-status plant species are not likely to occur, and the project would have no impact on such species.

The desert tortoise (*Gopherus agassizii*) is not likely to occur on the project site, due to previous and ongoing disturbance and degradation to on-site areas with habitat (i.e., desert wash). Habitat is lacking in the vicinity of the wildlife drinkers and on the operations and maintenance road to the east of the canals, and the aboveground canals lack habitat and are fenced, which could act as a barrier to desert tortoise. Additionally, the study area occurs approximately 3.2 miles outside of this species' range. Therefore, the desert tortoise currently has a low potential to occur based on current conditions. No impacts are anticipated on the desert tortoise; no mitigation measures are recommended.

Portions of the project site support salt cedar shrubs with the potential to support common (non-sensitive) nesting birds protected under the MBTA and CFG Code. Compliance with the MBTA and CFG Code is a regulatory requirement. Mitigation measure BIO-1 shall be completed by the project proponent to ensure that no impacts occur to nesting birds.

MM-BIO-1 If the removal of trees and/or shrubs must occur during the general passerine breeding season (February 1 to August 31) or general raptor breeding season (January 15 to July 15), a qualified biologist shall conduct a nesting bird survey within seven days of removal activities to determine the presence or absence of nesting birds. If no active nests belonging to nesting birds are found during the pre-construction surveys, then no additional action shall be required. If an active nest is found, then the nest and an

appropriate buffer shall be avoided. The initial size of the avoidance buffer shall be 300 feet for passerines and 500 feet for raptors, and shall be reduced at the discretion of the qualified biologist depending on the species and level of disturbance. Activities shall be allowed to proceed within the avoidance buffer once the young have fledged and the nest is confirmed no longer active, as determined by the qualified biologist.

CEQA Impact Significance: Sensitive Natural Communities

Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFW or USFWS?

Impact Analysis

No Impact. Project development would be restricted to common upland landforms that are not natural riparian habitat types or sensitive natural communities and do not require mitigation. Therefore, no impacts to riparian habitat or sensitive natural communities would occur.

Mitigation is not required.

CEQA Impact Significance: Wetlands

Would the project have a substantial adverse effect on federally-protected wetlands as defined by Section 404 of the federal CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption or other means?

Impact Analysis

No Impact. The proposed project consists of the modification of an existing canal that is an artificially created, serviceable facility created wholly within uplands, which crosses multiple desert washes. This section of the canal was not determined to be USACE jurisdictional when evaluated for the CCLP, and current regulatory guidance on the CWA Section 404 follows the same pre-2015 regulatory regime. Therefore, the project would have no impact on federally-protected wetlands as defined by Section 404 of the federal CWA.

Although the Coachella Canal is expected to be considered an artificial water of the State regulated pursuant to Porter-Cologne through WDRs, the project is expected to qualify as an exclusion for routine and emergency operation and maintenance activities conducted by public agencies, water utilities, or special districts that result in discharge of dredged or fill material to artificial, existing waters of the State. No adverse effects on waters of the State are anticipated with the implementation of standard BMPs and other avoidance and minimization measures incorporated into the project. Standard BMPs and avoidance and minimization measures may include conducting work during dry conditions, demarcation of approved work limits, installation of temporary silt fence, sand/gravel bags, dust control, and other measures.

Similarly, no natural streambed or riparian habitat that would meet the definitions presented in CFG Code Sections 1600 et seq. is present, and the project would not be expected to adversely affect fish and wildlife resources with implementation of BMPs and other avoidance and minimization measures.

Given the nature of the proposed project, with no changes or effects on the existing check structures and the fact that the canal will remain in use to convey Colorado River water (except for the few days required to complete grading to create the storage reservoir), there should be no potential to have a significant impact on any jurisdictional waters.

CEQA Impact Significance: Wildlife Movement and Nursery Sites

Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory corridors, or impede the use of native wildlife nursery sites?

Impact Analysis

Less than Significant. The project site encompasses disturbed and developed land outside of any areas targeted for conservation or designated as a corridor or linkage. Although the canal and/or its wildlife drinkers are water sources that may be attractive to desert wildlife, and fish may pass through the canal (since filtration systems for the canal do not exclude small fish), the finished proposed project would not change these conditions for wildlife. Access to water would be retained where wildlife drinkers are impacted by the proposed project, and this section of the canal will continue to flow between the upstream and downstream portions of the canal. Thus, except for a two- to three-day disruption in flow during construction, none of these conditions would change as a result of the proposed project. Therefore, the potential impacts of the project on wildlife movement and nursery sites would be less than significant.

Mitigation is not required.

CEQA Impact Significance: Local Policies and Ordinances

Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Impact Analysis

No Impact. There are no local policies or ordinances that are applicable to the project based on the findings of the biological resources technical study. Therefore, the project would have no conflict and no impact.

Mitigation is not required.

CEQA Impact Significance: Adopted Conservation Plans

Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?

Impact Analysis

No Impact. The project does not occur within the boundaries of any adopted conservation plans. No impact would occur.

Mitigation is not required.

CLOSING

We appreciate the opportunity to provide you with this letter report. Please do not hesitate to contact me at (619) 462-1515 if you have any questions or require further assistance.

Sincerely,



Amy Mattson
Senior Scientist

Attachments:

Figure 1: Regional Location
Figure 2: Aerial Photograph
Figure 3: USGS Topography
Figures 4a-c: Vegetation Communities

Attachment A: Critical Habitat
Attachment B: Sensitive Species
Attachment C: USFWS Database Query
Attachment D: IPaC Report
Attachment E: CNDDB Database Query
Attachment F: CNPS Database Query
Attachment G: National Wetands Inventory
Attachment H: Representative Site Photos
Attachment I: Special Status Plant Species with Potential to Occur
Attachment J: Special Status Animal Species with Potential to Occur

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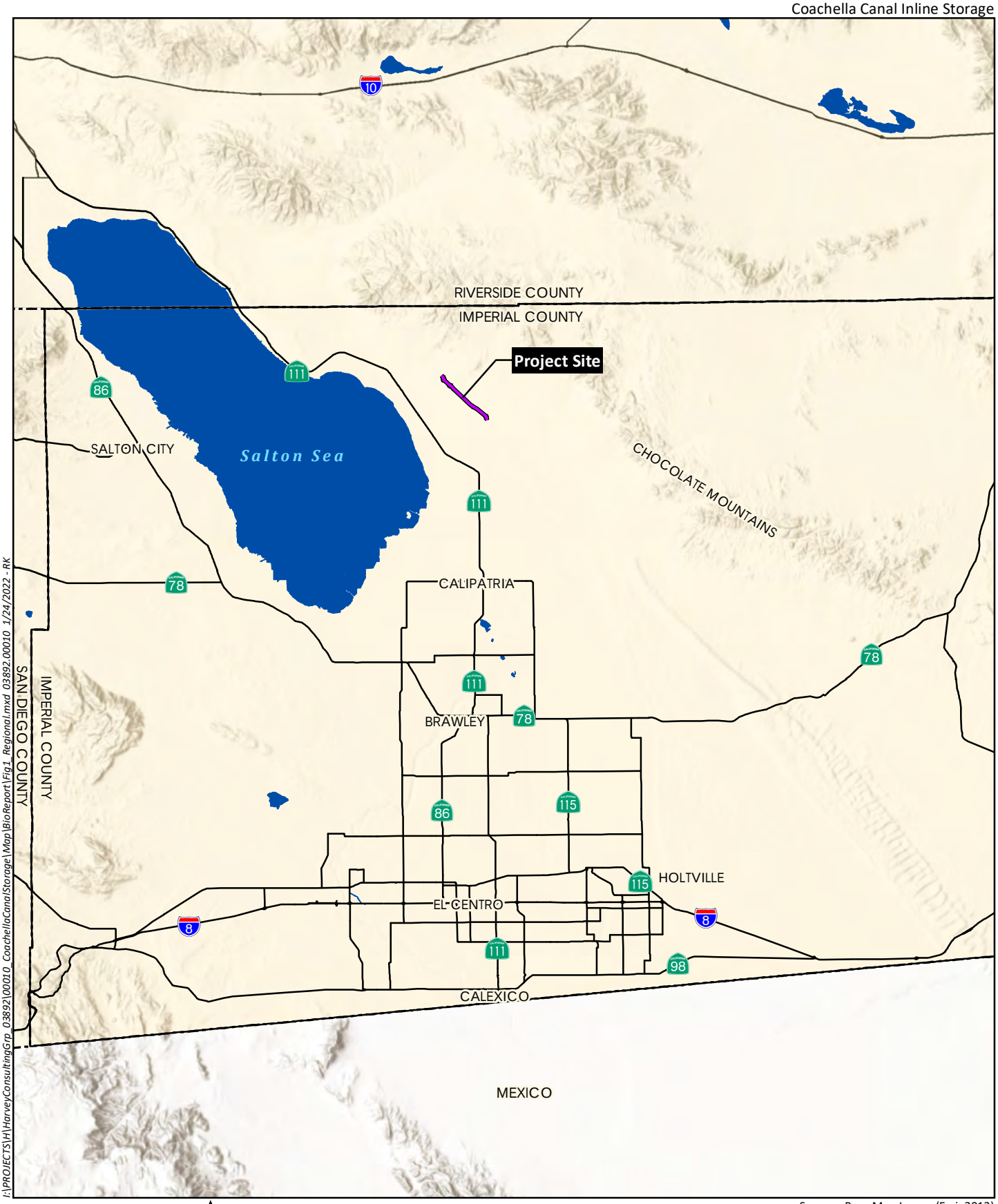
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Figures



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0 10 Miles

Source: Base Map Layers (Esri, 2013)

HELIX Environmental Planning

Regional Location

Figure 1



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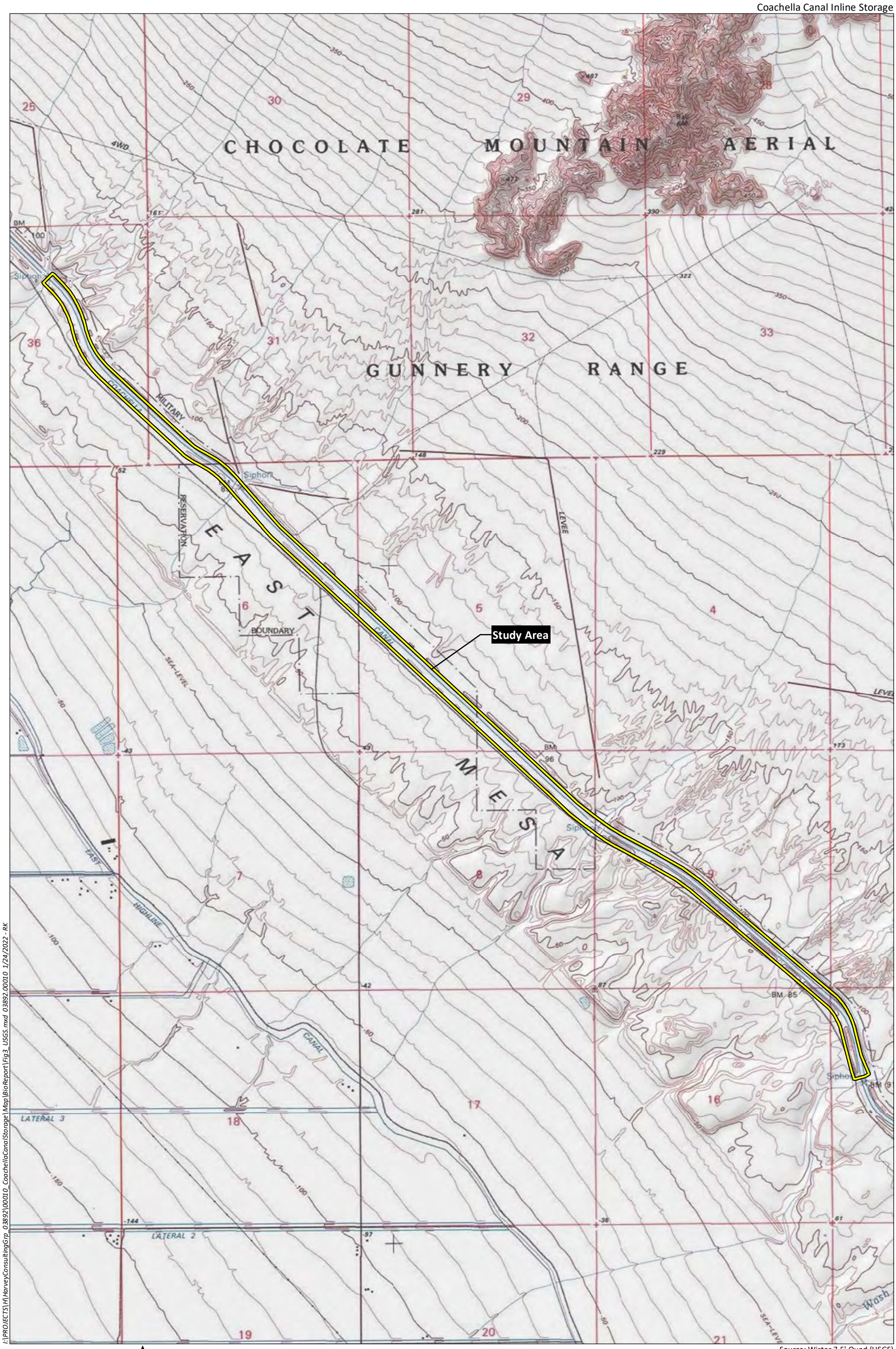
0 2,500 Feet

Source: Aerial (Esri 2019)

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Aerial Photograph

Figure 2



Source: Wister 7.5' Quad (USGS)

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USGS Topography

Figure 3

Coachella Canal Inline Storage

Study Area

Vegetation Communities

Disturbed Habitat

Urban/Developed

Gas Line Rd

Coachella Canal Rd

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0 600 Feet

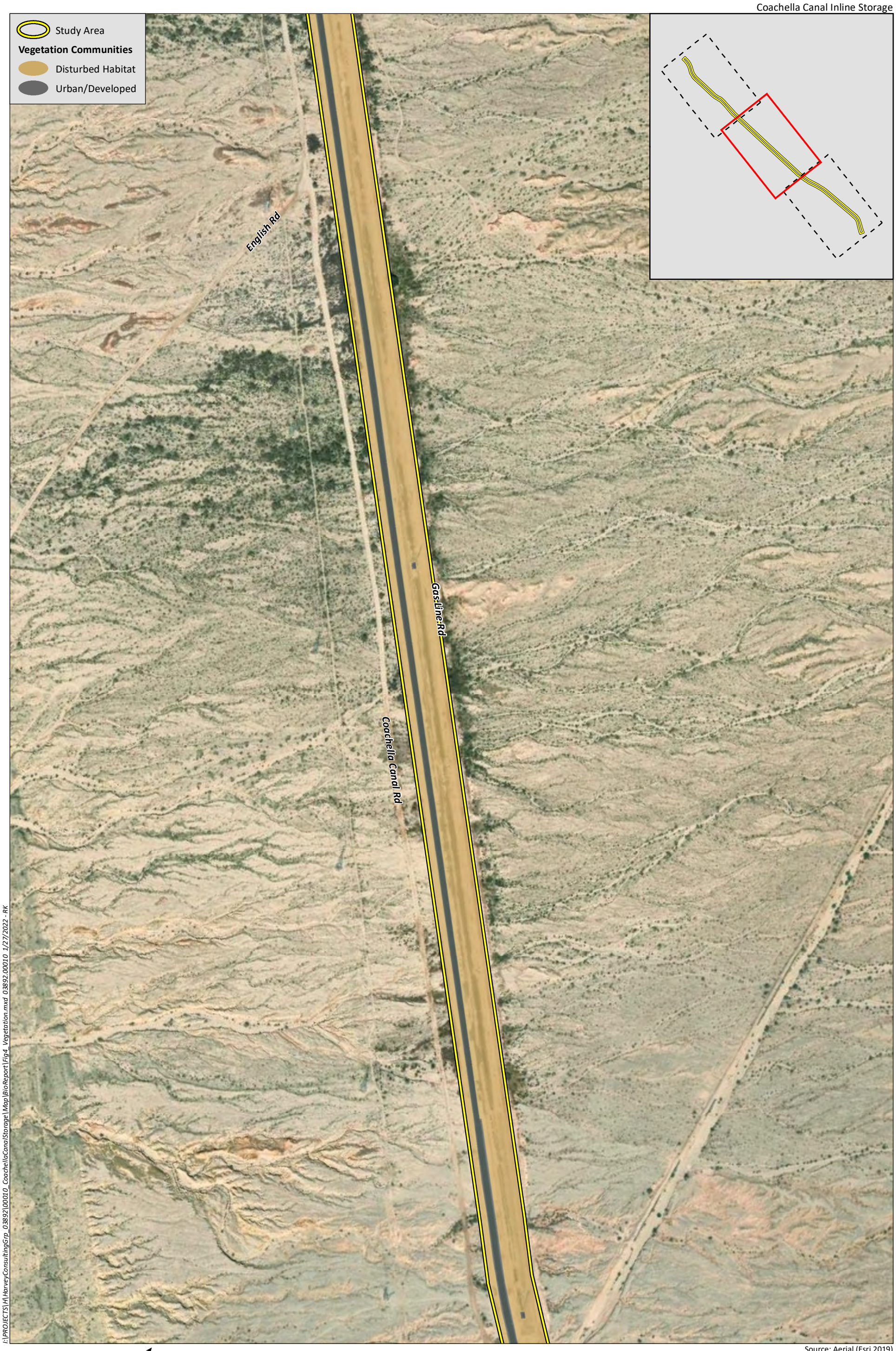
Source: Aerial (Esri 2019)

HELIX Environmental Planning

Vegetation Communities

Figure 4a

Coachella Canal Inline Storage



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0 600 Feet

Source: Aerial (Esri 2019)

HELIX Environmental Planning

Vegetation Communities

Figure 4b

Coachella Canal Inline Storage

Study Area

Vegetation Communities

Disturbed Habitat

Urban/Developed

Gas Line Rd

Coachella Canal Rd

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0 600 Feet

Source: Aerial (Esri 2019)

HELIX Environmental Planning

Vegetation Communities

Figure 4c

Attachment A

Critical Habitat



0 10,000 Feet

Source: Base Map Layers (Esri, 2019)

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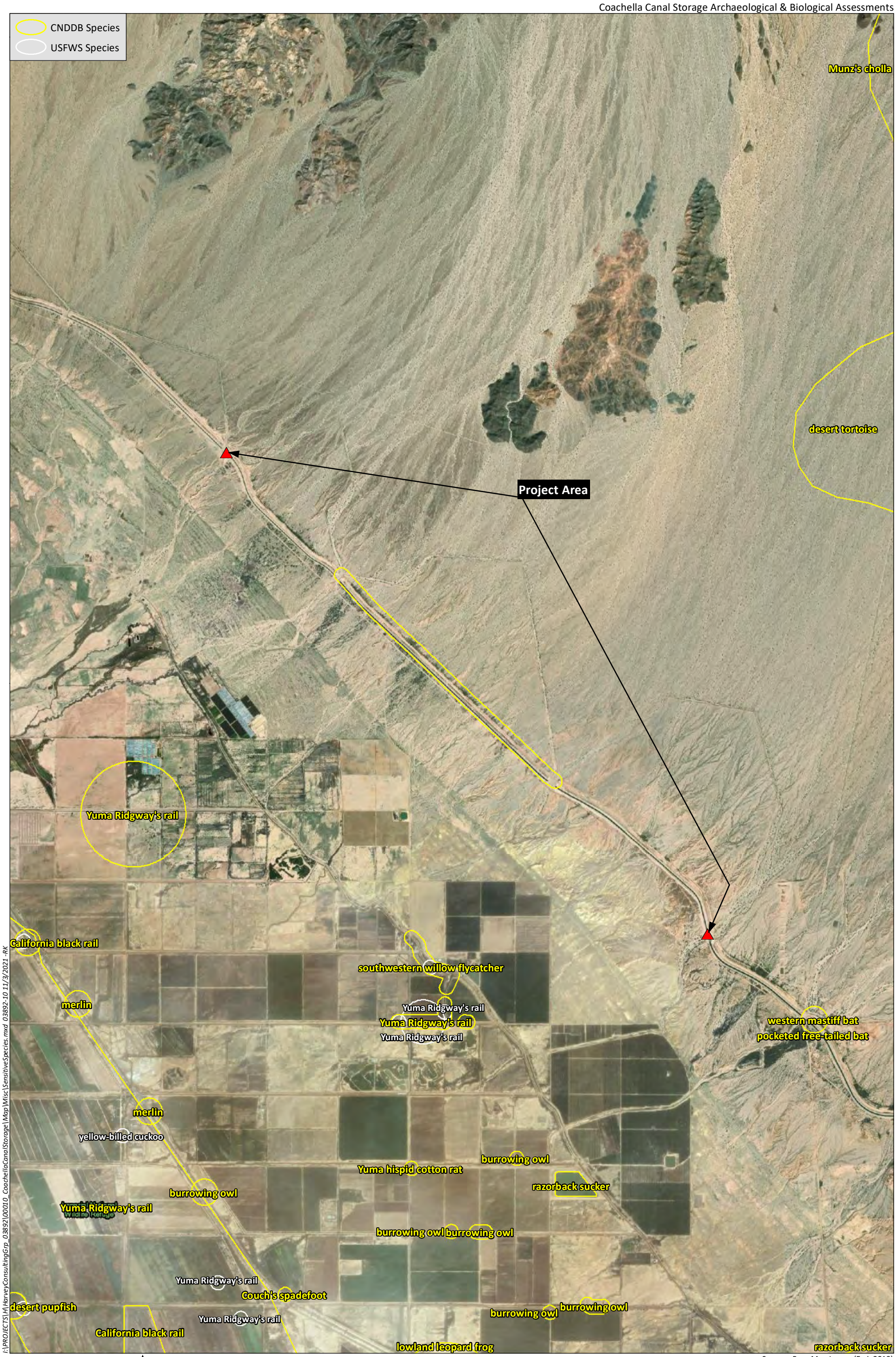
HELIX Environmental Planning

Critical Habitat

Attachment A

Attachment B

Sensitive Species



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0 4,000 Feet

Source: Base Map Layers (Esri, 2019)

HELIX Environmental Planning

Sensitive Species

Attachment C

USFWS Database Query

Attachment C
USFWS Database Query

01/21/22 Coachella Canal Mid-Canal Storage

USFWS Species

SNAME	CNAME	SPECIES	SPP_CODE	DATE_	OCC	SURVEYOR_N	DOC_SOURCE	SITE_NAME	LOC_DESCRI	SOURCE	VOUCHER_ID	VERIFIED_V	VV_YEAR	PCODE	PDEF	GEO_SOURCE	CreatedOn	ModifiedOn	Year	GlobalID	MMDD
Cyprinodon macularius	desert pupfish	DP	E044	20050000	-9 SAIKI M.		U.S. GEOLOGICAL SURVEY	IMPERIAL IRRIGATION DISTRICT	SALTON SEA	3			0	1	Within a 160 m diameter	4	8/13/2008	4/26/2019	2005	{C3034239-9DEB-4AC2-94D0-70DDF9F6D42A}	0
Cyprinodon macularius	desert pupfish	DP	E044	20050000	-9 SAIKI M.		U.S. GEOLOGICAL SURVEY	IMPERIAL IRRIGATION DISTRICT	SALTON SEA	3			0	1	Within a 160 m diameter	4	8/13/2008	4/26/2019	2005	{CF45832A-234F-4283-A64E-058C738DDFA6}	0
Cyprinodon macularius	desert pupfish	DP	E044	20050000	-9 SAIKI M.		U.S. GEOLOGICAL SURVEY	IMPERIAL IRRIGATION DISTRICT	SALTON SEA	3			0	1	Within a 160 m diameter	4	8/13/2008	4/26/2019	2005	{595F8A05-EF3D-4FF7-8C99-749CC962652E}	0
Cyprinodon macularius	desert pupfish	DP	E044	20050000	-9 SAIKI M.		U.S. GEOLOGICAL SURVEY	IMPERIAL IRRIGATION DISTRICT	SALTON SEA	3			0	1	Within a 160 m diameter	4	8/13/2008	4/26/2019	2005	{76835FC4-3C59-4CBC-B242-EA9ADD44683E}	0
Cyprinodon macularius	desert pupfish	DP	E044	20060000	-9 SAIKI M.		U.S. GEOLOGICAL SURVEY	IMPERIAL IRRIGATION DISTRICT	SALTON SEA	3			0	1	Within a 160 m diameter	4	8/13/2008	4/26/2019	2006	{95BF7BDD-7DB2-4567-A117-E903AF2F3C0D}	0
Cyprinodon macularius	desert pupfish	DP	E044	20060000	-9 SAIKI M.		U.S. GEOLOGICAL SURVEY	IMPERIAL IRRIGATION DISTRICT	SALTON SEA	3			0	1	Within a 160 m diameter	4	8/13/2008	4/26/2019	2006	{CB32B4FA-368E-4F5E-9702-FC776B974A39}	0
Cyprinodon macularius	desert pupfish	DP	E044	20060000	-9 SAIKI M.		U.S. GEOLOGICAL SURVEY	IMPERIAL IRRIGATION DISTRICT	SALTON SEA	3			0	1	Within a 160 m diameter	4	8/13/2008	4/26/2019	2006	{A0192368-E77C-4ADC-9E2E-15302E55849A}	0
Cyprinodon macularius	desert pupfish	DP	E044	20060000	-9 SAIKI M.		U.S. GEOLOGICAL SURVEY	IMPERIAL IRRIGATION DISTRICT	SALTON SEA	3			0	1	Within a 160 m diameter	4	8/13/2008	4/26/2019	2006	{67D33C90-CF2A-4769-B9FE-2D66FE077568}	0
Cyprinodon macularius	desert pupfish	DP	E044	20060000	-9 SAIKI M.		U.S. GEOLOGICAL SURVEY	IMPERIAL IRRIGATION DISTRICT	SALTON SEA	3			0	1	Within a 160 m diameter	4	8/13/2008	4/26/2019	2006	{23BD85AC-DC39-4221-9359-084D7DD7B1F0}	0
Cyprinodon macularius	desert pupfish	DP	E044	20060000	-9 SAIKI M.		U.S. GEOLOGICAL SURVEY	IMPERIAL IRRIGATION DISTRICT	SALTON SEA	3			0	1	Within a 160 m diameter	4	8/13/2008	4/26/2019	2006	{955B6A1E-10F0-4F1A-9698-FFFF7BE6716E}	0
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20070522	3 DAVENPORT A.		DAVENPORT BIOLOGICAL SERVICES	UNION PACIFIC RAILROAD PROJECT	IMPERIAL COUNTY	3			0	1	Within a 160 m diameter	4	12/4/2008	4/26/2019	2007	{B3DA88F6-34EF-43A8-B175-F163AEA72138}	522
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20070522	2 DAVENPORT A.		DAVENPORT BIOLOGICAL SERVICES	UNION PACIFIC RAILROAD PROJECT	IMPERIAL COUNTY	3			0	1	Within a 160 m diameter	4	12/4/2008	4/26/2019	2007	{9268DA25-7464-4C2A-8307-8F2988E98BC1}	522
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20070522	2 DAVENPORT A.		DAVENPORT BIOLOGICAL SERVICES	UNION PACIFIC RAILROAD PROJECT	IMPERIAL COUNTY	3			0	1	Within a 160 m diameter	4	12/4/2008	4/26/2019	2007	{FBF5363A-258D-4A88-A4F7-8F830C4745AC}	522
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20070522	2 DAVENPORT A.		DAVENPORT BIOLOGICAL SERVICES	UNION PACIFIC RAILROAD PROJECT	IMPERIAL COUNTY	3			0	1	Within a 160 m diameter	4	12/4/2008	4/26/2019	2007	{65984D49-C3FE-48AC-A4CD-3E37AD61391A}	522
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20070522	2 DAVENPORT A.		DAVENPORT BIOLOGICAL SERVICES	UNION PACIFIC RAILROAD PROJECT	IMPERIAL COUNTY	3			0	1	Within a 160 m diameter	4	12/4/2008	4/26/2019	2007	{B09C1021-42CB-4FF5-8E15-D52B706EB4C5}	522
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20070522	2 DAVENPORT A.		DAVENPORT BIOLOGICAL SERVICES	UNION PACIFIC RAILROAD PROJECT	IMPERIAL COUNTY	3			0	1	Within a 160 m diameter	4	12/4/2008	4/26/2019	2007	{324548C1-3084-4B1D-B3BE-19C0D77F9BF7}	522
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20070522	2 DAVENPORT A.		DAVENPORT BIOLOGICAL SERVICES	UNION PACIFIC RAILROAD PROJECT	IMPERIAL COUNTY	3			0	1	Within a 160 m diameter	4	12/4/2008	4/26/2019	2007	{4C7AAEF7-3812-423A-B77D-529D040EB75D}	522
Cyprinodon macularius	desert pupfish	DP	E044	20070907	20 DAVENPORT A.		DAVENPORT BIOLOGICAL SERVICES	UNION PACIFIC RAILROAD PROJECT	IMPERIAL COUNTY	3			0	1	Within a 160 m diameter	4	12/4/2008	4/26/2019	2007	{19516668-880D-4ED3-89C9-18E31BCF5FDA}	907
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20070707	2 DAVENPORT A.		DAVENPORT BIOLOGICAL SERVICES	LIBERTY ENERGY SITE	IMPERIAL COUNTY	3			0	1	Within a 160 m diameter	4	12/5/2008	4/26/2019	2007	{C9E4586B-65D6-49D4-945A-0EEDD3FF20F7}	707
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20070707	2 DAVENPORT A.		DAVENPORT BIOLOGICAL SERVICES	LIBERTY ENERGY SITE	IMPERIAL COUNTY	3			0	1	Within a 160 m diameter	4	12/5/2008	4/26/2019	2007	{C211319D-434F-404B-9E79-8AB1B8084586}	707
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20070707	2 DAVENPORT A.		DAVENPORT BIOLOGICAL SERVICES	LIBERTY ENERGY SITE	IMPERIAL COUNTY	3			0	2	Within a 500 m diameter	4	12/5/2008	4/26/2019	2007	{C26F3458-DCF3-4DB4-BBAD-79B25BA8F520}	707
Empidonax traillii extimus	southwestern willow flycatcher	SWWF	B094	20070624	1 DAVENPORT A.		DAVENPORT BIOLOGICAL SERVICES	LIBERTY ENERGY SITE	IMPERIAL COUNTY	3			0	1	Within a 160 m diameter	4	12/5/2008	4/26/2019	2007	{029C4E9B-7DD1-43A0-9B49-4A2A209DAE54}	624
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20070518	-9 KONECNY J./DEL PIZZO P./COOPER T./WILLICK D./WINCHELL A.		KONECNY BIOLOGICAL SERVICES	YEAR I RAIL SURVEY LOCATIONS IMPERIAL VALLEY AND YUMA	IMPERIAL VALLEY AND YUMA AREA	3			0	1	Within a 160 m diameter	4	3/11/2009	4/26/2019	2007	{7A300AF1-DBBB-492C-A187-C6D7A6F7EBF2}	518
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20070518	-9 KONECNY J./DEL PIZZO P./COOPER T./WILLICK D./WINCHELL A.		KONECNY BIOLOGICAL SERVICES	YEAR I RAIL SURVEY LOCATIONS IMPERIAL VALLEY AND YUMA	IMPERIAL VALLEY AND YUMA AREA	3			0	1	Within a 160 m diameter	4	3/11/2009	4/26/2019	2007	{673048D0-A8FB-4D56-A2FE-31DA2878624A14}	518
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20100412	1 DAVENPORT A.		DAVENPORT BIOLOGICAL SERVICES	SIMBOL MINING DEVELOPMENT PROJECT	IMPERIAL COUNTY	3			0	1	Within a 160 m diameter	4	1/7/2011	4/26/2019	2010	{61550CCC-F41C-4BFD-95A8-CC38AC7E1E26}	412
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20100426	1 DAVENPORT A.		DAVENPORT BIOLOGICAL SERVICES	SIMBOL MINING DEVELOPMENT PROJECT	IMPERIAL COUNTY	3			0	1	Within a 160 m diameter	4	1/7/2011	4/26/2019	2010	{8B53E1F7-F38C-44FD-9A2D-5668E75B2F02}	426
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20090728	-9 NADEAU C. ET AL		UNIVERSITY OF ARIZONA	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2009	{46122710-B299-4771-B7A6-68C0807885AA}	728
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20090728	-9 NADEAU C. ET AL		UNIVERSITY OF ARIZONA	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2009	{AE03B9DB-9F82-4EAE-A51D-433F230FD337}	728
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20090728	-9 NADEAU C. ET AL		UNIVERSITY OF ARIZONA	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2009	{281B72A0-206C-4588-9D75-CC04AE6A65DE}	728
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20090728	-9 NADEAU C. ET AL		UNIVERSITY OF ARIZONA	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2009	{6519B698-1769-46C8-923F-8C02C08A161F}	728
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20090728	-9 NADEAU C. ET AL		UNIVERSITY OF ARIZONA	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2009	{EEAD155A-018B-4F87-8A45-38E2FE693FDB}	728
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20090728	-9 NADEAU C. ET AL		UNIVERSITY OF ARIZONA	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2009	{FCF3ED81-85EE-4AF0-94BD-F29CCE16A414}	728
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20090728	-9 NADEAU C. ET AL		UNIVERSITY OF ARIZONA	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2009	{94631C85-89DA-4F3F-9F65-358D9667C0A7}	728
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20090728	-9 NADEAU C. ET AL		UNIVERSITY OF ARIZONA	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2009	{ED234C46-DE17-495F-8646-92115A9661EC}	728
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20090728	-9 NADEAU C. ET AL		UNIVERSITY OF ARIZONA	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2009	{C71B30E5-5AEC-4E4F-BE5F-2C0D554FDBC0}	728
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{538F195D-5359-4CBD-B0B0-D9ACC279D1B1}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{801D4211-44F9-4FB0-9B80-5F2456ABD7D5}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{932B4428-A609-456F-A6FA-873C4D2F7269}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{15BD1A53-986E-488B-BBFB-4125515E94C}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{FBB35A53-F153-474B-BB6F-20D439530A6B}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{7EBC7345-785F-4498-B5E5-030C485955E5}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{BEC665B5-2C1A-492A-A9B7-6FE1E9B7DFDE}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{E422FE45-A0B3-4B10-BE01-5E4C75716CDA}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{4E31A933-72A4-4445-8C71-94AEFE7EF51A}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{16A59E69-DCEF-44A0-9EA5-F7C85972904E}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{F36F9D64-3209-4DCF-8C79-C1103998E72}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{A902D5F8-1725-4B89-AD09-F4C6FBBBB448}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{4A238959-F1C7-4A76-A2EC-96E3A674994C}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{6E8C202F-A2FE-4775-A167-5314DD9047E8}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{E6B1C5D1-BF9B-4DD8-B93D-DC34BBCEEEFD}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{B2196BE4-EDBF-4830-A729-D20643C30570}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{F86B21E0-126B-4C8D-89EC-4C6A7D58A14D}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{1B2A78B7-487F-4A07-96D4-30B28D257E04}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{1CE91003-CAE7-468F-B738-BF6174998E95}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{D6AB69FE-68AE-4C05-B895-54ED90840044}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{84D4CEF5-37B4-453E-BAD7-8E61ED472D14}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{A8895894-99E6-4CFF-B54F-A8C6D03102DB}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{E38293E8-C474-46EB-8025-AB3285B48E5A}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{C67117A1-6434-4A6A-855FC-AE241969C79E}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{0814A612-207F-4B21-A89B-3FA9896C7765}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{6125F5DD-0F0B-4EF3-AEEA-100DD32F47F1}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{3471E679-A2C7-410F-B888-CF6FC8D97806}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{761AD157-C94F-4C08-9CDF-3A269599E056}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{8C248026-D0DA-48D2-95BB-7A7B40140793}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{B1B2663A-48E0-488E-B2B8-233431ECD054}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{D2D032EC-9E8C-401E-9056-B5342A4B481C}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{C8879586-1F55-4508-88DF-77294A5DBB12}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{B122651D-FC68-422D-8CDB-ECA02E4DE2A5}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{1B82356D-B171-45C9-A7A6-BE18553307DF}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{DE579357-7D89-489C-8FE0-EE7689D65AF1}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{AA371E29-432F-40C4-8295-C6E0EEC287C8}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{A1118000-2E35-41E3-8A95-F26EBBB21EBE}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{CDCF2A56-9B67-4901-9C45-1AA071A793CF}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{3DD52434-AAD0-4283-82F0-404F7D487A2D}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL		ARIZONA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT	LOWER COLORADO RIVER/SALTON SEA	CALIFORNIA/ARIZONA	3			0	4	Within a 2 km diameter	4	6/18/2013	4/26/2019	2006	{7DB5182D-3B90-488F-A9A1-2EEC0C1F0847}	713
Rallus obsoletus yumanensis	Yuma Ridgway's rail	YURR	B00P	20060713	-9 NADEAU C. ET AL

Attachment D

IPaC Report

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

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Project information

NAME

Coachella Canal

LOCATION

Imperial County, California



DESCRIPTION

Some(TBD)

Local office

Carlsbad Fish And Wildlife Office

(760) 431-9440

(760) 431-5901

2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385

http://www.fws.gov/carlsbad/

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Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS

Southwestern Willow Flycatcher Empidonax traillii extimus — Endangered
Wherever found
There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/6749

Western Snowy Plover Charadrius nivosus nivosus — Threatened
There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/8035

Yuma Ridgways (clapper) Rail Rallus obsoletus [=longirostris] yumanensis — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/3505

Fishes

NAME	STATUS
Desert Pupfish Cyprinodon macularius Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/7003	Endangered
Razorback Sucker Xyrauchen texanus Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/530	Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

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THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN

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	THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Black Skimmer Rynchops niger This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/5234	Breeds May 20 to Sep 15
Clark's Grebe Aechmophorus clarkii This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jun 1 to Aug 31
Gila Woodpecker Melanerpes uropygialis This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/5960	Breeds Apr 1 to Aug 31
Gull-billed Tern Gelochelidon nilotica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9501	Breeds May 1 to Jul 31
Le Conte's Thrasher toxostoma lecontei This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8969	Breeds Feb 15 to Jun 20
Marbled Godwit Limosa fedoa This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Willet Tringa semipalmata This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere

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Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the

FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

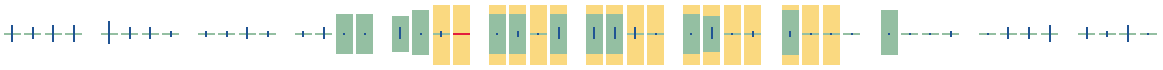
Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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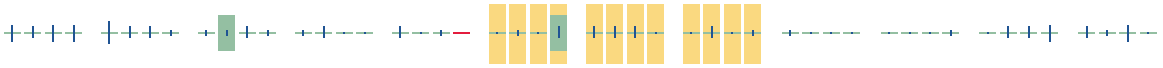
■ probability of presence ■ breeding season | survey effort – no data

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

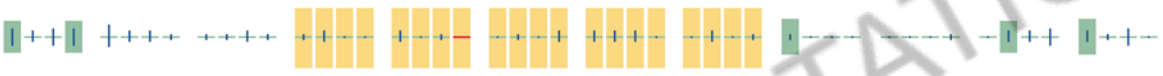
Black Skimmer BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Clark's Grebe BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Gila Woodpecker BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Gull-billed Tern BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

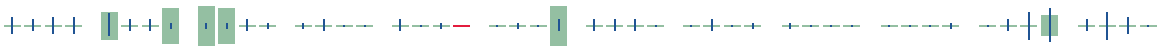


Le Conte's Thrasher BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

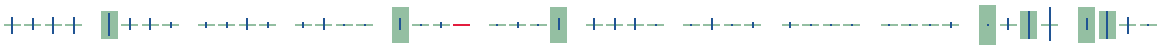


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Marbled Godwit BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Willet BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



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Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring

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in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

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Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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Attachment E

CNDDB Database Query

Attachment E
CNDDB Database Query

CNDDB Species SNAME	CNAME	ELMCODE	OCCNUMBER	MAPNDX	EONDX	KEYQUAD	KQUADNAME	KEYCOUNTY	PLSS	ELEVATION	PARTS	ELMTYPE	TAXONGROUP	EOCOUNT	ACCURACY	PRESENCE	OCCTYPE	OCCRANK	SENSITIVE	SITEDATE	ELMDATE	OWNERMGT	FEDLIST	CALLIST	GRANK	SRANK	RPLANTRANK	CDFWSTATUS	OTHRSTATUS	LOCATION	LOCDETAILS	ECOLOGICAL	GENERAL	THREAT	THREATLIST	LASTUPDATE	AREA	PERIMETER	AVLCODE	Symbology
Gopherus agassizii	desert tortoise	ARAAF01012	4	06371	14803	3311534	Iris Wash	IMP	T09S, R17E, Sec. 13 (S)	0	1	2	Reptiles	1	specific area	Presumed Extant	Natural/Native occurrence	Good	N	1987XXXX	1987XXXX	BLM, PVT, STATE, DOD-NAVY	Threatened	Threatened	G3	S253			IUCN_VU	CHUCKWALLA; MILPITAS WASH, CHUCKWALLA VALLEY AND BENCH IN THE SOUTHERN COLORADO DESERT.	1 OF 4 PRIMARY POPS IN CALIF. IN 1977, EST DENSITIES WERE 20 TO 250 TORTOISES/SQ.MI.	AREA COVERS APPROX 500 SQ MI FROM 500 TO 2000 FT ELEV WITH VARIOUS VEGETATION COMMUNITIES. BLM ACEC INCLUDED.		INCREASING OFF-ROAD TRAVEL AND PROPOSED PRISON ARE THREATS. OVERALL, THIS AREA HAS RELATIVELY LITTLE	Development; ORV activity	19960215	2573612951.03000000000	445261.38249500000	20201	202
Cylindropuntia munzii	Munz's cholla	PDCAC0D0V0	3	06387	12381	3311532	Pegleg Well	IMP	T10S, R17E, Sec. 17 (S)	1400	1	1	Dicots	1	non-specific area	Presumed Extant	Natural/Native occurrence	Unknown	N	20170301	20170301	DOD-NAVY, BLM-EL CENTRO RA	None	None	G3	S1	1B.3		BLM_S; IUCN_LC; SB_CalBG/RSABG	CHOCOLATE MOUNTAIN AERIAL GUNNERY RANGE; AREA WEST OF IRIS WASH AND SOUTH OF CHUCKWALLA MOUNTAINS, CHOCOLATE MOUNTAINS.	MAPPED ACCORDING TO A 1983 BERRY REPORT MAP AND TRS GIVEN IN 1984 KOBALY/YORK PHONE CONVERSATION. 1983 MAP INDICATED A DISTRIBUTION OVER A LARGE PORTION OF THE CHOCOLATE MOUNTAIN AERIAL GUNNERY RANGE. NEED MAP DETAIL FOR AREA.	OBSERVED OVER LARGE AREA OF CHOCOLATE MOUNTAINS AERIAL GUNNERY RANGE AND ADJACENT BLM LAND ON WASHES AND RIDGES IN CREOSOTE SCRUB. ASSOCIATED WITH LARREA TRIDENTATA, HILARIA RIGIDA, AMBROSIA DUMOSA, EPHEDRA CALIFORNICA, ETC.	20-30 PLANTS SEEN IN TBS R16E SECS 23-26 IN 1984, AND MENTIONED AS "SCATTERED" OVER OTHER TRS SURVEYED IN THE N CORNER OF POLY. MANY PLANTS WERE SEEN NEAR INDIAN WELL IN 1998. INCLUDES OBSERVATIONS FROM 2004, 2011, 2012, 2013, 2016, & 2017.	SOME COLONIES ARE THREATENED BY MILITARY ACTIVITIES.	Military operations	20180628	788695076.60100000000	237799.45243700000	10301	103
Ovis canadensis nelsoni	desert bighorn sheep	AMALE04013	37	06351	14493	3311544	Iris Pass	IMP	T10S, R16E, Sec. 09 (S)	0	1	2	Mammals	1	specific area	Presumed Extant	Natural/Native occurrence	Unknown	N	1986XXXX	1986XXXX	DOD-CHOCOLATE MOUNTAIN AGR	None	None	G4T4	S3		FP	BLM_S; USFS_S	CHOCOLATE MOUNTAINS, NW PORTION OF RANGE.	SHEEP CONCENTRATE AT THE NW END AND THE CENTRAL PART OF THE RANGE.	SHEEP ARE ALMOST ENTIRELY DEPENDENT ON NATURAL TANKS FOR WATER. MUCH OF THIS RANGE IS MARGINAL FOR SHEEP.	POPULATION ESTIMATE OF 120 INDIVIDUALS FOR THE ENTIRE CHOCOLATE MOUNTAINS. POPULATION ESTIMATE OF 80 INDIVIDUALS; HERD IN GOOD CONDITION.	BURRO COMPETITION IS SEVERE.	Other	19951121	630113651.55600000000	173005.82337300000	20201	202
Ovis canadensis nelsoni	desert bighorn sheep	AMALE04013	51	06120	14482	3311557	Orocopia Canyon	RIV	T07S, R11E, Sec. 04 (S)	0	1	2	Mammals	1	specific area	Presumed Extant	Natural/Native occurrence	Unknown	N	1986XXXX	1986XXXX	BLM, PVT, STATE	None	None	G4T4	S3		FP	BLM_S; USFS_S	OROCOPIA MOUNTAINS AND MECCA HILLS SOUTH OF BOX CANYON.					19890810	250266185.43600000000	104880.85783500000	20201	202
Falco mexicanus	prairie falcon	ABNKD06090	119	06213	26299	3311556	Red Canyon	RIV		1600	1	2	Birds	1	1/5 mile	Presumed Extant	Natural/Native occurrence	Unknown	Y	19770521	19770521		None	None	G5	S4		WL	USFWS_BCC		NEST WAS IN A POTHOLE 35 FT UP A 50 FT SCARP.				20201124	160910011.25800000000	50938.61087190000	99901	999
Laterallus jamaicensis coturniculus	California black rail	ABNME03041	23	A5571	105741	3311525	Niland	IMP	T11S, R13E, Sec. 26 (S)	-220	1	2	Birds	1	non-specific area	Presumed Extant	Natural/Native occurrence	Unknown	N	19470601	19470601	DFG, USFWS, PVT	None	Threatened	G3G4T1	S1		FP	BLM_S; IUCN_NT; NABCI_RWL; USFWS_BCC	VICINITY OF WILDLIFE AREAS AND AGRICULTURE LANDS ALONG THE ALAMO RIVER ABOUT 6 MILES NW OF CALIPATRIA, NEAR SALTON SEA.	LOCATIONS STATED AS "NEAR CALIPATRIA, ADJACENT TO THE SALTON SEA. ...EDGE OF FRESH WATER POND" AND AS "SALTON SEA." MAPPED NON-SPECIFICALLY TO AREA NW OF CALIPATRIA SHOWING A POND NEAR ALAMO RIVER ON 1944 & 1956 TOPO MAPS.	JANUARY COLLECTION WAS FOUND IN DENSE GREEN BARLEY AND WILD OATS ALONG A FRESH WATER POND. JUNE COLLECTION WAS FROM A SMALL PATCH OF BOTH GREEN & WASTED ALKALI GRASS, AND THE NEST HAD BEEN DEPREDATED. WILDLIFE AREAS EST 1930S & 1950S.	THOUGH LOCATION IS VAGUE, THE COLLECTIONS ARE SIGNIFICANT FOR IMPERIAL VALLEY BEING THE FIRST SPECIES RECORD AND THE FIRST BREEDING RECORD. ONE CAPTURED ALIVE AND UNINJURED BY A DOG ON 5 JAN 1947. NEST AND EGGS FOUND ON 1 JUN 1947.			20170728	50264209.88840000000	25132.58213880000	20301	203
Charadrius montanus	mountain plover	ABNNB03100	36	54343	54343	3311526	Obsidian Butte	IMP	T12S, R13E, Sec. 05 (S)	-225	1	2	Birds	1	non-specific area	Presumed Extant	Natural/Native occurrence	Unknown	N	20110102	20110102	USFWS-SONNY BONO SALTON SEA	None	None	G3	S253		SSC	BLM_S; IUCN_NT; NABCI_RWL; USFWS_BCC	ALONG THE SOUTH SHORE OF THE SALTON SEA, FROM THE MOUTH OF THE ALAMO RIVER TO THE WESTERNMOST END OF THE SALTON SEA NWR.	1970'S DATA MAPPED TO LOCATION "ALONG MOST OF THE SHORELINE FROM RED HILL TO THE WESTERNMOST EDGE OF THE REFUGE." RECORDS FROM EBIRD MAPPED TO PROVIDED COORDINATES AND LOCATION DESCRIPTIONS.	DIKED PONDS, MARSHLANDS, AND GRAIN FIELDS BORDERING SALTON SEA. PONDS RANGE FROM BRACKISH TO FRESH.	OBSERVED IN FEB (5 MAX OBS), MAR (5), OCT (100), & DEC (125) DURING SHOREBIRD SURVEY, JUL 1971 TO JUN 1974. 102 EBIRD REPORTS FROM 17 FEB 1973 TO 2 JAN 2011; PRIMARILY IN OCT (6 MAX), NOV (500), DEC (35), JAN (291), FEB (350), & MAR (250).			20120403	36907754.63010000000	50458.89061120000	20301	203
Rallus obsoletus yumanensis	Yuma Ridgway's rail	ABNME0501A	33	06268	14734	3311535	Wister	IMP	T10S, R13E, Sec. 26 (S)	-215	1	2	Birds	1	non-specific area	Presumed Extant	Natural/Native occurrence	Good	N	20070522	20070315	DFG-IMPERIAL WA, PVT	Endangered	Threatened	G3T3	S152		FP	NABCI_RWL	WISTER UNIT, IMPERIAL WILDLIFE AREA, SE SIDE OF SALTON SEA.	WILDLIFE AREA RUNS ALONG W SIDE OF HWY 111 TO THE SALTON SEA. WISTER UNIT REGULARLY SURVEYED FROM 1974-2005. 2007 DETECTIONS ALONG HWY 111 NEAR HOWELL RD, AND NEAR BEACH RD AT GADWALL RD. MAPPED GENERALLY TO PROPERTY BOUNDARY.	1989: HABITAT CREATED IN MAN-MADE FIELDS WITH WATER CONTROL; CROSS-CHECKS MAINTAIN WATER LEVEL & ENCOURAGE MARSH HABITAT COMPONENTS. FLAT TOPOGRAPHY WITH TYPHA, BULRUSH, GRASSES & WEEDY FORBES. TYPHA DOMINATED EMERGENT MARSH (2007).	86-IN 1974. 42 INDIV & 15 PAIRS EST, 1984. 31 IN 1985. 86 IN 1989. TELEMETRY IN 1990 W/ LARGE #S OF BIRDS, & NESTS W/ UP TO 11 EGGS. 157 IN 2000. 6 PAIRS, 2007 (INCOMPLETE COVERAGE). #S FOR ENTIRE IMPERIAL WA STABLE/INCREASING, 1995-2005.	POSSIBLE THREATS FROM CLEARING OF EMERGENT MARSH DURING DRAIN MAINTENANCE AND CHANAGES IN WATER REGIME.	Altered flood/tidal/hydrologic regime; Other	20110922	26275814.94710000000	26148.99793280000	20301	203
Charadrius montanus	mountain plover	ABNNB03100	85	85114	86042	3311524	Iris	IMP	T12S, R14E, Sec. 02 (S)	-160	1	2	Birds	1	non-specific area	Presumed Extant	Natural/Native occurrence	Unknown	N	20110226	20110226	PVT	None	None	G3	S253		SSC	BLM_S; IUCN_NT; NABCI_RWL; USFWS_BCC	AGRICULTURE FIELDS NORTH AND EAST OF CALIPATRIA AND SURROUNDING CALIPATRIA STATE PRISON.	SEVERAL EBIRD OBSERVERS & REPORTS. MAPPED GENERALLY TO EBIRD COORDINATES & LOCATIONS STATED AS "CALIPATRIA STATE PRISON," "BLAIR & YOUNG," BLAIR & BARSLEY," "BLAIR RD," AND "YOUNG RD. BTWN 111 AND CANAL," EXACT LOCATIONS UNKNOWN.	MOUNTAIN PLOVERS LIKELY USE MANY OF THE AGRICULTURE FIELDS IN THE IMPERIAL VALLEY FOR FORAGING AND OVER WINTERING.	46 OBSERVED 24 DEC 2004. ONE OR MORE OBS 12 MAR 2005. 35 OBS 25 JAN, 200 OBS 12 MAR, AND 80 OBS 19 DEC, 2006. ABOUT 50-400 OBS DURING FEB-MAR 2009. 45 OBS 21 DEC 2009. 203 OBS 6 FEB 2010 BY 9 OBSERVERS. 100-306 OBS JAN-FEB 2011.			20120508	22631407.76630000000	43513.49425400000	20301	203
Charadrius nivasus nivosus	western snowy plover	ABNNB03031	140	86475	87524	3311535	Wister	IMP	T10S, R13E, Sec. 16 (S)	-230	1	2	Birds	1	non-specific area	Presumed Extant	Natural/Native occurrence	Unknown	N	19991115	19990816	UNKNOWN	Threatened	None	G3T3	S2		SSC	NABCI_RWL; USFWS_BCC	BOMBAY BEACH TO THE MOUTH OF ALAMO RIVER, EASTERN SHORE OF SALTON SEA, JUST WEST OF WISTER, SALTON SEA.	SURVEY DATA FOR MOST YEARS HAS NO SPECIFIC LOCATIONS. SNOWY PLOVERS OCCUR THROUGHOUT THE ENTIRE LAKE AREA, BUT HAVE HIGHER CONCENTRATIONS AT TWO LOCATIONS; ON THE WESTERN AND SOUTHEASTERN SHORES. SOME DATA IS SHARED W/ EO #139, EONDX 87523.	OPEN, GENTLY SLOPING SHORELINES. CONFIRMED WINTERING SITE SINCE 1968.	EGG SETS COLLECTED 1929-1950. OBS 1933 & 1968. 78+ ADULTS, 7 BROODS, 10 NESTS OBS IN 1978. 54 OBS MAY 1998. 197 OBS 1989. 363 OBS 1990. 568 OBS 1991. 437 OBS 1992. 285 OBS APR, 63+ OBS MAY, & 351 OBS AUG 1999. PRESUMED NESTING ALL YEARS.	POTENTIAL THREAT FROM INCREASE IN SALINITY, DISEASE, AND AGRICULTURAL CONTAMINANTS.	Disease; Other; Pollution	20120919	21247833.49330000000	54160.37360020000	20301	203
Colubrina californica	Las Animas colubrina	PDRHA05030	11	58521	58557	3311554	Red Cloud Canyon	RIV	T07S, R15E, Sec. 28 (S)	2300	1	1	Dicots	1	non-specific area	Presumed Extant	Natural/Native occurrence	Unknown	N	XXXXXXX	XXXXXXX	DOD-NAVY, BLM	None	None	G4	S253	2B.3		SB_CalBG/RSABG	SOUTHERN END OF CHUCKWALLA MOUNTAINS.	MAPPED ACCORDING TO THE FOLLOWING T-R-S BY KOBALY: T7S R15E SECTIONS 15, 21, 28, 34, 36 AND T8S R15E SECTION 2.			FEWER THAN 50 PLANTS OBSERVED. VAGUE LOCATION IS ONLY INFORMATION. NEEDS FIELDWORK.		20041213	14496580.93130000000	33810.70709020000	10301	103
Pelecanus occidentalis californicus	California brown pelican	ABNFC01021	24	86423	87460	3311535	Wister	IMP	T10S, R13E, Sec. 34 (S)	-230	1	2	Birds	1	non-specific area	Presumed Extant	Natural/Native occurrence	Unknown	N	2004XXXX	19990816	PVT-IMPERIAL IRRIGATION DIST	Delisted	Delisted	G4T3T4	S3		FP	BLM_S; USFS_S	ABOUT 8 MILES OF SHORELINE ALONG SOUTHEASTERN SALTON SEA FROM NEAR WISTER TO ALAMO RIVER.	MAPPED TO POINT REYES BIRD OBSERVATORY (PRBO) 1999 SURVEY AREA 12. CHRISTMAS BIRD COUNTS (CBC) & WILDLIFE DISEASE SURVEILLANCE PROGRAM (WDSP) SURVEYS LOCATIONS ARE NON-SPECIFIC AND INCLUDE MAJORITY OF LAKE.		BROWN PELICANS OBSERVED IN LOW NUMBERS FROM 1952-1976 THROUGHOUT ENTIRE LAKE, OVER 98% JUVENILES. 263 OBSERVED 13-16 AUG 1999. CBC/WDSP SURVEYS OBSERVED APPROXIMATELY 20-4,000 BIRDS FROM 1994-2004 THROUGHOUT ENTIRE LAKE. COLLECTION BY J. VAN DENBURGH, 13 MAY 1916, CAS #41697. M. JENNINGS & M. HAYES CONSIDER THIS POPULATION EXTIRPATED.	BOTULISM OUTBREAK AT SALTON SEA KILLED 1,500 BROWN PELICANS IN 1996. POSSIBLE CONTAMINATION FROM SELENIUM, BORON, & DDE.	Biocides; Disease	20120912	11880914.96310000000	27798.37285960000	20301	203
Incilius alvarius	Sonoran Desert toad	AAABB01010	1	43419	43419	3311525	Niland	IMP	T11S, R14E, Sec. 04 (S)	-125	1	2	Amphibians	2	1 mile	Possibly Extirpated	Natural/Native occurrence	None	N	19160513	19160513	UNKNOWN	None	None	G5	SH		SSC	IUCN_LC	NILAND.	EXACT LOCATION UNKNOWN. MAPPED BY CNDDB CENTERED ON NILAND, WHICH WAS PREVIOUSLY KNOWN AS IMPERIAL JUNCTION.			20071126	8042147.18405000000	10053.01783240000	20902	809
Astragalus sabulonum	gravel milk-vetch	PDFAB0F7R0	11	43419	85325	3311525	Niland	IMP	T11S, R14E, Sec. 04 (S)	0	1	1	Dicots	2	1 mile	Presumed Extant	Natural/Native occurrence	Unknown	N	19060426	19060426	UNKNOWN	None	None	G4G5	S2	2B.2			IMPERIAL JUNCTION.	EXACT LOCATION NOT KNOWN. MAPPED ACCORDING TO LAT/LONG COORDINATES PROVIDED BY MANIS. LOCATION UNCERTAINTY GIVEN AS 5632.704 M (3.5 MILES). NORTH OF STATE ROAD 111 WHERE IT CURVES AND APPROXIMATELY 3 MILES SOUTH OF HOT SPRINGS RD.			20111117	8042147.18405000000	10053.01783240000	10902	809
Lasiurus xanthinus	western yellow bat	AMACC05070	22	58890	58926	3311545	Frink NE	RIV	T08S, R14E, Sec. 22 (S)	2300	1	2	Mammals	1	1 mile	Presumed Extant	Natural/Native occurrence	Unknown	N	19830401	19830401	UNKNOWN	None	None	G4G5	S3		SSC	IUCN_LC; WBWG_H	IN THE CHOCOLATE MOUNTAINS. ABOUT 2.3 MILES NORTH OF THE RIVERSIDE/IMPERIAL COUNTY LINE & 15 MILES NORTH OF NILAND.			1 MALE SPECIMEN COLLECTED 1 APR 1983 BY D. CONSTANTINE AT "14 MI N NILAND." DEPOSITED AT MVZ #181875.			20041221	8042068.86268000000	10052.96887940000	20901	209
Salvia greatae	Orocopia sage	PDLAM15OP0	32	78171	79071	3311536	Frink	IMP	T09S, R12E, Sec. 20 (S)	-150	1	1	Dicots	1	1 mile	Presumed Extant	Natural/Native occurrence	Unknown	N	1980XXXX	1980XXXX	PVT, BLM, SALTON SEA SRA	None	None	G2G3	S2S3	1B.3		BLM_S; SB_CalBG/RSABG	EAST OF BERTRAM AND NORTH OF BOMBAY BEACH, SALTON SEA.				ONLY SOURCE IS BLM MAP FROM 1980. NEEDS FIELDWORK.		20100223	8042068.86174000000	10052.96887950000	10901	109
Rallus obsoletus yumanensis	Yuma Ridgway's rail	ABNME0501A	61	83650	84487	3311536	Frink	IMP	T09S, R12E, Sec. 26, SE (S)	-225	1	2	Birds	1	1 mile	Presumed Extant	Natural/Native occurrence	Unknown	N	2000XXXX	2000XXXX	USBOR, BLM	Endangered	Threatened	G3T3	S152		FP	NABCI_RWL	MARSH AREA ABOUT 1.5 MILES EAST OF BOMBAY BEACH, EAST SHORE SALTON SEA.	LOCATION STATED AS "BOMBAY BEACH MARSH." MAPPED TO THE MARSH AREA EAST OF BOMBAY BEACH ON TOPO AND VISIBLE IN 2005 & 2010 AIR PHOTOS. EXACT LOCATION UNKNOWN.		THREE DETECTIONS IN 2000.			20110902	8042068.83569000000	10052.96886380000	20901	209
Charadrius montanus	mountain plover	ABNNB03100	82	85130	86039	3311514	Wiest	IMP	T12S, R15E, Sec. 27 (S)	-100	1	2	Birds	1	1 mile	Presumed Extant	Natural/Native occurrence	Unknown	N	20070120	20070120	PVT	None	None	G3	S253		SSC	BLM_S; IUCN_NT; NABCI_RWL; USFWS_BCC	VICINITY OF E ALBRIGHT RD AT FLEMING RD, ABOUT 6.5 MILES ESE OF CALIPATRIA.	MAPPED TO EBIRD COORDINATE LOCATION FOR "AG LANDS E OF CALIPATRIA." EXACT FIELDS SURVEYED AND LOCATIONS OF MOUNTAIN PLOVER FLOCKS UNKNOWN. EBIRD EXHAUSTIVE AREA COUNT LIKELY COVERED AREAS BEYOND MAPPED GRAPHIC.	MOUNTAIN PLOVERS LIKELY USE MANY OF THE AGRICULTURE FIELDS IN THE IMPERIAL VALLEY FOR FORAGING AND OVER WINTERING.	449 REPORTED BY K. GARRETT DURING A 6.5 HOUR EBIRD EXHAUSTIVE AREA COUNT EAST OF CALIPATRIA ON 20 JAN 2007.			20120509	8042068.81448000000	10052.96884930000	20901	209
Charadrius montanus	mountain plover	ABNNB03100	89	85139	86164	3311547	Durmid	IMP	T09S, R11E, Sec. 03 (S)	-200	1	2	Birds	1	1 mile	Presumed Extant	Natural/Native occurrence	Unknown	N	20081230	20081230	DPR-SALTON SEA SRA	None	None	G3	S253		SSC	BLM_S; IUCN_NT; NABCI_RWL; USFWS_BCC	ABOUT 1.3 MI SSW OF BAT CAVE BUTTES, AND ABOUT 12.8 MI NE OF SALTON CITY, SALTON SEA SRA.	EXACT LOCATION UNKNOWN. MAPPED TO PROVIDED EBIRD COORDINATES AND LOCATION STATED AS "SALTON SEA SRA." NO SPECIFIC LOCATION GIVEN FOR MUSEUM SPECIMENS; CARDIFF (1949, 1950) LOCALITIES "WESTMORLAND, 8 MI N" AND "WESTMORLAND, 7 MI N."		30 DETECTED BY J. ROWOTH ON 23 DEC 2007. 1 DETECTED BY B. TOLLEFSON ON 30 DEC 2008. 1 FEMALE COLLECTED ON 29 DEC 1949 (PSM #BIRD-07306) & 1 MALE COLLECTED ON 2 FEB 1950 (PSM #BIRD-07305) BY CARDIFF.			20120217	8042068.81448000000	10052.96884930000	20901	209
Melanerpes uropygialis	Gila woodpecker	ABNYF04150	62	85938	86970	3311525	Niland	IMP	T12S, R13E, Sec. 04 (S)	-220	1	2	Birds	1	1 mile	Presumed Extant	Natural/Native occurrence	Unknown	N	19500202	19500202	UNKNOWN	None	Endangered	G5	S1			BLM_S; IUCN_LC; USFWS_BCC	SE SALTON SEA; VICINITY OF LINDSEY RD AT BOYLE RD, ABOUT 7.5 MI N OF WESTMORLAND.					20120517	8042068.81422000000	10052.96884930000	20901	209
Charadrius montanus	mountain plover	ABNNB03100	84	85113	86041	3311525	Niland	IMP	T11S, R13E, Sec. 35 (S)	-200	1	2	Birds	1	1 mile	Presumed Extant	Natural/Native occurrence	Unknown	N	20070120	20070120	PVT	None	None	G3	S253		SSC	BLM_S; IUCN_NT; NABCI_RWL; USFWS_BCC	ALONG HATFIELD RD ABOUT 0.5 MILE SOUTH OF W SINCLAIR, ABOUT 5.25 MILES NW OF CALIPATRIA.	MAPPED TO EBIRD COORDINATES FOR LOCATION STATED AS "SOUTHEAST CORNER REGION SALTON SEA, IMPERIAL"; ASSUMED COORDINATE LOCATION WAS SOMEWHAT ACCURATE. EBIRD COORDINATE ALONG KAUN RD, LOCATION STATED AS "SALTON SEA," ALSO INCLUDED HERE.	MOUNTAIN PLOVERS LIKELY USE MANY OF THE AGRICULTURE FIELDS IN THE IMPERIAL VALLEY FOR FORAGING AND OVER WINTERING.	84 REPORTED BY S. GLOVER ON 1 JAN 2004. 1 OR MORE DETECTED BY E. BROWN ON 20 JAN 2007.			20120509	8042068.81421000000	10052.96884930000	20901	209
Charadrius montanus	mountain plover	ABNNB03100	46	85885	85766	3311525	Niland	IMP	T12S, R14E, Sec. 17 (S)	-180	1	2	Birds	1	1 mile	Presumed Extant	Natural/Native occurrence	Unknown	N	20110226	20110226	PVT	None	None	G3	S253		SSC	BLM_S; IUCN_NT; NABCI_RWL; USFWS_BCC	ENGLISH RD AT W YOUNG RD, JUST WEST OF CALIPATRIA.	EBIRD OBSERVATION LOCATIONS STATED AS "CALIPATRIA" AND "CALIPATRIA FIELDS." MAPPED TO COORDINATES FOR "CALIPATRIA" WEST OF CALIPATRIA. OTHER DETECTIONS MAY HAVE BEEN ON OTHER AGRICULTURE FIELDS NORTH OR EAST OF CALIPATRIA. MAPPED TO AREA NEAR "BOMBAY BEACH" ACCORDING TO 1956 USGS 15' TOPO MAP OF FRINK QUAD.	MOUNTAIN PLOVERS LIKELY USE MANY OF THE AGRICULTURE FIELDS IN THE IMPERIAL VALLEY FOR FORAGING AND OVER WINTERING.	50 REPORTED BY J. PARKER ON 1 FEB 2009. 40 REPORTED BY R. HOLLAND ON 1 JAN 2011 (CALIPATRIA). 250 REPORTED BY S. VINSON ON 26 FEB 2011.			20120509	8042068.81400000000	10052.96884930000	20901	209
Xyrauchen texanus	razorback sucker	AFCJC11010	32	88479	89490	3311536	Frink	IMP	T09S, R12E, Sec. 34 (S)	-230	1	2	Fish	1	1 mile	Presumed Extant	Natural/Native occurrence	Unknown	N	19561231	19561231	DPR-SALTON SEA SRA, PVT, UNK	Endangered	Endangered	G1	S152		FP	AFS_EN; IUCN_EN	BOMBAY BEACH, ABOUT 3.8 MILES W OF FRINK, EASTERN SALTON SEA.			1 RAZORBACK SUCKER COLLECTED (CAS #26235) ON 31 DEC 1956 BY W. FOLLETT AND E. FOLLETT. AT LEAST ONE OR MORE DETECTED BY D. WEIDEMANN ON 15 DEC 1981, AND BY G. & A. BOND ON 15 JAN 2003. 56 DETECTED BY M. SAN MIGUEL ON 14 DEC 2004. AT LEAST ONE OR MORE DETECTED BY S. QUARTIERI ON 18 JAN 2007.			20130319	8042068.79209000000	10052.96883590000	20901	209
Charadrius montanus	mountain plover	ABNNB03100	87	85878	86137	3311525	Niland	IMP	T11S, R14E, Sec. 09 (S)	-140	1	2	Birds	1	1 mile	Presumed Extant	Natural/Native occurrence	Unknown	N	20041214	20041214	PVT	None	None	G3	S253		SSC	BLM_S; IUCN_NT; NABCI_RWL; USFWS_BCC	VICINITY OF NILAND, ABOUT 8 MI N OF CALIPATRIA.	MAPPED TO PROVIDED COORDINATES AND LOCATIONS LISTED AS "NILAND" AND "SALTON SEA - NILAND." EXACT LOCATIONS UNKNOWN.	MOUNTAIN PLOVERS MORE THAN LIKELY USE THE AGRICULTURE FIELDS WEST AND SOUTH OF NILAND, AND THE IMPERIAL VALLEY IN GENERAL, FOR FORAGING AND OVER WINTERING.				20120508	8042068.49039000000	10052.96865140000	20901	209
Phrynosoma mcallii	flat-tailed horned lizard	ARACF12040	24	06128	27938	3311547	Durmid	RIV	T08S, R11E, Sec. 25 (S)	-120	1	2	Reptiles	1	1 mile	Presumed Extant	Natural/Native occurrence	Unknown	N	2005XXXX	2005XXXX	BLM, STATE, UNKNOWN	None	None	G3	S2		SSC	BLM_S; IUCN_NT	ABOUT 2 MILES NE OF BAT CAVES BUTTES AND 3 MILES WSW OF COACHELLA CANAL SIPHON 23, EAST SIDE OF SALTON SEA.	TBS R11E SEC 25. 2005: SE PART OF DOS PALMAS ACEC. DETECTIONS, NO DATE: "DOS PALMAS AREA," (BLM) "NEAR SALT CREEK AT CROSSING WITH 230 KV LINE, 100 YDS E OF TOWER" (IID).	2005: DURING SURVEY OF DOS PALMAS ACEC, FLAT-TAILED HORNED LIZARDS WERE FOUND ON PLOTS WITH SANDY SUBSTRATE. DESERT HORNED LIZARDS WERE FOUND ON ROCKIER SUBSTRATES IN W & NW PARTS OF THE ACEC.	SBCM #1695 COLLECTED 12 APR 1969. 1 FLAT-TAILED HORNED LIZARD OBSERVED ON 8 MAY 1979. 7 OBSERVED ON 3 OF 8 PLOTS SURVEYED IN 2005.			20150729	7919593.54211000000	9988.69420389000	20901	209
Icteria virens	yellow-breasted chat	ABPBX24010	18	06258	24891	3311535	Wister	IMP	T10S, R13E, Sec. 10, NE (S)	-199	1	2	Birds	1	1 mile	Presumed Extant	Natural/Native occurrence	Unknown	N	19610507	19610507	UNKNOWN	None	None	G5	S3		SSC	IUCN_LC	7 MI NW NILAND.			SBCM #S-3231.			19890810	7914952.93125000000	9985.76865212000	20901	209
Taxidea taxus	American badger	AMAJF04010	141	06273	56826	3311525	Niland	IMP	T11S, R13E, Sec. 23 (S)	-225	1	2	Mammals	3	1 mile	Presumed Extant	Natural/Native occurrence	Unknown	N	19370510	19370510	DFG-IMPERIAL WA, IMP COUNTY	None	None	G5	S3		SSC	IUCN_LC	ALAMO DUCK PRESERVE, NW OF CALIPATRIA, IMPERIAL COUNTY.	LOCATION GIVEN AS "ALAMO DUCK PRESERVE", MAPPED IN VICINITY OF THE IMPERIAL WATERFOWL MANAGEMENT AREA 6 MI NW OF CALIPATRIA.		MALE COLLECTED (MVZ #77276) BY WARD C. RUSSELL ON 10 MAY 1937.			20040928	7914300.00241000000	9985.35842312000	20903	809

Attachment E
CNDDB Database Query

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Attachment E
CNDDB Database Query

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Attachment E
CNDDB Database Query

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Attachment F

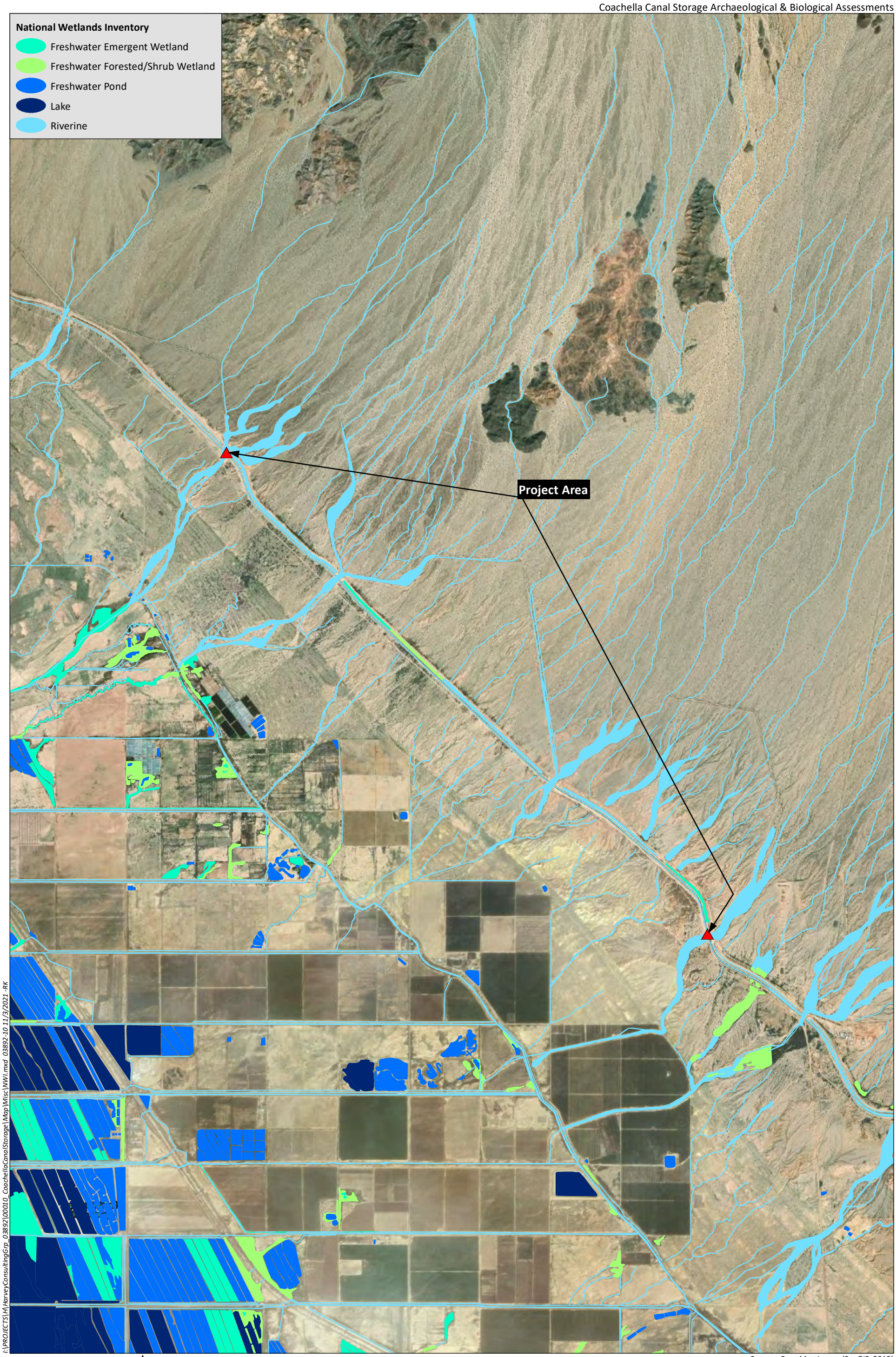
CNPS Database Query

Attachment F
CNPS Database Query

ScientificName	CommonName	Family	Lifeform	CRPR	GRank	SRank	OtherStatus	CESA	FESA	BloomingPeriod	Habitat	MicroHabitat	ElevationLow_m	ElevationLow_ft	ElevationHigh_m	ElevationHigh_ft	CAEndemic	States	Counties	Quads	EOTotal	EOA	EOB	EOC	EOD	EOX	EOU	EOHistorical	EORecent	EOExtant	EOPossiblyExtirpated	EOExtirpated	EOThreatList	Notes	Threats	Taxonomy	Other	FullScientificName	Synonyms	ElementCode	USDAPlantSymbol	CBRReason	DateAdded	LastUpdate
Astragalus crotalariae	Salton milk-vetch	Fabaceae	perennial herb		4.3	G4G5	S4	IUCN_LC, SB_USDA	None	None	Jan-Apr	Sonoran desert scrub		-60	-195	250	820	FALSE	AZ, BA, CA	IMP, RIV, SDG	Arroyo Tapiado (3211682), Borrego Mountain (3211622), Borrego Mountain SE (3211631), Carrizo Mtn. NE (3211681), Clark Lake (3311633), Durmid (3311547), Fonts Point (3311632), Harpers Well (3311538), Iris (3311524), Kane Spring (3311517), Kane Spring NE (3311527), Kane Spring NW (3311528), Plaster City (3211577), Shell Reef (3311621), Superstition Mtn. (3211587), Tubb Canyon (3311624), Wister (3311535), Yuha Basin (3211567)	0	0	0	0	0	0	0	0	0	0	0	0	0					Astragalus crotalariae		PDFAB0F2K0	ASCR5		1/1/1974 0:00	9/27/2021 0:00
Astragalus insularis var. harwoodii	Harwood's milk-vetch	Fabaceae	annual herb	2B.2	G5T4	S2	SB_CalBG/RSABG	None	None	Jan-May	Desert dunes, Mojavean desert scrub	Gravelly (sometimes), Sandy (sometimes)	0	0	710	2330	FALSE	AZ, CA, SO	IMP, RIV, SBD, SDG	Gray Well NE (3211467), Agua Caliente Springs (3211683), Araz (3211476), Arica Mountains (3411418), Arroyo Tapiado (3211682), Aztec Mines (3311552), Blythe (3311455), Borrego Mountain SE (3311611), Buzzard Spring (3311575), Carrizo Mtn. (3211671), Carrizo Mtn. NE (3211681), Conejo Well (3311576), Corn Spring (3311563), Coyote Wells (3211568), Danby Lake (3411521), Desert Center (3311564), East of Granite Pass (3411511), East of Red Canyon (3311555), East of Victory Pass (3311573), Ford Dry Lake (3311561), Harper Canyon (3311612), Hayfield Spring (3311565), Hopkins Well (3311458), In-ko-pah Gorge (3211661), Kane Spring NE (3311527), Little Maria Mts. (3311488), McCoy Peak (3311467), McCoy Spring (3311468), McCoy Wash (3311466), Ogilby (3211477), Painted Gorge (3211578), Pilot Mountain (3311553), Pinto Mountain (3311587), Placer Canyon (3311585), Red Cloud Canyon (3311554), Rice (3411417), Ripley (3311456), Roosevelt Mine (3311457), San Bernardino Wash (3311586), Sidewinder Well (3311562), Styx (3311487), Sweeney Pass (3211672), Thumb Peak (3311447), West of Palen Pass (3311582), Wister (3311535), Yuma West (3211466)	120	2	32	30	18	0	38	18	102	120	0	0	89	Threatened by vehicles and solar energy development.				Astragalus insularis var. harwoodii Munz & McBurn.		PDFAB0F491	ASINH		1/1/1980 0:00	8/25/2021 0:00
Juncus cooperi	Cooper's rush	Juncaceae	perennial herb		4.3	G4	S3	SB_CalBG/RSABG	None	None	Apr-May(Aug)	Meadows and seeps		-260	-855	1770	5805	FALSE	CA, NV	IMP, INY, RIV, SBD, SDG	Badwater (3611627), Ballarat (3611712), Beatty Junction (3611658), Carrizo Mtn. NE (3211681), Chloride City (3611668), Cottonwood Canyon (3611753), Craig Canyon (3611767), Devils Golf Course (3611637), Devils Speedway (3611638), Durmid (3311547), East of Echo Canyon (3611645), Echo Canyon (3611646), Frink (3311536), Furnace Creek (3611647), Grapevine Peak (3611782), Jacumba (3211662), Jail Canyon (3611722), Lower Warm Springs (3611777), Manix (3411685), Myoma (3311673), Nevares Peak (3611657), Oasis (3311641), Old Ibex Pass (3511664), Orocopia Canyon (3311557), Palm View Peak (3311665), Panamint Butte (3611743), Paradise Range (3511627), Resting Spring (3511682), Seventeen Palms (3311631), Shoshone (3511683), Soda Lake North (3511621), Tecopa (3511672), Thimble Peak (3611771), Topock (3411464), Ubehebe Crater (3711714), West of Furnace Creek (3611648), West of Teakettle Junction (3611776), Wister (3311535)	0	0	0	0	0	0	0	0	0	0	0	0	Possibly threatened by hydrologic alterations and grazing. See Transactions of the Academy of Science of St. Louis 2:590 (1868) for original description.				Juncus cooperi		PMJUN010T0	JUCO3		1/1/1974 0:00	1/5/2022 0:00
Astragalus sabulonum	gravel milk-vetch	Fabaceae	annual/perennial herb	2B.2	G4G5	S2		None	None	Feb-Jun	Desert dunes, Mojavean desert scrub, Sonoran desert scrub	Flats, Gravelly (sometimes), Roadsides, Sandy (usually), Washes	-60	-195	930	3050	FALSE	AZ, CA, NM, NV, SO, UT	IMP, INY, RIV, SDG	Borrego Palm Canyon (3311634), Borrego Sink (3311623), Calexico (3211564), Calvada Springs (3511588), Clark Lake (3311633), Harpers Well (3311538), Heber (3211565), Hopkins Well (3311458), Indio (3311662), Kane Spring (3311517), Kane Spring NE (3311527), Last Chance Range SW (3711716), Mecca (3311611)*, Mortmar (3311558), Mound Spring (3611518), Mount Signal (3211566), Niland (3311525), Roosevelt Mine (3311457), Stump Spring, Nev. (3511587), The Dunes (3611744), Tubb Canyon (3311624), Wister (3311535), Yuha Basin (3211567)	19	2	1	3	0	1	12	12	7	18	0	1	8	Threatened by solar energy development. Possibly threatened by vehicles, recreational activities, and non-native plants. See Proceedings of the American Academy of Arts and Sciences 13:361-374 (1878) for original description.				Astragalus sabulonum		PDFAB0F7R0	ASSA2		##########	8/25/2021 0:00

Attachment G

National Wetlands Inventory



Source: Base Map Layers (SanGIS, 2019)

I:\PROJECTS\H\HarveyConsultingGrp_03892\00010_CoachellaCanalStorage\Map\Misc\NWI.mxd 03892-10 11/3/2021 - RK

HELIX Environmental Planning

National Wetlands Inventory

Attachment H

Representative Site Photos



Photo 1. Looking north across original earthen canal and lined canal from Siphon Eleven.



Photo 2. Looking south at lined canal from near Siphon Twelve.

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Photo 3. Looking south at wildlife drinker near Siphon Twelve.



Photo 4. Looking northwest at original earthen canal, with some water near wildlife drinker by Siphon Twelve.

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Photo 5. Looking south at original earthen canal near Siphon Thirteen.



Photo 6. Looking southwest at gap between sections of the canal, near Siphon Thirteen.

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Photo 7. Looking south at original earthen canal near Siphon Fourteen.



Photo 8. Looking southwest at Siphon Fourteen.

\\HeEnpVM\vol2\PROJECTS\H\HarveyConsultingGrp_03892\00010_CoachellaCanalStorag Arch_Reports\NEPA biological assessment\photo page request\use these photos

Attachment I

Special Status Plant Species with Potential to Occur

Attachment I
Special Status Plant Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
Cooper's rush	*Juncus cooperi*	--/-- CRPR 4.3	Perennial herb. Occurs within mesic, alkaline, and saline meadows and seeps. Found within Inyo, San Bernardino, Riverside, Imperial, and San Diego Counties. Flowering period: April to May (August). Elevation: 850 to 5,810 feet (260 to 1,770 meters).	**Not Likely to Occur:** Suitable habitat does not occur within the project site, which is outside of the known elevation range for the species.
Cove's cassia	*Senna covesii*	--/-- CNPS 2B.2	Perennial herb. Occurs in dry, sandy desert washes and slopes within Sonoran desert scrub. Found in eastern San Bernardino County southwest to eastern San Diego County. Flowering Period: March to June (August). Elevation: 735 to 4,250 feet (225 to 1,295 meters).	**Not Likely to Occur:** Suitable habitat does not occur within the project site, which is outside of the known elevation range for the species.
Emory's crucifixion-thorn	*Castela emoryi*	--/-- CNPS 2B.2	Shrub. Occurs on dry, gravelly washes, slopes, and plains typically in creosote bush scrub. Found in Inyo, San Bernardino, Riverside, and Imperial Counties. Flowering period: June to July. Elevation: around 2,133 feet (650 meters).	**Not Likely to Occur:** Suitable habitat does not occur within the project site, which is outside of the known elevation range for the species. Disturbed washes crossing the project alignment are not vegetated and are subject to vehicle disturbance and scouring.
fairyduster	*Calliandra eriophylla*	--/-- CRPR 2B.3	Perennial shrub. Occurs within Sonoran desert scrub on sandy or rocky soils. Found in Riverside, Imperial, and San Diego Counties. Flowering period: January to March. Elevation: 390 to 4,920 feet (120 to 1,500 meters).	**Not Likely to Occur:** Suitable habitat does not occur within the project site, which is outside of the known elevation range for the species.
glandular ditaxis	*Ditaxis claryana*	--/-- CNPS 2B.2	Annual or perennial herb. Grows on sandy soils within creosote bush scrub. Found in San Bernardino, Riverside, and Imperial Counties. Flowering period: October to March. Elevation: below 328 feet (100 meters).	**Not Likely to Occur:** Suitable habitat does not occur within the project site.

Attachment I
Special Status Plant Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
gravel milk-vetch	*Astragalus sabulonum*	--/-- CNPS 2B.2	Perennial herb. Grows on desert dunes and sandy, sometimes gravelly, soils within Mojave and Sonoran desert scrub. Also occurs on flats, washes, and along road sides. Found in Inyo, Riverside, Imperial, and San Diego Counties. Flowering period: February to June. Elevation: below 3,050 feet (930 meters).	**Not Likely to Occur:** Suitable habitat does not occur within the project site.
Harwood's milk-vetch	*Astragalus insularis* var. *harwoodii*	--/-- CNPS 2B.2	Annual herb. Grows on desert dunes and sandy or gravelly soils within Mojave desert scrub. Found in San Bernardino, Riverside, Imperial, and San Diego Counties. Flowering period: January to May. Elevation: below 2,330 feet (710 meters).	**Not Likely to Occur:** Suitable habitat does not occur within the project site.
Las Animas colubrina	*Colubrina californica*	--/-- CNPS 2B.3	Perennial shrub. Occurs in desert scrub in Mojave and Sonoran desert. Found in Riverside, Imperial, and San Diego Counties. Flowering period: April to June. Elevation: 30 to 3,280 feet (10 to 1,000 meters).	**Not Likely to Occur:** Suitable habitat does not occur within the project site.
Munz's cholla	*Cylindropuntia munzii*	--/-- CNPS 1B.3	Perennial succulent. Occurs on gravelly or sandy soils of washes, canyon walls. Occurs primarily within Imperial County but some records from San Gabriel Mountains in Bernardino County. Flowering period: March to May. Elevation: 492 to 1,968 feet (150 to 600 meters).	**Not Likely to Occur:** Suitable habitat does not occur within the project site, which is outside of the known elevation range for the species. Disturbed washes crossing the project alignment are not vegetated and are subject to vehicle disturbance and scouring.
narrow-leaf sandpaper-plant	*Petalonyx linearis*	--/-- CNPS 2B.3	Perennial shrub. Grows in sandy or rocky canyons within Mojave and Sonoran desert scrub. Found within San Bernardino, Riverside, Imperial, and San Diego Counties. Flowering Period: March to May. Elevation: below 3,478 feet (1,060 meters).	**Not Likely to Occur:** Suitable habitat does not occur within the project site.

Attachment I
Special Status Plant Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
Orocopia sage	*Salvia greatae*	--/-- CNPS 1B.3	Shrub. Occurs on alluvial slopes, typically in creosote bush scrub, within Imperial, Riverside, and San Bernardino Counties. Flowering period: March to April. Elevation: 98 and 1,476 feet (30 to 450 meters).	**Not Likely to Occur:** Suitable habitat does not occur within the project site.
Salton milk-vetch	*Astragalus crotalariae*	--/-- CNPS 4.3	Perennial herb. Grows on sandy or gravelly soils within Sonoran desert scrub. Found in Riverside, Imperial, and San Diego Counties. Flowering period: January to April. Elevation: below 820 feet (250 meters).	**Not Likely to Occur:** Suitable habitat does not occur within the project site.
sand evening-primrose	*Chylismia arenaria*	--/-- CNPS 2B.2	Annual or bushy perennial herb. Occurs within sandy washes, rocky slopes, and desert scrub (such as creosote bush scrub) within San Bernardino, Riverside, Imperial, and San Diego Counties. Flowering period: March to April. Elevation: below 1,411 feet (430 meters).	**Not Likely to Occur:** Suitable habitat does not occur within the project site. Disturbed washes crossing the project alignment are not vegetated and are subject to vehicle disturbance and scouring.
sand food	*Pholisma sonorae*	--/-- CNPS 1B.2	Perennial (parasitic) herb. Occurs within dunes and sandy areas, such as within Sonoran desert scrub within Imperial County. Parasitic on *Eriogonum, Tiquilia, Ambrosia,* and *Pluchea*. Flowering period: April to May. Elevation: below 656 feet (below 200 meters).	**Not Likely to Occur:** Suitable habitat does not occur within the project site. Disturbed washes crossing the project alignment are not vegetated and are subject to vehicle disturbance and scouring.
slender-spined all thorn	*Koeberlinia spinosa* var. *tenuispina*	--/-- CNPS 2B.2	Shrub. Occurs within creosote bush scrub within Riverside and Imperial Counties. Flowering period: May to July. Elevation: below 1,411 feet (430 meters).	**Not Likely to Occur:** Suitable habitat does not occur within the project site.
spear-leaf matelea	*Matelea parvifolia*	--/-- CNPS 2B.3	Perennial herb. Occurs within rocky areas of Mojave and Sonoran desert scrub. Found within San Bernardino, Riverside, San Diego, and Imperial Counties. Flowering period: March to May. Elevation: 1,440 to 3,595 feet (440 to 1,095 meters).	**Not Likely to Occur:** Suitable habitat and soils do not occur within the project site, which is outside of the known elevation range for the species.

Attachment I
Special Status Plant Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
Wiggins' croton	*Croton wigginsii*	--/-- CNPS 2B.2	Perennial shrub. Grows in sand dunes and sandy soils of desert scrub in the southeastern portion of Sonoran Desert. Found in Los Angeles, Riverside, Imperial, and San Diego Counties. Flowering period: February to June. Elevation: 65 to 900 feet (20 to 275 meters).	**Not Likely to Occur:** Suitable habitat does not occur within the project site.

California Native Plant Society's California Rare Plant Rank:

1A Plants presumed extinct in California.

1B Plants rare, threatened, or endangered in California and elsewhere.

2 Plants rare, threatened, or endangered in California, but more common elsewhere.

3 Plants in need of more information.

4 Plants of limited distribution.

Potential to Occur:

Not Likely to Occur – There are no present or historical records of the species occurring on or in the immediate vicinity, (within 1 mile) of the survey area and the diagnostic habitats strongly associated with the species do not occur on or in the immediate vicinity of the survey area.

Low Potential to Occur – There is a historical record of the species in the vicinity of the survey area and potentially suitable habitat on the survey area, but existing conditions, such as density of cover, prevalence of non-native species, evidence of disturbance, limited habitat area, isolation, substantially reduce the possibility that the species may occur. The survey area is above or below the recognized elevation limits for this species.

Moderate Potential to Occur – The diagnostic habitats associated with the species occur on or in the immediate vicinity of the survey area, but there is not a recorded occurrence of the species within the immediate vicinity (within 1 mile). Some species that contain extremely limited distributions may be considered moderate, even if there is a recorded occurrence in the immediate vicinity.

High Potential to Occur – There is both suitable habitat associated with the species and a historical record of the species on or in the immediate vicinity of the survey area (within 1 mile).

Species Present – The species was observed on the survey area at the time of the survey or during a previous biological survey.

Attachment J

Special Status Animal Species with Potential to Occur

Attachment J
Special Status Animal Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
INVERTEBRATES				
monarch butterfly	*Danaus plexippus* (overwintering population)	CE/--	Roosts located in wind-protected tree groves (eucalyptus [*Eucalyptus* sp.], Monterey pine [*Pinus radiata*], cypress [*Cupressus* sp.]), with nectar and water sources nearby. Larval host plants consist of milkweeds (*Asclepias* sp.).	**Not Likely to Occur:** Suitable habitat is not present in the project site, and the associated plant species were not observed.
VERTEBRATES				
Fish				
desert pupfish	*Cyprinodon macularius*	FE/FE	In California, historically occurred in several springs, seeps and slow-moving streams in the Salton Sink Basin, as well as in backwaters and sloughs along the lower Colorado River. Naturally occurring populations are currently restricted to the Salton Sea and nearby shoreline pools, freshwater ponds, and irrigation drains, as well as in portions of creeks and washes that are tributary to the Salton Sea. Habitats generally consist of shallow, clear water with soft substrates found within springs, small streams, shoreline pools, irrigation drains and ditches, and pond margins at elevations below 5,200 feet.	**Not Likely to Occur:** Suitable habitat is not present in the project site (lined canal lacks substrate), and there have been no reports of pupfish in the Canal.

Attachment J
Special Status Animal Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
razorback sucker	*Xyrauchen texanus*	FE/FE	Occurs within the Colorado River Basin of southwestern U.S. Populations are currently found in the Green River, upper Colorado River, San Juan River, lower Colorado River between Lake Havasu and Davis Dam, Lake Mead, small tributaries of the Gila River (Verde River, Salt River, and Fossil Creek), and in local areas such as Cibola High Levee Pond, Achii Hanyo Native Fish Facility, and Parker Strip. Inhabits large rivers with deep runs, eddies, backwaters, and flooded off-channels. Typically occurs in sandy bottomed, low gradient, flat-water reaches outside of the spawning period. Spawning in rivers occurs over bars of cobble, gravel, and sandy substrates and over rocky shoals and shorelines in reservoirs. Young require quiet, warm, shallow water such as tributary mouths, backwaters, or inundated floodplain habitats in rivers, and coves or shorelines in reservoirs.	**Not Likely to Occur:** Suitable habitat is not present in the project site (lined canal lacks substrate), and there have been no reports of razorback sucker in the Canal.
bonytail chub	*Gila elegans*	FE/SE	In California, population has declined but known in the Colorado River system. Population is being augmented with hatchery born bonytails. Mostly restricted to sections of the river in rocky canyons. May prefer backwaters with rocky or muddy bottoms and flowing pools but have been observed in swiftly flowing water.	**Not Likely to Occur:** Suitable habitat is not present in the project site (lined canal lacks substrate), and the species occurs in the Colorado River System.

Attachment J
Special Status Animal Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
Reptiles and Amphibians				
Couch's spadefoot	*Scaphiopus couchii*	--/SSC	In California, occurs east of the Algodones sand dunes in Imperial County, north into San Bernardino County at elevations below 5,900 feet. Terrestrial species requiring temporary pools for breeding. Suitable upland habitats include desert and arid regions of grassland, prairie, mesquite, creosote bush, thorn forest, and sandy washes. Buried underground for most of the year, emerging after rains. Breeds in temporary pools formed by heavy rains. Estivates in burrows.	**Low Potential to Occur:** Potentially suitable habitat is present in the project site, but is limited to disturbed washes used by vehicles where they cross the project alignment. There is not a historical record of the species on or in the immediate vicinity of the survey area (within 1 mile).
Desert tortoise	*Gopherus agassizii*	FT/ST	In California, found throughout the Mojave and Sonoran Deserts of southern California at elevations below 3,500 feet. Generally, occurs north and west of the Colorado River and along the east side of the Salton Basin; absent from Coachella Valley. Occupies a variety of habitats including creosote scrub flats, rocky foothills, riverbanks, washes, alluvial fans, sandy dunes, canyon bottoms, and desert oases where suitable sandy or gravelly soils for den construction occur. Spends up to 95 percent of life within underground burrows which they dig. Most active during the spring when they mate and forage for food.	**Low Potential to Occur:** Potentially suitable habitat is present in the project site, but is limited to the disturbed washes used by vehicles where they cross the project alignment. Canal fencing could exclude tortoise from most of the project site. There is not a historical record of the species on or in the immediate vicinity of the survey area (within 1 mile). The site occurs approximately 3.2 mile outside of this species' range.

Attachment J
Special Status Animal Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
flat-tailed horned lizard	*Phrynosoma mcallii*	--/SSC	Occurs throughout the Colorado Desert in southeastern California from Coachella Valley (San Bernardino County) south through Imperial Valley (Imperial County) at elevations below 1,000 feet. Specialized sand-dweller found in a variety of desert scrub habitats with shifting sand and scattered sparse vegetation of low species diversity; rarely occurs on sand dunes. Most common in areas with a high density of harvester ants.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
lowland leopard frog	*Lithobates yavapaiensis*	--/SSC	May be extirpated from California. Isolated populations could remain in the Imperial Valley and the San Felipe Creek drainage. Occurs in a variety of habitats, in streams, river side channels, springs, ponds, stock ponds, canals, ditches, grassland, woodland, and pinyon juniper at elevations below 5,577 feet. Terrestrial species that stays close to water and shelters in streamside vegetation, breeding in the water. May remain active in winter, in warmer locations.	**Low Potential to Occur:** Potentially suitable habitat is present in the project site, but species was extirpated from its nearest recorded location from 1940. Entire species likely extirpated from California. Furthermore, construction for the canal lining would have removed any individuals present at that time.
Sonoran Desert toad	*Incilius alvarius*	--/SSC	May be extirpated from California; last recorded in 1955. Occurs in a variety of habitats, in grasslands, arid desert lowlands, mountain canyons with oaks and sycamores, and pinyon-oak-juniper mountain forests. Found near washes, river bottoms, springs, reservoirs, canals, irrigation ditches, stock ponds, streams, temporary pools, and sometimes away from water sources at elevations below 5,784 feet. Terrestrial species that requires water to breed.	**Low Potential to Occur:** Potentially suitable habitat is present in the project site, but species described as possibly extirpated from its nearest recorded location from 1916. Entire species likely extirpated from California. Furthermore, construction for the canal lining would have removed any individuals present at that time.

Attachment J
Special Status Animal Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
Birds				
black skimmer	*Rynchops niger* (nesting colony)	BCC/SSC	Year-round resident in southern California breeding in localized areas along coast from San Francisco Bay south to San Diego County, and east at the Salton Sea. Nests in mixed species colonies on open sandy areas, or gravel and shell bars, with sparse vegetation. In winter, roosts communally on urban beaches or on mud flats in estuaries. In San Diego County, primarily observed in Mission Bay during winter and at salt works in San Diego Bay during summer.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
black-tailed gnatcatcher	*Polioptila melanura*	--/WL	Year-round resident of California ranging from southern Inyo County south through Imperial County and west to Barstow and Morongo Valley San Bernardino County, San Gorgonio Pass Riverside County, and Anza-Borrego Desert in San Diego County. Inhabits semiarid and desert scrub communities below elevations of 6,900 feet. Prefers nesting and foraging in densely lined arroyos and washes dominated by creosote bush (*Larrea tridentata*) and salt bush with scattered bursage (*Ambrosia dumosa*), ocotillo (*Fouquieria splendens*), and various cacti species. Tends to avoid areas composed of the introduced tamarisk and has become less common in irrigated agricultural areas of the Coachella, Imperial, and Lower Colorado River Valleys.	**Not Likely to Occur:** Suitable habitat is not present in the project site. Washes crossing the project site were predominately bare.

Attachment J
Special Status Animal Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
burrowing owl	*Athene cunicularia* (burrow sites & some wintering sites)	BCC/SSC	Found from central California east to the Mojave Desert and south to coastal San Diego County. Primarily a grassland species that prefers areas with level to gentle topography and well-drained soils. Also occupies agricultural areas, vacant lots, and pastures. Requires underground burrows for nesting and roosting that are typically dug by other species such as the California ground squirrel (*Spermophilus beecheyi*). Will also utilize natural rock cavities, debris piles, culverts, and pipes for nesting and roosting.	**Not Likely to Occur:** Suitable habitat is not present in the project site, which appears to occur outside this species' range. Burrows were not noted during the general biological survey, and anecdotal information from CVWD employees does not include reports of species occurrence within berms and dikes associated with canal infrastructure.
California black rail	*Laterallus jamaicensis*	BCC/ST & FP	In California, breeds in the Sacramento-San Joaquin River delta, San Francisco Bay area, Bolinas Lagoon and Tomales Bay in Marin County, Morro Bay in San Luis Obispo County, White Slough in San Joaquin County, the Salton Sea in Imperial County, and the Lower Colorado River Valley. Inhabits salt and freshwater marshes and wet meadows. Associated with pickleweed (*Salicornia* ssp.), bulrush, alkali heath (*Frankenia salina*), and cordgrass (*Spartina* ssp.). Requires dense cover of upland vegetation in tidal areas for protection when rails must leave marsh habitats during high tide events.	**Not Likely to Occur:** Suitable habitat is not present in the project site, and the associated plant species was not observed.

Attachment J
Special Status Animal Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
California brown pelican	*Pelecanus occidentalis californicus* (nesting colony & communal roosts)	delisted/delisted & FP	Found year-round in estuarine, marine subtidal, and marine pelagic waters along the California coast. Rare to uncommon visitor at the Salton Sea in Imperial County from July to September. Nests on undisturbed islands adjacent to marine fishing areas. Rests on water or inaccessible rocks offshore or on the mainland, but also uses mudflats, sandy beaches, wharfs, and jetties.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
California gull	*Larus californicus* (nesting colony)	--/WL	In California, winters along coastal regions with breeding populations localized at Mono Lake and southern San Francisco Bay. Breeding colonies nearly always occur on islands in natural lakes, rivers, or reservoirs. In the winter, the species is found along coastal California at beaches, rocky coasts, mudflats, coastal estuaries, and deltas of rivers and streams.	**Not Likely to Occur:** Suitable habitat is not present in the project site.

Attachment J
Special Status Animal Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
Caspian tern	*Hydroprogne caspia* (nesting colony)	BCC/--	In California, occurs commonly to very commonly along the coast and at scattered inland locations. Primarily a summer visitor but may also winter and occur year-round in southern California regions. Nests in dense colonies at a wide variety of habitats ranging from coastal estuarine, salt marsh, and barrier islands to beaches and freshwater islands in inland rivers and salt lakes. Breeding adults often fly substantial distances to forage at rivers lakes, and fresh or saltwater wetland habitats. Nesting colonies occur at Humboldt Bay, San Francisco Bay, San Pablo Bay, San Diego Bay, Elkhorn Slough, and several lakes in Modoc and Lassen Counties. Present in large numbers at the Salton Sea during the breeding season, no longer nests there.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
Crissal thrasher	*Toxostoma crissale*	--/SSC	Permanent resident of the Mojave, Colorado, and Sonoran Deserts of southeastern California. Inhabits a large variety of desert riparian and scrub habitats from below 6,000 feet. Prefers areas of dense, low shrubby vegetation but has also been found foraging at agricultural edges (e.g., citrus orchards) when adjacent to native habitat patches.	**Not Likely to Occur:** Suitable habitat is not present in the project site.

Attachment J
Special Status Animal Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
Gila woodpecker	*Melanerpes uropygialis*	BCC/SE	Permanent resident in southeast California in the Imperial and lower Colorado River Valleys. Inhabits desert with large cacti and trees, dry subtropical forests, and riparian woodlands at elevations below 5,300 feet. Prefers cottonwood-dominated habitat along lower Colorado River in winter and summer. Nests in cavities typically created in saguaro cacti (*Carnegiea gigantea*), mesquite, and fan palms (*Washingtonia* ssp.).	**Not Likely to Occur:** Suitable habitat is not present in the project site, and the associated plant species were not observed.
golden eagle	*Aquila chrysaetos* (nesting and wintering)	BCC/WL & FP	Typical foraging habitat includes grassy and open, shrubby habitats. Generally nests on remote cliffs; requires areas of solitude at a distance from human habitation.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
gull-billed tern	*Gelochelidon nilotica* (nesting colony)	BCC/SSC	Occurs as a summer resident within southern California; rarely observed in the winter. Breeding colonies occur at Salton Sea in Imperial and Riverside Counties, and San Diego Bay in San Diego County. Nesting habitat includes small, bare islets of fine clay within impoundments at the Salton Sea or isolated sections of earthen levees at the salt works in south San Diego Bay.	**Low Potential to Occur:** Potentially suitable habitat is present in the project site, but not isolated. Species not identified as having potential to occur in EIR for canal lining.
Le Conte's thrasher	*Toxostoma lecontei*	BCC/SSC	Permanent resident found in the in southern California from San Joaquin Valley south through the Mojave and Colorado Desert to the U.S./Mexico border. Inhabits sparsely vegetated desert flats, dunes, alluvial fans, or gently rolling hills dominated by saltbush and cholla.	**Not Likely to Occur:** Suitable habitat is not present in the project site.

Attachment J
Special Status Animal Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
least Bell's vireo	*Vireo bellii pusillus* (nesting)	FE, SE	Summer resident of Southern California. Inhabits riparian woodland and is most frequent in areas that combine an understory of dense, young willows or mule fat with a canopy of tall willows.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
loggerhead shrike	*Lanius ludovicianus* (nesting)	BCC/SSC	Found year-round within California throughout the foothills and lowlands with winter migrants found coastally north of Mendocino County. Inhabits a variety of habitats and forages over open ground within areas of short vegetation, pastures with fence rows, old orchards, mowed roadsides, cemeteries, golf courses, riparian areas, open woodland, agricultural fields, desert washes, desert scrub, grassland, broken chaparral and beach with scattered shrubs. Forages by perching to search for prey (such as large insects, small mammals, amphibians, reptiles, and fish) and using impaling as a means of handling prey.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
merlin	*Falco columbarius* (wintering)	--/WL	Uncommon winter migrant in California occurring from September to May at elevations below 5,000 feet. Often found in open woodland, grasslands, cultivated fields, marshes, estuaries and seacoasts; rarely found in heavily wooded areas or over open deserts.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
mountain plover	*Charadrius montanus* (wintering)	BCC/SSC	Winters visitor in central and southern California, primarily in the Central and Imperial Valleys. Strongly associated with short-grass habitats such as fallow, grazed, or burned areas. Rare in San Diego County.	**Not Likely to Occur:** Suitable habitat is not present in the project site.

Attachment J
Special Status Animal Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
prairie falcon	*Falco mexicanus* (nesting)	BCC/WL	Uncommon permanent resident and migrant of California ranging from the Sierra Nevada southwest along the inner coastal mountains and east to the southeastern deserts but absent from northern coastal fog belt. Primary habitats include grasslands, savannahs, alpine meadows, some agricultural fields during the winter season, and desert scrub areas where suitable cliffs or bluffs are present for nest sites. Requires sheltered cliff ledges for cover and nesting which may range in height from low rock outcrops of 30 feet to cliffs up to and higher than 400 feet.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
southwestern willow flycatcher	*Empidonax traillii extimus* (nesting)	FE/SE	Breeds within thickets of willows or other riparian understory usually along streams, ponds, lakes, or canyons. Migrants may be found among other shrubs in wetter areas.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
western snowy plover	*Charadrius alexandrinus nivosus* (nesting)	FT & BCC/SSC	Occurs in beaches, dunes, and salt flats.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
yellow warbler	*Setophaga petechia* (nesting)	BCC/SSC	Found along riparian woodlands.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
yellow-billed cuckoo	*Coccyzus americanus* (nesting)	FT & BCC/SE	Uncommon summer resident of California. Current breeding range is restricted to isolated sites in Sacramento, Amargosa, Kern, Santa Ana, and Colorado River Valleys. Riparian obligates that nest in riparian woodlands with native broadleaf trees and shrubs, such as cottonwoods (*Populus* ssp.) and willows at least 50 acres or more in size within arid to semiarid landscapes. Most likely found in patches of riparian habitat greater than 200 acres.	**Not Likely to Occur:** Suitable habitat is not present in the project site.

Attachment J
Special Status Animal Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
yellow-breasted chat	*Icteria virens* (nesting)	--/SSC	Prefers mature riparian woodlands.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
Yuma Ridgway's rail	*Rallus obsoletus yumanensis*	FE/ST & FP	One of six subspecies occurring from southeastern California and southwestern Arizona along the lower Colorado River and tributaries (Virgin River, Bill Williams River, lower Gila River) and Salton Sea in California. Inhabits freshwater marshes dominated by cattails and bulrush.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
Mammals				
American badger	*Taxidea taxus*	--/SSC	Occurs in open plains and prairies, farmland, and sometimes edges of woods.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
California leaf-nosed bat	*Macrotus californicus*	--/SSC	In California, ranges from Ventura County south to the U.S./Mexico Border. Within San Diego County, primarily occurs as a desert species within the Anza-Borrego Desert, but has also been documented in the western foothills along the Santa Margarita River and inland valley of Dulzura. Uses caves and similar structures for roosting including buildings, bridges, and fallen palm trunks. Forages along desert washes and floodplains in the east, and sandy river valleys along the coast.	**Low Potential to Occur:** Potentially suitable habitat is present in the project site, but structures in the project area not likely to be used given the high level of disturbance.

Attachment J
Special Status Animal Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
desert bighorn sheep	*Ovis canadensis nelsoni*	--/FP	Prefers rugged and open habitat on rocky slopes and cliffs, canyons, washes and alluvial fans. Associated with water sources in summer. Population occurs within Mono, Inyo, San Bernardino, Los Angeles, Riverside, and Imperial Counties. Desert bighorn sheep are distinct from Peninsular bighorn sheep (of the same subspecies), which are limited to the Peninsular Ranges within Riverside, Imperial, and San Diego Counties.	**Not Likely to Occur:** A population of desert bighorn sheep inhabits the Chocolate and Orocopia Mountains near the project area and use the reach of the canal near check structure 20 as a water source, but are not known to use the canal within 1 mile of the project site.
pallid bat	*Antrozous pallidus*	--/SSC	Locally common species of low elevations in California. Rocky, mountainous areas and near water; also found over more open, sparsely vegetated grasslands, and prefers foraging in the open. Uses three different roosts: 1) the day roost is in a warm, horizontal opening such as rock cracks; 2) the night roost is in the open, near foliage; and 3) the hibernation roost, which is in caves or cracks in rocks.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
Palm Springs pocket mouse	*Perognathus longimembris bangsi*	--/SSC	Found within the Anza-Borrego Desert region of San Diego County at elevations below 1,500 feet. Occupies dunes and sparse desert scrub environments dominated by creosote, saltbush, and mesquite.	**Not Likely to Occur:** Suitable habitat is not present in the project site.

Attachment J
Special Status Animal Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
Palm Springs round-tailed ground squirrel	*Xerospermophilus tereticaudus chlorus*	--/SSC	Historically occurred throughout the floor of the Coachella Valley in Riverside County, but currently occupies small fragmented areas within its historical range. Preferred habitat is where hummocks of sand have accumulated at the base of large shrubs, but may occur in coarse sands in washes, or the transition between dunes and creosote bush scrub. May prefer mesquite over creosote bush.	**Not Likely to Occur:** Suitable habitat is not present in the project site.
pocketed free-tailed bat	*Nyctinomops femorosaccus*	--/SSC	Semiarid desert lands. Day-roosts in caves, crevices in cliffs, and under the roof tiles of buildings. Uses a variety of arid habitats in southern California: pine-juniper woodlands, desert scrub, palm oases, desert wash, desert riparian, etc. Prefers rocky areas with high cliffs.	**Low Potential to Occur:** Potentially suitable habitat is present in the project site, but is limited to disturbed washes used by vehicles where they cross the project alignment. There is not a historical record of the species on or in the immediate vicinity of the survey area (within 1 mile).
western mastiff bat	*Eumops perotis californicus*	--/SSC	Suitable habitat consists of extensive open areas with abundant roost locations (crevices in cliff faces, high buildings, trees, and tunnels).	**Not Likely to Occur:** Suitable habitat is not present in the project site.
western yellow bat	*Lasiurus xanthinus*	--/SSC	Found in wooded areas and desert scrub, particularly in palm trees. Rare visitor to San Diego County (SDNHM 2019).	**Not Likely to Occur:** Suitable habitat is not present in the project site.

Attachment J
Special Status Animal Species with Potential to Occur

Common Name	Species Name	Status [1]	Habitat Associations	Potential to Occur
Yuma hispid cotton rat	*Sigmodon hispidus eremicus*	--/SSC	Restricted to areas along the lower Colorado River, south of the Palo Verde Mountains, in southwestern Arizona (Yuma) and southeastern California (Imperial County). Inhabits marshy areas and backwater sloughs adjacent to rivers dominated by willows, sedges or tule, wire grass, and/or arrowweed. Found commonly along drainage ditches, canals, and seeps which have a weedy vegetative cover composed of arrowweed, saltgrass, sedges, common reed, mesquite, cattails, tamarisk, and annual grasses. Invades agricultural crops such as cotton, sugar beets and citrus.	**Not Likely to Occur:** Suitable habitat is not present in the project site.

1 Listing codes are as follows:

Federal:

FE Federal Endangered

CE Candidate Endangered

FT Federal Threatened

FSC Federal Species of Concern

BCC Bird of Conservation Concern

State:

SSC California Species of Concern

WL Watch List

Potential to Occur:

Not Likely to Occur - There are no present or historical records of the species occurring on or in the immediate vicinity, (within 1 mile) of the survey area and the diagnostic habitats strongly associated with the species do not occur on or in the immediate vicinity of the survey area.

Low Potential to Occur - There is a historical record of the species in the vicinity of the survey area and potentially suitable habitat on the survey area, but existing conditions, such as density of cover, prevalence of non-native species, evidence of disturbance, limited habitat area, isolation, substantially reduce the possibility that the species may occur. The survey area is above or below the recognized elevation limits for this species.

Moderate Potential to Occur - The diagnostic habitats associated with the species occur on or in the immediate vicinity of the survey area, but there is not a recorded occurrence of the species within the immediate vicinity (within 1 mile). Some species that contain extremely limited distributions may be considered moderate, even if there is a recorded occurrence in the immediate vicinity.

High Potential to Occur - There is both suitable habitat associated with the species and a historical record of the species on or in the immediate vicinity of the survey area (within 1 mile).

Species Present - The species was observed on the survey area at the time of the survey or during a previous biological survey.

Appendix C:

Cultural Resources and Historic Properties Assessment

Mid-Coachella Canal Storage Project

Cultural Resources Technical Report

May 2022 | 03892.00010.001

Submitted to:

Coachella Valley Water District
51501 Tyler Street
Coachella, CA 92236

Prepared for:

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Mary Robbins-Wade
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National Archaeological Database Information

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Firm:	HELIX Environmental Planning, Inc.
Client/Project:	Harvey Consulting Group / Mid-Coachella Canal Storage Project
Report Date:	May 2022
Report Title:	Cultural Resources Technical Report for the Mid-Coachella Canal Storage Project, Imperial County, California
Submitted to:	Coachella Valley Water District
Type of Study:	Cultural Resources Assessment
New Sites:	None
Updated Sites:	P-13-007858/CA-IMP-007858 (CA-RIV-5705/CA-IMP-7658)
USGS Quad:	Wister 7.5' Quadrangle
Acreage:	Approximately 120 acres
Key Words:	Imperial County; Township 9S, Range 14E, East ½ of Section 36; SW ¼ of SW ¼ of Section 31; East ½ of Section 6; Southwest ¼ of Section 5; Northeast ¼ of Section 8; South ½ of Section 9; Northwest ¼ of Section 15; Wister, CA; Coachella Canal; old Coachella Canal; P-13-007858/CA-IMP-007858 (CA-RIV-05705/CA-IMP-07658)

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ACBCI	Agua Caliente Band of Cahuilla Indians
AMSL	above mean sea level
ASM	ASM Affiliates, Inc.
B.P.	Before Present
Canal	Coachella Canal
CCLP	Coachella Canal Lining Project
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CMAGR	Chocolate Mountains Aerial Gunnery Range
CRHR	California Register of Historical Resources
CVWD	Coachella Valley Water District
HELIX	HELIX Environmental Planning, Inc.
IID	Imperial Irrigation District
NAHC	Native American Heritage Commission
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
O&M	operations and maintenance
OHP	Office of Historic Preservation
PRC	Public Resources Code
project	Mid-Coachella Canal Storage Project
Reclamation	Bureau of Reclamation
ROW	right of way
RPA	Register of Professional Archaeologists/Registered Professional Archaeologist
SCIC	South Coastal Information Center
SDCWA	San Diego County Water Authority
SHPO	State Historic Preservation Officer
SOIS	Secretary of the Interior Standards
SPRR	Southern Pacific Railroad

ACRONYMS AND ABBREVIATIONS (cont.)

TCP	Traditional Cultural Properties
TCR	Tribal Cultural Resources
USDI	U.S. Department of the Interior
USGS	U.S. Geological Survey

EXECUTIVE SUMMARY

Harvey Consulting Group, Inc. contracted HELIX Environmental Planning, Inc. (HELIX) to provide cultural resources services for the Mid-Coachella Canal Storage Project (project) in the community of Wister, Imperial County, California. The project is a proposed approximately 120-acre redesign of the Coachella Canal (Canal); the redesign will entail the removal of the concrete lining through the segments between siphon 11 and siphon 14 and the removal of the embankment between the original earthen canal and the new, concrete-lined portion of the Canal between siphons 11 and 14 to create a clay-lined storage reservoir. This assessment intends to determine the potential of ground disturbances associated with this project to affect significant cultural resources. The results of this assessment, which addresses both historic-era and prehistoric resources, is based on the results of an archival records search and research, Sacred Lands File search, Native American coordination, a site visit to the proposed project area, and an assessment of the significance of impacts to archaeological resources and historic-era structures. This report details the methods and results of the cultural resources study and has been prepared to comply with the California Environmental Quality Act (CEQA). A separate report was prepared for the U.S. Department of the Interior (USDI) Bureau of Reclamation, the federal lead agency for the project, to comply with Section 106 of the National Historic Preservation Act (NHPA), as amended.

An archaeological records search, conducted at the South Coastal Information Center (SCIC) on December 07, 2021, indicated that 20 previous cultural resource studies occur within the records search limits, four of which overlap with the project area. The studies consist of cultural resource reviews, environmental impact reports, a biological survey, a mining and reclamation plan, resource inventory and evaluation reports, a historic and archaeological resources protection (HARP) plan, an archaeological and cultural resources surveys, history of local development, and a consultation report. The records search results also indicated that a total of 22 cultural resources have been previously recorded within one-half mile of the project area; one of which has been documented within the project site (P-13-007858/33-005705). P-13-007858/P-33-005705 is the National Register of Historic Places-eligible Canal, which was constructed between 1938 and 1948.

The field investigations included a site visit of the study area by a HELIX archaeologist, architectural historian, and a Native American monitor and Tribal Archaeologist from the Agua Caliente Band of Cahuilla Indians on January 6, 2022. The site visit did not result in the identification of any cultural material within the project area. However, the Canal itself is a historic property that is both an archaeological and historic built environment resource.; it is eligible for, but not listed in, the National Register of Historic Places (NRHP).

Based on the results of the current study, the Mid-Coachella Canal Project will not affect historic properties. While the proposed work will essentially redesign the portion of the Canal within the project area, the work is limited to the removal of an embankment between the original, unlined Coachella Canal and a parallel canal constructed when the original canal was lined in 2006. No historic features contributing to the significance of the Canal will be impacted by the work. The infilling of the unlined, old canal with water will serve to restore this portion of the feature to a use that mirrors its original purpose as a water conveyance feature. Re-inundating the portion of the unlined canal will also help to preserve the portion of the unlined old canal between siphons 11 and 14, which is currently abandoned.

While no additional archaeological sites have been identified within the project (other than the Canal itself), the area surrounding the project is highly sensitive for archaeological deposits. The potential exists that intact cultural resources may be present within the middle embankment that will be removed

for the project. In addition, because the Canal was built prior to the advent of laws protecting cultural resources, no archaeological study of the Canal alignment was conducted prior to the feature's construction. As such, human remains or cultural items protected under the NHPA and/or the Native American Graves Protection and Repatriation Act may occur within the previously disturbed soils within the project. In addition, any such items, whether identified in an intact or disturbed deposit, would likely be considered by the consulting Tribes to be Tribal Cultural Resources and would need to be treated as such.

A cultural resources monitoring program should be conducted during project development. The monitoring program would include attendance by the archaeologist at a pre-construction meeting with the grading contractor and the presence of an archaeological monitor during initial ground-disturbing activities in areas that will be over excavated in previously undisturbed soils. An archaeological monitor would have the authority to temporarily halt or redirect grading and other ground-disturbing activity in the event that cultural resources are encountered. If significant cultural material is encountered, the project archaeologist will coordinate with the Coachella Valley Water District and the USDI Bureau of Reclamation to develop and implement appropriate mitigation measures.

1.0 INTRODUCTION

Harvey Consulting Group, Inc. contracted HELIX Environmental Planning, Inc. (HELIX) to provide cultural resources services for the Mid-Coachella Canal Storage Project (project) in the community of Wister, Imperial County, California. The project is a proposed expansion of the Coachella Canal (Canal) by removing the berm between the original unlined canal and a more recently constructed lined parallel canal. Once the berm has been removed, an approximate 120-acre clay-lined water storage area comprised of three cells will be created along the length of the Canal between Check 11 (MP 54.6) and Check 14 (MP 59.5). A cultural resources study, including a records search, Sacred Lands File search, Native American outreach, archival research, a review of historic aerial photographs and maps, and a site visit of the project area, was completed. This report details the methods and results of the cultural resources study and has been prepared to comply with the California Environmental Quality Act (CEQA).

1.1 PROJECT LOCATION

The project is located near the community of Wister, in Imperial County (Figure 1, *Regional Location*). The project is situated in Township 9 South, Range 14 East, east ½ of Section 36; southwest ¼ of southwest ¼ of Section 31; east ½ of Section 6; southwest 1/4 of Section 5; northeast ¼ of Section 8; south ½ of Section 9; northwest ¼ of Section 15, on the U.S. Geological Survey (USGS) 7.5' Wister quadrangle (Figure 2, *USGS Topography*). The approximately 120-acre project site is located within Assessor's Parcel Numbers 003-050-018, 003-050-025, 003-120-014, 003-120-022, 003-130-006, 003-200-047, and 003-210-001, and bordered by Gasline Road to the east and Coachella Canal Road to the west (Figure 3, *Aerial Photograph*). The U.S. Navy's Chocolate Mountain Aerial Gunnery Range (CMAGR) sits adjacent to the eastern edge of the project.

1.2 PROJECT DESCRIPTION

The Coachella Canal is a branch of the All-American Canal that brings water from the Lower Colorado River into the Imperial and Coachella valleys. The Coachella Canal is owned by the US Department of the Interior (USDI) Bureau of Reclamation (Reclamation) and operated and maintained under contract by the Coachella Valley Water District (CVWD). The Coachella Canal Lining Project (CCLP) is a water conservation project completed in 2006 under an agreement between Reclamation, CVWD, and the San Diego County Water Authority (SDCWA). CCLP resulted in a parallel 32-mile-long segment of a concrete-lined canal that replaced the adjacent original earthen canal as a means of reducing seepage losses to conserve water and make that water available for transfer to the SDCWA.

An approximately 4.5-mile segment of the lined canal between siphons 11 and 14 crosses heavy clay soils that shrink and swell seasonally, resulting in cracked panels of the concrete lining that have required significant maintenance. In addition, the Canal has very limited operational flexibility due to its lack of storage capability. The purpose of the proposed project is to bury the concrete lining through the segments between siphon 11 and siphon 14, thereby resolving the maintenance problems, and to remove the embankment between the original earthen canal and the lined canal to create a storage reservoir providing substantially improved operational flexibility. The estimated total footprint of the storage system to be developed is approximately 120 acres, with a storage capacity of approximately 728 acre-feet.

The project is proposed as an inline reservoir between Check 11 (Mile Post 54.6) and Check 14 (Mile Post 59.5). The reservoir will be formed by removing the existing embankment between the existing lined canal and the original earthen canal section to form single-wide trapezoidal sections. The materials removed will be used to construct more gradual canal side slopes (3:1) and to raise the invert by two feet. Existing check structures and siphons will remain in place. Check 11 will serve as the inlet control structure, and Check 14 will be the outlet control structure. The newer CCLP siphons (11, 12, and 13) will continue to be used to convey flow through the reservoir, with siphons 12 and 13 dividing the reservoir into three cells.

All work will be confined within the existing canal right-of-way (ROW), including the fence line on the western perimeter and the existing operations and maintenance (O&M) road just outside the fence line on the eastern side of the Canal. Three other elements of the project outside of the existing ROW include (1) the use of an existing staging area near the northern end of the project developed for the CCLP, a portion of which is still in use as an equipment storage yard by CVWD; (2) use of the existing and regularly used County road that parallels the Canal that will be used for transport from the staging area to the work site; and (3) reuse of existing rock rubble piles located along the west side of the Canal ROW north of the main project site, at Check 24. The rock rubble piles will likely be used as source material for bank armoring on the west-facing eastern edge of the original canal as it is converted into the storage reservoir. If needed, additional rock will be obtained from a commercial source. For either source, the material will be transported to the project site via the existing County Road.

Embankments near Check 14 will be raised to maximize the amount of useful storage and to allow for a maximum reservoir level three feet higher than the present canal design water level. Since the new reservoir invert is approximately two feet higher than the existing concrete canal invert, the maximum water depth in the reservoir is 12 feet at Check 14. Modifications to siphons 12 and 13 and Check 14 will be required to accommodate the higher water levels and raised inverts.

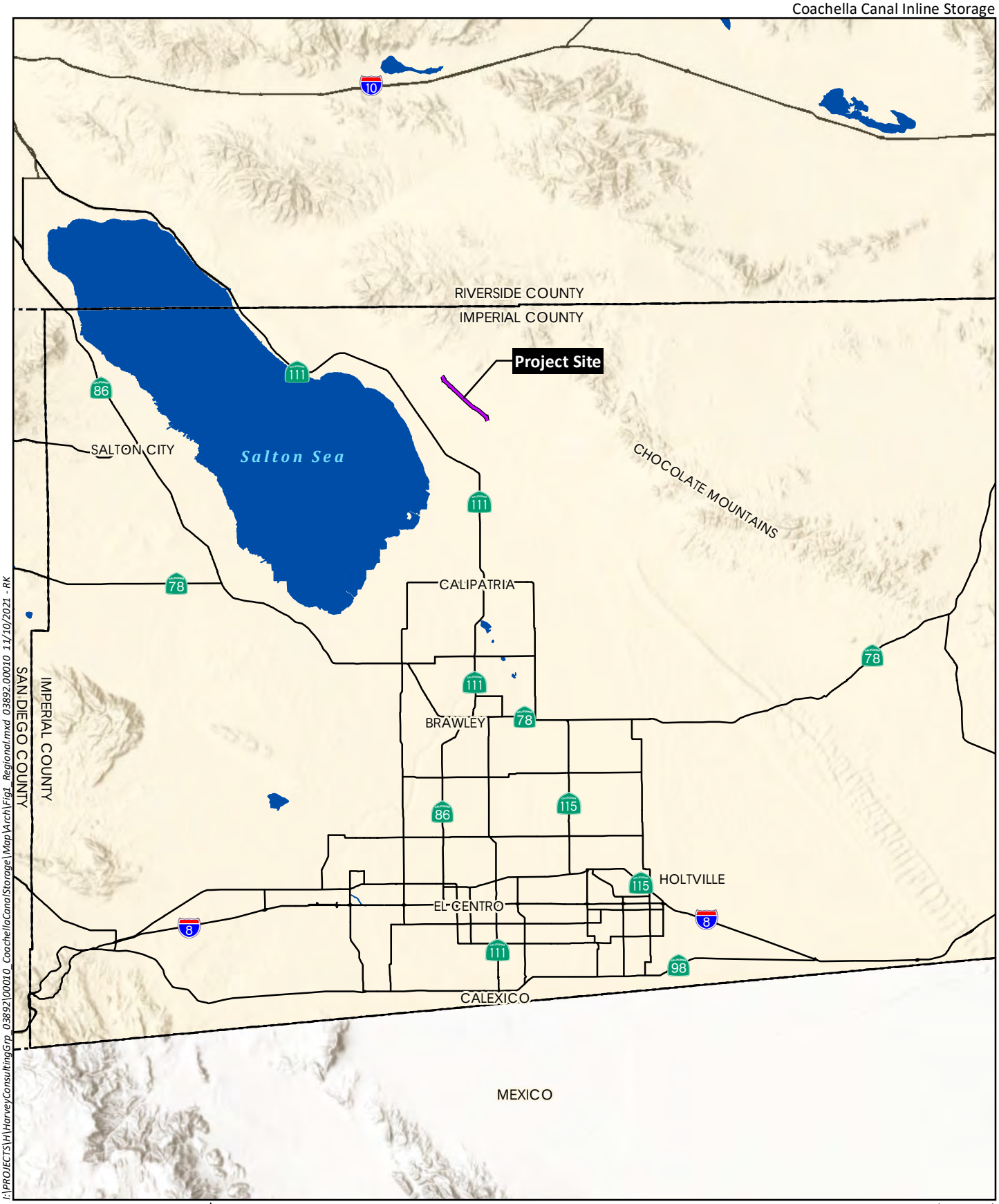
The reservoir will have three cells separated by siphons 12 and 13. With no additional control structures added at these two siphon inlets, the water surface will be almost level and at about the same elevation in all three cells during low-flow conditions (<400 cubic feet per second). At higher flow rates, the water surface will step down from upstream cell to downstream cell due to head loss through the siphons. The size of these steps will increase with flow rate, up to about a six-foot drop between cells at maximum canal flow. The three-cell reservoir will resemble a wide canal with three pools, except the water surface within each cell will be almost horizontal due to the increased cell width and resulting low flow velocity.

1.3 REGULATORY FRAMEWORK

Cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, and/or scientific importance. Significant resources are those resources that have been found eligible for listing in the California Register of Historical Resources (CRHR) or National Register of Historic Places (NRHP), as applicable.

1.3.1 Federal

Federal regulations that would be applicable to the project consist of the National Historic Preservation Act (NHPA) and its implementing regulations (16 United States Code 470 et seq., 36 Code of Federal Regulations [CFR] Part 800). Section 106 of the NHPA requires Federal agencies to account for the effects of their undertakings on “historic properties”, that is, properties (either historic or



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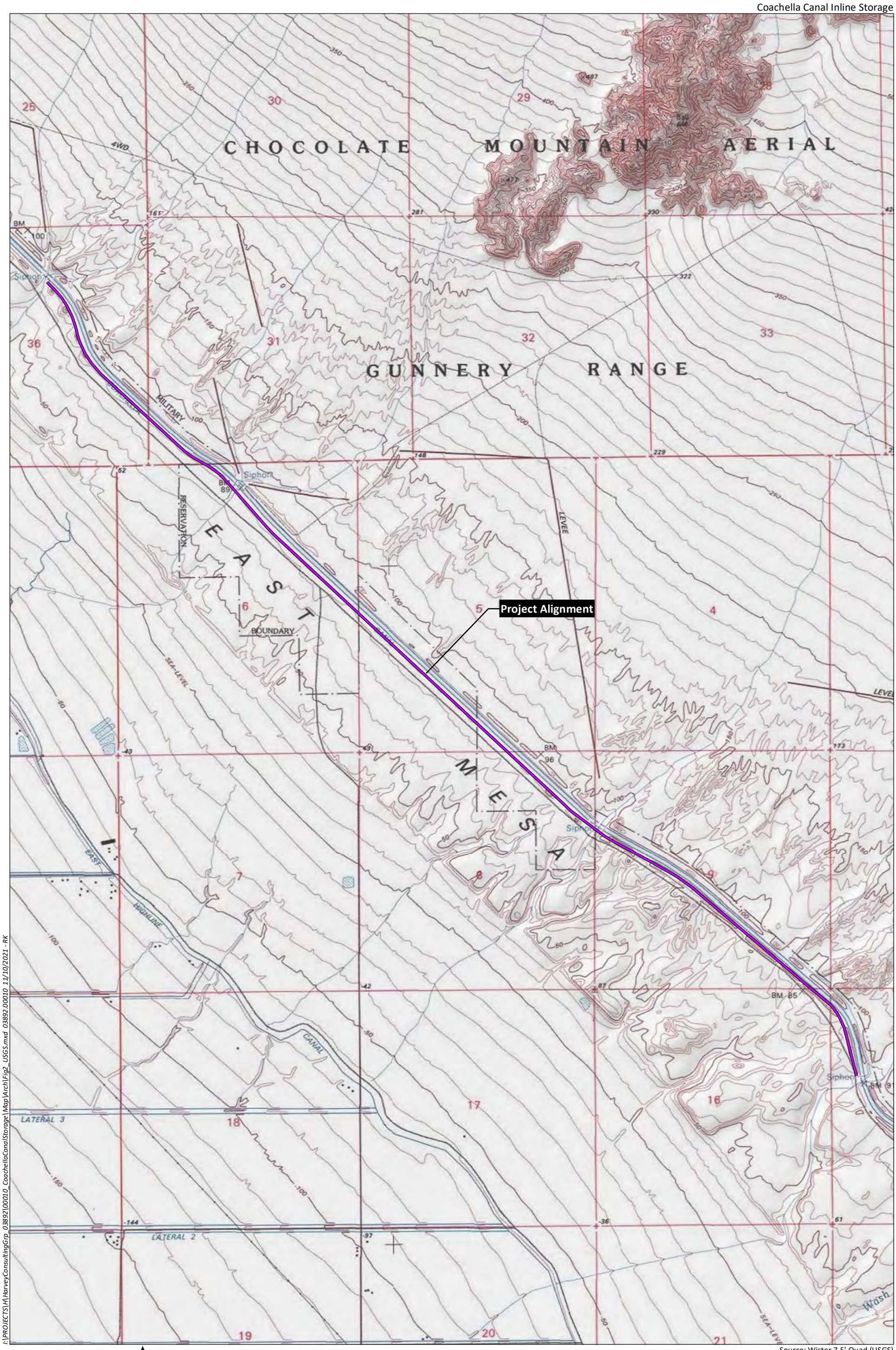
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Source: Base Map Layers (Esri, 2013)

HELIX Environmental Planning

Regional Location

Figure 1



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HELIX Environmental Planning

USGS Topography

Figure 2



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0 2,000 Feet

Source: Aerial (Esri 2019)

HELIX Environmental Planning

Aerial Photograph

Figure 3

archaeological) that are eligible for the NRHP. To be eligible for the NRHP, a historic property must be significant at the local, state, or national level under one or more of the following four criteria:

A. associated with events that have made a significant contribution to the broad patterns of our history;

B. associated with the lives of persons significant in our past;

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; and/or

D. has yielded, or may be likely to yield, information important in prehistory or history.

1.3.2 State

CEQA, Public Resources Code (PRC) 21084.1, and California Code of Regulations (CCR) Title 14 Section 15064.5, address determining the significance of impacts to archaeological and historic resources ("historical resources"). Section 15064.5(b)(1) of the State CEQA Guidelines specifies that projects that cause "…physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historic resource would be materially impaired" shall be found to have a significant impact on the environment. Pursuant to CEQA, "historical resources" are defined as:

- resource(s) listed or determined eligible by the State Historical Resources Commission for listing in the CRHR (14 CCR Section 15064.5[a][1])

- resource(s) either listed in the National Register of Historic Places (NRHP) or in a "local register of historical resources" or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the PRC, unless "the preponderance of evidence demonstrates that it is not historically or culturally significant" (14 CCR Section 15064.5[a][2])

- resources determined by the Lead Agency to meet the criteria for listing on the CRHR (14 CCR Section 15064.5[a][3])

For listing in the CRHR, a historical resource must be significant at the local, state, or national level under one or more of the following four criteria:

1. It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States;

2. It is associated with the lives of persons important to local, California, or national history;

3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values;

4. It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

Under 14 CCR Section 15064.5(a)(4), a resource may also be considered a "historical resource" for the purposes of CEQA at the discretion of the lead agency.

All resources that are eligible for listing in the CRHR or the NRHP must have integrity, which is the authenticity of a historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance. Resources, therefore, must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association. In an archaeological deposit, integrity is assessed with reference to the preservation of material constituents and their culturally and historically meaningful spatial relationships. A resource must also be judged with reference to the particular criteria under which it is proposed for nomination.

In accordance with the National Park Service and CEQA Guidelines, projects that comply with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* and *Secretary's Guidelines for Rehabilitation* (SOIS) are projects that retain the historic integrity of a resource. A project that complies with the SOIS is generally considered to be a project that will not cause a significant adverse impact to a historical resource.

The goal of the SOIS is to outline treatment approaches that allow for the retention of and/or sensitive changes to the distinctive materials and features that lend a historical resource its significance. The SOIS offer general recommendations for preserving, maintaining, repairing, and replacing historical materials and features. These standards also provide guidelines for rehabilitation to facilitate designing and making alterations in order to ensure that there are no adverse impacts to historic properties.

1.3.3 Native American Heritage Values

California State Assembly Bill 52 (AB 52) revised PRC Section 21074 to include Tribal Cultural Resources (TCRs) as an area of CEQA environmental impact analysis. As a general concept, a TCR is similar to the federally defined termed Traditional Cultural Properties (TCP); however, it incorporates consideration of local and state significance and required mitigation under CEQA. According to Patricia L. Parker and Thomas F. King (1998), "Traditional" in this context refers to those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice. The traditional cultural significance of a historic property, then, is derived from the role the property plays in a community's historically rooted beliefs, customs, and practices.

A TCR may be considered significant if it is (i) included in a local or state register of historical resources; (ii) determined by the lead agency to be significant pursuant to criteria set forth in PRC Section 5024.1; (iii) a geographically defined cultural landscape that meets one or more of these criteria; (iv) a historical resource described in PRC Section 21084.1 or a unique archaeological resource described in PRC Section 21083.2; or (v) a non-unique archaeological resource if it conforms with the above criteria.

1.3.4 Local Regulations

The project area is located within Imperial County. The Imperial County General Plan land use designations for the portion of the Coachella Canal affected by the project are primarily Recreation/ Open Space, with small segments of this portion of the Canal in the Government/Special Public designation. The latter is associated with the assessor's parcels within the CMAGR. The County's General

Plan Open Space and Conservation Element does not identify the Coachella Canal as a historically sensitive linear feature or a tribally sensitive area in the sensitivity modeling maps (Imperial County 2016). However, the General Plan Land Use Element contains Goal 9 under the Protection of Environmental Resources to identify and preserve significant cultural resources. Objective 9.1 calls for preserving lands that contain watersheds, important natural resources, and prehistoric and historic sites as open space.

Zoning for the project area is primarily noted as "military" in the GS (Government/Special Public Zone, Zoning Map. No. 49, Wister Area), with small segments zoned S-2 (Open Space/Preservation, Zoning Map No. 70, Open Space). The intent of the GS zone is to allow for the operation of government facilities and those with special public benefit uses. The primary purpose of the S-2 zone is for the preservation of natural and cultural resources and the open space areas that contain those resources. There are no specific historic preservation or cultural resource preservation ordinances in the Imperial County code.

1.4 PROJECT PERSONNEL

Mary Robbins-Wade, RPA served as the Principal Investigator for archaeology for the project. HELIX Cultural Resources Specialist Catherine A. Wright served as the project manager, participated in the site visit, and served as the primary author of this technical report. HELIX Architectural Historian Teri Delcamp also participated in the site visit and prepared the architectural history sections of this report. Resumes of key HELIX personnel are included as Appendix A. A Native American monitor and a Tribal archaeologist from the Agua Caliente Band of Cahuilla Indians (ACBCI) were also present for the site visit, which occurred on January 06, 2022.

2.0 PROJECT SETTING

2.1 NATURAL SETTING

The project area is situated within the western portion of the Colorado Desert, a subregion of the Sonoran Desert. The Colorado Desert is the largest and most arid subdivision of the Sonoran Desert. The Colorado Desert contains a variety of biogeographic subregions that reflect differences in terrain, hydrologic features, and biota. While intense monsoonal summer thunderstorms occur, the area is otherwise generally subjected to long, hot, and dry summers with moderate winters. Rainfall within Imperial County averages slightly more than three inches per year and is only slightly higher along the Colorado River, with an average annual rainfall of three to four inches (Morton 1977). The project area is situated along the eastern margin of a major physiographic and geologic feature of the Colorado Desert, the Salton Trough or Salton Basin. The Salton Trough is an extensive topographic and structural depression extending from the Gulf of California about 130 miles northwest through the Coachella Valley to the summit of San Gorgonio Pass (Hall 2007; Morton 1977). At the eastern edge of this trough, the Chocolate Mountains rise immediately to the east of the project, reaching elevations over 2,500 feet above mean sea level (AMSL). Elevation within the project area ranges from approximately 85 to 95 feet AMSL. The project area is characterized by open sandy desert, with some adjacent areas of agricultural fields. The Salton Sea is located nearby to the west.

The Gulf of California is separated from the southern end of the Salton Trough by the roughly 11-meter-high (36-foot-high) delta of the Colorado River, which slopes gradually downward to the north to about 226 feet below sea level at the Salton Sea, then rises gradually through the Coachella Valley. This feature

evolved during the late Cenozoic Era, resulting from tectonic forces that continue to the present day to separate the Baja California peninsula from mainland Mexico. These forces are manifested by numerous fault systems (including the San Andreas Fault) that have resulted in a deepening of the rift that, through the millennia, has contained bodies of either freshwater or saltwater. Intrusions of seawater into the rift first occurred during the late Cenozoic Era, during the Miocene and Pliocene epochs. During the last 10,000 years, the Colorado River has temporarily diverted into the trough numerous times, creating a large freshwater lake, the Late Prehistoric manifestation of which is designated as Lake Cahuilla. Lake Cahuilla, when full or even nearly full, would have encompassed the smaller present-day Salton Sea and covered much of the Imperial Valley, creating an extensive (but temporary) lacustrine environment (Apple et al. 1997; Schaefer 2006; Waters 1983). The last infilling occurred naturally in the seventeenth century (Laylander 1997). The project area is situated along the eastern maximum shoreline of this ancient lake. The current Salton Sea was created by accident in the early twentieth century during early canal construction in the area.

Geologically, the project area is underlain mostly by young alluvium and colluvium eroding from the Chocolate Mountains to the east as well as by aeolian and lacustrine deposits, both of which originate from the old Salton Basin lakebed. The Chocolate Mountains, situated immediately to the east of the project area, consist of very old (possibly Precambrian) metamorphic rocks as well as intrusive Miocene volcanic rocks. In general, prior to modern disturbance, the soils in the project area consisted of unconsolidated alluvium and colluvium derived from metamorphic bedrock or Cenozoic-aged lacustrine and aeolian sedimentary formations (Morton 1977). These soils are mostly moderate to excessively drained sands, gravelly sands, sands with cobbles, fine sands, and silty clays in lacustrine basin areas. In some areas, a clay layer occurs buried below a surface deposit of sand, gravel, or cobble materials. Wind and water erosion are both significant agents in soil erosion, and erosion from both is substantially evident in the area.

In general, creosote bush or low desert scrub is the most widespread native vegetation type in the Sonoran Desert, covering large expanses of the Colorado Desert. Other native plant communities include alkali sink, mesquite woodland, desert ironwood woodland, palo verde woodland, four-wing saltbush scrub, creosote bush-burrow weed scrub, brittlebush scrub, ocotillo scrub, and desert buckwheat scrub. The creosote bush scrub community is dominated by creosote bush (*Larrea tridentata*) and saltbush (*Atriplex canescens*) and occurs where the soil is more alkaline. With the exception of sparse creosote scrub, ocotillo (*Fouquieria splendens*), and brittlebush (*Encelia farinose*), little vegetation is present in surface-exposed sandy areas. Small shrubs such as mesquites (*Prosopis* sp.), burrobush (*Hymenoclea salsola* var. *pentalepis*), desert ironwood (*Olneya tesota*), desert broom (*Baccharis sarothroides*), and introduced tamarisk, are present along some valleys and dry water courses, with ocotillo sparsely present on alluvial fans (Hall 2007; Munz 1974).

The Colorado Desert is inhabited by a variety of faunal species well adapted to the dry and arid environment. Mammals commonly found in this region include kit fox (*Vulpes macrotis*), desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), and an array of rodents such as white-tailed antelope squirrel (*Ammospermophilus leucurus*), round-tailed ground squirrel (*Spermophilus tereticaudus*), desert and Merriam kangaroo rats (*Dipodomys merriami*), and desert pocket mouse (*Perognathus penicillatus*). Coyote (*Canis latrans*), desert bighorn sheep (*Ovis canadensis nelson*), and Sonoran pronghorn antelope (*Antilocapra americana sonorensis*) are among the larger mammals. The most common bat species in this area is the California leaf-nosed bat (*Macrotus californicus*). This region is also populated by a variety of reptiles, such as the fringed-toed lizard (*Uma inornata, U. notate*), flat-tailed horned lizard (*Phrynosoma m'calli*), desert tortoise (*Gopherus cinctus*),

chuckwalla (*Sauromalus obesus*), and desert iguana (*Dipsosaurus dorsalis*). Many snake species thrive in the hot, sandy ecosystem of the Colorado Desert as well, including the banded sandsnake (*Chilomeniscus cinctus*), sidewinder (*Crotalus cerastes*), and rosy boa (*Lichanura trivirgata gracia*) (Jaeger 1961).

Many of the animal species living within these plant communities are known to have been used by native inhabitants (Bean 1978). Rabbits and rodents were very important to the prehistoric diet. Bighorn sheep and pronghorn antelope were somewhat less significant for food but were an important source of leather and bone for tools and clothing. Many of the plant species naturally occurring in the project area and vicinity are known to have been used by native populations for food, medicine, tools, ceremonial, and other uses (Barrows 1900; Bean and Siva Saubel 1972).

2.2 CULTURAL SETTING

2.2.1 Prehistoric Period

The project area is situated in the Salton Basin area of western Imperial County. This area lies within the western portion of the Colorado Desert, which, in California, extends from the crest of the Peninsular Ranges of eastern San Diego County to the Colorado River. East of the crest, largely desert-like conditions have prevailed in this area of California through millennia. The project area is also situated in proximity to the Mojave Desert to the northeast. While both areas have been subject to more than 90 years of archaeological investigation, the prehistory of the Mojave Desert is considerably more developed than that of the Colorado Desert (Schaefer 1994; Schaefer and Laylander 2007; Sutton et al. 2007).

In contrast to the Mojave Desert region, for example, the basic culture history of the Colorado Desert region has not changed dramatically since pioneering archaeologist Malcolm Rogers (1939, 1945, 1966) published his initial impressions of the desert's chronology and cultural development. As in the Mojave Desert, substantially more archaeological investigation has occurred, and a more substantial culture history has been developed in the coastal area due, in no small part, to the substantial level of modern development that has occurred there. Consequently, understanding of the early prehistory of the Colorado Desert region still relies heavily on comparisons with the adjacent Mojave Desert and coastal regions. Many of the diagnostic artifacts present in the Colorado Desert were first found and originally named for locations in the Mojave Desert. A principal reason for a less-developed culture history in the Colorado Desert has been a paucity of stratified subsurface sites found in the Colorado Desert region relative to the Mojave Desert or coastal area, with most sites in the Colorado Desert, until recently, still being primarily surficial (Schaefer 1994; Schaefer and Laylander 2007). As will be described further below, however, some recent work at stratified sites in the Coachella Valley and in the Jacumba area have finally produced such results, thereby providing the basis for the development of a culture history through time for the western Colorado Desert. While the project is situated within the Salton Basin area of the western Colorado Desert, the cultural history and chronological periods described below, first proposed for the Colorado Desert area by Schaefer (1994), are more reflective of the periods commonly used in the adjacent coastal and western mountain areas of San Diego County.

The western Colorado Desert is dominated by the substantial geologic feature of the Salton Trough or Salton Basin. Although it is generally accepted that freshwater inundations of the Salton Trough likely began during the Pleistocene epoch, it is better documented that, during Holocene times, Lake Cahuilla formed in the Salton Trough when, during major flood episodes, the Colorado River breached a drainage

divide near Cerro Prieto in northern Baja California. The resulting head-cutting diverted all or most of the Colorado River flow into the Salton Trough. Unchecked, the Colorado River flow would fill the trough to the 12-meter (40-foot) contour, at which point an outflow channel was created. Flow into the trough presumably would have continued until siltation clogged the inflow channel. High evaporation rates would then cause the lake to recede and salinity to increase proportionally. Lake Cahuilla filled during these natural episodes of Colorado River flooding, and then receded, several times before its last natural desiccation about 300 years before present (B.P.) (Schaefer 1994, 2006; Waters 1983; Wilke 1978). Stands of Lake Cahuilla at the maximum 12-meter contour were huge, covering 5,700 square kilometers (2,201 square miles) and reaching a maximum depth of 96 meters (315 feet). With the possible exception of the Paleoindian Period, the intermittent presence of this lake in the Basin in mid- to late-Holocene times has had a profound effect on the prehistoric peoples inhabiting the area.

2.2.1.1 Paleoindian Period

The earliest well-documented prehistoric sites in Southern California are identified as belonging to the Paleoindian Period. While in the adjacent Mojave Desert, the Paleoindian Period is dated from approximately 10,000 to 12,000 B.P. (Sutton et al. 2007:236), Schaefer has defined the period as dating from approximately 7000 to 12,000 B.P. in the Colorado Desert (Schaefer 2018:10). In the western U.S., most evidence for the Paleoindian peoples derives from finds of large, fluted spear and projectile points (Fluted-Point Tradition) associated with big game hunting, in places such as Clovis and Folsom in the Great Basin and the northern Desert Southwest (Moratto 1984:79–88). In California, however, most evidence for the Fluted-Point Tradition derives principally from along the margins of these areas in the Sierra Nevada (Moratto et al. 2011), the southern Central Valley (Riddell and Olsen 1969), and the Mojave Desert of southeastern California (Davis 1978), with only isolated occurrences in the Colorado Desert, consisting almost entirely of scattered surface finds. These discoveries in the Colorado Desert region include one in the Yuha Desert of the southwestern Colorado Desert (Davis et al. 1980:150) and one in the McCoy Mountains in the eastern area (Kline 2014), as well as three in the eastern mountain areas of San Diego County, including one in the foothills near Ocotillo Wells (Rondeau et al.: 65), one in Cuyamaca Pass (Dillon 2002), and one east of Warner Springs (Kline and Kline 2007). Two such artifacts have also been found to the south in Baja California (Des Lauriers 2008; Hyland and Gutierrez 1995).

Another tradition associated with the Paleoindian Period is the San Dieguito Tradition, with an artifact assemblage distinct from that of the Fluted-Point Tradition. In California (Alta California), this tradition has been documented only in the Mojave and Colorado deserts of southern California (Rogers 1939, 1966; Schaefer 1994; Warren 1967) and in the coastal area of San Diego County (Carrico et al. 1993; Rogers 1966; Warren 1966, 1967; Warren and True 1961). Warren dates the San Dieguito Tradition as beginning circa 10,000 B.P. and ending sometime between 8500 and 7200 B.P. (Warren 1967, 1968:4; Warren et al. 1998; Warren and Ore 2011). It is characterized by an artifact inventory consisting almost entirely of flaked stone biface and scraping tools but lacking the fluted points associated with the Fluted-Point Tradition. The subsistence system or emphasis of the San Dieguito Tradition, while not yet entirely agreed upon, is suggested by Warren as having an economy oriented toward hunting rather than gathering, based on an artifact assemblage of primarily hunting-associated tools (Warren 1967).

The C.W. Harris Site (CA-SDI-149), located along the San Dieguito River in western San Diego County, is a stratified archaeological site that formed the original basis upon which, first Rogers (1939, 1966), and then Warren and others (Warren 1966, 1967; Warren and True 1961), originally identified the “San Dieguito complex”, that Warren later reclassified as the San Dieguito Tradition (1968). Diagnostic artifact types and categories recovered from the deepest stratum at the site as well as, recently, in the lowest

strata at two nearby associated sites, CA-SDI-316 and CA-SDI-4935B (Carrico et al. 1993; Cooley 2013), include elongated bifacial knives, leaf-shaped projectile points, scraping tools, and crescentics (Carrico et al. 1993; Rogers 1966; Vaughan 1982; Warren 1966, 1967; Warren and True 1961). The Harris Site is also the source for the oldest calibrated radiocarbon date (9968 B.P.) found in association with a deeply buried subsurface San Dieguito artifact assemblage (Warren et al. 1998; Warren and Ore 2011). Another calibrated radiocarbon date of 9130 B.P. has also recently been acquired from a San Dieguito-associated deep subsurface stratum at site CA-SDI-316, located immediately adjacent, and associated stratigraphically with, the Harris Site (Cooley 2013). This latter date further documents the presence and antiquity of the buried San Dieguito stratum at the Harris Site.

While Rogers (1939, 1966) has described occurrences of sites and artifacts attributable to the San Dieguito Complex/Tradition in the Mojave and Colorado desert areas, because they have, until recently, been nearly all surface finds, the ability to accurately determine the antiquity of these artifacts and sites by radiometric dating methods has proven to be problematic (Schaefer and Laylander 2007:247; Sutton et al. 2007:237; Warren 1967:179). Consequently, radiometric dating of the artifacts and their context at the Harris Site has, for several decades, been the principal means of ascertaining the antiquity of the San Dieguito complex and these related desert assemblages (Warren 1967; Warren et al. 1998; Warren and Ore 2011). In the Mojave Desert area, the San Dieguito complex has been largely subsumed under the Lake Mojave complex (Sutton et al. 2007:236). Recently, calibrated radiocarbon dates from several Lake Mojave complex-associated sites have produced dates of similar antiquity to those from the Harris Site (Sutton et al. 2007:235), i.e., circa 10,000 to 11,000 B.P. In the Mojave Desert area, Lake Mojave complex sites are frequently associated with glacial lakes that were still present at the end of the Pleistocene and the beginning of the Holocene. Such lacustrine features were generally not present in the more southerly Colorado Desert area. Given the discovery of the Paleoindian Period and/or Lake Mojave complex-associated projectile points on the western side of the Salton Basin (Apple et al. 1997; Wahoff 1999), it is possible that it too may have been inundated, at least periodically, during this earlier period.

Very recently, some surprising new evidence has been obtained from subsurface archaeological investigations at site CA-SDI-7074, located to the south-southeast of Borrego Springs, near Jacumba in the mountain foothills of eastern San Diego County (Williams 2014). The site was found to be stratified and to contain more than 100 subsurface thermal features, most of which were indicated to likely be earth ovens associated with agave roasting activity. While radiocarbon dating of 22 of the features indicated most of them dating to the Late Prehistoric Period (after circa, 1700 B.P.), five of the more deeply buried features were discovered to date to between 8590 and 9600 B.P. (Williams 2014). These results represent a remarkable indication of vegetal food processing activity occurring in the Colorado Desert area during a time period when most of the existing archaeological evidence is associated with hunting for subsistence.

2.2.1.2 Archaic Period

The Archaic Period is generally differentiated from the earlier Paleoindian Period by a shift from hunting-focused subsistence systems to a more generalized economy with an increased focus on gathering and the use of grinding tools and seed-processing technology. Consequently, typical artifact assemblages in the Mojave Desert for the early Archaic Period contain dart points, but with increasing quantities of ground stone tools, such as manos and metates, occurring into the middle and latter parts of the period (Sutton et al. 2007). In general, compared to the Mojave Desert, only limited archaeological evidence has yet been encountered in the Colorado Desert area that can be definitely

attributed to the Archaic Period; most of the evidence that does exist has been found in the western Colorado Desert. The area east of the Salton Basin, which constitutes the eastern part of the Colorado Desert, contains principally large areas of desert pavements, washes, rocky volcanic mountains, and the Colorado River Valley. With the possible exception of the Colorado River Valley, most of these areas have not been found to contain archaeological deposits with depth and/or with materials suitable for absolute dating. Instead, these areas appear to be where various resources were obtained, such as lithic raw material. This is evidenced by the presence of many quarry and flaking station sites in these areas, along with trails leading to and from them to the Colorado River and to the Salton Basin (Apple 2005; Bryne 2011; Pendleton et al. 1986). These trails are prominent features within the eastern area, and, while it is known from ethnographic sources and by the presence of pottery features associated with them, that they were in use in Late Prehistoric times, it seems likely that such trails were in use during earlier times (i.e., Archaic Period) times as well (Apple 2005; Bryne 2011:8; Rogers 1966:47-48). Some sites that have recently been investigated in the Ford Dry Lake area, at the northeastern edge of the Colorado Desert, contain a large number of manos and metates along with a few projectile points possibly diagnostic of the Archaic Period, but no materials that can be dated by absolute methods were found in association (AECOM 2016). Results from some recent excavations conducted at a site adjacent to the Colorado River (CA-IMP-7911/H) have revealed buried cultural deposits and features as deep as 1.85 meters, but the earliest radiocarbon date for these deep deposits is 1620 B.P. (Cleland 2005).

Until recently, little archaeological evidence had been encountered in the Colorado Desert that could definitively be attributed to the earliest part of the Archaic Period, i.e., from circa 8000–4000 B.P. (Schaefer 1994:64; Schaefer and Laylander 2007:247). However, as noted above for the Paleoindian Period, evidence has been recently obtained from subsurface archaeological investigations in the western Colorado Desert at site CA-SDI-7074, located in the Jacumba area of San Diego County, that dates to this time period (Williams 2014). These results not only indicate the utilization of agave as a food resource much earlier in time than was previously realized but may also suggest a reappraisal of the dating for the inception of the Early Archaic Period in the Colorado Desert area, as Williams states that the thermal roasting features “spanned the Early Archaic to Late Prehistoric periods” (Williams 2014:325). Also recovered from the site was an Elko-style projectile point, suggestive of a mid- to late-Archaic Period occupation (Williams 2014:151).

Another discovery located in the western Colorado Desert area, also noted above, occurred during an archaeological investigation at the Salton Sea Test Base. This discovery consisted of an assemblage of large projectile points that are stylistically associated with early-to-mid-Archaic-style projectile points in the Mojave Desert, including Pinto and Elko styles (Apple et al. 1997; Wahoff 1999). Although the investigation did not obtain any radiocarbon dates to verify the presence of cultural deposits of this antiquity, the size and styles of these points are clearly associated with the early Archaic Period. One other site of note, described below for the Late Archaic Period, consists of deposits at the Indian Hill Rockshelter (CA-SDI-2537), in Anza-Borrego Desert State Park in the mountain foothills of eastern San Diego County (McDonald 1992). These cultural deposits have been dated by radiocarbon dating to 4070 ± 100 years B.P.; therefore, an assignment to the late Archaic is admittedly arbitrary.

Evidence for late Archaic Period activity (beginning circa 4000 B.P.) in the Colorado Desert includes results from subsurface investigations at sites in the Coachella Valley area of the Salton Basin, northwest of the project area (Love and Dahdul 2002). The contexts of several sites in the valley, some with deeply buried deposits possibly associated with ancient stands of Lake Cahuilla, were radiocarbon dated to circa 2000–3000 B.P. (Love and Dahdul 2002; Schaefer and Laylander 2007:249). Other evidence for the Late Archaic Period in the area includes deposits found in the western Colorado Desert at the Indian Hill

Rockshelter and at a rockshelter in Tahquitz Canyon, in the mountains west of Palm Springs (Bean et al. 1995; Schaefer and Laylander 2007:247). Until the recent results from CA-SDI-7074, the Indian Hill Rockshelter was the oldest radiocarbon-dated archaeological site in the Colorado Desert, with a date of 4070 ± 100 years B.P. (McDonald 1992). The site also contained distinctive dart-sized projectile points, ground stone implements, rock-lined caches, and inhumations (McDonald 1992; Schaefer 1994; Wilke and McDonald 1989). The rockshelter in Tahquitz Canyon, while lacking radiocarbon dating, contained an assemblage similar to that found and dated in the Indian Hill Rockshelter (Bean et al. 1995; Schaefer and Laylander 2007:247).

While evidence for settlement patterning during the Archaic period in the Colorado Desert is minimal, some Late Archaic sites in the Coachella Valley (Love and Dahdul 2002) appear to have been in contexts associated with intermittent ancient stands of Lake Cahuilla. It seems likely, therefore, that, similar to the subsequent Late Prehistoric Period, this hydrological feature had a significant influence on settlement patterns in the western Colorado Desert, at least during the Late Archaic. The limited occurrences of evidence of Archaic habitation at the Indian Hill Rockshelter and Tahquitz Canyon rockshelter sites indicate that settlement of the adjacent mountain areas can also be inferred during the Middle to Late Archaic. While evidence for settlement pattering during the Early Archaic is even more limited, the occurrence, adjacent to the current Salton Sea, of an assemblage of large projectile points stylistically associated with Early-Archaic-style projectile points in the Mojave Desert (Apple et al. 1997:6-41 to 6-52; Wahoff 1999) and of three Middle- to Late-Archaic-style projectile points at three sites in the Ocotillo Wells area (Mealey 2012:234-235, 2014:177) suggests, again, that the possible presence or absence of lacustrine resources associated with this hydrological feature may, as during subsequent periods, have had a significant influence on settlement in the western Colorado Desert, possibly intermittently throughout the Archaic Period. Lastly, the recent results from CA-SDI-7074, introduce a new set of possibilities for early settlement of the area that remains to be explored.

In the eastern Colorado Desert, while definite evidence is still lacking, it seems probable that the Colorado River was a location of considerable prehistoric resource availability extending back into Archaic Period times and was, therefore, a place where habitation frequently occurred. The lack of archaeological evidence for this is likely due to the dynamic conditions present as a result of recurrent flooding and erosion that have occurred through the millennia associated with this substantial river. These natural forces have likely served to remove or to deeply bury any habitation deposits that may once have been present along the river. For example, the discovery noted above of buried cultural deposits along the river occurred during deep trenching for the installation of a pipeline. The oldest date for these deep deposits of circa 1620 B.P. would be marginal between the end of the Archaic Period and the beginning of the subsequent Late Prehistoric Period.

2.2.1.3 Late Prehistoric Period

The Late Prehistoric Period in the Colorado Desert dates from approximately 1500 B.P. to the historic period (Schaefer 1994). In Southern California, generally, this period is seen as a time marked by a number of rather abrupt human behavioral changes, which are reflected in the archaeological record. The magnitude of these changes and the short period of time within which they took place are reflected in the significant alteration of previous subsistence practices and the adoption of significant new technologies. As discussed below, some of this change may have resulted from significant variations in climatic conditions.

As is evidenced in the archaeological record, subsistence and technological changes that occurred in Southern California during the Late Prehistoric Period include:

- A shift from hunting using the atlatl and dart to using the bow and arrow, as indicated by the presence of smaller projectile points;
- A reduced emphasis on shellfish gathering along some areas of the coast (possibly as a result of silting-in of the coastal lagoons);
- The introduction and production of pottery;
- An increase in storage of principal foodstuffs, such as mesquite, acorns, and piñon nuts, as indicated by the presence of mortars and pestles and large ceramic storage vessels;
- A shift in burial practices from inhumation to cremation; and,
- Along the Colorado River, a change in economic and settlement patterns that involved subsistence expansion to include floodplain horticulture.

In the Coachella and Imperial valleys in the Salton Basin area, the Late Prehistoric Period is strongly associated with the periodic infilling and emptying of Lake Cahuilla. This substantial hydrological feature is seen as recurrently altering the course of human settlement in the area during the period (Schaefer and Laylander 2007:250–251). During periods when lakes were absent, and elsewhere in the Colorado Desert, settlement is seen as associated with semi-sedentary villages established along major water courses and around springs, with adjacent montane areas seasonally occupied to exploit agave, mesquite, acorns, and piñon nuts. Mortars for mesquite, piñon nuts, and acorn processing increased in frequency relative to seed-grinding basins. Most archaeological resources in the record for the western Colorado Desert, east of the mountain foothills, that date to the Late Prehistoric Period, are associated with the Lake Cahuilla shoreline(s) (Apple et al. 1997; Laylander 1997; Love and Dahdul 2002; Noah 2012; Schaefer 2006; Wilke 1978). Recessional shorelines of the lake during the Late Holocene are marked by high frequencies of Native American sites. Hundreds of rock features interpreted as fish traps and habitation features have been recorded primarily on the northern and western shores of Lake Cahuilla (Wilke 1978), and Rogers (1945:191) identified sites along the eastern shoreline (before the construction of the Coachella Canal, which disturbed much of the 12-meter contour). Also affecting sites in other areas of the Salton Basin, particularly those containing the northern and western recessional shorelines of Lake Cahuilla, has been the substantial enhancement of water conveyance systems during the twentieth century that has resulted in the transformation of much of the region into agricultural fields (Laylander 1997:1; Schaefer and Laylander 2007: 249). A natural factor also affecting sites, especially along the lower elevation recessional shorelines of the lake, has been the lacustrine sediment deposition that has occurred from the repeated inundations of the basin through time. This has resulted in the burial of earlier occupations along the shorelines under deep deposits of sediments (Schaefer and Laylander 2007: 249).

In addition to cultural resources directly associated with Lake Cahuilla, important Late Prehistoric Period cultural resource sites in the project region were seasonally occupied locations in rock shelters, at springs, and along major drainages, located within or emanating from the adjacent montane areas to the west. In these latter categories, several sites along Boulder Creek near Mountain Spring on the eastern slopes of the Peninsular mountains have been radiocarbon dated to the Late Prehistoric Period (Shackley 1984). In addition to the late Archaic Period occupations described above, radiocarbon

evidence of Late Prehistoric Period occupation was noted at site CA-SDI-7074, near Jacumba (Williams 2014), and at CA-SDI-2537, the Indian Hill rockshelter (McDonald 1992); both sites are located in the upper elevation, desert foothills of southeast San Diego County. In the adjacent mountainous area of southwestern Riverside County, to the northwest of the project area, an important population center has also been documented in Tahquitz Canyon, during the Late Prehistoric Period (Bean et al. 1995).

Also, as discussed above for the Archaic Period, in the eastern Colorado Desert, prehistoric trails are prominent features in this area. While their use during the Archaic Period can only be proposed, their use during the Late Prehistoric Period is well documented, both archaeologically and ethnographically. During the Late Prehistoric Period, it is known that they served multiple functions, including routes for trade and travel between areas, spiritual and ceremonial activity, as well as routes used for resource procurement (Apple 2005; Byrne 2011).

The chronology most commonly applied to the Colorado Desert is based on ceramic types from data derived principally from the central and eastern areas of the desert. This chronology has been developed by Schiffer and McGuire (1982:216–222) and Waters (1982a), using a chronology originally proposed by Rogers (1945) that divided the Late Prehistoric Period in the Colorado Desert area based on the progression or changes in the development of ceramic types. Using the term "Patayan" (instead of the term "Yuman," used by Rogers) for these periods, three periods were defined (in addition to a preceramic period) based on ceramic types associated with changes in ceramic traits through time that he correlated with fillings and desiccations of Lake Cahuilla:

- Patayan I began approximately 1200 B.P. with the introduction of pottery into the Colorado Desert, but it appeared to be limited mostly to the Colorado River area.

- The Patayan II phase coincides with an infilling of Lake Cahuilla around 950 B.P. As described previously, the lake covered much of the Imperial Valley and created an extensive lacustrine environment that is thought to have attracted people from the Colorado River area. New pottery types appeared resulting from local production along the lakeshore and technological changes in the Colorado River area. Subsequently, Lake Cahuilla experienced several fill/recession episodes before its final desiccation.

- The last period, Patayan III, began around 500 B.P. as the lake receded. Colorado Buff Ware became the predominant pottery type during this period, both in the desert and along the river, although several Patayan II types continued (Waters 1982a, 1982b).

While this chronological paradigm has served for years as a useful tool for organizing archaeological assemblages in the area, more recently, Schaefer and Laylander (2007:252–253) have described some serious discrepancies based on new information (e.g., Hildebrand 2003).

2.2.2 Ethnohistory

2.2.2.1 Cahuilla

The Cahuilla are a subgroup of the Takic family of the Uto-Aztecan stock and are, therefore, closely related linguistically to other Takic speaking groups, including their neighbors to the west and north, the Luiseño, Cupeño, Gabrielino, and Serrano. These Takic-speaking groups are thought to represent a migration into the area occurring approximately 1500 B.P. (Schaefer 2006:21). According to Schaefer (2006:22):

> What role these Takic speakers had in the development of the Patayan pattern in the Colorado Desert remains unclear, although it may have been considerable. The ancestors of the Colorado River Yumans are most often identified as the source of ceramics, cremation practices, agriculture, some architectural forms, and some stylistic and symbolic representations. The Takic migrations may coincide with the introduction of bow-and-arrow technology but no direct association can be made. They may have contributed specific hunter and gatherer techniques as well as cosmological and symbolic elements to the Patayan cultural system.

The diversity of Cahuilla territory reflected the range of environmental habitats in inland Southern California. Topographically, their territory ranged from the summit of the San Bernardino Mountains, in excess of 11,000 feet, to the Coachella Valley and Salton Sink, well below sea level. Ecological habitats included the full range of mountains, valleys, passes, foothills, and desert areas. Villages were typically situated in canyons or on alluvial fans near water and food resources, and a village's lineage owned the immediately surrounding land (Bean 1978). Well-developed trails were used for hunting and travel to other villages. Village houses ranged from brush shelters to large huts 15 to 20 feet long. Important plant foods exploited from the Cahuilla's diverse habitat included mesquite and screw beans, piñon nuts, and various cacti. Other important plant foods included acorns (six oak varieties), various seeds, wild fruits and berries, tubers, roots, and greens. Women were instrumental in the collection and preparation of vegetal foods.

When Lake Cahuilla was present, it undoubtedly affected the settlement and subsistence patterns, with the desert area becoming a more productive resource area. Schaefer (2006:22) states that "Cahuilla mythology and oral tradition also indicate that when Lake Cahuilla dried up, it was the mountain people who resettled the desert floor. The time of Lake Cahuilla is also best documented in the oral traditions of the Cahuilla, both with regard to settlement patterns, song cycles, and the effects of Lake Cahuilla on patrilineal clan segmentation." According to Strong (1929:36), "The derivation of the term Cahuilla is obscure, and it is regarded by the Indians to be of Spanish origin."

The earliest Spanish contact with the Cahuilla may have been with the Anza expedition trips in 1774 and 1777. The route followed San Felipe Creek west through Borrego Springs, up into the San Jacinto Mountains (Pourade 1962:164; Schaefer 2006:23). The impact of the Spanish mission system and colonization along the coast was much less immediate and profound within the isolated desert and mountain groups. It was not until 1819, after the establishment of the San Bernardino estancia and cattle ranch at San Gorgonio, that a more direct Spanish influence was felt. By 1823, members of the Romero Expedition documented that the Cahuilla at Toro were growing corn and melons and were already familiar with the use of horse and cattle, indicating a familiarity with Hispanic practices (Bean and Mason 1962).

During the Spanish period and into the Mexican period, political leadership became more centralized as Juan Antonio from the Mountain Cahuilla and Chief Cabazon in the desert emerged as central figures (Strong 1929). Juan Antonio's group played a significant role during the Mexican-American War, siding with the Mexicans against the Luiseño, who supported the American invasion (Phillips 1975). Along with the rise of powerful chiefs and political restructuring, Mexican language, clothing, and food were incorporated into traditional culture during this era.

With the 1848 signing of the Treaty of Guadalupe Hidalgo, the American government promised to preserve the liberty and property of the inhabitants of California, and, in 1852, a treaty was drafted to settle land rights issues for the Cahuilla (as well as Serrano and Luiseño). The treaty was never ratified by

Congress, and the best farming and grazing lands were claimed by Euro-American settlers. In addition, Cahuilla land was substantially reduced during the 1860s and 1870s, primarily as a result of two Executive Orders establishing reservations. The result of this was a checkerboard of 48 sections of reservation lands spread across the eastern edge of the Santa Rosa and San Jacinto mountains and the Coachella Valley. Although various modifications have occurred over time, this has remained the permanent home of the Cahuilla to date (Schaefer 2006).

2.2.3 Historical Background

The Post-Contact period of California is generally broken into three distinct periods: the Spanish period (1769 to 1821), the Mexican period (1821 to 1848), and the American period (1848 to present).

2.2.3.1 Spanish Period (1769 to 1821)

The first Europeans to arrive in what became southern California were members of the 1542 expedition of Juan Rodriguez Cabrillo. Cabrillo and other early explorers sailed along the coast and made limited expeditions into Alta (upper) California between 1529 and 1769. Although Spanish, Russian, and British explorers briefly visited Alta California during this nearly 250-year span, they did not establish permanent settlements (Starr 2007).

While the end of Indigenous control of Southern California is viewed as having begun in 1769 and throughout the Mission Era, it was not until several decades later that de facto European control was established, with the end of the Garra Uprising in the 1850s (Evans 1966). The Spanish Period, however, represents a period of Euro-American exploration and settlement throughout the state, with the establishment of Spanish presidios and the introduction of the Mission system, beginning with Gaspar de Portolá and Franciscan Father Junipero Serra establishing the first Spanish settlement in Alta California at San Diego in 1769. Mission San Diego de Alcalá was the first of 21 missions built by the Spanish between 1769 and 1823.

While the area that was to become Imperial County was first explored by Europeans in 1540, with the expedition of Hernando de Alarcón, it was not until the 1700s that the area began to be fully explored. Pedro Fages led the first exploration in 1772 while chasing deserters, and continued explorations in 1782 and 1785. Juan Bautista de Anza undertook two expeditions to cross the Imperial Valley, beginning at the Spanish presidio of Tubac in Arizona and traveling to Mission San Gabriel in Los Angeles County (Mitchell 2011).

The inhospitable environment and terrain of the Algodones Dunes made exploration difficult and discouraged colonization in the eastern portion of Imperial County, so settlements were primarily located in the West Mesa (Yuha Desert). Settlements in the eastern portions were limited to Mission Puerto de Purisima Concepción and Mission San Pedro y San Pablo de Bicuñer, both located along the Anza Trail and both destroyed in 1781 during conflicts between the Spanish and the Quechan (Hurt 2002).

2.2.3.2 Mexican Period (1821 to 1848)

After more than a decade of intermittent rebellion and warfare, New Spain (Mexico and the California territory) won independence from Spain in 1821. In 1822, the Mexican legislative body in California ended isolationist policies designed to protect the Spanish monopoly on trade and decreed California ports open to foreign merchants. During this period, the retention of many Spanish inquisitions and laws

continued the dispassion of Indigenous people, especially following the secularization of the mission system in 1834.

With secularization, extensive land grants were established in the interior in order to increase the population of the inland areas, enticing families from the more settled coastal areas colonized by the Spanish. During the supremacy of the ranchos between 1834 and 1848, the economy was largely focused around the cattle industry, and landowners devoted large tracts to graze their herds. Cattle hides became a primary southern California export, providing a commodity to trade for goods from the east and other areas in the United States and Mexico. The number of Euro-American inhabitants increased during this period due to an influx of explorers, trappers, and ranchers associated with the land grants, which further contributed to the introduction and rise of diseases foreign to the Indigenous population, who had no associated immunities.

The Mexican Period of Imperial County was focused on the effort to establish an overland route from Sonora to the California coast. Its purpose was to increase trade between the two regions, as well as to encourage settlement. In 1825, after numerous exploratory expeditions, the Sonora Road was established, using much of the Anza Trail before turning west to continue through the Carrizo Corridor and splitting into San Diego and Temecula. The Mexican government established Fort Romualdo Pacheco along the route in 1825; however, it was abandoned and destroyed in 1876, due to an attack by the Kumeyaay (Office of Historic Preservation [OHP] 2021).

The Sonora Road would continue to be used, though never gaining popularity until its southwest portion shifted north of the United States-Mexico Border in the late 1830s. Ironically, the route was used in 1846 by General Stephen Watts Kearny to lead his troops across the Yuha Desert during the Mexican-American War. A portion of the road was again used in 1846, this time by Colonel Philip St. George Cooke, who led the Mormon Battalion from Iowa to San Diego in an attempt to establish a wagon route to California.

2.2.3.3 American Period (1848 to present)

The United States attacked California in 1846, taking control of Monterey, San Francisco, San Diego, and Los Angeles with little resistance. Los Angeles soon slipped from American control, however, and needed to be retaken in 1847. Approximately 600 U.S. sailors, marines, Army dragoons, and mountain men converged under the leadership of General Kearny and Commodore Robert F. Stockton in early January of that year to challenge the California resistance, which was led by General José Maria Flores. The American party scored a decisive victory over the Californios in the Battle of the Rio San Gabriel and at the Battle of La Mesa the following day, effectively ending the war and opening the door for increased American immigration (Harlow 1992). Hostilities officially ended with the signing of the Treaty of Guadalupe Hidalgo in 1848, in which the United States agreed to pay Mexico $15 million for the conquered territory, including California, Nevada, Utah, and parts of Colorado, Arizona, New Mexico, and Wyoming, representing nearly half of Mexico's pre-1846 holdings. California joined the Union in 1850 as the 31st state (Wilkman and Wilkman 2006).

Further exploration and development of the agricultural potential of the Imperial Valley marked the beginning of the American Period in the region. With the signing of the Treaty of Guadalupe Hidalgo in 1848 and the subsequent acquisition of California by the United States, settlers began making their way into the county. The establishment of the Southern Emigrant Trail, which followed the old Sonora Road, was extensively used by settlers, miners, and the military on their way to California (Brian F. Mooney

Associates 1993). This route would be used by the Butterfield Overland Mail (1858–1861), and Camp Salvation, located near present-day Calexico, was just one of the numerous stops along its route, established to provide water to travelers along the trail (OHP 2014). This route served as the primary route until the establishment of the Smith-Groom Country Road in 1865, but even then, it was not until the twentieth century that more than a few rugged individuals would settle the harsh environment of Imperial County.

While a few people settled in the area, and some farmers started the town of Imperial in the 1890s, it was not until the 1900s that more farmers entered the valley and established homesteads. This was primarily due to the construction of the Alamo Canal in 1901, which brought water from the Colorado River to the Alamo River and began the irrigation of the Imperial Valley (Mitchell 2011). With water came growth; the City of Imperial was officially formed in 1904, Imperial County was established in 1907, and in the same year, the cities of Brawley, Calexico, Heber, and Silsbee were officially formed. This boom in growth was partially due to the intense promotion by the federal government, through the use of the Homestead Act and the Desert Land Act, through which many farmers acquired ownership of land. By 1930, over 500,000 acres of the Imperial Valley were being irrigated, and in 1934 construction of the All-American Canal began. It was completed in 1940, by which time the population of the area had grown to more than 61,000.

Railroad lines, including a branch of the Southern Pacific Railroad (SPRR) extending through the Imperial Valley to Calexico, were constructed throughout portions of the County in the early 1900s, which further increased settlement. With the introduction of automobiles, the development of new and better roads was required, including included Plank Road, which was a seven-mile-long, movable road built over the sand dunes between Imperial Valley and Yuma in 1914 and continued to be added on to and improved into the 1930s (OHP 2014; Brian F. Mooney Associates 1993).

2.2.3.4 Advent of Irrigation in the Imperial and Coachella Valleys (1848 to 1934)

The Coachella Canal is a branch of the All-American Canal; the canals, with their related distribution systems, deliver water to the fertile Imperial and Coachella valleys. The Canal has been described as part of a historic district that includes the Imperial Dam and Desilting Works, the All-American Canal, and the Coachella Canal (Schaefer and Ní Ghabhláin 2003, Ní Ghabhláin and Schaefer 2005).

The Coachella Canal would not exist without the All-American Canal, and both owe their existence to the Colorado River, which historically had overflowed into tributary rivers in the valleys. The canal systems were the culmination of a complex history woven from the need for water, numerous efforts to irrigate the Imperial and Coachella valleys, and tensions between private and public ownership of water rights. Beginning in the mid-1800s, the geological surveys of William P. Blake noted several features of the valleys that would yield the potential for significant agricultural production. The Salton Trough region was lower in elevation than the Colorado River, which was observed to overflow into the New and Alamo rivers. The area's fertile clay soils, with little irrigation by gravity flow from these rivers, were likely to produce abundant crops (Blake 1853).

By 1900, the privately-owned California Development Company had developed the first irrigation system in the region, the Imperial Canal, also known as the Alamo Canal. As envisioned by Blake 50 years earlier, the Alamo Canal was fed by Colorado River water redirected to the Alamo River (Starr 1990; JRP Consulting 2000). The availability of water in the region, as well as several federal land acts, including the Homestead Act, the Desert Land Act, and the Carey Land Act, encouraged settlers to

establish farms throughout the Imperial Valley. The Carey Land Act specifically allowed private companies to profit from the sales of water using the irrigation systems they built (Ní Ghabhláin and Schaefer 2005).

However, both the original Alamo Canal and a later bypass canal had silted up by the early 1900s (Starr 1990). In addition, the federal government had begun steps to wrest control of the irrigation systems away from private companies (Schaefer and Ní Ghabhláin 2003). The U.S. Reclamation Service (later renamed the USDI Bureau of Reclamation) was formed in 1902 by the Newlands Reclamation Act to provide oversight of the irrigation systems in the arid and semiarid western states that owed their origins to the previous federal land acts of the late 1800s. Irrigation projects were known at that time as "reclamation" projects because the irrigation projects would "reclaim" arid lands for human use, specifically the settlement of American farms and homes (Trover 2016). The agency targeted and challenged private developers, one of the first being the California Development Company, regarding claims about regional economic development and soil fertility, and profits from the use of Colorado River water. In 1903, the Colorado River was declared a navigable waterway, which placed the river and any redirection of its water under federal control (Schaefer and Ní Ghabhláin 2003).

The California Development Company switched tactics and built a canal to draw water from the Colorado River south of the border in Mexico and into the Imperial Valley. Their efforts to open the diversion without a concrete headgate led to the flood of 1905-1907, which destroyed the Imperial Valley's irrigation system, formed the Salton Sea, and put the now-bankrupt Company under the SPRR's control in 1907. The SPRR had to expend monumental efforts and funds to finally divert the river back to the Gulf of California (Wells 1907; Starr 1990; Frisby 1992). These factors ultimately led to the formation of the Imperial Irrigation District (IID) in 1911 after additional flooding occurred in 1910. Together with the Imperial Laguna Water Company, formed in 1914, IID proposed the All-American Canal in 1919 to irrigate all of the Imperial Valley (Dowd 1956). At about the same time, the Coachella Valley water table had fallen dramatically as a result of the hundreds of artesian wells drilled in the region after the discovery of artesian water in 1894. By 1909, there were approximately 400 wells, 300 of which were artesian, in the Coachella Valley, and farmers needed a supplemental water source to continue agricultural production. However, reports of private investors in Los Angeles who intended to appropriate and impound water from the Imperial Valley triggered opposition and a successful effort to form a local water district in the Coachella Valley (Bureau of Reclamation 1955; Trover 2016). As a result, the Coachella Valley Water District (CVWD) was formed in 1918 and oversaw areas in Riverside, Imperial, and San Diego counties (CVWD 1978).

By 1919, Congressmen Kettner and Kincaid introduced legislation intent on replacing the California Development Company's irrigation canal that brought Colorado River water to the Imperial Valley through Mexico. The first bill drafts gave IID priority for water reclaimed outside IID's boundaries, making CVWD's water rights secondary (Trover 2016). In 1919, CVWD entered into the first contract with the federal government under the Kettner Bill for the importation of water from the Colorado River for agricultural uses. A second contract was made under the Kincaid Bill in 1921 to survey the Coachella Branch route of the All-American Canal (CVWD 1978). However, the actual construction of canal systems to redirect Colorado River water to the Imperial and Coachella valleys could not come to fruition until after federal legislation was passed to enact an agreement (the Colorado River Compact) that determined the distribution of Colorado River water to the seven states that border the waterway (Fradkin 1981). That legislation was the final version of the Swing-Johnson Bill, also known as the Boulder Canyon Project Act, which was passed in 1928 after seven years of deliberation and negotiations. The Boulder Canyon Project Act ratified the 1922 Colorado River Compact, provided

California ratified it (it had not been binding because Arizona had not ratified it and never did, an issue only resolved in 1963 by the US Supreme Court). The Act also authorized the construction of Hoover Dam (formerly known as Boulder Dam), Imperial Dam, and the All-American Canal. Federal funds were to be advanced through the contracts, with the irrigation districts ultimately responsible for repayment (Wilbur and Ely 1948; Reisner 1993; Trover 2016). The USDI Bureau of Reclamation (Reclamation) undertook detailed surveys of the alignment for the All-American Canal and the Coachella Canal branch in 1929 and 1930, with the final report, including cost estimates, completed in 1931 (Gault 1931).

IID and CVWD were often in conflict over water rights. Although an agreement had been signed between IID and Reclamation in 1932, a conflict between the two districts over the allocation and control of water delayed the start of construction for the Imperial Dam. It was not until 1934 that the two agencies agreed on co-operation and funding for the building of the All-American Canal, after the entire CVWD Board had been recalled over their plan to join IID in 1932. The compromise allowed CVWD its own terms in the construction contract and provided that each water district would pay in proportion to the amount of water the delivery system provided to them. In a special election in 1934, voters overwhelmingly approved the formation of a 137,000-acre improvement district, the "Coachella Service Area," to construct the Coachella Canal – during the midst of the Great Depression and knowing it would create a new tax on their property (Wilbur and Ely 1948; CVWD 1978; Trover 2016).

With the completion of the All-American Canal in 1939, which was placed in service in 1940 and began delivering water to the Imperial Valley in 1941, the Imperial and Coachella valleys became one of the most productive agricultural areas in the United States (Schaefer and Ní Ghabhláin 2003). Without the All-American Canal and its dependable water source, farmers in the region would not have been able to produce the intensive high-risk crops that supported the economic development of Riverside and Imperial counties. The growth in agricultural production in these two counties following the completion of the All-American Canal was gigantic, with Imperial County seeing a 1,122-percent growth in the value of field crops in the first 14 years. The later completion of the Coachella Canal resulted in the doubling of irrigated farmland in the Coachella Valley within seven years, resulting in a 900-percent increase in the value of field crops (Bureau of Reclamation 1955).

2.2.3.5 Coachella Canal (1934 to 1948)

With the formation of the Coachella Service Area improvement district, Reclamation agreed to construct the Imperial Dam, All-American Canal, and the Coachella Branch of the All-American Canal (Coachella Canal). Title to the Coachella Canal and related structures would remain with Reclamation, while the operation, maintenance, and replacement responsibilities were to be transferred to CVWD upon completion (Trover 2016).

The Coachella Canal begins as a monumental turnout gate at Drop 1 on the All-American Canal, which is located 38 miles downstream from Imperial Dam in Imperial County. It then follows an almost 124-mile route, first northwest to Indio, then curving south to terminate at the artificial reservoir known as Lake Cahuilla in Riverside County. Starting at an elevation of 160 feet AMSL, the Canal terminates at about sea level (Schaefer and Ní Ghabhláin 2003).

Surveying that began in the 1910s and 1920s culminated in a final survey report with cost estimates in 1931. More detailed surveys and design drawings were prepared in 1938 and 1939. The contract for construction of the first 43-mile-long reach of the Coachella Canal was awarded in 1938; excavation began late that year, and construction was completed by early 1940. Excavation used routine methods

and equipment, including two dragline excavators and buckets, tractors, and bulldozers. The construction of Drop 1 of the All-American Canal for the Coachella Canal turnout was completed in 1939 (Bureau of Reclamation 1938, 1939).

Construction on the second reach of 47 miles began in 1939 and included excavation of the Canal, diversion channels, dikes, and parallel drains, as well as construction of 32 siphons, five drainage inlets, four automatic wasteways, and one check structure. The design for the siphons was modified under the contract in 1940 to increase the size of the box sections and barrel lengths and eliminate concrete in the floors of the wash crossing channels. Significant excavation and construction for this reach of the Canal occurred between 1940 and 1941. Approximately 31 miles was excavated, and the concrete work for siphons 1 to 32 was completed. However, virtually all construction work on the Canal was suspended due to World War II. The second reach was not completed until 1943 (Bureau of Reclamation 1940, 1941, 1943).

Bids for the third reach of the Canal, which had been sought but rejected in 1941, were again opened in early 1944. Due to a shortage of labor and materials, construction did not commence until late in the year. The third reach extended through difficult soil conditions and required drilling and blasting operations. Shortages of labor, materials, and labor housing slowed construction progress between 1944 and 1945. Construction to line the Canal with clay and improve the Canal road under a separate contract occurred during this time. A government camp for employee housing with a water tank and utilities was built in 1945 near the town of Coachella and included 25 two- and three-bedroom houses. By the end of 1946, all construction on the third reach and the government housing camp was completed. Contracts for construction of the fourth and fifth reaches of the Canal were awarded in 1946, and for the final reach in 1947. The final reach of the Canal was completed in 1948, and water service commenced in 1949 when it took a full 24 hours for water from the Colorado River to reach the Coachella Valley (Schaefer and Ní Ghabhláin 2003).

The Canal's last 38 miles between North Shore and Lake Cahuilla were lined with three-inch concrete to prevent water loss through seepage, with the first 85 miles lined with 12-inch- thick clay (Bureau of Reclamation 1934, 1948, 1949, 1984). The Canal is trapezoidal in shape, with the banks at least 24 feet in width. While the clay-lined sections have a bottom width of 60 feet and a water depth of 10.3 feet, the original concrete-lined sections have a bottom width of 12 feet and a depth of 10.8 feet (Bureau of Reclamation 1948). Associated structures include 33 inverted siphons, nine automatic spillways, 22 checks, seven evacuation channels, an eight-foot diameter tunnel, and 39 bridges (Bureau of Reclamation 1948). With over 160 wash channels from the adjacent mountains crossing the channel, a series of dikes were created in order to protect the Canal from floodwaters while limiting the number of flood control structures. These include a total of 37 miles of diversion dikes and 36 miles of detention dikes (Bureau of Reclamation 1938, 1948). The SPRR crosses the Canal at two locations. The portion of the Canal from the All-American Canal to Niland is operated by IID, and the remainder north of Niland is operated by CVWD (Schaefer and Ní Ghabhláin 2003).

Modifications have been made to the Coachella Canal over time. Early improvements include the installation of electronic telemetering control systems and debris screens in 1957 and 1967. Approximately 132,000-acre-feet of water lost annually to seepage resulted in the construction of a parallel concrete-lined canal in 1980-1981 for the first 48 miles between the All-American Canal and Niland (Schaefer and Ní Ghabhláin 2003). Another parallel 33.2-mile-long concrete-lined canal, extending north of Niland, was constructed by the CCLP and completed in 2006, a portion of which is involved in the current project.

3.0 METHODS

HELIX requested a records search of the project site and a one-half-mile radius from the South Coastal Information Center (SCIC) at San Diego State University on November 29, 2021, the results of which were received on December 7, 2021. The records search covered a one-half-mile radius around the project area and included the identification of previously recorded cultural resources and locations and citations for previous cultural resources studies. A review of the California Historical Resources, the state OHP historic properties directories, and the Local Register, was also conducted. The records search maps are included as Confidential Appendix B to this report. Historic maps and aerial photographs were reviewed to assess the potential for historic archaeological resources to be present.

The Native American Heritage Commission (NAHC) was contacted on November 10, 2021, for a Sacred Lands File search and a list of Native American contacts. A second request was sent on January 14, 2022, and a phone call was placed to NAHC to follow up on the request.

A visit to the project site was conducted by HELIX Cultural Resources Specialist Catherine A. Wright, HELIX Architectural Historian Teri Delcamp, Native American monitor Andreas Heredia of ACBCI, and ACBCI Archaeologist Lacy Padilla on January 6, 2022. The project lies within the completely developed limits of the Canal and its supporting facilities; no pedestrian survey was completed because the natural ground surface has been obscured by the development of the middle embankment of the Canal. However, a windshield survey was performed to ensure that no areas of the natural ground surface with the potential to contain cultural resources at the surface were present.

4.0 ARCHIVAL RESEARCH AND CONTACT PROGRAM

4.1 RECORDS SEARCH

HELIX received a records search of the California Historical Resources Information System from SCIC on December 7, 2021. The records search summary and map are included as Appendix B (Confidential Appendices, bound separately).

4.1.1 Previous Surveys

The SCIC identified 20 previous cultural resource studies within the records search limits, four of which overlap the project area (Table 1, *Previous Studies within One-Half Mile of the Project Area*). The studies consisted of cultural resource reviews, environmental impact reports, a biological survey, a mining and reclamation plan, resource inventory and evaluation reports, a historic and archaeological resources protection plan, archaeological and cultural surveys, history of local development, and a consultation report. Some of the reports are multiple drafts or phases of the same project, rather than 20 separate projects or studies.

Table 1
PREVIOUS STUDIES WITHIN ONE-HALF MILE OF THE PROJECT AREA

Report Number (SD-)	Report Title	Author, Year
IM-00225	Appendix A - History of Local Development	WESTEC Services, Inc., 1980
IM-00230	Salton Sea Anomaly Cultural Resource Review Data-Support Package	WESTEC Services, Inc., 1981
IM-00234	Salton Sea Anomaly - Master Environmental Impact Report	WESTEC Services, Inc., 1981
IM-00236	Volume II - Salton Sea Anomaly Master Environmental Impact Report and Magma Power Plant #3 (49 MW) Environmental Impact Report Appendices	WESTEC Services, Inc., 1981
IM-00237	Volume I - Salton Sea Anomaly Master Environmental Impact Report and Magma Power Plant #3 (49 MW) Environmental Impact Report Draft	WESTEC Services, Inc., 1981
IM-00254	Final Salton Sea Anomaly Master Environmental Impact Report and Magma Power Plant #3 (49 MW) Environmental Impact Report Comments and Responses	WESTEC Services, Inc., 1981
IM-00255	Final Salton Sea Anomaly Master Environmental Impact Report and Magma Power Plant #3 (49MW) Environmental Impact Report Volume I	WESTEC Services, Inc., 1981
IM-00651	Cultural Resource Overview - Coachella Canal Lining Project	Green and Middleton, 1994
IM-00674	Southern Arizona Transmission Project Preliminary Draft Environmental Impact Statement, Draft Environmental Impact Report, Draft Plan Amendment, DEIS/DEIR/DPA	Bureau of Land Management, 1994
IM-00734	East Salton Sea Material Sites Quartz, Chuckwalla, Niland, Standard, and Miter – Biological Survey Report	Dunham, 1989
IM-00735	Mining and Reclamation Plan for the Chuckawalla Material Site (Imperial County)	Caltrans, 1990
IM-00969	A Class III Cultural Resource Inventory and Evaluation for the Coachella Canal Lining Project: Prehistoric and Historic Sites Along the Northeastern Shore of Ancient Lake Cahuilla, Imperial and Riverside Counties, California	Schaefer, Ni Ghabhlain, and Becker, 2003
IM-01284	Draft Historic and Archaeological Resources Protection (HARP) Plan for The Chocolate Mountain Aerial Gunnery Range, Imperial County, California	McCorkle Apple and Cleland, 1999
IM-01510	Draft Environmental Impact Statement and California Desert Conservation Area Plan Amendment for the West Chocolate Mountains Renewable Energy Evaluation Area	Bureau of Land Management, 2011
IM-01598	Cultural Resources Inventory, Site Monitoring, and Historic Resources Verification for Chocolate Mountain Aerial Gunnery Range Imperial and Riverside Counties, California	Shaver, Lilburn, and McCorkle Apple, 2005
IM-01604	Archaeological Survey for Shallow Temperature Gradient Test Holes, Desert Warfare Training Facility, Chocolate Mountain Aerial Gunnery Range, Imperial County, California	Wahoff, 2009
IM-01605	Results of a Class III Cultural Resources Survey of 6,933 Acres in SWAT-4, Chocolate Mountains Aerial Gunnery Range, Imperial County, California	Schaefer and Dalope, 2011

Report Number (SD-)	Report Title	Author, Year
IM-01607	Cultural Resource Survey Special Warfare Training Areas 4 and 5 Chocolate Mountain Aerial Gunnery Range, Imperial and Riverside Counties, California	Rudolph, 2013
IM-01766	Draft Legislative Environmental Impact Statement for the Renewal of the Chocolate Mountain Aerial Gunnery Range Land Withdrawal	Finn, 2012
IM-01767	Initiation of Consultation for the Renewal of the Chocolate Mountain Aerial Gunnery Range Land Withdrawal	Pearce, 2012

4.1.2 Previously Recorded Resources

The SCIC has a record of 22 previously recorded cultural resources within a one-half-mile radius of the project. Sites within the half-mile records search radius consist of 16 prehistoric archaeological resources, four historic resources, one multi-component site, and one site of undetermined age (see Table 2, *Previously Recorded Resources within One-Half Mile of the Project Area*). One of these resources, recorded as P-13-007858/P-33-005705, consists of the Coachella Canal and berms associated with it (Ní Ghabhláin 2003) (Table 2) and was the only resource located within the Project area.

In general, the sites recorded within the one-half-mile search radius consist of prehistoric resources comprised of well-developed habitation sites, trails, artifact scatters, midden sites, and isolated artifacts. The multi-component site is recorded as consisting of three historic cairns and a disturbed protohistoric rock ring. One site, a cleared rock circle with no associated artifacts, is noted as undetermined. Two of the four historic resources are recorded as stone house foundations; another is a bladed road recorded as a site complex consisting of a network of dirt roads associated with P-13-014651 and indirectly associated with the construction of the Coachella Canal; and the fourth is the Coachella Canal itself. The bladed road recorded as a site complex was not recognized as an archaeological site by the SCIC and recorded as not eligible for the NRHP. The Coachella Canal was constructed between 1938 and 1948 and was formally determined to be eligible for the NRHP (Ní Ghabhláin and Schaefer 2005). No previously recorded cultural resources were identified directly adjacent to the project; however, two sites, P-13-006639, a ceramic scatter with one flake, and P-13-012583, a possible prehistoric trail segment, are situated within 500 feet of the Canal.

Table 2
PREVIOUSLY RECORDED RESOURCES WITHIN ONE-HALF MILE OF THE PROJECT AREA

Primary Number	Trinomial	Age	Description	Recorder, Date
P-13-004332	CA-IMP-4332	Prehistoric Site	Trail associated with stone house foundations and cleared circles	Wilcox and Smith, n.d.; Pigniolo, 2007
P-13-004333	CA-IMP-4333	Historic Structure	Rock house foundation consisting of 11 rocks	Wilcox, 1980
P-13-004334	CA-IMP-4334	Historic Structure	Rock house foundation consisting of six large rocks and numerous small pebbles and dirt	Wilcox, 1980

Primary Number	Trinomial	Age	Description	Recorder, Date
P-13-004827	CA-IMP-4827	Prehistoric Site	Lake Cahuilla occupation site consisting of a lithic scatter, ceramic scatter, hearths, habitation debris, burnt faunal bone, and other (not specified)	DeCosta and Graham, 1982
P-13-004828	CA-IMP-4828	Prehistoric Site	Midden site with hearths, a sparse ceramic, lithic, and ground stone scatter (flakes, metate, and fire-affected rock [FAR], hammerstone, cores, chopping tools)	Graham, 1982; Schneider, 1987
P-13-005480	CA-IMP-5480	Prehistoric Site	Large lithic scatter (flakes, FAR, core) with ceramics and fishbone fragments	Schneider, 1987
P-13-005481	CA-IMP-5481	Prehistoric Site	Large ceramic sherd scatter with lithics (flakes, reduction debris), charcoal, burnt fish, mammal, and tortoise bones and remains	Schneider, 1987
P-13-005482	CA-IMP-5482	Prehistoric Site	Ceramic sherd scatter with one core and ground stone	Schneider, 1987
P-13-005483	CA-IMP-5483	Prehistoric Site	Ceramic scatter and ground stone	Schneider, 1987
P-13-006530	CA-IMP-6530	Prehistoric Site	Ceramic and ground stone scatter	Unknown, 1956
P-13-006531	CA-IMP-6531	Prehistoric Site	Ceramic scatter	Unknown, 1957
P-13-006543	CA-IMP-6543	Prehistoric Site	Ceramic scatter	ASA, 1955
P-13-006639	CA-IMP-6639	Prehistoric Site	Ceramic scatter with one flake	ASA, 1956; Apple and Lilburn, 2005
*P-13-007858/ P-33-005705	CA-IMP-7658/ CA-RIV-5705	Historic Site	Coachella Canal and associated berms	O'Neill and Schaefer, 1997; Avina, 1999; Ni Ghabhlain, 2003; Jones and Broockmann, 2013; Brann and Broockmann, 2014
P-13-012143	---	Prehistoric Isolate	Isolate consisting of one core and one flake	Murphy, 2010
P-13-012570	CA-IMP-11080	Multi-component Site	Three historic cairns and a disturbed protohistoric rock ring	Dalope et al., 2010
P-13-012583	CA-IMP-11093	Prehistoric Site	Originally recorded as a single trail segment; determined to be a modern military pedestrian and game/burro trail. A modern rock circle with a buried pipe in the middle is noted to be one meter west of the trail as well.	Dalope, 2010; Cardno TEC et al., 2012
P-13-012584	CA-IMP-11094	Prehistoric Site	Single trail segment on light desert pavement	Dalope, 2009
P-13-013072	CA-IMP-11431	Prehistoric Site	Nine concentrations of charcoal and ashy soil recorded as possible hearth features, FAR, four concentrations of ceramic sherds, FAR, and fish bone	Toenjes, 2010

Primary Number	Trinomial	Age	Description	Recorder, Date
P-13-014506	CA-IMP-12193	Undetermined	Cleared rock circle with no associated artifacts	Broockmann, 2012
P-13-014507	CA-IMP-12194	Prehistoric Site	Cleared circle surrounded by a deflated wall, a cleared circle, and a trail	Broockmann, 2012
P-13-014651	---	Historic Site	Bladed road associated with CA-RIV-11686/P-13-014651, recorded as a site complex (not recognized as an archaeological site by SCIC)	James and Perry, 2014

Overlaps with project area

4.1.3 P-13-007858/P-33-005705 (CA-IMP-7658/CA-RIV-5705)

One archaeological site has been recorded within the project area, P-13-007858/P-33-005705 (CA-IMP-7658/CA-RIV-5705), the Coachella Canal. The Canal has previously been recorded as P-13-007658 in Imperial County and P-33-005705 in Riverside County. Built between 1938 and 1948, the site includes the original, unlined canal, diversion channels and dikes, parallel drains, siphons, drainage inlets, wasteways, and check structures. The first site form for the Coachella Canal (CA-RIV-5705) was prepared in 1983 by ASM Affiliates, Inc. (ASM) and covers a portion of the Canal between siphons 7 and 32. ASM recorded the site as being in good condition but not eligible for the NRHP. No justification was provided for the finding of the Canal being ineligible for listing in the NRHP. CA-IMP-07658 is an 8.9-kilometer (5.5-mile) segment of the Old Coachella Canal, which was evaluated as eligible for listing in the NRHP in 1997 (Schaefer et al. 2003). Both site forms were updated in 2003 by ASM for the CCLP, and the entire length of the old canal was recommended as eligible for the NRHP. The site form for P-13-007858/P-33-005705 was updated in 2014 to include a dirt and riprap berm with ramps and firing positions located on the northeast side of the Canal, Berm 22, which is situated outside of the project and on CMAGR, adjacent to the eastern limit of the project (Brann and Brookman 2014). According to the site form (Brann and Brookman 2014), Berm 22 is 2,537 feet long and between 49 and 66 feet wide at the base. The berm has boulder riprap on portions of the lower half of the eastern side that was employed to assist in controlling the erosion from floodwaters coming down the alluvial channels on the eastern side of the berm. The military converted the berm into part of the range complex associated with the SWAT ranges and Camp Billy Machen. Two firing positions have been placed atop the northern end of the berm, which consist of metal poles sunk into the berm with a roof structure over the top and fencing on the west side. These structures do not substantially alter the original structure of the berm.

4.2 OTHER ARCHIVAL RESEARCH

Various archival sources were also consulted, including historic topographic maps (USGS Online Historical Topographic Map Explorer 2022) and aerial imagery (NETR Online 2022). These include a historic aerial from 1953 and several historic USGS topographic maps, including the 1940 and 1944 Frink (1:62,500) maps, the 1954 and 1955 Salton Sea (1:125,000) maps, the 1956 Wister (1:24,000) and 1956 Frink (1:62,500) maps, and the 1965 and 1968 Salton Sea (1:125,000) maps. The purpose of this research was to identify historic structures and land use in the area.

Other than the Canal and its associated structures, no buildings or structures appear in the project area on any of the aerials and topographic maps examined. On the 1940 and 1945 maps, several dirt roads appear, including the Canal access road along the west side of the Canal, and a road extending

perpendicular to the east from the Canal near the northern end, whose purpose is indicated to be to access a mine. In adjacent areas, to the west, increasing amounts of agricultural use and development can be seen to occur through time.

4.3 NATIVE AMERICAN CONTACT PROGRAM

HELIX contacted the NAHC on November 10, 2021, for a Sacred Lands File search and a list of Native American contacts for the project area. A response from NAHC was received on February 15, 2022, indicating that a search of the Sacred Lands File was negative and no sacred lands have been identified associated with the project area. No outreach to the Tribes, either verbal or written, was conducted by HELIX. However, the Tribal archaeologist and a Tribal monitor from the ACBCI participated in the site visit to ensure that the potential for TCRs to be present in the study area was considered during the project analysis. To date, a copy of the records search from SCIC prepared for the current study and the 2003 CCLP history and evaluation report (Schaefer and Ní Ghabhláin 2003) have been provided to the ACBCI. The Tribe has not provided information indicating TCRs are present within or in the vicinity of the project area.

CVWD will perform government-to-government consultation in compliance with AB 52, and Reclamation will conduct Tribal consultation under Section 106. No follow-up letters will be prepared for this report. A list of Tribal contacts provided by NAHC is included as Appendix C of this report. The lead agencies for the project will be responsible for any government-to-government consultation efforts for the project.

4.4 SITE VISIT

A site visit was conducted on January 6, 2022, by HELIX Cultural Resources Specialist Catherine A. Wright, who also served as HELIX Project Manager; HELIX Architectural Historian Teri Delcamp; ACBCI Native American Monitor Andreas Heredia; and ACBCI Archaeologist Lacy Padilla. The project area was subject to a visual survey by driving down each side of the Canal along the operations and maintenance (O&M) roads between siphons 11 and 14. Brief stops were conducted along the route when inlet or outlet control structures were encountered.

The project site is completely developed by the original Coachella Canal alignment, the concrete-lined parallel canal alignment, embankments created by the spoils from the construction of the canals, the middle embankment separating the two canals, fence lines, and the O&M roads (see Plates 1 through 4). Because the natural ground surface has been obscured by these developments, a pedestrian survey for archaeological sites was not warranted. However, a windshield survey was performed to ensure no areas of the natural ground surface where archaeological resources might occur were present

The ground surface has been impacted by the development of the Canal, including excavation for the canals themselves, and the grading and leveling for the O&M roads running between each canal segment. It also appears that the areas along both sides of the Canal have been built up to protect the Canal, and to accommodate the O&M roads and security fencing along the Canal. Embankments created from the removal of sediments to build the original and parallel-lined canals run along the outside of the O&M roads, forming an approximate 30-foot embankment, creating a physical boundary between the Canal and the surrounding open desert to the east. The existing siphon and check structures within the project area were constructed for the CCLP project in 2006. The project was essentially devoid of any vegetation, save that growing within the now-dewatered abandoned portion of the old canal segment around wildlife drinkers created by the CCLP.

The only area within the project that appears to have remaining intact soils forms the approximately 30-foot-wide embankment separating the two canals, which was graded to create an O&M road along the top of the embankment. The Canal was constructed utilizing draglines to dig the trench in which the water was to flow (Schaefer and Ní Ghabhláin 2003). However, it does not appear that the surrounding lands were excavated or graded. Further, it appears that what was originally the western side of the Canal, which became the current middle embankment, was not excavated or otherwise disturbed during the original construction, nor was it removed or deeply excavated when the parallel alignment was created for the CCLP. According to Schaefer and Ní Ghabhláin (2003), the soils excavated to create the original canal were utilized to create a six-foot embankment on the west side of the Canal that was then graded to create access and maintenance roads, leaving the natural ground surface intact below the embankment. When the CCLP was constructed, this area along the western edge of the original Canal became the eastern side of the middle embankment. The middle embankment will be removed to create the midline storage.

The original Canal's easterly embankment is still present but was modified by the CCLP, with periodic grading for access down to the wildlife drinkers that were added at the bottom of the original Canal. The clay-lined banks of the Canal are eroded.



Plate 1. View along east side of original Coachella Canal towards south; embankment created from canal construction spoils shown to east.



Plate 2. View south from center berm between original and lined canals; concrete-lined canal on right.



Plate 3. View northwest from Check 11 north from east side of Coachella Canal showing old canal with some remaining water in foreground and newer concrete-lined canal in background.



Plate 4. View of old, unlined portion of the Canal towards the north at curve in alignment south of Check 11. Note overall level of disturbance and wildlife drinker midframe. Lined canal is shown to the left.

5.0 RESULTS

No prehistoric archaeological resources were identified within the project by either the records search or the site visit. The Coachella Canal is recorded as an archaeological resource, as described below and in Section 4.1.3, P-13-007858/P-33-005705 (CA-IMP-7658/CA-RIV-5705). Other than the Canal, no archaeological material was observed within the project site. As noted above, the project area has been graded and otherwise heavily disturbed by the construction of the canals.

5.1 SITE DESCRIPTION

5.1.1 P-33-005705 and P-13-007658 (Coachella Canal)

The Coachella Canal occurs in both Imperial and Riverside counties. P-13-007658 only refers to a small portion of the old Coachella Canal between siphons 7 and 32, in Imperial County, while P-13-007858 documents the entire canal. The portion of the Coachella Canal between siphons 7 and 32 is recorded as an archaeological resource under trinomials CA-IMP-7658 and CA-RIV-5705. Within this portion of the Canal, there are 25 siphons, three check structures, two automatic spillways, five drainage inlet structures, one railroad bridge, and numerous dirt and rip rap berms, in addition to the Canal itself. The entirety of the Canal documented as P-13-007858 includes the 123.5-mile sand trench that formed the Old Coachella Canal. Overall, the Canal appears to be in a good state of repair and maintains a high level of integrity.

5.2 HISTORICAL SIGNIFICANCE

The Coachella Canal was evaluated by ASM in 2003 prior to completion of the CCLP and found to be potentially eligible for listing in the NRHP under Criterion A and Criterion C (Schaefer and Ní Ghabhláin 2003). It is eligible under Criterion A as a part of the effort to capture the waters of the Colorado River for the development of agriculture in the Imperial and Coachella valleys. As one of the largest public works projects ever completed in the United States, the development of the Canal is representative of Federal involvement in the development of water reclamation projects at the onset of the twentieth century. The Canal also represents the role of local irrigation districts and agricultural interests in the development of this desert region of the Southwest. Finally, the Canal ensured a reliable water supply for the Coachella Valley, thereby spurring the agricultural and its associated economic development of the region. The Coachella Valley remains, to this day, one of the most productive irrigated agricultural areas of the United States.

The Coachella Canal was also evaluated as eligible under Criterion "C" as a good example of a moderate-sized Bureau of Reclamation irrigation canal constructed in the 1930s and 1940s, with distinctive characteristics of canal construction from the period.

Reclamation made a formal determination of NRHP eligibility under criteria A and C in 2003. Also, in 2003, Reclamation made a finding of the adverse effect that would result from the CCLP with the abandonment of the original canal, demolition of the downslope berm, and destruction of most of the associated canal structures. Reclamation had previously submitted a draft treatment plan to the State Historic Preservation Officer (SHPO) for mitigation of impacts to all cultural resources, including the Coachella Canal that would result from the CCLP. Ultimately in 2004, the SHPO concurred on NRHP eligibility only under Criterion A and agreed with the determination of effect and that the treatment plan was sufficient mitigation for the CCLP. Thus, the Canal's significance with regard to NRHP eligibility is at the broader level of contributions to the region's development history rather than for any physical features that are distinctive to canal construction.

Since the Coachella Canal was determined eligible for the NRHP under Criterion A, and the CCLP treatment plan was determined sufficient to mitigate all impacts to cultural resources from that project, the consideration with the current project is whether any additional impacts could occur that were not previously mitigated. The portion of the original canal that will be affected by the current project has already been significantly altered by the CCLP, which replaced the original earthen canal with the construction of a parallel concrete-lined canal. Portions of the old canal that remain intact are the embankment between the old and newer canals, as well as the bottom and easterly embankment of the old canal. The embankments have been altered by grading for the O&M roads and access to the wildlife drinkers that were created in the bottom of the old canal with the CCLP. Moreover, because the Coachella Canal was not determined eligible for the NRHP under Criterion C, the modifications to physical features do not factor as impacts unless those modifications would affect the purpose and function of the Canal as water conveyance infrastructure.

6.0 SUMMARY AND MANAGEMENT RECOMMENDATIONS

6.1 SUMMARY

A study was undertaken to identify any additional cultural resources present in the Mid-Coachella Canal Storage Project and to determine the effects of the project on historical resources, as defined by CEQA. A cultural resources site visit did not identify any archaeological resources within the project area; however, the Coachella Canal itself is a highly significant historical resource. Since the entirety of the old Coachella Canal was determined eligible for the NRHP (and, by extension, the CRHR), it is considered a historical resource under CEQA. As a historical resource, the potential for a project to have significant environmental impacts must be analyzed. However, as noted above, the portion of the old canal in the project area has been previously significantly altered by the CCLP, and SHPO concurred that Reclamation's treatment plan fully mitigated all impacts to cultural resources from that project. The sections below discuss the potential for any new impacts associated with the current project and mitigation measures.

6.1.1 Archaeological Resources

The entire project area has been disturbed by the development of the original Canal in the 1930s and 1940s and the construction of the CCLP in the 2000s. Construction activities would have obliterated archaeological sites present within the areas trenched or otherwise disturbed during canal development. However, the project is situated along the high-water shoreline of prehistoric Lake Cahuilla, which would have attracted humans prehistorically in this arid portion of the desert. Considerable evidence exists for prehistoric use of the area along the lake margins, predominantly in the form of habitation sites with associated fish bone (York n.d.). The records search from SCIC identified 22 previously recorded cultural resources within a one-half-mile radius of the project; these consist of 16 prehistoric archaeological resources, four historic resources (including the Canal), and two multi-component sites. Of these sites, five are documented prehistoric habitations showing signs of considerable use, all of which were identified and documented during surveys, and none of which has been evaluated for significance. While surface manifestations of archaeological resources may not be present within the project area, the project location along the high-water shoreline of Lake Cahuilla also indicates there is a potential for buried sites to occur along former shorelines used by humans as the lake receded. Further, while none of the prehistoric habitations have been excavated to date, the documentation prepared for the sites does mention the potential for buried deposits to occur. As such, the potential exists for intact cultural resources to be present within the undisturbed soils of the middle embankment between the original and the lined Canal that will be removed to create the reservoir.

It should be noted that the prior replacement of the earthen Coachella Canal, which included dewatering of the trench that forms the Canal, has the potential to affect the integrity of the site. Between wind and water erosion, the potential exists, that over time, the unlined trench that makes up the original Coachella Canal will continue to be filled in while the slopes grading into the feature erode. As time passes, visible manifestations of the Canal may be slowly erased from the landscape. The introduction of water back into this portion of the Canal as a result of the project will not only restore this portion of the site to a use more consistent with its original purpose; it will also preserve the integrity of the feature over time.

6.1.2 Historical Resources

The old Coachella Canal was formally determined eligible for the NRHP under Criterion A in 2004 for its part in bringing water for the development of agriculture in the Imperial and Coachella valleys. It was not determined eligible under Criterion C as a good example of an early-twentieth-century irrigation canal with distinctive characteristics of canal construction. Thus, the Canal's significance is at the broader level of contributions to the region's development history rather than for any physical features that are distinctive to canal construction. The portion of the Canal that will be affected by the project was dewatered and replaced by a parallel, lined canal segment completed with the CCLP in 2006. The only intact portions of the old canal that remain in the project area are the embankment separating it from the newer lined canal and on the east side, as well as the bottom of the Canal.

The Canal continues to be a water conveyance resource and has been modified over time to ensure it is effective for that purpose; the current project also intends to ensure efficient operation of the Canal. Therefore, the proposed further modifications to the physical features of the Canal, which will remove the middle embankment and add material to the easterly embankment to provide water storage reservoir cells, do not have the potential to significantly impact the NRHP or CRHR significance of the Coachella Canal. This section of the original canal will once again be utilized for water conveyance and storage, which will allow it to function in a manner more consistent with its historic use.

6.2 MANAGEMENT RECOMMENDATIONS

6.2.1 Archaeological Resource Recommendations

While no archaeological or Native American cultural resources have been identified within the project area, the potential exists for sites to be uncovered when the project is developed in undisturbed soils. Because the original canal was built prior to the existence of CEQA, no archaeological study was performed prior to its construction. Numerous archeological resources are documented within a one-half-mile radius of the project, including well-developed prehistoric habitation sites, three prehistoric trail segments, two sites made up of cleared circles, and numerous artifact scatters. In addition, the Canal is situated near the high stand of Lake Cahuilla, an area known for prehistoric archaeological resources associated with the use of the lake, primarily for fishing. As such, the potential exists that cultural deposits remain buried within the embankment separating the two canals. In addition, while no Native American cultural resources have been identified within the project area, there are important cultural resources within one-half mile of the project, including five prehistoric habitations.

Subsurface construction activities, such as grading associated with the project, have the potential to damage or destroy previously undiscovered archaeological resources or TCRs, resulting in a potentially significant impact. Archaeological resources can include both prehistoric and historic features and artifacts; tribal cultural resources may be archaeological in nature but have cultural significance that may not be obvious to the archaeologist or non-Native American observer. TCRs can also include cultural landscapes or other non-archaeological resources. Due to this potential, it is recommended that cultural resource monitoring be conducted as needed during initial ground disturbance in canal segments that will be over excavated in previously undisturbed alluvial soils. Full-time monitoring in these segments will be performed during steps 2 and 3 of construction, when the middle embankment is removed. Monitoring will no longer be necessary once construction activities occur within soils previously disturbed during construction of the original or lined canal. If significant cultural material is

encountered, CVWD will coordinate with Reclamation staff and a qualified Archeologist to develop and implement appropriate site-specific treatment measures (e.g., avoidance, data recovery, capping).

The existing staging area near the northern end of the project, a portion of which is still in use as an equipment storage yard by CVWD, was developed for the canal lining project; it has been graded and maintained. No archaeological sites have been identified within this portion of the project. Because no ground disturbance is proposed for the staging area, no further archaeological study of this portion of the project is warranted.

Existing rock rubble piles located along the west side of the Canal ROW, north of the project site at Check 24, were placed in their location during the CCLP and are not a part of the original canal construction nor do they serve as a feature of the Canal. No additional study of this portion of the project is necessary.

Inadvertent Discoveries

In the event that cultural resources are exposed during ground-disturbing activities, construction activities (e.g., grading, grubbing, or vegetation clearing) should be halted in the immediate vicinity of the discovery. An archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards should then be retained to evaluate the find's significance under CEQA. If the discovery proves to be significant, additional work, such as data recovery excavation, may be warranted and should be discussed in consultation with CVWD.

Discovery of Human Remains

Although there is no evidence to suggest the presence of human remains in the project area, their discovery is always a possibility during project construction. If such an event did occur, the specific procedures outlined by the NAHC, in accordance with Section 7050.5 of the California Health and Safety Code and Section 5097.98 of the Public Resources Code, must be followed:

1. All excavation activities within 100 feet of the remains will immediately stop, and the area will be protected with flagging or by posting a monitor or construction worker, to ensure that no additional disturbance occurs.

2. The project owner or their authorized representative will contact the County Coroner.

3. The coroner will have two working days to examine the remains after being notified in accordance with HSC 7050.5. If the coroner determines that the remains are Native American and are not subject to the coroner's authority, the coroner will notify NAHC of the discovery within 24 hours.

The NAHC will immediately notify the Most Likely Descendant, who will have 48 hours after being granted access to the location of the remains to inspect them and make recommendations for their treatment. Work will be suspended in the area of the find until CVWD approves the proposed treatment of human remains.

Should the project limits change to incorporate new areas of proposed disturbance, an archaeological survey of these areas will be required.

With the implementation of the recommendations proposed below, potential impacts to previously undiscovered cultural resources would be reduced to a less than significant level.

6.2.2 Historical Resource Recommendations

While the project will not significantly impact the Coachella Canal's historical resources, it may create the false impression that the reservoir was part of the Canal's original construction in the 1930s and 1940s. With the implementation of the recommendation proposed below, potential impacts to historical resources that may result from the project would be reduced to a less than significant level.

The Canal has been well-documented by past surveys and evaluations, including a Historic American Engineering Record document in 2003. Therefore, the recommendation is that CVWD complete drone flight recordings of the project area before construction commences, and after construction is completed once the reservoir cells are filled with water. The recordings will be stored and made available by CVWD and Reclamation to the public.

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Appendix A

Resumes

Mary Robbins-Wade, RPA

Cultural Resources Group Manager

Summary of Qualifications

Ms. Robbins-Wade has 41 years of extensive experience in both archaeological research and general environmental studies. She oversees the management of all archaeological, historic, and interpretive projects; prepares and administers budgets and contracts; designs research programs; supervises personnel; and writes reports. Ms. Robbins-Wade has managed or participated in hundreds of projects under the California Environmental Quality Act (CEQA), as well as numerous archaeological studies under various federal jurisdictions, addressing Section 106 compliance and National Environmental Policy Act (NEPA) issues. She has excellent relationships with local Native American communities and the Native American Heritage Commission (NAHC), as well as has supported a number of local agency clients with Native American consultation under State Bill 18 and assistance with notification and Native American outreach for Assembly Bill 52 consultation. Ms. Robbins-Wade is a Registered Professional Archaeologist (RPA) and meets the U.S. Secretary of the Interior's Professional Qualifications for prehistoric and historic archaeology.

Education

Master of Arts, Anthropology, San Diego State University, California, 1990

Bachelor of Arts, Anthropology, University of California, Santa Barbara, 1981

Registrations/ Certifications

Caltrans, Professionally Qualified Staff-Equivalent Principal Investigator for prehistoric archaeology, , Bureau of Land Management Statewide Cultural Resource Use Permit (California), permit #CA-18-35, , Register of Professional Archaeologists #10294, 1991

County of San Diego, Approved CEQA Consultant for Archaeological Resources, 2007 , Orange County Approved Archaeologist, 2016

Selected Project Experience

12 Oaks Winery Resort (2015 - 2018). Project Manager/ Principal Investigator for a cultural resources survey of approximately 650 acres for a proposed project in the County of Riverside. Oversaw background research, field survey, site record updates, Native American coordination, and report preparation. Met with Pechanga Cultural Resources staff to discuss Native American concerns. Worked with applicant and Pechanga to design the project to avoid impacts to cultural resources. Work performed for Standard Portfolio Temecula, LLC.

28th Street between Island Avenue and Clay Avenue Utilities Undergrounding Archaeological Monitoring (2014 - 2018). Project Manager/Principal Investigator for a utilities undergrounding project in a historic neighborhood of East San Diego. Responsible for project management; coordination of archaeological and Native American monitors; coordination with forensic anthropologist, Native American representative/Most Likely Descendent, and City staff regarding treatment of possible human remains; oversaw identification of artifacts and cultural features, report preparation, and resource documentation. Work performed for the City of San Diego.

Archaeological Testing for the F11 (2015 - 2017). Project Manager for a cultural resources study for a proposed mixed-use commercial and residential tower in downtown San Diego. Initial work included an archaeological records search and a historic study, including assessment of the potential for historic archaeological resources. Subsequent work included development and implementation of an archaeological testing plan, as well as construction monitoring and the assessment of historic archaeological resources encountered. Work performed for the Richman Group of Companies.

Blended Reverse Osmosis (RO) Line Project (2018 - 2019). Project Manager/ Principal Investigator for cultural resources monitoring during construction of a 24-inch recycled water pipeline in the City of Escondido. Oversaw monitoring program, including Worker Environmental Awareness Training; responsible for Native American outreach/coordination, coordination with City staff and construction crews, and general project management. Work performed for the City of Escondido.

Borrego Springs Community Library IS/MND (2015 - 2016). Cultural Resources Task Manager/ Principal Investigator for a cultural resources survey for a proposed development consisting of a public library, park, and police substation for the County of San Diego. The project is proposed on a 20.5-acre site on undeveloped land in the Borrego Springs community.

Buckman Springs Road Bridge Widening Technical Studies (2017 - 2020). Senior archaeologist for a cultural resources survey in support of the proposed Buckman Springs Road Bridge Widening Project, entails the rehabilitation and widening of the existing bridge crossing of Buckman Springs Road over Cottonwood Creek (Bridge No. 57C-0270). The project proponent is the County of San Diego Department of Public Works (DPW), with local assistance funding from the Federal Highway Administration. Provided senior technical oversight and quality assurance/quality control on deliverables.

Buena Sanitation District Green Oak Sewer Replacement Project (2016 - 2017). Project Manager/Principal Investigator for a cultural resources testing program in conjunction with a proposed sewer replacement project for the City of Vista. Oversaw background research, fieldwork, site record update, Native American coordination, and report preparation. Work performed for Harris & Associates, Inc., with the City of Vista as the lead agency.

Cactus II Feeder Transmission Pipeline IS/MND (2017 - 2018). Cultural Resources Task Lead for this project in the City of Moreno Valley. Eastern Municipal Water District proposed to construct approximately five miles of new 30-inch to 42 inch-diameter pipeline; the project would address existing system deficiencies within the City and provide supply for developing areas. Oversaw background research, field survey, and report preparation. Responsible for Native American outreach for cultural resources survey. Assisted District with Native American outreach and consultation under AB 52. Work performed under an as-needed contract for Eastern Municipal Water District.

Dale 2199C Pressure Zone Looping Pipeline Project (2019 - 2019). Cultural Resources Task Lead for this project in Moreno Valley. Eastern Municipal Water District proposed construction of a new pipeline to connect two existing pipelines in the District's 2199C Pressure Zone. The pipeline would consist of an 18-inch-diameter pipeline between Kitching Street and Alta Vista Drive that would connect to an existing 12-inch-diameter pipeline in the northern end of Kitching Street and to an existing 18-inch-diameter pipeline at the eastern end of Alta Vista Drive. The project will improve reliability and boost the Dale Pressure Zone's baseline pressure and fire flow availabilities. Four potential alignments were under consideration; three of these bisect undeveloped land to varying degrees, while the other is entirely situated within developed roadways. Oversaw background research and field survey. Responsible for Native American outreach for cultural resources survey and co-authored technical report. Work performed under an as-needed contract for Eastern Municipal Water District.

Downtown Riverside Metrolink Station Track & Platform Project (2019 -). Cultural Resources Task Lead for this project involving changes to and expansion of the Downtown Riverside Metrolink Station. Overseeing records search and background information, archaeological survey, and report preparation. Responsible for coordination with Native American Heritage Commission, Riverside County Transportation Commission (RCTC), and Federal Transportation Authority (FTA) on Native American outreach. Work performed for Riverside County Transportation Commission as a subconsultant to HNTB Corporation.

Emergency Storage Pond Project (2018 - 2018). Project Manager/Principal Investigator for a cultural resources testing program in conjunction with the Escondido Recycled Water Distribution System - Phase 1. Two cultural resources sites that could not be avoided through project design were evaluated to assess site significance and significance of project impacts. Work included documentation of bedrock milling features, mapping of features and surface artifacts, excavation of a series of shovel test pits at each site, cataloging and analysis of cultural material recovered, and report preparation. The project is located in an area that is sensitive to both the Kumeyaay and Luiseño people, requiring close coordination with Native American monitors from both groups. Work performed for the City of Escondido.

Escondido Brine Line Project (2018 - 2019). Project Manager/Principal Investigator for cultural resources monitoring during construction of approximately 2.3 miles of a 15-inch brine return pipeline in the City of Escondido. The project, which is part of the City's Agricultural Recycled Water and Potable Reuse Program, enables discharge of brine recovered from a reverse osmosis facility that is treating recycled water; it is one part of the larger proposed expansion of Escondido's recycled water distribution to serve eastern and northern agricultural land. The project is located in an area that is sensitive to both the Kumeyaay and Luiseño people, requiring close coordination with Native American monitors from both groups. Oversaw monitoring program, including Worker Environmental Awareness Training; responsible for Native American outreach/coordination, coordination with City staff and construction crews, and general project management. Work performed for the City of Escondido.

Fox Tank Monitoring (2018 - 2019). Principal Investigator and Project Manager for the cultural resources monitoring program during construction of the Fox Tank Project. Oversaw the cultural resources monitoring program, including coordination with the District and the Native American tribal cultural monitors regarding cultural resources encountered during monitoring and their ultimate disposition. Work performed under an as-needed contract for Eastern Municipal Water District.

Hacienda del Mar EIR (2016 - 2020). Senior Archaeologist for a proposed commercial development project for a senior care facility in Del Mar. Assisted in the preparation of associated permit applications and an EIR. Oversaw background research, updated records search and Sacred Lands File search, monitoring of geotechnical testing, coordination with City staff on cultural resources issues, and preparation of updated report. Prior to coming to HELIX, served as Cultural Resources Task Lead for the cultural resources survey for the project, conducted as a subcontractor to HELIX. Work performed for Milan Capital Management, with the City of San Diego as the lead agency.

Haymar Easement Protection Project (2020 -). Cultural Resources Task Lead/Principal Investigator for an emergency repair project to protect a trunk sewer and associated access path badly damaged by erosion. Overseeing cultural resources monitoring during construction in this highly culturally sensitive area, including coordination with Luiseño tribal monitors and City staff.

Judson Potable Water Storage Tank and Transmission Pipeline IS/MND (2016 - 2019). Cultural Resources Task Lead for this project in the City of Moreno Valley. Eastern Municipal Water District is proposing the construction and operation of a steel, 2.2-million-gallon (MG) potable water storage tank, approximately 2,300 linear feet of 18-inch-diameter transmission pipeline, a paved access road, a detention basin, and other appurtenances to support tank operations. Oversaw background research and field survey. Responsible for Native American outreach for cultural resources survey and co-authored technical report. Assisted District with Native American outreach and consultation under AB 52. Work performed under an as-needed contract for Eastern Municipal Water District.

Lilac Hills Ranch (2014 - 2017). Project Manager/Principal Investigator of a cultural resources survey and testing program for an approximately 608-acre mixed-use development in the Valley Center area. Oversaw background research, field survey, testing, recording of archaeological sites and historic structures, and report preparation. Responsible for development of the research design and data recovery program, preparation of the preservation plan, and Native American outreach and coordination. The project also included recording historic structures, development of a research design and data recovery program for a significant archaeological site, and coordination with the Native American community and the client to develop a preservation plan for a significant cultural resource. The project changed over time, so additional survey areas were included, and a variety of off-site improvement alternatives were addressed. Work performed for Accretive Investments, Inc. with County of San Diego as the lead agency.

Moulton Niguel Water District Regional Lift Force Main Replacement (2017 - 2018). Cultural Resources Task Lead/Principal Investigator for the replacement of a regional lift station force main operated by Moulton Niguel Water District (MNWD). The project comprises an approximately 9,200 linear foot alignment within Laguna Niguel Regional Park in Orange County, in an area that is quite sensitive in terms of cultural resources. HELIX is supporting Tetra Tech throughout the preliminary design, environmental review (CEQA), and final design, including permitting with applicable state and federal regulatory agencies. The cultural resources survey will inform project design, in order to avoid or minimize potential impacts to cultural resources. Oversaw background research and constraints analysis, Native American coordination, cultural resources survey, coordination with MNWD and Tetra Tech, and report preparation. Work performed for MNWD, as a subconsultant to Tetra Tech.

Murrieta Hot Springs Road Improvements Project (2018 - 2020). Principal Investigator/Cultural Resources Task Lead for cultural resources survey in support of an Initial Study/Mitigated Negative Declaration (IS/MND) for the widening of Murrieta Hot Springs Road in the City of Murrieta. The project would widen or restripe Murrieta Hot Springs Road between Winchester Road and Margarita Road from a 4-lane roadway to a six-lane roadway to improve traffic flow, as well as provide bike lanes in both directions along this segment. A new raised median, light poles, signage, stormwater catch basins, retaining walls, and sidewalks would also be provided on both sides of the roadway, where appropriate.

The project area is in a location that is culturally sensitive to the Native American community. The cultural resources study included tribal outreach and coordination to address this cultural sensitivity.

Oceanside Water Utilities Dept On-Call Environmental Consulting Services, 2017-2022 (2018 - 2020). Cultural Resources Task Lead/Principal Investigator for three consecutive on-call contracts with the City of Oceanside Water Utilities Department. Oversees the preparation of cultural resource reports, coordinates with Native American tribes, and directs construction monitoring teams for projects as part of this contract. Project types include reservoirs, pump stations, lift stations, pipelines, and treatment plants.

Park Circle - Cultural Resources (2014 - 2019). Project Manager/Principal Investigator of a cultural resources survey and testing program for a proposed 65-acre residential development in the Valley Center area of San Diego County. The project is located along Moosa Creek, in an area that is culturally sensitive to the Luiseño people. Oversaw background research, historic study, field survey, testing, recording archaeological sites and historic structures, and report preparation. Responsible for Native American outreach and coordination. The cultural resources study included survey of the project area, testing of several archaeological sites, and outreach and coordination with the Native American community, as well as a historic study that addressed a mid-20th century dairy barn and a late 19th century vernacular farmhouse. Work performed for Touchstone Communities.

Peacock Hill Cultural Resources (2014 - 2017). Project Manager/Principal Investigator of a cultural resources study update for a residential development in Lakeside. Oversaw updated research, fieldwork, lab work, analysis by forensic anthropologists, report preparation, and Native American coordination. In the course of outreach and coordination with the Native American (Kumeyaay) community, possible human remains were identified, prompting additional fieldwork, as well as coordination with the Native American community and forensic anthropologists. Work performed for Peacock Hill, Inc.

Sky Canyon Sewer Environmental Consulting (2018 - 2019). Cultural Resources Task Lead for this project adjacent to the City of Murrieta in southwestern Riverside County. Eastern Municipal Water District (District) proposed to implement the Sky Canyon Sewer Main Extension Project to construct approximately 6,700 linear feet of new gravity-fed 36-inch-diameter sewer main to provide additional sewer capacity for planned development. The proposed 36-inch-diameter sewer main would extend the existing 36-inch-diameter French Valley Sewer at Winchester Road further downstream to Murrieta Hot Springs Road. Oversaw background research and field survey. Responsible for Native American outreach for cultural resources survey and co-authored technical report. Assisted District with Native American outreach and consultation under AB 52. Work performed under an as-needed contract for Eastern Municipal Water District.

Catherine A. Wright

Cultural Resources Specialist

HELIX Environmental Planning

Summary of Qualifications

Ms. Wright has 23 years of experience performing cultural resource management in the West. She has performed the full range of archaeological and historic resource studies in California, Arizona and Nevada. This includes background research, surveys, site evaluations, and mitigation through data recovery and monitoring. She has prepared numerous cultural resource survey reports, site overviews, background summaries, survey and testing plans, and Integrated Cultural Resource Management Plans (ICRMPs). She acted as Quality Assurance Manager for numerous large cultural resources contracts with the Department of Defense, including the Navy, Air Force, Army Corps of Engineers (Corps), and the US Army. Ms. Wright has also served as a Natural Resources Specialist for Naval Facilities Engineering Command (NAVFAC), Southwestern Division and has worked closely with NAVFAC personnel managing cultural resource contracts for NAVFAC Southwest and NAVFAC Atlantic. Ms. Wright has supported historic built environment studies, prepared interpretive programs and displays, and prepared portions of National Register of Historic Places district nominations in southern California.

Ms. Wright has considerable experience with the applications of the NHPA and with cultural resource requirements of CEQA and with CEQA Plus. Through her federal service, she is also familiar with the requirements of various Executive Orders guiding archaeological and historic resource studies. Ms. Wright has also worked with BLM, City and County of Riverside, California State Parks, Caltrans, Bureau of Indian Affairs (BIA), U.S. Forest Service (USFS), Bureau of Reclamation, Corps, Imperial Irrigation District (IID), Coachella Valley Water District, the City and County of San Diego, and Caltrans.

Education

Bachelor of Science, Anthropology, University of California, Riverside, 1998

Registrations/ Certifications

Field Director, Bureau of Land Management Statewide Cultural Resource Use Permit (California), permit #CA-18-35

Selected Project Experience

Olive Park Telecom Site (2019 - 2019). Cultural Resources Specialist for the preparation of a technical report for a telecommunications site in Spring Valley. Prepared portions of the monitoring report summarizing activities and results. Work performed for the County of San Diego.

Shell Station - 490 PCH - Initial Study/ Mitigated Negative Declaration (2018 - 2018). Cultural Resources Specialist for cultural resources survey addressing CEQA requirements for the construction of a 2,438-square foot food mart with a gas station in Seal Beach. Prepared historic background section, including summarizing a review of historic aerial photographs and maps. Work performed for A&S Engineering.

3Roots San Diego EIR (2018 - 2018). Cultural Resource Specialist for budget tracking for a survey in the City of San Diego. Gathered data on hours spent to ensure sufficient funding was available to conduct mitigation studies.

Marisol Specific Plan Initiative (2018 - 2018). Cultural Resources Specialist for preparing the cultural resources section of an EIR prepared to support the development of a hotel and resort property along the coast in Del Mar. The project falls within the boundaries of one of the last intact prehistoric coastal adaptation sites in southern California and is archaeologically very sensitive. Prepared mitigation measures to be implemented prior to ground breaking and once construction commences. Work performed for the City of Del Mar.

Oceanside Water Utilities Dept On-Call Environmental Consulting Services, 2017-2022 (2018 - 2019). Cultural Resource Specialist for the preparation of technical studies for archaeological and historic built environment issues in the city of Oceanside. Prepared numerous technical reports and proposals to ensure the City remains in compliance with the cultural resources requirements of CEQA and NEPA.

Sycamore-Watson Residential Project (2018 - 2018). Archaeological Peer Reviewer for a cultural resources survey technical report that summarized the cultural resources work performed by a consultant on a 7-acre development property. The project area is sensitive for cultural and Tribal cultural resources. Provided critical feedback on the methods utilized and the recommendations provided in the report. Work performed for the City of Vista.

Sprouts Cultural Report Project (2018 - 2018). Cultural Resource Specialist for the preparation of an ARMR-format technical report to summarize a cultural resources survey for the proposed Sprouts store in Vista; work was performed under Section 106 of the NHPA. A historic-era irrigation ditch was identified during survey and was evaluated as significant for project management purposes. Work performed for the City of Vista.

S. Santa Fe Heights Project (PC14-310) (2019). Cultural Resources Specialist for an archaeological survey for a proposed residential development on South Santa Fe Avenue in Vista. Prepared technical report for submission to the City of Vista.

Olive Avenue 15-Lot TSM/ANX Project (P17-0388) (2019). Cultural Resources Specialist for an archaeological survey on Olive Avenue in Vista. Prepared technical report and coordinated with subconsultant architectural historian to provide the City of Vista with site documentation for a residential property located within the project area.

Cedar Road Townhomes Project/P19-0255 (2020). Peer Reviewer for a private development project in Vista. Provided written technical feedback regarding a cultural

resources survey report prepared by another firm. Work conducted for the City of Vista

Apple Valley Airport Detention Basin IS/MND (2018 - 2018). Assistant Project Manager for coordination with the San Manuel Band of Mission Indians, which provided Native American monitoring services during an archaeological survey of the Apple Valley Airport. Work performed for the Apple Valley Airport Authority.

Sweetwater Vistas Technical Reports (2018 - 2018). Cultural Resources Specialist for preparation of a detailed historic context for the project, which is situated in a culturally sensitive portion of eastern San Diego County. Prepared a summary of prehistoric and historic human activities in the Sweetwater Valley from the Late Prehistoric period to the post-Mission era. Work performed under contract to Sweetwater Vistas, LLC under review by the U.S. Army Corps of Engineers.

Cactus II Feeder Transmission Pipeline IS/MND (2018 - 2018). Cultural Resource Specialist for a 4.5-acre survey in Moreno Valley for the proposed installation of a sewer line and associated facilities. Coordinated Native American monitoring, completed survey, and prepared a negative survey report. The project area is sensitive for cultural resources but the ground surface was obscured by grass. Recommended archaeological and Native American monitoring once construction commences. Work performed for Eastern Municipal Water District.

De Anza Sewer Force Main Project (Bio and Cultural Resources) (2018 - 2018). Cultural Resources Specialist for coordinating the services of a subcontractor to perform archaeological and paleontological monitoring services for Eastern Municipal Water District. Worked with subconsultant to ensure adequate staffing of the project during construction. Work performed for Eastern Municipal Water District.

DALE 2199C PRESSURE ZONE LOOPING PIPELINE PROJECT (2019). Cultural Resources Specialist for the preparation of a ARMR-format technical report to summarize a CEQA-compliant archaeological survey in Riverside County. Completed online research regarding historic land use of the property, prepared letters of consultation for Native American representatives traditionally affiliated with the project site, and prepared the technical report. The results of the survey were negative but based upon the cultural sensitivity of the project area, recommended monitoring be performed during site development.

Escondido Brine Line Project (2019 - 2019). Cultural Resources Specialist for proposal preparation and budget tracking. Tracked expenditures to ensure the project did not exceed the contract amount. Work performed for the City of Escondido.

La Ventana Project (2018 - 2018). As Cultural Resources Specialist, prepared an archaeological monitoring plan for the development of a residential property. Summarized previous studies of the property and an agreement between the developer and the Pechanga Band of Luiseno Indians ensuring monitoring is complete in compliance with their recommendations. Prepared guidance for monitoring, survey, surface collection, the relocation of bedrock milling features on the property into open space, and the installation of fencing. The monitoring plan will be reviewed by Pechanga prior to submission to the developer and the County of Riverside. Work was performed in compliance with CEQA and Section 106 of the NHPA.

Seraphina Project (2017 - 2018). Cultural Resources Specialist for a technical report to summarize the results of a 40-acre survey adjacent to Santa Gertrudis Creek in Temecula. Two pipelines associated with the historically significant First San Diego Aqueduct are situated within the project area and will be capped during project construction. Prepared site forms for the pipes and a historic road alignment, which are located within the study area. Prepared a State Historic Preservation Officer (SHPO) consultation letter for the U.S. Army Corps of Engineers. Work was performed in compliance with Section 106 of the NHPA. Work performed for Hillcrest Homes.

964 Urania Avenue (2018 - 2018). Cultural Resources Specialist for monitoring of grading on a small residential property in Encinitas prior to site development. Performed monitoring of heavy equipment, the results of which were negative. Work performed for Hallmark Communities.

Oceanpointe Cultural Resources (2019). Cultural Resources Specialist for a 36-acre survey along the south side of Mission Avenue in Oceanside. The project will entail the development of residences just southwest of Mission San Luis Rey, an area known to be culturally, historically, and archaeologically sensitive. One previously recorded site and three previously recorded isolates were reidentified during survey and their documentation updated. One newly identified site was documented and significance evaluation completed. Prepared the technical report, completed background archival research, and prepared recommendations for additional archaeological study of the property prior to site development.

Downtown Riverside Metrolink Station Track & Platform Project (2020). Cultural Resource Specialist for preparation of a technical report to summarize the archaeological survey of the proposed location of a new train depot in Riverside. Conducted background research, summarized survey results, and provided recommendations for additional cultural resource studies required for project compliance with NEPA. Work performed for HNTB under contract to the Federal Transit Authority.

Orchard Wood Sewer Replacement Project (2018 - 2018). Cultural Resource Specialist for preparation of a technical report to summarize the results of a survey of an existing sewer line in Encinitas. The technical report summarized status of knowledge information, methods and results of the study, and provided recommendations for additional work. The area is sensitive for prehistoric archaeological resources and recommendations for archaeological and Native American monitoring during ground disturbances were made. Work performed as a subconsultant to Infrastructure Engineering Corporation, with the City of Encinitas as the lead agency.

Bouquet Canyon Road Project (2018 - 2018). Project Manager for an intensive pedestrian survey of a residential property in Benedict Canyon. Coordinated with Tribal monitors and archaeological crew to complete the survey and prepared technical report, including a historic context for the cities of Los Angeles, Beverly Hills, and West Hollywood. Work performed for 9712 Oak Pass Road, LLC.

461 Harbor Project (2018 - 2018). Cultural Resources Specialist for archival review of a rail line that bisects 5.55 acres of vacant lands located at 461 Harbor Blvd. in La Habra between Cypress Avenue and S. Harbor Blvd. Identified the rail alignment and worked with historic aerial photos and topographic maps to determine the potential age of extant historic buildings on the property. Work performed for KB Home.

City of San Diego Alvarado Trunk Sewer Phase IV Design (2018 - 2018). Cultural Resources Specialist for the preparation of a technical report to summarize an archaeological survey along Alvarado Creek within the City of San Diego. Worked with Field Director to ensure the areas that were subjected to survey were captured in the report. Prepared a summary of background research, NAHC consultation, a records search from the South Coastal Information Center. Work performed for the City of San Diego.

San Elijo Joint Powers Authority Roadway and Trail Addendum and Permitting (2018 - 2018). Cultural Resources Specialist for roadway and shared-use trail crossing improvements within Manchester Avenue along the frontage of Manchester Avenue in Cardiff. Prepared background section including historic context information. Work performed for Kimley-Horn.

Padre Dam Municipal Water District East County Advanced Water Purification Program Year 2 (2018 - 2018). Cultural Resources Specialist for preparation of a technical report to summarize the background research and survey completed for the replacement of water lines from the western portion of Santee to Lakeside, CA. The project bisects numerous historical areas in the region, including historic ranches, prehistoric and historical archaeological sites, and the San Diego Aqueduct Flume. Prepared recommendations for mitigation measures to be implemented once construction begins. Work performed for the City of San Diego.

Rosamond Community Services District Wetland Conceptual Design Services Environmental Surveys and Documentation (2018 - 2019). Cultural Resources Specialist for survey of a 32-acre property proposed for the construction of evaporation ponds along the western boundary of Edwards Air Force Base. Coordinated with field crew and Native American monitors. Two previously recorded sites were subjected to testing and determined to be not eligible for the NRHP or CRHR. Prepared the technical report and technical memos to summarize the work for AB 52 consultation by the Rosamond Community Services District. Work performed for Kennedy Jenks under review by the U.S. Army Corps of Engineers.

Newage Carlsbad Luxury Resort Technical Studies (2018 - 2018). Cultural Resources Specialist for preparing a prehistoric context for the site of a future hotel on the west site of Batiquitos Lagoon in south Carlsbad. Reviewed historic archaeological reports and geological data to summarize the Native American land use history of the property, to summarize prior archaeological work performed in the region, and to add to the assessment of the cultural sensitivity of the property prior to construction.

Salt Bay Design District Specific Plan EIR (2020 -). Cultural Resource Specialist for a proposed mixed-use development within the Salt Bay Design District in Chula Vista. Prepared an updated technical report incorporating City of San Diego recommended revisions to the original report.

Buena Vista Apartments Project-Cultural Resources Services (Monitoring) (2018 - 2018). Cultural Resource Specialist for preparing a consultation letter for the State Historic Preservation Officer to comply with Section 106 of the NHPA.

Wildomar Crossings Retail Development Project (2018 - 2018). Cultural Resources Specialist for preparing an ARMR-format technical report under Section 106 of the NHPA. Reviewed CEQA report and reformatted the contents of the document into an appropriate format. Work performed for Mann Property Company under review by the Army Corps of Engineers.

Cultural Resources Monitoring and Site Surface Collection for MILCON P-970 Ammunition Supply Point Upgrade at MCB Pendleton (2019). Cultural Resources Specialist for the preparation of an interim monitoring report to summarize archaeological surface collection and monitoring for the development of an ammunition supply depot at Marine Corps Base Camp Pendleton. Work performed for NAVFAC Southwest.

Escondido Country Club (2018 - 2018). Senior Archaeologist for coordination with an architectural historian subcontractor to provide a proposal to evaluate extant structures at the former Escondido County Club.

CEQA/NEPA Support for Ontario International Airport (2019 - 2019). Cultural Resource Specialist for archaeological survey for the expansion of the Ontario International Airport. Prepared portions of technical report, including historic background section, and coordinated Native American monitoring for the survey. Work performed for the Ontario International Airport Authority.

Otay Reservoir Biological Survey and Report and Cultural Resources Report Review (2018 - 2018). Cultural Resources Specialist for peer review of a consultant's 1996 technical report regarding archaeological studies for the Reservoir-Rancho Jamul 0.50-MG project. Summarized the studies as performed and provided recommendations for additional studies of the property to meet CEQA compliance requirements. Prepared a proposal to complete archaeological studies prior to site development. Work performed for Otay Water District.

Palomar Community College District Maintenance and Operations Facility Cultural Resources Monitoring (2018 - 2018). Cultural Resource Specialist for archaeological monitoring during excavation of a detention basin on the Palomar College campus in San Marcos. Coordinated with a Native American monitor to observe mechanical excavation into undocumented fill with the potential to hold cultural resources. The results of monitoring were negative. Prepared detailed notes for submission to Palomar Community College District. Work performed for Palomar Community College.

Murrieta Hot Springs Road Improvements Project (2020 -). As Cultural Resource Specialist, updated a cultural resources survey report for a proposed residential development located in Murietta, CA. The results of the survey were negative. Work performed for SB&O under review by the City of Murietta.

City of San Diego As-Needed Permitting Assistance for O & M Activities and Emergencies, July 2017 - June 2018 (2018 - 2018). Cultural Resources Specialist for preparation of a technical report to summarize pedestrian survey performed along the San Diego River. Summarized background research and the results of the survey. Work performed for the City of San Diego.

CONFIDENTIAL Cottonwood Sand Mine Environmental Impact Report (2018 - 2019). Cultural Resources Specialist for Native American consultation pertaining to Tribal sensitivity of a proposed sand mine in San Diego. Worked with Viejas, Barona, Kwaaymii Laguna Band of Mission Indians, Ewiiaapaayp Band of Kumeyaay Indians, and the Kumeyaay Cultural Repatriation Committee to identify Traditional Cultural

Resources within the study area. Coordinated a historic built environment study for the project with a subconsultant. Work performed for Enviromine, Inc.

The Commons at Hidden Springs (2019). Cultural Resources Specialist for a 15-acre archaeological survey in Wildomar, Riverside County, CA. Coordinated with Field Director to prepare a technical report summarizing the background, methods, and results of the study, which were negative.

P-586 Missile Assembly Building - San Nicolas Island (2020 - ongoing). Project Manager for archaeological studies performed to support the development of a missile assembly bunker at San Nicolas Island. Coordinated with client and Navy personnel, prepared work plan, met with Tribal monitors, and oversaw project schedule and expenditures. Work performed for Soltek Pacific under contract to NAVAIR.

Verizon Quail Run (2017 - 2018). Cultural Resources Specialist for the development of a cellular site along Central Avenue in Riverside. Coordinated archaeological monitoring with the construction crews and Native American monitoring with Tribal representatives. Work performed for Verizon.

Verizon Bassmore Arch Monitoring (2018 - 2018). Cultural Resources Specialist for archaeological monitoring of a cellular tower site along Central Avenue in Riverside. Coordinated with Tribal monitor and construction crew to ensure monitors were present during ground disturbances.

TCI-54 **Oaks Senior Living Community Peer Reviews** (2019 - 2019). Cultural Resources Specialist for the preparation of a peer review summary of a technical study performed by GANDA for a property in Marin County. Reviewed the technical report and recommendations and provided written feedback on alternative approaches for the study.

La Salina Sewer Lift Station Design and Wastewater Treatment Plant Decommissioning (2018 - 2019). Cultural Resources Specialist for the preparation of a cultural resources survey and assessment report for the project, which is located along the coast in central Oceanside. Worked with a qualified historian, who prepared a historic context and evaluation of the ca. 1947 La Salina Wastewater Treatment Plant. Summarized the prehistoric and historical archaeological sites that may be impacted by project development. Work performed for Tetra Tech, Inc., with the City of Oceanside as the lead agency.

EMWD Quail Valley III Regional Water Tank Environmental Consulting (2020). Cultural Resource Specialist for the construction of a new water tank and associated piping and facilities in Riverside County. Prepared the technical report to summarize

a records search, Native American outreach, archaeological survey, and research into the historic land uses of the project lands. Work performed for ...

Previous Project Experience

Malibu Creek Regional Park Interpretive Displays (2015 – 2016). Project Archaeologist for preparation of a historic context to summarize the prehistoric and historic uses of the area surrounding Malibu Creek in the Santa Monica Mountains. Prepared text for on-site interpretive signs to be placed within the park to educate the public on historic uses of the area. Work performed for the Salvation Army.

Historical Resources Evaluation of the Palmdale Ditch (2008). Report Editor for the review and revision of a technical report summarizing a cultural resources survey and evaluation of a historic water feature in the Antelope Valley. Work performed for Metropolitan Water District of Southern California.

Archaeological Site Signing at San Clemente Island (2007). Archaeologist for installation of new protective signs at the Eel Point site. Prepared a scope of work to install more than 700 additional signs for sites located near roadways and in areas with a high level of access to military personnel. Prepared brochures to be provided to military personnel to inform them on the SCLI cultural resources program. Work performed for Navy Region Southwest.

PSEP L1004 Archaeological High-Level Review, (2017 - 2017).Senior Archaeologist for preparation of a literature review and sensitivity analysis for a proposed pipeline replacement project. Worked with SoCalGas personnel to obtain records search information. Prepared a sensitivity analysis to identify the potential for the unanticipated discovery of archaeological or historical sites during project development. Provided recommendations for compliance with CEQA and NEPA. Produced a second set of recommendations pertaining to a number of taps to be installed in the project. The results were negative. Work performed for Southern California Gas Company

Archaeological Monitoring for the Widening of 32151 Del Obispo (2017 - 2017).Archaeologist for preparation of a scope of work and cost estimate to perform five days of archaeological monitoring during trenching and potholing within a known archaeological district in San Juan Capistrano. Work performed for Southern California Gas Company

Archaeological Survey for the Repair of Line 235 (2017 - 2017) –Archaeologist for the preparation of a scope of work, cost estimate, and Fieldwork Authorization Request (FAR) for a survey on Bureau of Land Management (BLM) lands administered by the BLM's Needles Field Office. Survey was conducted to support repair or replacement of 34-inch diameter pipeline that has succumbed to various forms of degradation since its installation in the late 1950's. Work performed for Southern California Gas Company

Archaeological Monitoring for Southern California Gas Line 85 Pipeline Right of Way (2017 - 2017). Archaeologist for the preparation of a Fieldwork Authorization Request (FAR) for submission to the Bureau of Land Management (BLM). Prepared draft technical report to summarize the results of monitoring. Prepared a DPR form for a single isolated artifact identified during construction. Work performed for Southern California Gas Company

PSEP L1005 Archaeological High-Level Review (2017 - 2017). Senior Archaeologist for the preparation of a literature review and sensitivity analysis for a proposed pipeline replacement project. Worked with SoCalGas personnel to obtain records search information. Prepared a sensitivity analysis to identify the potential for the unanticipated discovery of archaeological or historical Work performed for Southern California Gas Company

Archaeological Survey for the Line 6916 Sunnyslope Relocation Potholing (2017 - 2017). Co-Project Manager for coordinating an archaeological survey along a gas line near Twentynine Palms, CA. Work performed for Southern California Gas Company

Archaeological Monitoring for Line 6916 (2017 - 2017). Project Manager for coordination with a subcontractor to provide a qualified archaeological monitor during the excavation of an existing natural gas line on BLM lands near Needles. An isolated artifact was recorded in proximity to the gas line and so monitoring was required. No additional artifacts or cultural resources were identified during construction. Work performed for Southern California Gas Company

Cuyama Photovoltaic (PV) Monitoring (2017 - 2017). Project Manager for archaeological and Native American monitoring, noise, air quality, and Best Management Practices work for the development of a PV project in Santa Barbara County. Coordinated with First Solar staff to provide qualified monitoring personnel to observe construction and to monitor air quality and noise levels during construction. Provided weekly updates to First Solar on the progress of monitoring and nesting bird surveys. Work performed for First Solar

Pallowalla High-Level Environmental Review and Cultural Resources Survey (2017 - 2017). Senior Archaeologist for a high-level review of cultural resources information for a 2.5-acre project located in open desert adjacent to a residential development in Blythe. Prepared recommendations for cultural resource studies of the property. Managed an intensive pedestrian survey of the project. Prepared technical report to summarize the negative results of the survey. Work performed for Southern California Gas Company

Sunroad Otay Plaza CEQA Clearance Study (2017 – 2017). Project Manager for an archaeological survey, noise study, and air quality study to support the development of a new commercial complex. The results of an archaeological records search for the property identified the project as being situated within the boundaries of a previously recorded, 700-acre prehistoric lithic quarrying site. Prepared a technical memo to summarize the results of the archaeological study and coordinated

with City of San Diego staff to ensure the construction phase of work was not delayed by archaeological finds. Responded to Native American inquiries into the project. Work performed for KLR Planning

Cultural Resource Reviews for the SoCalGas PSEP Project (2016 - 2017). Senior Archaeologist for the preparation of summaries of existing cultural resource information for numerous SoCalGas undertakings in Central California. Coordinated with SoCalGas adjunct staff to obtain records searches of information provided by the California Historical Resources Information System (CHRIS) information centers in Fullerton, Bakersfield, and Santa Barbara counties. Reviewed historic topographic maps and aerial photos to determine the historic land use of the project properties. Prepared high-level reviews and detailed environmental reviews for pipeline maintenance, replacement, and abandonment projects throughout the region. Provided recommendations for additional work required to implement the PSEP program. Work performed for Southern California Gas Company

Environmental Monitoring for Valves 18 and 18a (2017 2017). Co-Project Manager for coordinating the work of a qualified biologist during monitoring of construction for the replacement of two gas valves. Worked with the subcontractor to ensure a preconstruction survey was completed within a week of the commencement of construction. Reviewed daily field notes during monitoring and reviewed and edited the preconstruction survey reports. Work performed for Southern California Gas Company

On-Call Environmental Studies for Southern California Gas Company (2017 - 2017)– Project Manager for cultural resource services under this on-call contract. Worked with SoCalGas personnel to propose upon, staff, and complete various technical studies including records searches, surveys, Native American monitoring, archaeological monitoring, and site significance evaluations throughout SoCalGas's jurisdiction. Coordinated with subcontractors to provide qualified cultural resources personnel. Coordinated with federal agencies to obtain permitting to perform the studies. Prepared and reviewed technical reports. Provided labor estimates for upcoming projects. Tracked use of subcontractors to ensure adequate use of Disadvantaged Business Enterprises. Work performed for Southern California Gas Company

Line 3000 Cultural Resource Surveys and Monitoring (2016 - 2017). Project Manager for coordinating with a qualified subcontractor to perform archaeological surveys and monitoring for safety related conditions on natural gas lines located south of National Trails Highway in Needles, CA. Prepared scope and cost and negotiated the Request for Contractor Service (RFCS). Monitoring was performed on an as-needed basis during construction and required immediate responses to requests for service. The work was performed under a Fieldwork Authorization by the Needles BLM. Reviewed technical report prior to submittal to SoCalGas Project Manager. Work performed for Southern California Gas Company

Archaeological Testing at the SoCalGas Goleta Facility (2016 - 2017). Project Manager for preparation of a proposal to complete archaeological testing within the

boundaries of a known prehistoric habitation site located within the SoCalGas facility located along Goleta Slough, Santa Barbara County. Prepared mapping of shovel test pit (STP) locations for approval by the County prior to the commencement of testing. Coordinated the exact placement of excavation locations with the field director. Coordinated site access and project work with the SoCalGas archaeologists and environmental personnel. Reviewed technical report prior to submission. Work performed for Southern California Gas Company

Archaeological Studies at the Sanchez Adobe (2016 - 2017). Project Manager for archaeological monitoring during the replacement of a waterline within a National Register of Historic Places (NRHP-) listed historic district in San Mateo County. The five-acre property includes archaeological remains attributable to every major habitation period in California, from the prehistoric through WWII. Coordinated with San Mateo County to provide Ground Penetrating Radar (GPR) studies to determine if intact subsurface cultural deposits are present within the site boundaries; edited resulting GPR report and utilized the results to prepare a proposal for performing an Extended Phase I testing program within the boundaries of an area slated for the construction of an interpretive center. Coordinated the preservation in place of human remains discovered during testing through placement of a cap with Park personnel, the construction contractor, and Native American representatives. Work performed for San Mateo County Parks Department.

Class III Archaeological Survey of BLM Lands for the Upgrade and Maintenance of Southern California Gas Pipeline Line 3000 (2016 - 2017). Project Managerfor the completion of a 1,127-acre survey along an existing natural gas line situated along Kelbaker Road in the Mojave Desert. The work was performed for compliance with the FLPMA and Section 106 of the NHPA. Prepared and submitted a Fieldwork Authorization Request to the Bureau of Land Management (BLM) to conduct fieldwork. Obtained a records search from SoCalGas. Coordinated with field staff to complete the survey along 62 miles of the pipeline. Coordinated with BLM to obtain additional project information, a Fieldwork Authorization, and to prepare appropriate recommendations for the evaluation and mitigation of project sites. Prepared portions of historic context. More than 70 resources were identified and recorded. Eligibility evaluations were provided based upon surface components of the site. Two separate ARMR-format reports were prepared for BLM review. Work performed for Southern California Gas Company

Naval Weapons Station Seal Beach Integrated Cultural Resources Management Plan (ICRMP) Update (2017 – 2017)**.** Project Coordinator to prepare and negotiate a budget for updating the NWS Seal Beach, Detachment Fallbrook and Detachment Corona ICRMPs. Attended the project kickoff meeting with technical staff and management staff from the Prime to determine the distribution of work between the firms. Reviewed draft ICRMP sections. Coordinated the transfer of data and deliverables between Rincon and the Prime. Work performed for Ultrasystems Environmental under contract with NAVFAC SW

Cuyama Solar Development (2016 - 2016). Task Manager for archaeological and Native American monitoring effort during ground disturbances related to the

development of a solar field and gen-tie line in Cuyama. Coordinated with the client and monitors to ensure appropriate archaeological and Tribal coverage during site development. Attended weekly coordination meetings and worked closely with the Project Manager to provide data to First Solar in a timely manner. Prepared a brief technical report to summarize the background, methods utilized during fieldwork, and the results of the study, which were negative. *Work performed for Fist Solar.*

Scarlet Solar Archaeological Survey (2016 - 2016). Task Manager for preparation of a records search request and request to the Native American Heritage Commission to conduct a search of the California Sacred Lands File (SLF). Coordinated fieldwork with Field Director and the client to ensure access to the study area was granted. Conducted informal Native American consultation to determine the Tribal sensitivity of the 4,000+-acre project property. Work performed for Recurrent Energy

Work Plan for the Orcutt Specific Plan Area Archaeological Testing Project (2016 - 2017). Senior Archaeologist for drafting the testing plan for a small lithic scatter located at the confluence of three streams in San Luis Obispo County. Work plan included the methods for testing the site with shovel test pits (STPs) and test excavation units (TEUs) to determine the CRHR eligibility of the site. Work performed for Ambient Communities, LLC.

Archaeological Technician Support for the Development of Sewage Settling Ponds along Lake Rosamond (2016 - 2016). Project Manager for working with the installation's on-call contractor to provide adequate, qualified field surveyors to complete a pedestrian inventory of a large area along Rosamond Lake on the western side of the base. Coordinated with field crew and base staff to complete the survey. Prepared site forms and other field documentation for more than 80 prehistoric and historic sites located near Challenger Road. For the most part, the sites are attributable to the Western Pluvial Lakes Tradition and to the historic period occupation of EAFB. Work performed for JT3.

Braverman Drive Residential Development Site Mitigation and Salvage (2016 - 2016). Archaeologist for the salvage of late prehistoric cremations and associated burial goods after the completion of data recovery mitigation of a prehistoric site along the San Diego River in Santee, San Diego County. Screened soil and collected diagnostic and unique artifacts and human remains for repatriation with the Kumeyaay Indians. Reviewed portions of the technical report. Work performed for KB Home.

Line 33-37 Archaeological Monitoring, Santa Monica Mountains Recreation Area (2016 - 2016). Task Manager for working with Southern California Gas to provide archaeological and Native American monitors for the replacement of a gas line on National Park Service (NPS) lands. Coordinated the revision of an existing ARPA permit for the project to include monitoring. Worked with NPS and SoCalGas to obtain timely approval of the permit. Work performed for Southern California Gas Company

Block 81 (Park and Market) Archaeological Testing and Monitoring (2016 - 2016). Project Manager for preparation of a proposal with an associated archaeological testing plan for a large commercial block in downtown San Diego (Block 81) where known historic sites were documented in 2002. Worked with subcontractor to obtain a bid for providing paleontological monitors during construction. Work performed for Holland Partners Group

Richmar Park Archaeological Monitoring (2016 - 2016). Project Manager for a contract with the City of San Marcos staff to provide archaeological monitoring for the development of a park on Richmar Ave. The project was performed for CEQA and HUD NHPA compliance. No sites were identified. *Work performed for* Schmidt Design

Archaeological Testing for the 6th Avenue Suites Project (2016 - 2016). Senior Archaeologist for monitoring of mechanical trenching to test a previously developed property for subsurface archaeological deposits. Monitored geotechnical testing and boring being performed by the project geologist. No sites were identified. Coordinated with City of San Diego personnel to provide paleontological monitors during deeper excavations on the property. Prepared technical report. Work performed for the Narven Partners.

Frazier Park to Pine Mountain Telecommunications Cable Project– (2015 – 2015). Senior Archaeologist for preparation of a permit application for an ARPA permit to complete replacement of telecommunication lines within the Angeles National Forest (ANF). Worked with ANF archaeologists to obtain permitting. Work performed for Plains All American Pipeline, LLC

Archaeological Monitoring for 220 West Gutierrez Street (2015 - 2015). Senior Archaeologist for preparation of a technical report summarizing monitoring and the discovery of two historic trash deposits on the property at 220 W. Gutierrez in Santa Barbara. Prepared technical report and site form for the discovery. Work performed for Paladin Law Group, LLC

Walker Pass Archaeological Survey (2015 - 2015). Senior Archaeologist for a survey and preparation of site documentation, a historic context for the town of Neenach, and portions of an archeological survey report for compliance with CEQA prior to the development of a 1,200-acre solar field in the Antelope Valley. Work performed for Recurrent Energy

Garland Solar Archaeological Monitoring Project (2015 - 2016). Senior Archaeologist for coordinationwith monitoring staff to ensure adequate archaeological and Native American monitors were present during project development. Tracked monitoring hours and expenses for the client. Prepared monthly summary reports to describe the month's construction monitoring activities as required by the project MMRP. Project Coordinator/Technical Writer. Work performed for Recurrent Energy

Malibu Creek Regional Park Interpretive Displays (2015 – 2016). Project Archaeologist for preparation of a historic context to summarize the prehistoric and

historic uses of the area surrounding Malibu Creek in the Santa Monica Mountains. Prepared text for on-site interpretive signs to be placed within the park to educate the public on historic uses of the area. Work performed for the Salvation Army.

Environmental Assessment/Overseas Environmental Assessment (EA/OEA) for the Fiber Optic Communications Underwater System (FOCUS) Replacement (2014 - 2015). Technical Editor for review of the draft EA/OEA being prepared by the Department of the Navy for the replacement of submarine communications lines running from Naval Base Ventura County, Point Mugu to Santa Cruz and San Nicolas islands, offshore from the California mainland. Ensured Government comments to the draft document were properly incorporated. Provided input on the archaeological studies to be accomplished before project implementation. Work performed for Naval Air Systems Command (NAVAIR).

Update and Evaluation of 31 Sites at Airport Lake (2014 - 2014). Senior Archaeologist for preparation of prepared site forms and background information for the preparation of a technical report to summarize a testing and evaluation program at NAWS China Lake. Work performed for Naval Air Systems Command (NAVAIR).

Target Buffer Survey (2014 - 2014). Senior Archaeologist for preparation of previous research section for a technical report summarizing the results of an intensive pedestrian survey on the North Range of NAWS China Lake. Identified previous studies conducted within the current study area and summarized their results. Prepared summaries of site information for more than 50 sites identified within the project APE. Work performed for Naval Air Systems Command (NAVAIR).

Bodie Hills Archaeological Surveys (2014 – 2014). Senior Archaeologist for the preparation of site forms and previous research sections for the technical report provided to the BLM summarizing a survey and evaluation effort on BLM lands in Inyo and Mono counties, California. Survey was conducted over the course of three years and resulted in the identification, documentation, and evaluation of more than 200 prehistoric and mining-related historic sites. Work performed for the BLM.

NAVFAC Southwest On-Call Cultural Resources Contract (2012 - 2017). Contract Manager for working with lead cultural resource specialists and NAVFAC cultural resources personnel to conduct the full range of archaeological and architectural history studies on Navy and Marine Corps installations throughout the American Southwest. Served as Quality Control Manager for project deliverables. Work performed for NAVFAC Southwest.

Edwards Air Force Base (EAFB) Additional 85 Sites Testing (2010 - 2010). Assistant Contract Manager for the preparation of a cost estimate and scope of work for submission to the Air Force. Edited portions of technical report. Negotiated the budgeted amount with base personnel. Work performed for the US Air Force.

Sunrise Powerlink Archaeological Monitoring Project (2009 – 2015). Assistant Contract Manager for coordination with San Diego Gas & Electric Company (SDG&E)

to staff, permit, and manage archaeological monitoring of the construction of a major transmission corridor from Imperial County to the San Diego coastline. Worked with BLM to obtain FLPMA permitting for temporary field crews and coordinated project scheduling. Work performed for SDG&E.

San Diego Gas & Electric Monitoring at 749 Ora Avo Road (2008 - 2008). Archaeologist for mergency monitoring of the replacement of a power pole in Vista. Coordinated work with SDG&E project managers and construction foreman, conducted archaeological monitoring of pole replacement, and prepared technical report to summarize the results of the project. Work performed for SDG&E.

La Pozz Cement Survey (2008 - 2009). Project Coordinator for ensuring completion of technical aspects of work. Edited archaeological report and managed report production. Work performed for Enviroscientists.

SHPO Consultation for the JIEDDO Construction Project (2007 - 2007). As Natural Resources Specialist, assisted with the preparation of a SHPO consultation package for Section 106 compliance on a large-scale trenching project for the installation of a fiber optic network. Prepared a written review of previous cultural resources work that had taken place within the project, identified sites that were impacted by trenching, and made recommendations for treatment and/or mitigation of 29 NRHP-eligible sites. Reviewed a contractor's damage assessment report and provided comments. Conducted site visits to identify sites damaged by trenching. Work performed for NAVFAC Southwest.

Historical Resources Evaluation of the Palmdale Ditch (2008 - 2008). Report Editor for the review and revision of a technical report summarizing a cultural resources survey and evaluation of a historic water feature in the Antelope Valley. Work performed for Metropolitan Water District of Southern California.

Determination of Effect for Ranges at San Clemente Island (2007 - 2007). Natural Resource Specialist for the preparation of a written determination of effects (DOE) from the construction of berms within a rifle range on the Island. Conducted site visits to identify impacts to a NRHP-eligible site. Prepared background information on the project and coordinated with the Officer-In-Charge to determine any plans for future work in the area. The DOE report was submitted to the SHPO for concurrence. Work performed for Navy Region Southwest.

Archaeological Site Signing at San Clemente Island (2007 - 2007). Archaeologist for installation of new protective signs at the Eel Point site. Prepared a scope of work to install more than 700 additional signs for sites located near roadways and in areas with a high level of access to military personnel. Prepared brochures to be provided to military personnel to inform them on the SCLI cultural resources program. Work performed for Navy Region Southwest.

Data Consolidation for Previous Work at San Clemente Island (2007 - 2007). Archaeologist for a review of previous documentation for studies conducted in the central portion of San Clemente Island. Prepared a scope of work and cost estimate

for consolidation of the data under a single cover. Work performed for Navy Region Southwest.

NALF San Clemente Island Programmatic Agreement (PA), (2007 - 2007). Archaeologist for the review of the cultural resources section of the Southern California Range Complex EIR and provided comments. Prepared an abbreviated history of work at the Island to include in a consultation package for submission to the SHPO to support Commander Navy Region Southwest's Programmatic Agreement for cultural resources at the Island. Consulted with the Commanding Officers of both Naval Base Coronado and NALF San Clemente Island, and Navy environmental personnel to facilitate the submission of the PA. Work performed for Navy Region Southwest.

MCAS Miramar Integrated Cultural Resources Management Plan (2007 - 2009). Technical Editor for a management planning document, which covers regulatory requirements and status of knowledge information for archaeological resources and historic built environment resources on the MCAS Miramar base in San Diego County. Work performed for NAVFAC SW.

MCAS Miramar Archaeological Study (2007 - 2009). Prepared work plan for the preparation of an Integrated Cultural Resources Management Plan (ICRMP) for this Marine Corps installation, located in central coastal San Diego County. Reviewed status of knowledge information related to the archaeology and history of the base. Worked with Base Archaeologist, Public Works Office, and environmental personnel to complete the ICRMP. Work performed for NAVFAC SW.

UCSD San Diego Consortium for Regenerative Medicine Archaeological Monitoring (2009 - 2009). Assistant Project Manager for coordinating work between the Prime Contractor and project personnel. Worked with project archaeologist to develop a strategy for conducting monitoring within the boundaries of a known archaeological site for the construction of a new research facility and associated parking structures. Work performed for the University of California, San Diego (UCSD).

EAFB Phase II and III Studies Along the West and Northwest Base Boundaries (2007 - 2009). Technical Editor to ensure study documentation was complete and correct. Edited technical report summarizing background information, study methods and results. Work performed for the US Army Corps of Engineers, Los Angeles District.

Archaeological Inventory of the Chicken Springs Project (2008 - 2009). Assistant Project Managerfor preparation of bid documents including written proposal and project budget. Coordinated work with offices in Cheyenne and Rock Springs, Wyoming. Edited technical report resulting from fieldwork. Work performed for the Wyoming BLM.

Historical Resources Evaluation of the Palmdale Ditch (2008 - 2008). Report Editor for the review of and revisions toa technical report for the survey and

evaluation of a historic water feature in the Antelope Valley. Work performed for the Metropolitan Water District of Southern California.

LaPozz Mining Archaeological Survey (2008 - 2008). Report co-author for the review of and revisions to a technical report providing recommendations for eleven sites prior to their disturbance by mining undertakings. Revised report to follow BLM requirements (ARMR report format) and reviewed site records and additional project documentation to ensure compliance with Section 106 of the NHPA. Work performed for the BLM.

Edwards Air Force Base Archaeological Survey and Evaluations (2008 - 2008). Report Editor for the review of cultural resources technical reports and revisions provided to Principal Investigators. Work performed for the US Army Corps of Engineers, Los Angeles District.

UCSD Gliderport Cultural Resources Assessment Project (2008 - 2008). As Report Editor, reviewed technical report resulting from an archival review of known sites within a proposed construction project area. Work performed for the University of California, San Diego (UCSD).

Naval Detachment Concord Archaeological Survey (2006 – 2008). Assistant Project Manager for coordination with Navy personnel and staff GIS administrator to prepare project area maps for use during survey and to conduct the records search. Edited final draft of technical report. Work performed for NAVFACSW

Carson Lake Geothermal Project (2007 – 2007). Report Editor for review of a technical report resulting from a 300-acre archaeological survey near Naval Air Station Fallon in Nevada. Reviewed technical report and provided recommendations for revisions to the content. Work performed for the Nevada BLM.

Felicita Park Archaeological Monitoring (2007 – 2007). Assistant Project Manager for archaeological monitoring during the removal of large signs at Felicita Park in Escondido. Prepared scope and budget and coordinated between Parks and Recreation staff and archaeological monitors. Work performed for County of San Diego Department of Parks and Recreation.

Black Mountain Park Project (2005 – 2007). Associate Archaeologist for preparation of a background study of the park and surrounding area based upon records search information from the South Coastal Information Center and the San Diego Museum of Man. Reviewed and summarized records search results to provide a historic context for the study area. Edited historic resources management plan for the mine complex. Work performed for the City of San Diego.

Power Line Reconstruction at Palomar Mountain, (2007 – 2008). Assistant Project Manager for consultation with SDG&E environmental managers to provide archaeological monitors during the replacement of power poles that were burned during the 2007 San Diego wildfires. Coordinated with SDG&E personnel, California State Parks archaeologists, and staff members to ensure adequate archaeological coverage during the ground disturbances resulting from this project. Provided

assistance with Section 106 compliance. Coordinated monitoring during clean-up of a diesel spill within Rancho Cuyamaca State Park. Work performed for San Diego Gas & Electric Company.

Integrated Cultural Resource Management Plan (ICRMP) for Navy Bae Ventura County (2006 – 2008). Associate Archaeologist for preparation of a draft ICRMP for base facilities including NAS Point Mugu, CBC Port Hueneme, Laguna Peak, Catalina Heights housing area, and the Camarillo Airport. Prepared an historic context for the base facilities, compiled data on cultural resource studies and building evaluations, heritage assets, historic landscapes, eligible properties, data gaps and sensitive areas requiring further study. Prepared data for and updated the inFADs database with heritage asset codes. Provided information on cultural resources management and procedures at the base including the project review system, the base's programmatic agreement, Native American consultation, NAGPRA compliance and cultural resource inventories and evaluations. Assisted with making recommendations for the base's five-year plan. Also compiled information on Standard Operating Procedures for base projects. Work performed for NAVFACSW.

Integrated Cultural Resource Management Plan for Navy Base Coronado (2006 – 2007). Associate Archaeologist for the preparation of a work plan for the ICRMP for base facilities including NAS North Island, Naval Amphibious Base Coronado, Imperial Beach Outlying Landing Field, SERE Training Facility, and the Mountain Warfare Training Facility in La Posta. Compiled an historic context for the base facilities, data on cultural resource studies and building evaluations, heritage assets, historic landscapes, eligible properties, data gaps and sensitive areas requiring further study. Provided information on cultural resources management and procedures at the base including the project review system, the base's programmatic agreement, Native American consultation, NAGPRA compliance and cultural resource inventories and evaluations. Assisted with making recommendations for the base's five-year plan. Also compiling information on Standard Operating Procedures for base projects. Work performed for NAVFACSW.

Integrated Cultural Resource Management Plan for the Barry M. Goldwater Range West (BMGR West)(2006 – 2008). Associate Archaeologist for preparation of a workplan to guide the completion of an ICRMP for the BMGR in Yuma, AZ. The ICRMP will include an historic and natural context, information on historic preservation studies and resources on the base, legal guidance, descriptions of standard operating procedures, future projects, GIS mapping, and recommendations for the treatment of historic properties on the installation. The INFADs data for the BMGR will also be updated in a format compatible with the government's data systems. Work performed for NAVFACSW.

San Diego Military Family Housing PPV Program, (2006 – 2006). Associate Archaeologist for preparation of a brochure template to provide information to the residents of NRHP-listed housing units in military family housing in San Diego County. Prepared a listing of architectural drawings for Quarters D located at NAS North Island to assist in the preparation of architectural documentation for this NRHP-listed property. Work performed for San Diego Military Family Housing

Archaeological Monitoring Plan for the Admiral Hartman Family Housing Project (2006 – 2006). Associate Archaeologist for preparation of an archaeological monitoring plan for the replacement of leaking natural gas lines at the Admiral Hartman Family Housing in Pacific Beach; this housing is situated within a well-known prehistoric and ethnohistoric Kumeyaay village site. Work performed for Clark Realty.

Amberwoods Archaeological Monitoring (2006 – 2006). Project Coordinator for attending the preconstruction meeting and coordinating with an on-site monitor. Conducted spot-checking of project site during the removal of large eucalyptus trees on the property. Work performed for California West Homes

Archaeological Monitoring for Construction of the New San Diego Federal Courthouse (2006 – 2006). Archaeological Monitor during excavation of the former site of the Hotel San Diego for underground parking facilities at the new federal courthouse located at Union and Broadway in downtown San Diego. Identified and documented one small deposit of historic bottles associated with a large footing that was removed for the project. Coordinated on site monitoring with client and qualified temporary field personnel. Work performed for Jacobs Engineering.

Preparation of Publications for the Journal of California and Great Basin Archaeology (2006 - 2006). Peer Reviewer for editing two technical reports prepared by CalFire for submission to the Journal of California and Great Basin Archaeology. One of the papers provides the basis for identifying and describing a qunique site type: Cuyamaca Oval basin metates (Hector et al. 2006). Work performed for CalFire.

Archaeological Survey for the Moapa Powerline, (2006 – 2006). Associate Archaeologist for a 8.5-mile survey along the base of the Mormon Mountains outside of Mesquite, Nevada. Identified a number of prehistoric isolated artifacts and historic sites within the project APE. Documented sites and coordinated with client. Work performed for Interconnect Towers, Inc.

Weinman Residence Monitoring (2006 – 2006). Project Manager for archaeological monitoring of a private residence located on Via Latina in San Diego. Directed updating of an existing records search at the South Coastal Information Center. Prepared required documentation for the City of San Diego Mitigation Monitoring Coordination and Land Development Review Department. Work performed for the City of San Diego.

Archaeological Survey of the El Camino Real Widening Project (2006 – 2006). Associate Archaeologist for an archaeological survey of a one-mile segment of El Camino Real between Chestnut Avenue and Tamarack Avenue in Carlsbad. Prepared technical report. Work performed for the City of Carlsbad.

Archaeological Survey of the Ridge Creek Project (2006 – 2006). Project Manager for an archaeological survey of a 40-acre agricultural property located along Live Oak Park Road in Fallbrook. Directed a preliminary evaluation of six buildings on

the property including photo-documentation and a search of County Assessor's records. Prepared a technical report for submission to the County of San Diego. Coordinated between County personnel and client. Work performed for Leising Builders

Archaeological Survey of the Redhawk Project (2006 - 2006). Associate Archaeologist for a records search of the project area at the Eastern Information Center and a technical report based upon field survey. Directed a paleontological study of the project and incorporated the results into a technical report. Work performed for HELIX Environmental Planning.

Survey of Pacific Highway and Barnett Avenue, (2006 – 2006). Associate Archaeologist for a records search from the South Coastal Information Center and preparation of a technical report based upon field survey by staff. Report identified constraints and opportunities from a number of historic features located within the project area. Work performed for BRG Consulting

Teri Delcamp, MA

Architectural Historian

HELIX Environmental Planning

Summary of Qualifications

Ms. Delcamp is a qualified historian/architectural historian who meets the Secretary of the Interior's standards for her profession. Ms. Delcamp has more than 20 years of professional experience in preparing history and architectural history studies in California. She has served as Principal Planner for the City of Carlsbad, Senior Planner (Historic Preservation) for the City of Riverside, Historic Preservation Manager for the City of San Juan Capistrano, Senior Planner for the cities of San Diego, Oceanside, and San Clemente. Ms. Delcamp's experience includes a wide range of study types, from the preparation of historic context studies to historic built environment evaluations.

Selected Project Experience

Coachella Canal Midline Storage Project, Niland, California (2021 - Present). Architectural Historian for the Mid-Canal Reservoir Storage Project, proposed as an inline reservoir on the Coachella Canal that will be formed by removing the existing embankment between the existing lined canal with the original earthen canal section to form a single wide trapezoidal section. Responsible for reviewing extant data on the historicity of the National Register of Historic Places (NRHP)-eligible Canal, surveying the project, and completing an impacts/effects analysis utilizing the data from the survey and the literature review. Work performed as a subconsultant to Harvey Consulting Group, with Coachella Valley Water District and Bureau of Reclamation as the lead agencies.

Previous Experience

Principal Planner, City of Carlsbad, Carlsbad CA (2015-2020). Manage the current planning and customer service sections supervising 11 employees, including senior planners, associate planners and planning technicians. Review the most complex development projects ranging across the full spectrum of land uses and entitlements. Make CEQA determinations for both sections; provide cultural resource CEQA significance determinations for section development projects and provide internal peer review of cultural resource studies. Conduct CEQA analyses including preparation of initial studies and mitigated negative declarations. Implement and administer a variety of local land use regulations including Tribal, Cultural & Paleontological Resources Guidelines; Local Coastal Program; Habitat Management Plan and Airport Land Use Compatibility Plan. Prepare and present reports to Commissions and Council. Respond to inquiries and meet with community members to provide information and discuss land use-related concerns.

Carlsbad Tribal, Cultural and Paleontological Resources Guidelines, Carlsbad, California (2015-2020). Senior Planner for the update to cultural resources guidelines

Education

Master of Arts, History, California State University San Marcos

Bachelor of Arts, Liberal Studies (History focus), California State University Long Beach

Professional Affiliations

American Planning Association

National Trust for Historic Preservation

California Preservation Foundation

Awards

Association of Environmental Professionals, Merit Award, Carlsbad Tribal, Cultural and Paleontological Resources Guidelines, 2018

American Institute of Architects San Diego Chapter, Divine Detail Award, Montanez Adobe, San Juan Capistrano, CA, 2010

for the City of Carlsbad. Oversaw consultant contract, oversaw tribal consultation, collaborated and edited draft and final document, and achieved City Council adoption. Work conducted for City of Carlsbad.

City of Carlsbad Cultural Resource CEQA Determinations for Development Projects, Carlsbad, California (2015-2020). Senior Planner for determining the need for cultural resources/historical reports for numerous projects including single family homes, historic theater, historic school campus buildings, churches, commercial and institutional sites. Work conducted for City of Carlsbad.

City of Carlsbad Tribal Consultation Projects, Carlsbad, California (2015-2020). Senior Planner for leading or assisting City colleagues conducting AB 52 and SB 18 tribal consultations for numerous development projects, General Plan Amendments and Specific Plan Amendments. Work conducted for City of Carlsbad.

Historic Preservation Senior Planner, City of Riverside, Riverside, CA (2011-2015). Manage and oversee day-to-day operation of historic preservation section within the Neighborhood Engagement Division. Detailed analysis and presentation of planning cases to decision-makers. Manage projects and consultant contracts for various surveys and CEQA documents. Acting Historic Preservation Officer for Administrative Certificates of Appropriateness. Prepare and secure grants and prepare progress reports and annual reports in conjunction with the Certified Local Government program. Write and review cultural resource reports submitted in support of designation, historical significance evaluations and/or in accordance with the California Environmental Quality Act. Supervise Associate Planner and Assistant Planner. Partner with community preservation organizations and other departments to achieve preservation goals. Provide customer service via public counter, telephone and email regarding land uses, development standards and historic preservation.

City of Riverside Consultant Contract Management, Riverside, California (2011-2015). Senior Planner focused on Historic Preservation in the City of Riverside. Prepared Requests for Proposals and managed professional consultant contracts for preparation of Environmental Impact Report and Mitigated Negative Declaration for historic resource demolition and area-wide Utility Department infrastructure improvements, respectively. Prepared Requests for Proposals and managed professional consultant contracts for preparation of historic surveys for grant funded work and Specific Plan updates. Work performed for the City of Riverside.

City of Riverside Historic Preservation Ambassador Training Program, Riverside, California (2011-2015). Prepared Request for Proposals and managed consultant for new training manual and workshop series to create cohort of community preservation leaders to assist city in preservation education and advocacy. Work performed for the City of Riverside.

Relocation of the Cooper House, Riverside, California (2011-2015). As Senior Planner, prepared a Cultural Resources Report and Evaluation of Impacts for the Cooper House in Riverside. Work performed for the City of Riverside.

4135 Market Street, Structure of Merit Designation, Riverside, California (21011-2015). Senior Planner for the preparation of a Historic Evaluation & DPR Form for a significant structure located at 4135 Market Street in Riverside.

Historic Evaluation & DPR Form Recordation for the James & Jessie Shaw Residence, Riverside, CA (2011-2015). Senior Planner for preparation of a historic evaluation and landmark designation for a private residence at 8410 Cleveland Avenue. Work performed for City of Riverside.

Historic Evaluation & DPR Form Recordation for the Frank and Katherine Wells-Patsy O'Toole House, Riverside, CA (2011-2015). Senior Planner for the preparation of a historic evaluation, DPR form and landmark designation for a private residence at 1945 Arroyo Drive. Work performed for the City of Riverside.

Historic Evaluation & DPR Form Recordation for the Mackey House, Riverside, CA (2011-2015). Senior Planner for the preparation of a historic evaluation, DPR form and landmark designation for a private residence at 6140 Tiburon Drive. Work performed for the City of Riverside.

Cultural Resources Report and Evaluation of Impacts, Demolition of 11134 and 11144 Pierce Street, Riverside, CA (2011-2015). Senior Planner for the preparation of a cultural resources report prior to the demolition of properties located at 11134 and 11144 Pierce Street. Work performed for the City of Riverside

Riverside Mid-Century Modern Building Survey Certified Local Government Grant, Riverside, CA (2011-2015). Grant writer and contract and project manager for a survey and inventory of mid-century modern buildings in Riverside. Work performed for the City of Riverside.

Riverside Mid-Century Modern Subdivision Oral Histories Certified Local Government Grant, Riverside, CA (2011-2015). Grant writer and contract and project manager for preparation of oral histories surrounding mid-century modern buildings in Riverside. Work performed for the City of Riverside.

American Recovery and Reinvestment Act (ARRA) Surveys, Riverside, CA (2011-2015). Senior Planner for the completion of historical contexts and preparation of a multiple property DPR form. Work performed for the City of Riverside.

Management of Certificates of Appropriateness, Riverside, CA (2011-2015). Senior Planner for the analysis, preparation for Board and Council consideration, and supervision or approval of numerous planning applications for master plans, additions, adaptive re-use, relocation and/or restoration of historic commercial, industrial, educational and residential landmarks and district contributors, including commercial offices/stores, train depots, packing houses, individual homes and college campus landmarks, etc. Work performed for the City of Riverside.

Historic Preservation Fund Grant Program, Riverside, CA (2011-2015). Senior Planner for the management of bi-annual General Fund competitive grant program for historic preservation projects including staff to Council-created committee for award of grants. Work performed for the City of Riverside.

Teri Delcamp, MA

Architectural Historian

Historic Preservation Manager, City of San Juan Capistrano, San Juan Capistrano, CA (2005-2011). Solely responsible for management and administration of the City's historic preservation program. Staffed City's Cultural Heritage Commission. Reviewed complex development projects affecting designated historic sites. Managed planning, design, bid and construction phases of 7year Capital Improvement Program for City-owned historic sites (approximate budget $1.3 million). Developed and administered Historic Preservation section's annual budget and coordinated annual historic building maintenance budget and priorities with Public Works. Wrote and presented reports to Commissions, Council, community organizations and public. Coordinated with other departments and state and federal agencies on historic preservation issues and projects. Prepared, supervised and/or reviewed National Register, California Register and local nominations. Conducted historic preservation public outreach including events and workshops.

Forster Mansion Exclusive Events Conditional Use Permit, San Juan Capistrano, CA (2005-2011). Historic Preservation Manager for controversial, complex case for outdoor special events within mixed use residential and commercial area. Work performed for City of San Juan Capistrano

Zoomars on Los Rios Conditional Use Permit San Juan Capistrano, CA (2005-2011). Historic Preservation Manager for the management of a complex expansion of non-conforming use case for petting zoo in residential historic district. Work performed for City of San Juan Capistrano

Montanez Adobe Restoration and Seismic Repair San Juan Capistrano, CA (2005-2011). Historic Preservation Manager for the preparation of RFPs and managed contracts; managed design, bid and construction. Montanez Adobe project received state award 2012. Work performed for City of San Juan Capistrano

7-Year Capital Improvement Program for City-Owned Historic Structures, San Juan Capistrano, CA (2005-2011). Contract & Project Manager for bid and construction projects including Harrison House Repair & Restoration, Roger Williams/Swanner House Historic Paint Restoration, Roger Williams /Swanner House and Water Tower Foundation Repairs, Roger Williams/Swanner House Interior Repairs Joel Congdon House Repairs, and Blas Aguilar Adobe Repairs. Work performed for City of San Juan Capistrano

7-Year Capital Improvement Program for City-Owned Historic Structures, San Juan Capistrano, CA (2005-2011). Contract & Project Manager for Design RFP, Bid & Construction, including Montanez Adobe Restoration & Seismic Repair, Joel Congdon House ADA Improvements**,** Joel Congdon House Water Tower Restoration, Parra Adobe Seismic Repair and Restoration Historic Structure Report. Work performed for City of San Juan Capistrano

7-Year Capital Improvement Program for City-Owned Historic Structures, San Juan Capistrano, CA (2005-2011). Contract & Project Manager for RFP for Historic Structure Report and Rehabilitation Plans, including Parra Adobe Save America's Treasures Grant, The Ecology Center at the Congdon House, Blas Aguilar Adobe Repair and Native Education Facility, Mission San Juan Capistrano: Rectory Garden; Entry Restoration and Gift Shop projects, Historic Evaluation Report, Nick's Café, 26755 Verdugo Street, SB18 Tribal Consultation for General Plan and Specific Plan projects, and management of Historic Preservation Week 2006, 2007, 2008, 2009. Work performed for the City of San Juan Capistrano

Senior Planner, City of Oceanside, Oceanside, CA (2004-2005). Under direction of City Planner, supervised the current planning and customer service section. Supervised Associate Planners and Assistant Planners, including completion of performance evaluations. Reviewed complex development projects ranging across the full spectrum of land uses and entitlements, including CEQA initial studies

and documents. Implemented Local Coastal Program. Wrote and presented reports to Commission and Council. Work performed for the City of Oceanside.

Senior Planner, Historic Preservation, City of San Diego, San Diego, CA (2002-2004). Staffed Old Town Community group and Design Review Board; evaluated and presented planning cases to both. Managed and administered City's historic preservation program and supervised staff including Administrative Interns, Secretary and Senior Planners on team. Conducted detailed review of historic resource reports and surveys for designation. Oversaw and participated in historic resource surveys. Reviewed projects for consistency with Secretary of the Interior's Standards. Staffed Historical Resources Board. Participated in Section 106 consultation and managed MOU and PA compliance, coordinating with Port Authority, Navy Region Southwest and various historic preservation organizations, etc. Fulfilled Certified Local Government duties. Wrote and presented reports to Board, Commissions, Council, community organizations and public. Conducted historic preservation public outreach including events, training and workshops. Individual assignments included:

Naval Training Center Historic District Plancheck Drawings, City of San Diego, CA (2002-2004). Senior Planner for an evaluation of the Liberty Station Re-Use plans for consistency with Secretary of the Interior's Standards. Work performed for the City of San Diego

Secretary of the Interior's Standards Consistency Determinations, San Diego, CA (2002-2004). Senior Planner for the San Diego Zoo/Balboa Park expansion; Salk Institute Expansion; SDG&E Station A adaptive re-use; Santa Fe Depot/Museum of Contemporary Art; Coronado Belt Line bike trail; Hard Rock Hotel/Depot re-use; various rehabilitation and re-use projects in Gaslamp Historic District, Old Town San Diego, etc. Work performed for the City of San Diego

US Navy, US Marine Corps and San Diego Airport Authority Section 106 Programmatic Agreement (PA) Compliance, San Diego, CA (2002-2004) Senior Planner to review proposals for consistency with the PA. Met with agency representatives and property owners.

La Jolla Intensive Historic District Survey, San Diego, CA (2002-2004). Senior Planner on a survey team for the La Jolla Historic District. Work performed for the City of San Diego.

Burlingame and Islenair Historic Districts, San Diego, CA (2002-2004). Senior Planner for the supervision of the preparation of historic contexts and historic district nominations. Work performed for the City of San Diego

East Village, Warehouse, and African American Historic District Surveys, San Diego, CA (2002-2004). Outreach team member for inventories of historic districts in the East Village, Warehouse District, and the historic African American district of San Diego. Work performed for the City of San Diego

Individual Historic Designations and Mills Act Program, San Diego, CA (2002-2004). Reviewed all historic designation requests and referrals, prepared staff reports, supervised staff and managed Mills Act contract program comprising 80-100 property evaluations per year; worked with Deputy Director, community, preservation stakeholders and Land Use Committee to develop methodology for implementing new fees for designations and Mills Act contracts.

Senior Planner, City of San Clemente, CA (1990-2002). As Senior Planner, supervised the current planning and customer service section. Supervised Associate Planners and Assistant Planners, including completion of performance evaluations. Reviewed complex development projects ranging across the full spectrum of land uses and entitlements, including CEQA initial studies and documents. Supervised

consultant contracts on various projects including General Plan amendments, Specific Plans and implementing entitlements, grants and CEQA documents. Served as Air Quality Planner and LOSSAN rail corridor technical advisory committee member. Managed and administered Planning Commissions and Design Review Subcommittee. Fulfilled Certified Local Government duties. Wrote and presented reports to Commissions, Council, community organizations and public. Established and implemented Mills Act incentive program. Conducted public outreach including community workshops and training.

Marblehead Coastal Project, San Clemente, CA (1990-2002). Managed mid-1990s re-activation of 117 acre, 400+ dwelling unit and 61 acre regional commercial project; supervised and coordinated consultants for General Plan Amendment, Specific Plan and EIR; managed all associated entitlements including tentative tract, site plan review, conditional use permits, design review; coordinated weekly meetings with developer team, and meetings and reviews with other agencies including Coastal Commission and Department of Fish and Game; coordinated all revised project documentation and reports through numerous public hearings; processed project through to approval by Planning Commission and City Council.

Metrolink Station, San Clemente, CA (1990-2002). Managed city portion of award-winning project adjacent to National Register community building; liaised with OCTA consultant; supervised separate design consultant for ancillary "depot" building; coordinated staff and community meetings; developed ancillary building budget and design priorities; completed shared parking analysis, coordinated Coastal Commission's acceptance of methodology, and conducted required monitoring.

Certified Local Government, San Clemente, CA (1990-2002). Assisted in preparation of application, program, ordinance, etc., to obtain CLG status; prepared grant application; managed OHP and consultant contracts for grant; conducted research, outreach, workshops and public hearings to adopt updated survey; conducted workshops with CLG grant consultant; planned, prepared and obtained approval for City's first Mills Act Contract program.

Downtown/Business Park Economic Development Achievements and Housing Balance, San Clemente, CA (1990-2002). Managed numerous retail, office and industrial from discretionary entitlements through plancheck to permit issuance for 200,000+ square feet in new projects including DeNaults Hardware; Sav-On; Rip-Curl; Rancho San Clemente Plaza Pacifica; Rancho San Clemente Industrial Park; Talega Business Park; Rancho San Clemente Business Park; as well as residential subdivisions for 500+ dwelling units throughout Forster Ranch and Rancho San Clemente Specific Plan areas, Cross Hill, and numerous individual home developments.

Advanced Planning, San Clemente, CA (1990-2002). **P**repared SCAQMD AQMP baseline analysis for City as representative to Orange County Air Quality Technical Advisory Committee; wrote Zoning Code for amended site plan review process and historic preservation incentives; member of staff advisory committee for Citywide General Plan and comprehensive Zoning Code updates, and new Urban Design Guidelines; represented City on LOSSAN rail corridor technical advisory committee which resulted in new Metrolink Station; prepared grant applications for transportation enhancement projects.

Appendix D:

Project Feasibility Report

Coachella Valley Water District

DRAFT FEASIBILITY STUDY FOR STORAGE OF COLORADO RIVER WATER

July 2019

Submitted by:
Dahl Consultants, Inc.

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1 Summary and Benefits

The Mid-Canal Reservoir is proposed as an inline reservoir between Check 11 (Mile Post 54.6) and Check 14 (Mile Post 59.5). The reservoir will be formed by removing the existing embankment between the existing lined canal with the original earthen canal section to form a single wide trapezoidal section. The materials removed will be used to construct more gradual canal side slopes (3:1) and raise the invert (2 feet higher). Existing check structures and siphons will remain in place. Check 11 will serve as the inlet control structure and Check 14 will be the outlet control structure. The newer siphons (11, 12, & 13) will continue to be used to convey flow through the reservoir, with siphons 12 and 13 dividing the reservoir into three cells, see **Figure 1**.

The Mid-canal Reservoir will create direct economic benefits and cost savings. Converting the Coachella Canal to in-line regulatory storage at this location will also greatly enhance water operations. Benefits will include:

- Elimination of Recurring Lining Repairs - Reconstructing canal pools between Check 11 and Check 14 will eliminate recurring problems with damage to the concrete lining in this section of the canal. The heavy clay soils in this area are largely responsible for ongoing lining damage and for restrictions to canal operations. The reservoir will eliminate the concrete canal lining in this segment, which has been the area most prone to expensive repairs. Thus far, repair costs have exceeded $4M. It will also help prevent similar problems in the lined canal upstream and downstream from the reservoir by smoothing operations and decreasing water level fluctuations that can cause lining damage.

- Normal Operational Benefits
  - Water storage to help manage large, rapid delivery flow changes that affect Coachella Canal operations.
  - Increased amount of operational storage in the project to help compensate for loss of in-channel storage caused by the Coachella Canal Lining Project.
  - Reservoir storage is easier to manage than using in-channel storage in Coachella Canal reaches, especially with limitations to water level fluctuations in the concrete-lined canal.
  - Although Lake Cahuilla will continue to provide storage for mismatches between total canal inflow and total deliveries, canal capacity limits restrict how much excess water can be routed all the way to the tail end.
  - The Mid-canal Reservoir will be able to supply shortages in the middle and lower ends of the Coachella Canal delivery system and will help attenuate large flow changes that might otherwise exceed drawdown criteria or exceed capacity near the canal's downstream end.

- Refinement to Current Operational Procedures - Allows refinement of the current operating rules listed in the Operating Procedures (OP), which should provide CVWD with more flexibility. It is understood that SDCWA wishes to revisit the current OP, unrelated to this project.

- Reduction in Potential for CVWD Water Allocation Losses – At times when significant emergency cuts to CVWD orders are required (such as large rainfall events), valuable water supply can by lost to Mexico or the Brock Reservoir.

- Frost Events – Although difficult to quantify, CVWD's ability to draw from this new source of stored water could significantly reduce potential crop damage – commonly estimated as a very high potential loss.

The total volume of the new reservoir will be **728 acre-feet** (ac-ft). Based on experience and evaluation of construction costs for numerous existing reservoirs, Dahl Consultants has adopted a budget number of about $10,000 per acre-ft as a "rule of thumb" cost for an optimally constructed reservoir. With an estimated construction cost of **$6.4 million**, the ratio of cost to storage volume is about **$9000/ac-ft**. This cost is lower than typical new reservoir construction, largely because of earthwork savings from using existing embankment material.

The Mid-canal Reservoir Project appears to be technically and economically feasible.



WATER DISTRICT	DAHL consultants	COACHELLA VALLEY WATER DISTRICT FEASIBILITY STUDY FOR STORAGE OF COLORADO RIVER WATER	DATE MARCH 2019
		SITE MAP	FIGURE NUMBER 1

2 Background

Coachella Canal operations have always been challenging for several reasons:

- Long distances from source of water to delivery area
- Lengthy delays to get flow changes downstream
- Lack of operating storage
- Coordination with Reclamation and IID for water orders

Loss of in-canal storage as a result of the construction of the Coachella Canal Lining Project created additional difficulties. During 2011, specific operating procedures were developed and documented in a report titled *Coachella Canal Lining Project Operating Procedures.* These operational procedures were developed with the condition that Check 14 would be locked out (in the full-open position) and a weir would be installed at the in inlet to Siphon 13. Further, the gate at Check 18 would be operated in a manner to minimize water level depths in the pools between Check 11 and Check 18. These agreed upon operating procedures imposed even greater reductions in usable in-canal storage.

In 2015, a study was conducted and documented in a report titled *Feasibility Study to Investigate Storage Requirements for the Coachella Canal* by Dahl Consultants and Rogers Engineering Hydraulics Inc. evaluated hydraulic operations and water storage possibilities, yielding the following conclusions:

- Water storage is necessary to manage large, rapid delivery flow changes that affect Coachella Canal operations.
- The Coachella Canal Lining Project reduced the amount of useful storage in the project and made existing storage more difficult to use. The reduced canal prism size and the restrictions imposed by drawdown limitations both resulted in significantly less operational storage in middle portion of the canal system.
- A number of sites in the area of North Shore were evaluated but none were found feasible due to construction cost, institutional concerns (DSOD), and operations. An affordable all-gravity system could not be found.
- Alternatives methods of using storage exist, including active management of canal water levels to use in-canal storage and diverting canal water to or from reservoirs near the canal (off-canal storage).
- Lake Cahuilla should continue to be used to provide storage for major imbalances between total canal inflow and total canal outflows. However, the canal's capacity limits how much excess flow can be routed all the way to Lake Cahuilla. Additionally, storage located at the canal's tail end has limited value to supply shortages upstream.
- In-canal storage can help to manage flow-change events, but it is complicated to use in-canal storage effectively and it can require constant operator attention. It is problematic for operators to actively use in-canal storage while they also must manage multiple other daily tasks.

- Additional storage near the middle of the Coachella Canal length would be valuable to spread out large flow changes over several hours and reduce peak flows through the canal. Mid-system storage can attenuate large flow changes that might otherwise exceed drawdown criteria or exceed capacity near the canal's downstream end (e.g. in the Silver Rock area).

The 2015 study used data provided by CVWD to compute the amount of additional storage that would be required to manage predicted events that cause either an excess or a deficit in water supplied through the canal. **Table 1** shows the amount of flow mismatch and duration of these events, and the resulting amount of storage volume needed for each.

Table 1 – Major Events that cause Excess or Shortage of Water in Coachella Canal

Canal Inflow Decrease or Cut			
Excess Water Events	**Flow Amount (cfs)**	**Duration (hours)**	**Resulting Storage Requirements (AF)**
Rain storm: Flood inflows plus delivery shutdowns	150	24	300
Weekend Ramp Down	300	24	600
Canal Inflow Increase			
Deficit Water Events	**Flow Amount (cfs)**	**Duration (hours)**	**Resulting Storage Requirements (AF)**
Frost prevention: unscheduled delivery increase	75	24	150
Sunday into Monday Ramp Up	250	24	500

The previous study in 2015 used a computer model that was developed to study hydraulic operations and water storage for Coachella Canal. Building upon that model, this investigation used similar methods to quantify storage volumes and how these volumes would provide either additional supply or space to contain excess water during those events that create a flow mismatch in the canal system.

3 Project Description

The Mid-Canal Reservoir is proposed as an inline reservoir between Check 11 (Mile Post 54.6) and Check 14 (Mile Post 59.5), as shown in **Figure 1**. This location was selected for several reasons:

- Well situated in CVWD's canal delivery system, which will provide valuable regulatory storage that is easily used.
- Readily adaptable existing facilities –
    - Relatively new check structures already in place
    - Large cross section geometry, combining the old canal and the new canal to provide ample storage volume
- Flow regulation using gravity flow both into and out of the reservoir.
- Soils in this reach of the Coachella Canal contain impermeable clay, so the reservoir can be constructed with material excavated from the site without a PVC or concrete liner.
- Retirement of the concrete canal lining – The canal lining constructed as part of the Coachella Canal Lining Project (CCLP) has not performed well due to the heavy clay foundations. Retiring the concrete lining will reduce future potential lining replacement costs for this reach of the canal.
- The project is not jurisdictional under DSOD. This is in contrast to issues that surfaced for other sites considered and evaluated as part of the North Shore sites that were evaluated in our previous study.

The existing lined canal will be combined with the old canal prism to create a wide section that will serve as an inline reservoir between Check 11 and Check 14, see **Figures 2 through 5**. This will create a flow-through reservoir with all canal flow passing through the reservoir. Removing the existing embankment between the two canals provides significant storage volume. Check 11 will control inflow to the reservoir and Check 14 will serve as the reservoir outlet structure. Existing Siphons 11, 12, and 13 will remain in place, with inflow to the reservoir through Check 11 and uncontrolled flow through Siphon 12 and Siphon 13. Siphons 12 and 13 will divide the reservoir into three cells.

Embankments near Check 14 will be raised to maximize the amount of useful storage and to allow for a maximum reservoir level that is 3 feet higher than present canal design water level. Since the new reservoir invert is approximately 2 feet higher than the existing concrete canal invert, the maximum water depth in the reservoir is 12 feet at Check 14. Modifications to Siphons 12 and 13 and Check 14, shown on **Figures 6 and 7**, will be required to accommodate the higher water levels and raised inverts. This configuration creates the storage volumes shown in **Table 2**, with a total volume over 700 acre-feet.

Table 2 – Reservoir Volume vs. Depth

Reservoir Depth at Downstream End (Check 14) (feet)	Total Volume (acre-feet)
12	728
11	640
10	556
9	475
8	397
7	323
6	252
5	184
4	120
3	59
2	28
1	9
0	0

Cost to raise embankments is relatively low because much of the canal is in cut and there will be an abundance of material from the removal of the center berm. Raising the water surface 3 feet above the present canal design water elevation at Check 14 creates about 250 acre-feet of additional storage. All of this storage in the upper part of the reservoir is usable as regulatory storage that will provide significant operational benefits.

Because the proposed reservoir is in-line with the canal, water level at the reservoir's upstream end must remain low enough to convey canal flow into the reservoir through Check 11, and level at the downstream end must be high enough to convey water out of the reservoir through Check 14. Level at the upstream end does not pose a restriction, because it will only start to limit inflow if the reservoir is full while inflow through Check 11 is 1200 cfs or greater. There should never be a need for this much flow into the reservoir when it's already full.

Level at the reservoir downstream end will pose a restriction. Outflow through Check 14 requires enough head to push the water through Check 14, and this required head is proportional to the square of the flow rate. As the outflow increases, the minimum required reservoir level also increases. **Table 3** shows a range of canal flow rates and the required minimum reservoir depths to convey flow through Check 14. Because the reservoir levels cannot be lowered below the required minimums, storage volume below these minimum levels cannot be used. Therefore, at higher flow rates the amount of usable storage is limited to the upper portion of the reservoir.

Because the reservoir will behave like a large canal when passing flow through its length, water depth will not fall below the normal depth needed to pass a given flow. This doesn't pose any problems, but it does reduce the amount of effective storage because the volume needed to pass flow doesn't serve as regulatory storage.

The above limitations determine the useful operating range of water levels in the reservoir and the useful volume of storage at different flow rates. **Table 3** shows these minimum reservoir depths (at the downstream end) and the corresponding usable storage volumes. For each of the flows in **Table 3**, usable storage equals the water volume above the minimum reservoir depth for that flow rate.

Table 3 – Minimum Reservoir Depth and Usable Storage Volumes

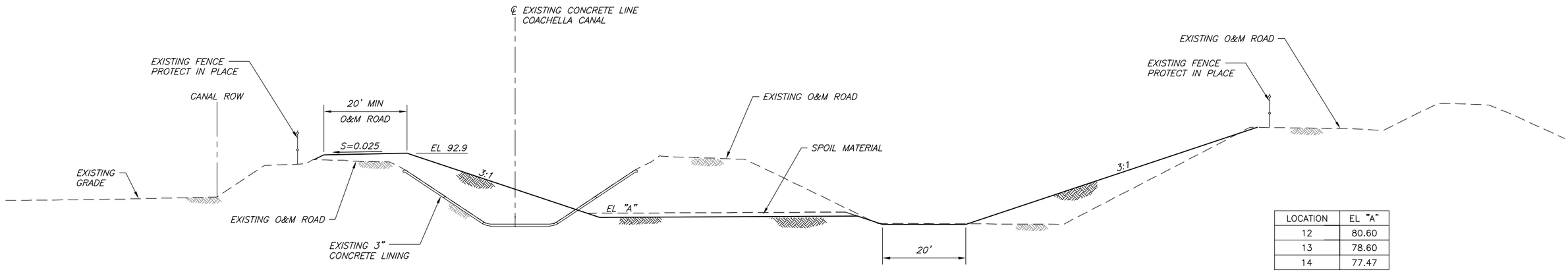
Canal Flow Rate (cfs)	Minimum Reservoir Depth (feet)	Usable Storage Volume (acre-feet)
25	0.5	728
50	0.8	728
100	1.2	728
200	1.8	718
400	2.8	660
600	4.4	570
800	5.8	490
1000	7.1	395
1200	8.3	305

Topographic survey data was collected to determine the "as-built" distribution of soils made during construction of the CCLP. The collected topo data was used to create a digital terrain model (DTM) for the pools that was then patched into the DTM developed from aerial photomapping during the design of the CCLP. The resulting combined DTM provides a good representation of the existing terrain for the reservoir cells between the siphons. Utilizing the above-described DTM, the proposed canal geometry will minimize/eliminate most hauling or importing of material during construction.

A preliminary geotechnical investigation was conducted to verify the suitability of the existing soils for use in lining the bottoms and sides of the reservoir to form an acceptable seepage barrier. The investigation included collection of soils samples from each of the proposed reservoir cells for laboratory testing including permeability testing. The test results show that the material in the embankment between the existing and old canal can be used to construct the reservoir sides and bottoms without the need to locate and mine an "all clay" source. The material in these embankments came from excavation of the original canal and the new CCLP. The material was sufficiently mixed (clays, silts, and sands) during the previous earthwork operations to become a good source for construction of a relatively homogenous compacted fill for the reservoir. The expected permeability of the fills is less the $1x10^{-5}$ cm/sec which will be adequate to prevent seepage losses outside allowable ranges.

The preliminary geotechnical evaluation is included as an appendix to this report. Recommendations in the report include providing slope protection on the westerly facing slopes (right side slope when facing downstream) which would be the slope most exposed to wave action from the dominant wind direction.

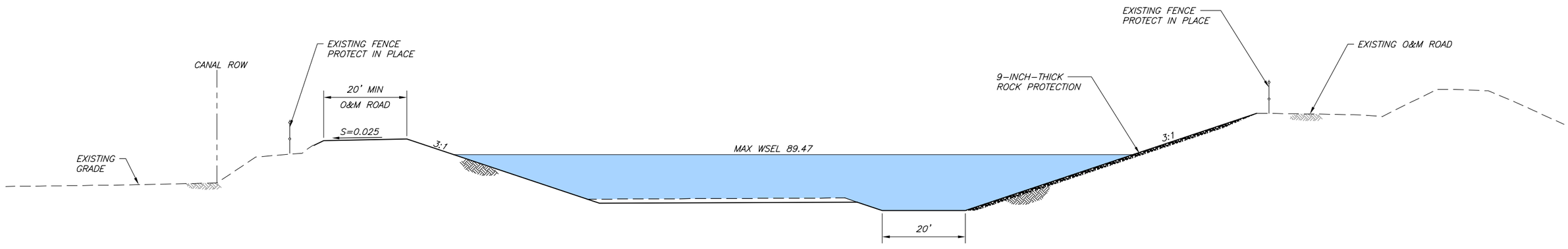
Currently, the radial gates at Check 14 are locked out in the full-open position. Commercial power is not available at this site. Instead, the site is powered by batteries charged by solar panels. The solar installation has not performed well. Although it is rarely used, the solar system has been maintained. CVWD could consider a redesign of the solar system to bring it to an acceptable reliability or commercial power can be extended from the overhead power line that currently terminates at Check 11. Solar technology, especially related to batteries, has advanced significantly since the initial installation over 10 years ago.



LOCATION	EL "A"
12	80.60
13	78.60
14	77.47

EXISTING VS. NEW SECTION — A

SCALE: 1" = 1'-0"



COMPLETED SECTION — B

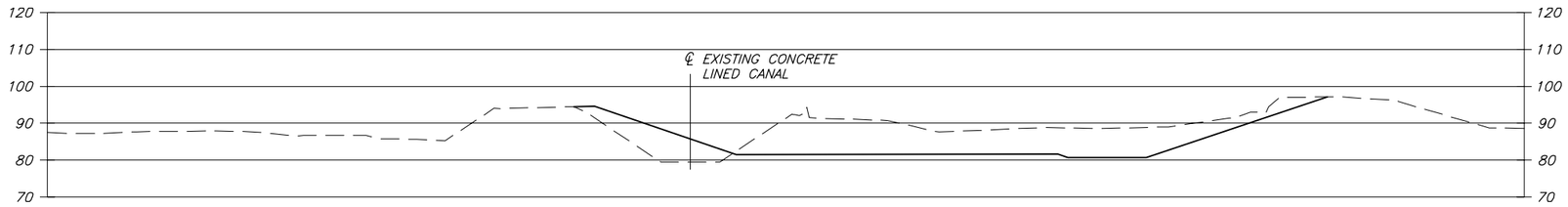
SCALE: 1" = 1'-0"

COACHELLA VALLEY WATER DISTRICT
FEASIBILITY STUDY FOR STORAGE OF COLORADO RIVER WATER

TYPICAL SECTION

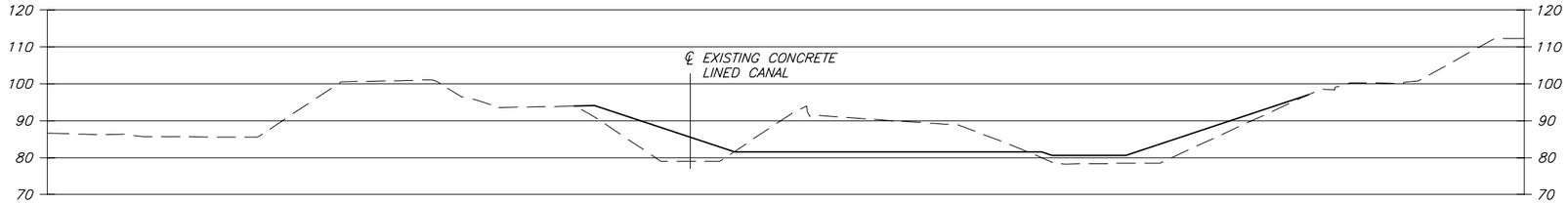
DATE: MARCH 2019

FIGURE NUMBER: 2



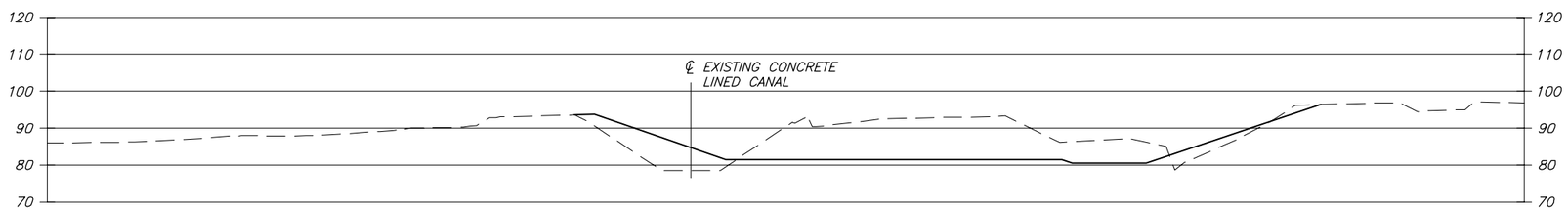
SECTION AT STA 2807+00 (A)

SCALE: 1" = 20'



SECTION AT 2847+00 (B)

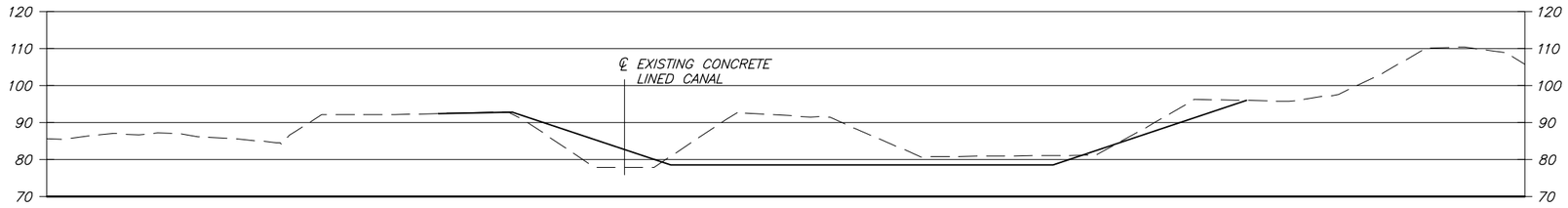
SCALE: 1" = 20'



SECTION AT 2888+00 (C)

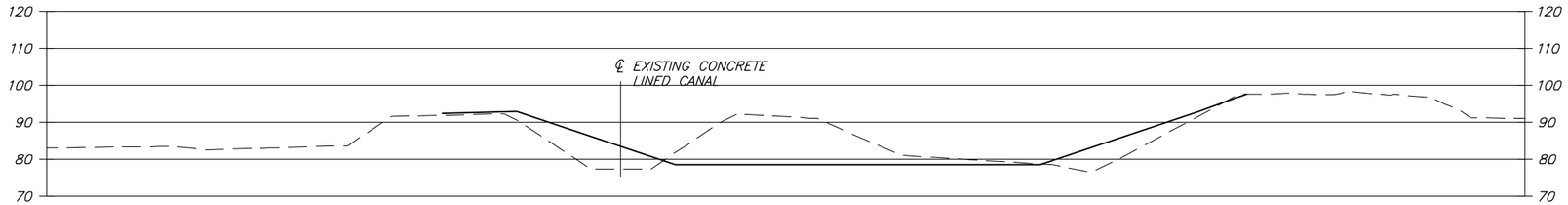
SCALE: 1" = 20'

WATER DISTRICT	DAHL consultants	COACHELLA VALLEY WATER DISTRICT FEASIBILITY STUDY FOR STORAGE OF COLORADO RIVER WATER	DATE MARCH 2019
		CELL 1 CROSS SECTIONS	FIGURE NUMBER 3



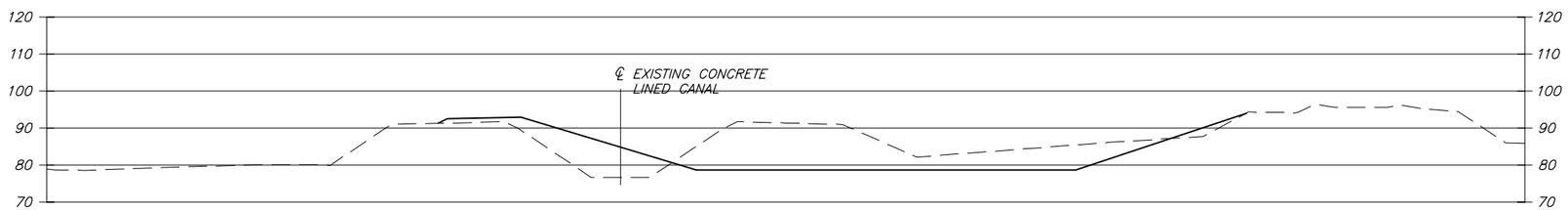
SECTION AT STA 2893+00 (D)

SCALE: 1" = 20'



SECTION AT STA 2946+00 (E)

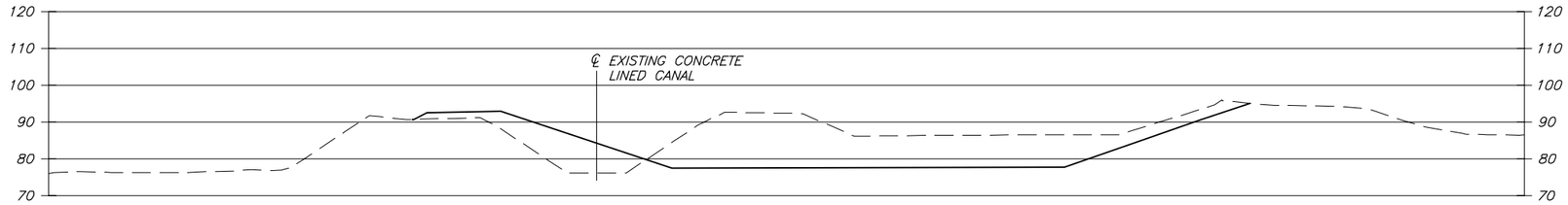
SCALE: 1" = 20'



SECTION AT STA 2999+00 (F)

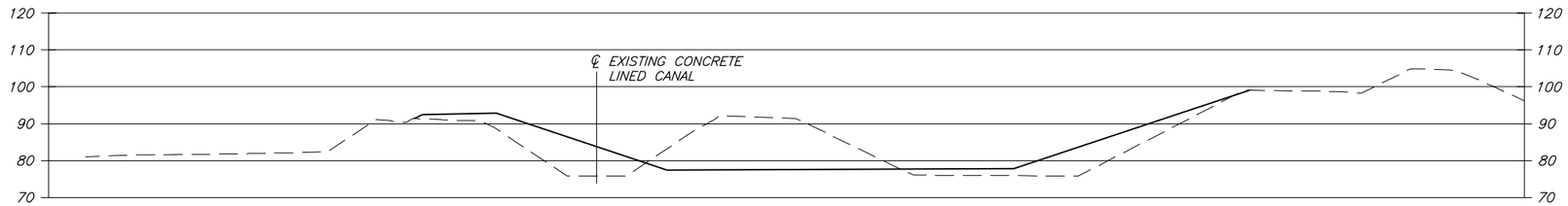
SCALE: 1" = 20'

WATER DISTRICT	DAHL consultants	COACHELLA VALLEY WATER DISTRICT FEASIBILITY STUDY FOR STORAGE OF COLORADO RIVER WATER CELL 2 CROSS SECTIONS	DATE MARCH 2019 FIGURE NUMBER 4



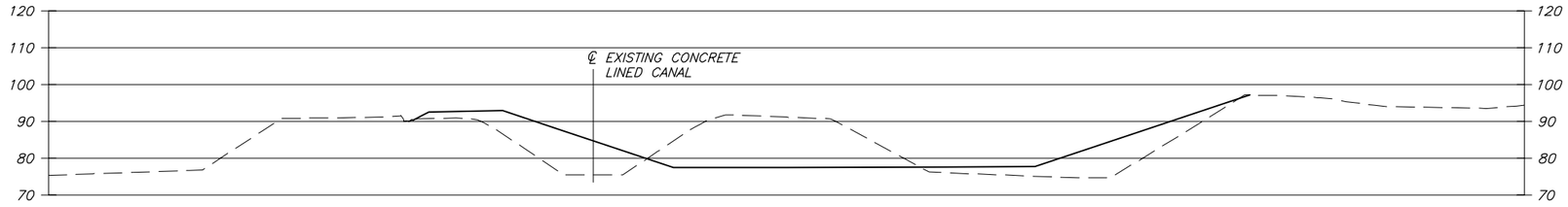
SECTION AT STA 3003+00 — G

SCALE: 1" = 20'



SECTION AT STA 3033+00 — H

SCALE: 1" = 20'



SECTION AT STA 3062+00 — J

SCALE: 1" = 20'

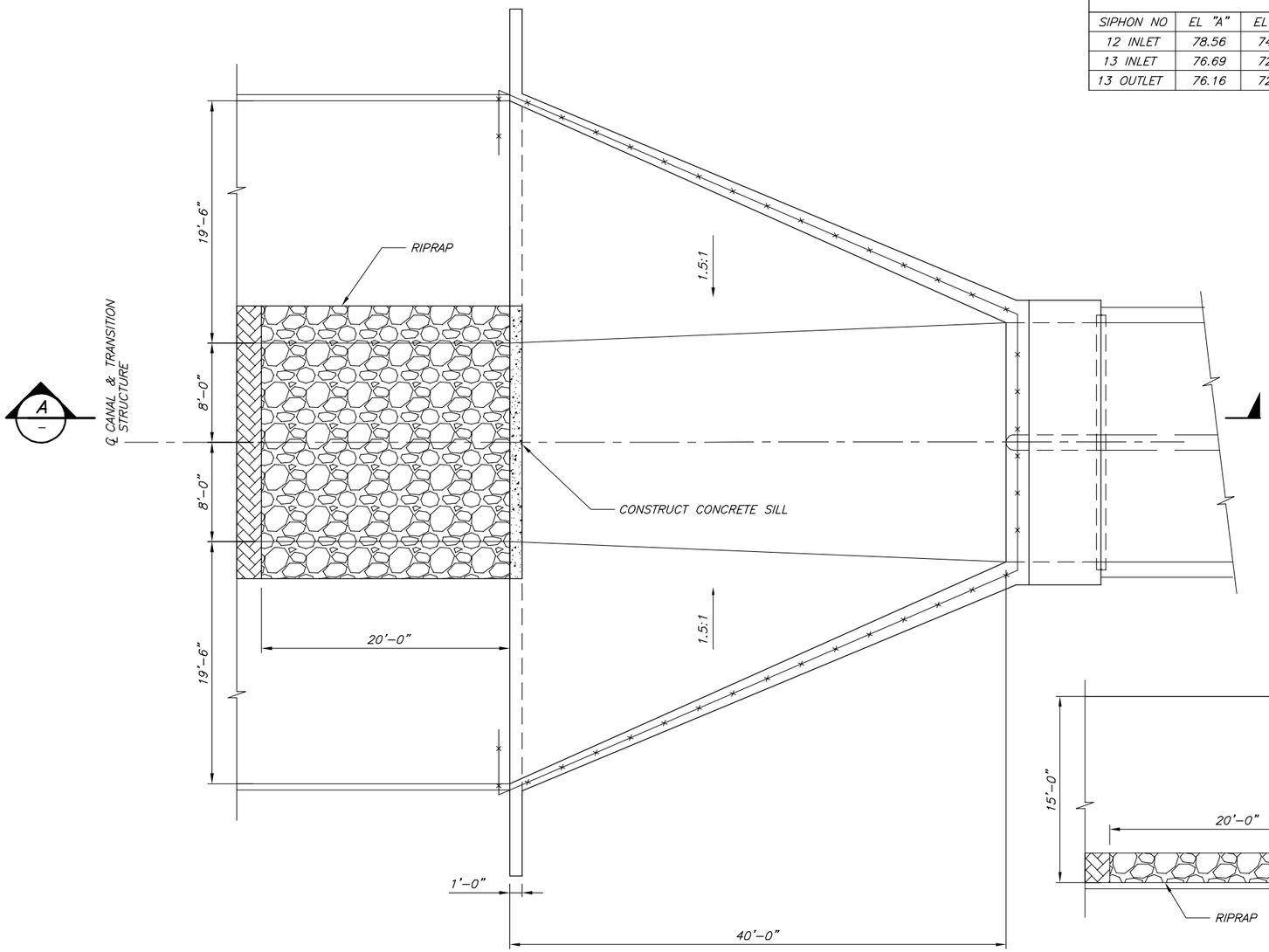
COACHELLA VALLEY WATER DISTRICT
FEASIBILITY STUDY FOR STORAGE OF COLORADO RIVER WATER

CELL 3 CROSS SECTIONS

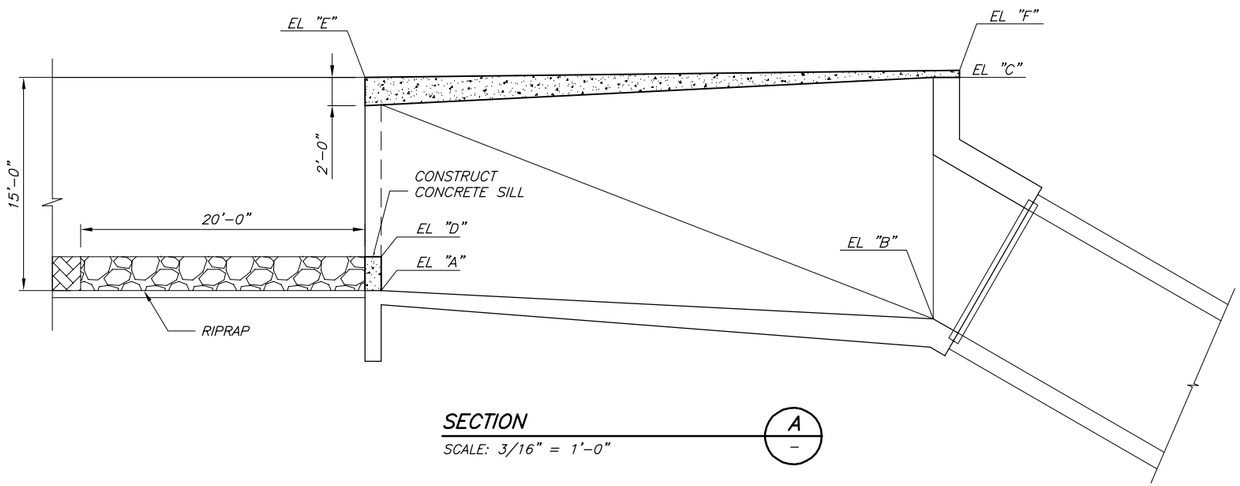
DATE: MARCH 2019

FIGURE NUMBER: 5

TABLE OF DATA						
SIPHON NO	EL "A"	EL "B"	EL "C"	EL "D"	EL "E"	EL "F"
12 INLET	78.56	74.56	93.56	80.56	N/A	N/A
13 INLET	76.69	72.69	91.69	78.69	91.69	92.19
13 OUTLET	76.16	72.16	91.16	78.16	91.16	91.66



PLAN 1
SCALE: 3/16" = 1'-0"



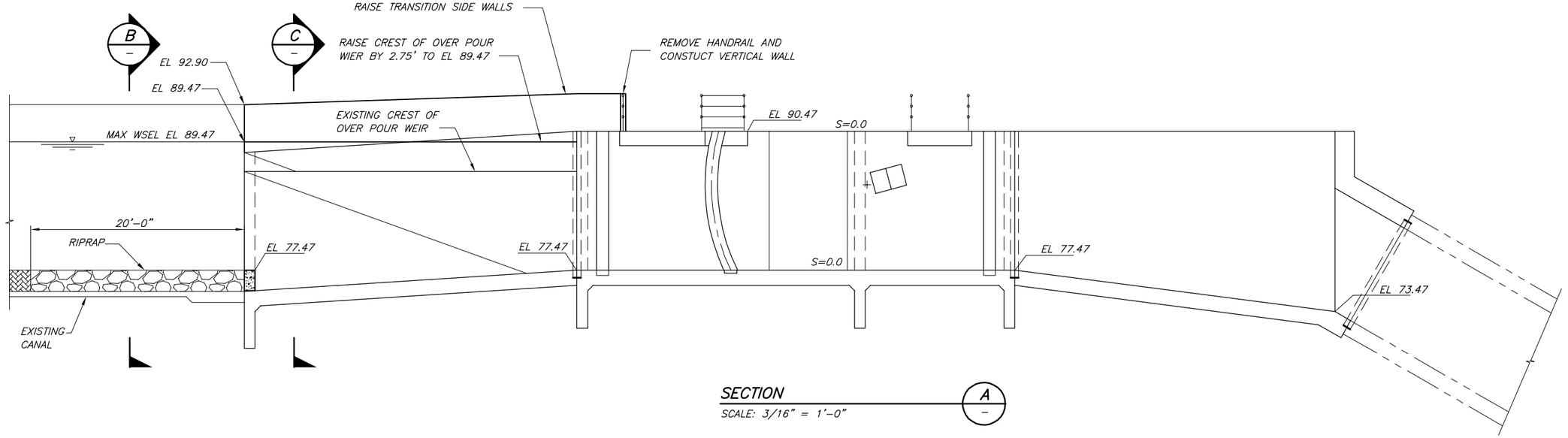
SECTION A
SCALE: 3/16" = 1'-0"

COACHELLA VALLEY WATER DISTRICT
FEASIBILITY STUDY FOR STORAGE OF COLORADO RIVER WATER

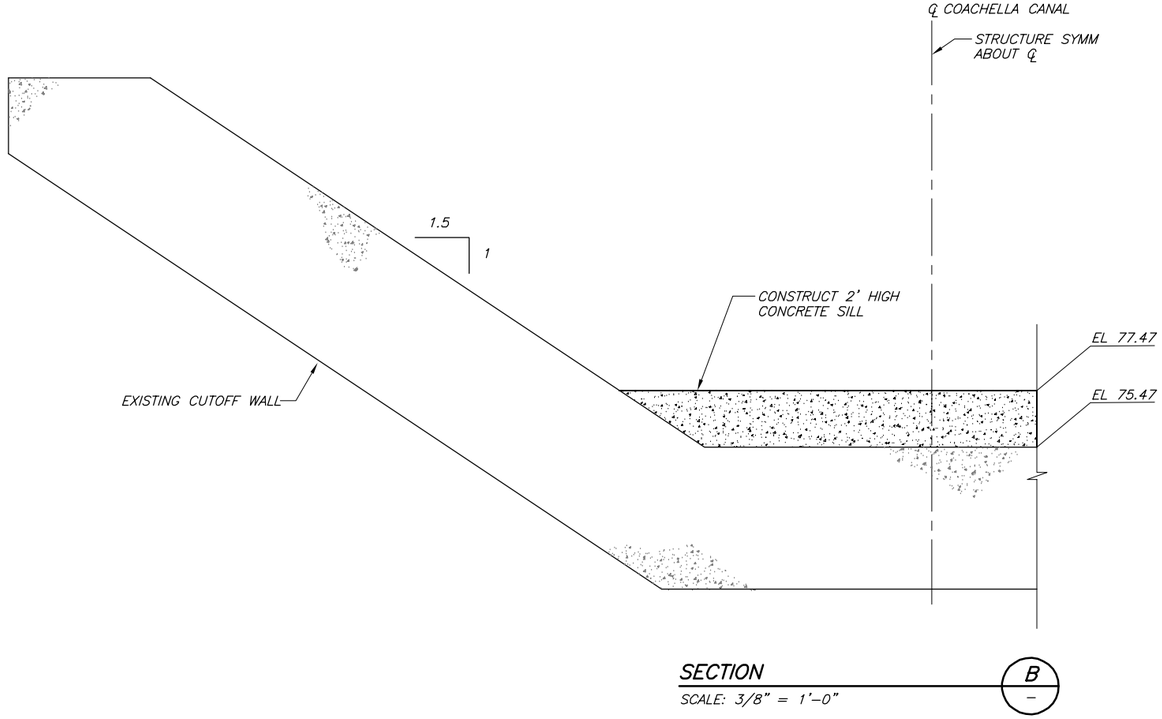
MODIFICATIONS AT SIPHON 12 & 13

DATE
MARCH 2019

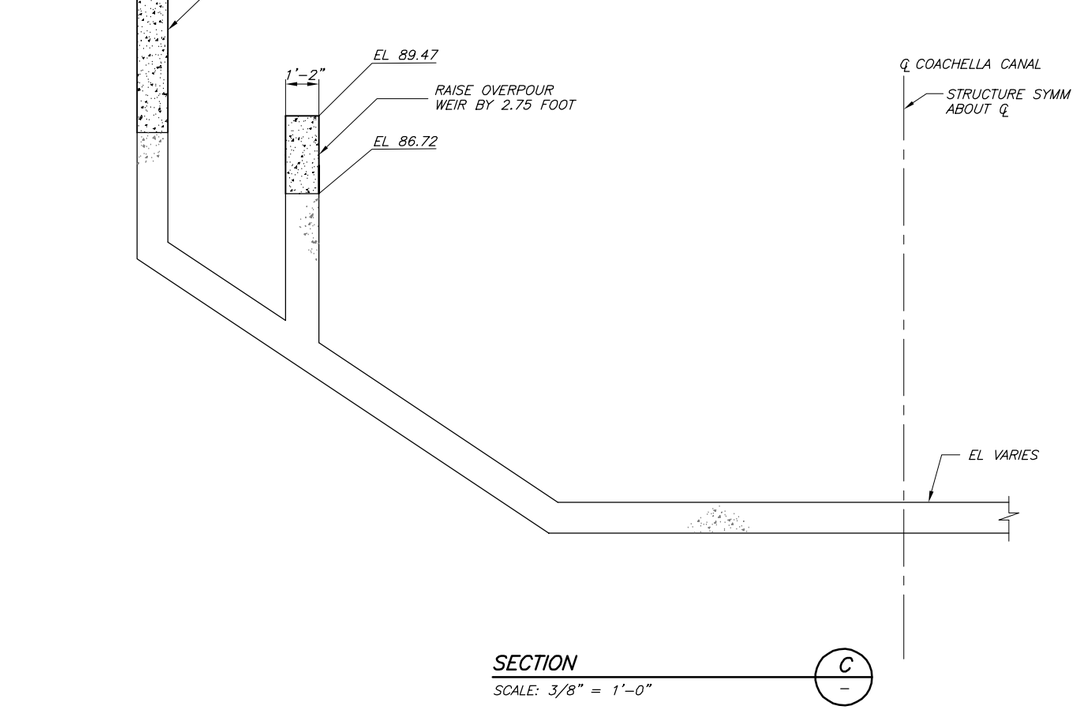
FIGURE NUMBER
6



SECTION A
SCALE: 3/16" = 1'-0"



SECTION B
SCALE: 3/8" = 1'-0"



SECTION C
SCALE: 3/8" = 1'-0"

COACHELLA VALLEY WATER DISTRICT
FEASIBILITY STUDY FOR STORAGE OF COLORADO RIVER WATER

MODIFICATIONS AT CHECK 14 INLET STRUCTURE

DATE
MARCH 2019

FIGURE NUMBER
7

4 Theory of Operations

The reservoir will have three cells separated by Siphons 12 and 13. With no additional control structures added at these two siphon inlets, the water surface will be almost level and at about the same elevation in all three cells during low-flow conditions (<400 cfs). At higher flow rates, the water surface will step down from upstream cell to downstream cell due to head loss through the siphons. The size of these steps will increase with flow rate, up to about a 6" drop between cells at maximum canal flow. The three-cell reservoir will resemble a wide canal with three pools, except the water surface within each cell will be almost horizontal due to the increased cell width and resulting low flow velocity.

Reservoir water level will be controlled at Check 14, much the same as controlling a checked water surface in the canal. A minimum water depth must be maintained at this point in order to pass flow into canal Pool 15 downstream. This minimum allowable water depth depends on canal flow rate. Most of the time, water level in Pool 15 will be the normal depth for the present flow rate. At low flows, Pool 15 will operate at a relatively low water level. Therefore, the water level upstream of Check 14 can be correspondingly low. At high flows, water depth in Pool 15 will be higher and reservoir water level must be higher also in order to push water through Check 14. This restriction will reduce the amount of available regulatory storage in the reservoir during high flow periods. A high checked water level at Check 18 can also affect the depth in Pool 15 during high-flow conditions, but typical operations at Check 18 will not significantly affect the minimum reservoir depth.

As discussed in Section 4, Table 3 shows the minimum allowable water depth required in the reservoir at varying flow rates for conveyance to Pool 15. Table 3 also shows the resulting amount of available reservoir storage above the minimum reservoir depth. For most normal operating conditions, the minimum reservoir level will be between 3 and 6 feet deep and the amount of usable storage will be from 500 to 700 acre-feet.

The reservoir will provide volume to store excess water or to supply water into the canal when needed. A given volume in the reservoir equates to an inflow or outflow rate for a particular length of time. Tables 4, 5, and 6 show how much time it takes to fill or drain volumes from the reservoir, and therefore how the reservoir level will change over time. Differential volume is shown for 1-foot increments of depth, for the useful operating range in the reservoir. Reservoir level will rise at a rate that is proportional to the net rate of *inflow* into the reservoir, or level will fall at a rate that is proportional to the net *outflow* from the reservoir. (Note: these net inflows or outflows are different than the through-flow in the canal that influences how low the reservoir can drop.)

Table 4 shows the time, in hours, to fill the reservoir at different net inflow rates. Incremental time is shown for each 1-foot increase of water level. Total time to fill the entire reservoir and average time for a 1-foot level change are shown at the bottom. A depth range from 4 to 12 feet is shown because the bottom 4 feet of the reservoir will be needed for conveyance into Pool 15 except during periods of very

low canal flows (less than 400 cfs). (Note: even when the reservoir is full with a 12-feet depth at the downstream end, up to 1200 cfs could flow into the reservoir with a typical checked water level at Check 11.)

Table 4 – Time (in hours) to increase reservoir level vs.net inflow rate

Reservoir Depth (feet)	Differential Volume (acre-feet)	Net flow into reservoir (cfs):					
		50	100	200	400	600	800
		Time (in hours) to increase reservoir level by 1 foot					
12	**88**	21.3	10.6	5.3	2.7	1.8	1.3
11	**84**	20.3	10.2	5.1	2.5	1.7	1.3
10	**81**	19.6	9.8	4.9	2.5	1.6	1.2
9	**78**	18.9	9.4	4.7	2.4	1.6	1.2
8	**74**	17.9	9.0	4.5	2.2	1.5	1.1
7	**71**	17.2	8.6	4.3	2.1	1.4	1.1
6	**68**	16.5	8.2	4.1	2.1	1.4	1.0
5	**64**	15.5	7.7	3.9	1.9	1.3	
4	**61**	14.8	7.4	3.7	1.8	1.2	
Totals:	**669 AF**	**132 hr**	**88 hr**	**44 hr**	**21hr**	**13 hr**	**8 hr**
Average time for a 1-foot change in level (hrs)		**19 hr**	**9 hr**	**5 hr**	**2.4 hr**	**1.6 hr**	**1.2 hr**

Table 5 shows the time, in hours, to drain the reservoir at different *net* outflow rates. The table only shows values for conditions that are possible within the outflow limitations caused by higher water levels in Pool 15 as flow through Check 14 increases. When the ***net*** flow out of the reservoir is 600 or 800 cfs then the outflow going into Pool 15 must be at least that large, so corresponding minimum depths will further limit the usable storage. Values in **Table 3** above should be used to show additional limitations on the useful storage amount based on flow rate in the canal downstream.

Table 5 – Time (in hours) to decrease reservoir level vs.net outflow rate.

Reservoir Depth (feet)	Differential Volume (acre-feet)	Net flow out of reservoir (cfs):					
		50	100	200	400	600	800
		Time (in hours) to decrease reservoir level by 1 foot					
12	**88**	21.3	10.6	5.3	2.7	1.8	1.3
11	**84**	20.3	10.2	5.1	2.5	1.7	1.3
10	**81**	19.6	9.8	4.9	2.5	1.6	1.2
9	**78**	18.9	9.4	4.7	2.4	1.6	1.2
8	**74**	17.9	9.0	4.5	2.2	1.5	1.1
7	**71**	17.2	8.6	4.3	2.1	1.4	1.1
6	**68**	16.5	8.2	4.1	2.1	1.4	1.0
5	**64**	15.5	7.7	3.9	1.9	1.3	
4	**61**	14.8	7.4	3.7	1.8		
Totals:	**669 AF**	**132 hr**	**88 hr**	**44 hr**	**21hr**	**12 hr**	**8 hr**
Average time for a 1-foot change in level (hrs)		**19 hr**	**9 hr**	**5 hr**	**2.4 hr**	**1.6 hr**	**1.2 hr**

As a summary of how the reservoir will provide compensating flows for surplus or deficit events, **Table 6** shows how long it will take to drain or fill reservoir storage. Two examples are shown, a low-flow case with 400 cfs flowing through Siphon 14 and a high-flow case with 1,000 cfs flowing through Siphon 14. The time durations for filling or draining the available storage are shown.

Table 6 – Summary of storage use vs. time

When the flow through Siphon 14 is:		400 cfs (low flow)	1000 cfs (high flow)
Usable storage volume is:		**660 acre-feet**	**395 acre-feet**
Differential flow (filling or draining)	Average time to change level by 1 foot	Time to drain/fill entire usable volume of 660 acre-feet	Time to drain/fill entire usable volume of 395 acre-feet
50 cfs	18 hr	160 hr	96 hr
100 cfs	9 hr	80 hr	48 hr
200 cfs	5 hr	40 hr	24 hr
400 cfs	2.3 hr	20 hr	12 hr
600 cfs	1.5 hr	13 hr	8 hr
800 cfs	1 hr	10 hr	6 hr

5 Construction Sequencing

At present, it is anticipated that construction would begin in summer 2020 and be completed by spring 2021. Construction will include two brief shutdowns during low periods in winter 2020/21. Work can be sequenced as shown in **Figures 8 through 10** using the steps below.

Step 1 – Earthwork in existing old canal (completed during summer/fall)

- Clear, scarify, and compact subgrade from Siphon 11 to 14
- Remove portion of existing left embankment
- Construct compacted right embankment using removed material from left embankment
- Work completed for all reaches without disrupting service in existing canal

Step 2 – Diversions (completed during winter low-flow period)

- Coordinate temporary shutdown with CVWD
- Construct temporary plugs in the canal to isolate Siphons 11 (downstream only), 12, 13, and 14 (upstream only)
- Complete structural modifications at Siphons 12 and 13 and Check 14
- Construct temporary transitions to divert flow into the old canal

Step 3 – Earthwork in lined canal (completed during winter low-flow period)

- Dewater existing lined canal pools
- Remove portion of canal-right concrete lining and place on new canal invert
- Remove portion of existing canal right embankment and use it to construct compacted clay liner over the canal left embankment and invert concrete lining

Step 4 – Complete final reservoir section (completed during winter low-flow period)

- Coordinate temporary shutdown with CVWD
- Dewater old canal
- Use remaining embankment between old and new canals to construct finished reservoir left embankment
- Any excess material can be spoiled on reservoir invert
- Construct final transitions (see **Figure 11**)

The temporary shutdowns will require closing the gates at Check 11 and dewatering the canal by gravity through Check 14. **Table 7** shows how the water volume in canal pools 11, 12, and 13 will be depleted, and when water level will be low enough for construction activities to begin.

This example assumes that canal flow rate is 400 cfs prior to shutdown, which will create a normal flow depth of 6 feet in these canal pools. At this flow rate, water level in Pool 14 should be low enough to not restrict reservoir outflow through Siphon 14, and the siphon drops will create starting level in canal pools 11, 12, and 13 that are even a little lower than 6 feet. The table shows that the upstream end of Pool 11 will be almost empty in about 2 hours, and all of Pool 11 should be empty in about 3 hours. The upstream end of Pool 12 should be empty in about 3 hours and all of Pool 12 should be empty in about 4 hours. It will also be possible to construct temporary berms and pump out the remaining water in work areas before these areas are completely empty from gravity flow.

Table 7 – Volume depletion and depth reductions vs. time (dewatering existing canal)

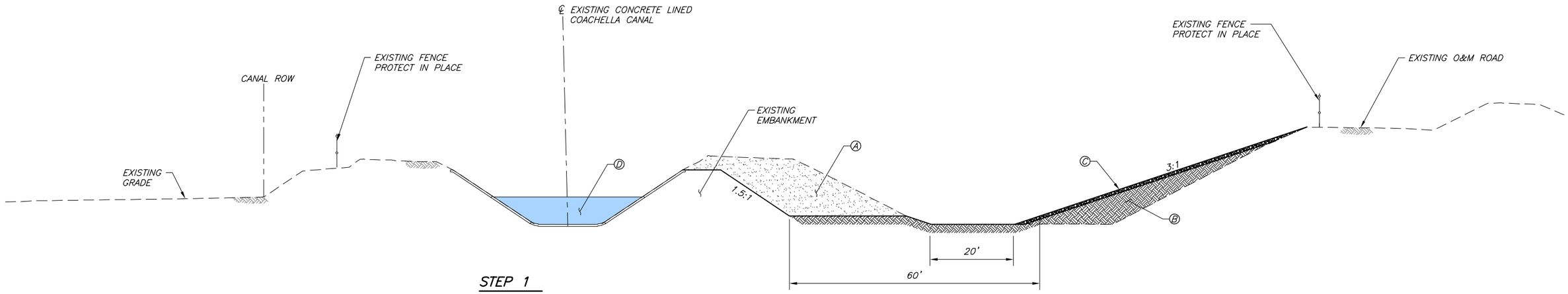
Time (hours)	Canal 3-pools combined		Res outflow thru Check 14	Pool 13		Pool 12		Pool 11	
	Total Volume (ac-ft)	Percent Volume	Q (cfs)	d/s Y (ft)	u/s Y (ft)	d/s Y (ft)	u/s Y (ft)	d/s Y (ft)	u/s Y (ft)
0	75	100%	400	5.70	5.70	5.50	5.60	5.30	5.40
0.5	59	79%	368	5.50	5.50	5.30	4.70	3.70	2.80
1	45	61%	316	5.00	5.20	4.20	4.20	2.70	1.70
2	24	32%	220	4.10	3.40	2.90	1.70	1.10	0.20
3	10	14%	136	2.70	2.00	1.50	0.25	0	0
4	3	3%	65	1.50	0.80	0.30	0	0	0
5	1	1%	10	0.30	0	0	0	0	0

Table 8 shows an example schedule for filling the newly completed reservoir. Inflow to the reservoir through Check 11 should be ramped up gradually at first to avoid high flow velocities on the new reservoir invert. It would be best to increase inflow gradually from zero to 100 cfs over the first few minutes. The filling strategy in the table suggests increasing inflow in 100 cfs increments every 10 minutes for the first half hour, after which time all three reservoir cells should contain some water.

After that time, inflow can be increased as desired to achieve the desired flow for Coachella Canal downstream from the reservoir. It should take about 3 hours to obtain enough reservoir depth (about 3 feet) to pass 400 cfs out of the reservoir into Pool 14, and approximately another hour to achieve enough depth (about 4 ft) to pass 600 cfs out of the reservoir.

Table 8 – Volume Filling Schedule

Time	Inflow cfs	Cells being filled	Average Depth feet
0	100	1	0.00
10 min	200	1, 2	0.10
20 min	300	1, 2	0.15
30 min	400	1, 2, 3	0.20
40 min	600	1, 2, 3	0.25
50 min	800	1, 2, 3	0.39
1 hr	1000	1, 2, 3	0.58
2 hr	1000	1, 2, 3	2.00
3 hr	1000	1, 2, 3	3.30
4 hr	1000	1, 2, 3	4.50
5 hr	1000	1, 2, 3	5.60



STEP 1

Ⓐ REMOVE PORTION OF EXISTING EMBANKMENT.

Ⓑ CONSTRUCT COMPACTED EMBANKMENT ALONG OLD CANAL USING THE MATERIAL EXCAVATED FROM THE EXISTING EMBANKMENTS.

Ⓒ FURNISH AND PLACE 9-INCH-THICK ROCK PROTECTION ALONG WESTERLY SLOPE.

Ⓓ WORK SHALL BE COMPLETED FOR ALL CELLS WITHOUT DISRUPTING SERVICE TO EXISTING CANAL.

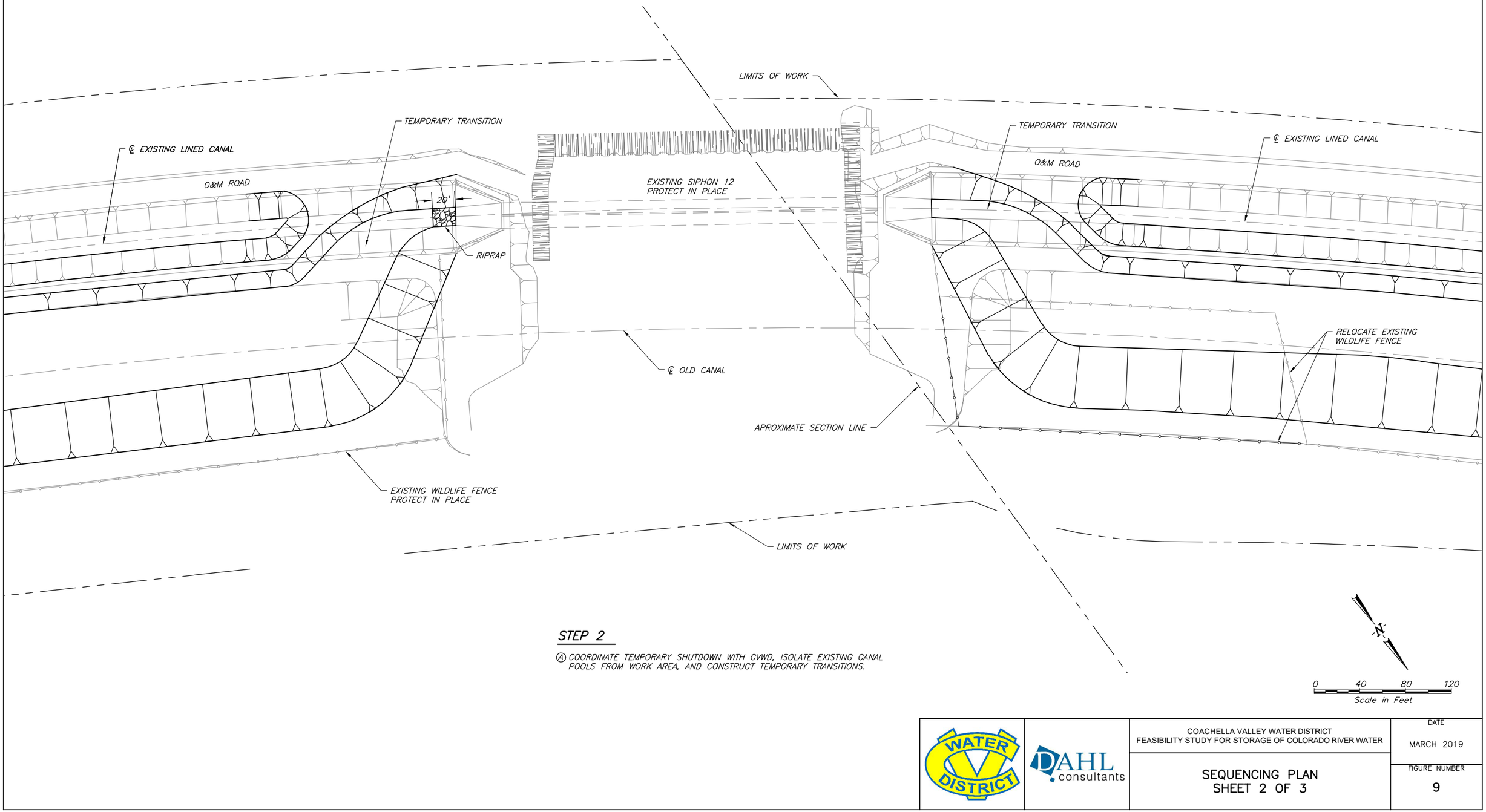
0 15 30
Scale in Feet

COACHELLA VALLEY WATER DISTRICT
FEASIBILITY STUDY FOR STORAGE OF COLORADO RIVER WATER

SEQUENCING PLAN
SHEET 1 OF 3

DATE
MARCH 2019

FIGURE NUMBER
8



STEP 2

Ⓐ COORDINATE TEMPORARY SHUTDOWN WITH CVWD, ISOLATE EXISTING CANAL POOLS FROM WORK AREA, AND CONSTRUCT TEMPORARY TRANSITIONS.

WATER DISTRICT

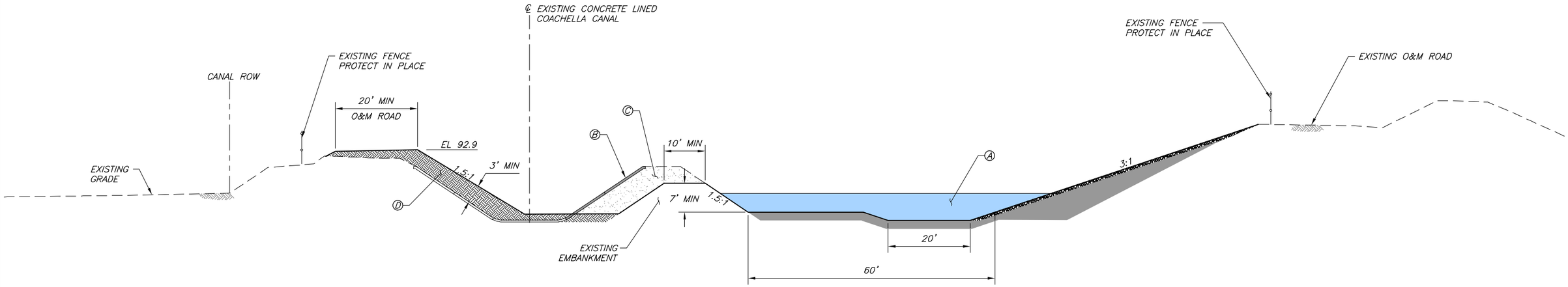
DAHL consultants

COACHELLA VALLEY WATER DISTRICT
FEASIBILITY STUDY FOR STORAGE OF COLORADO RIVER WATER

SEQUENCING PLAN
SHEET 2 OF 3

DATE
MARCH 2019

FIGURE NUMBER
9



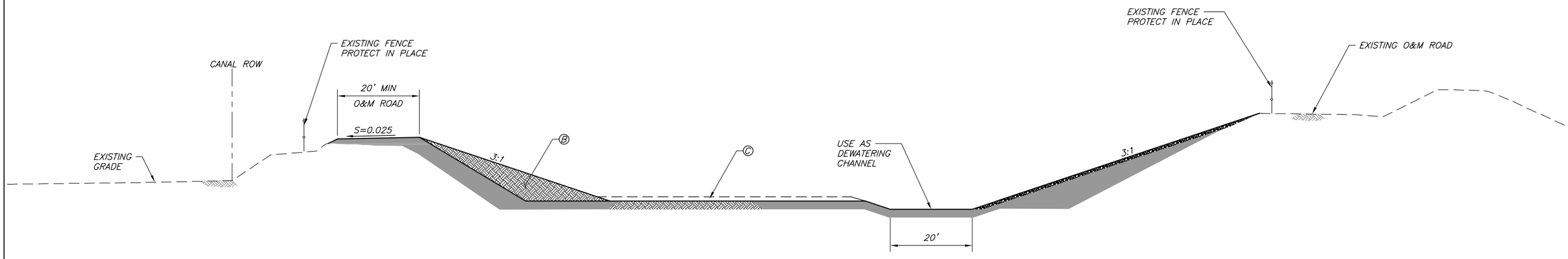
STEP 3

Ⓐ FLOW DIVERTED TO THE OLD CANAL.

Ⓑ CUT AND REMOVE EXISTING LINING ON CANAL RIGHT AND PLACE WASTE MATERIAL ALONG COACHELLA CANAL INVERT. WORK SHALL BE COMPLETED WITHOUT DISRUPTING SERVICE IN THE OLD CANAL.

Ⓒ REMOVE PORTION OF EXISTING EMBANKMENT TO CONSTRUCT CLAY LINER.

Ⓓ CONSTRUCT 3–FOOT–THICK MINIMUM CLAY LINER.



STEP 4

Ⓐ COORDINATE TEMPORARY SHUTDOWN WITH CVWD AND DEWATER OLD CANAL.

Ⓑ USE REMAINING EMBANKMENT MATERIAL FROM STEP 2 TO CONSTRUCT NEW EMBANKEMENT.

Ⓒ ANY EXCESS MATERIAL SHALL BE SPOILED AS SHOWN.

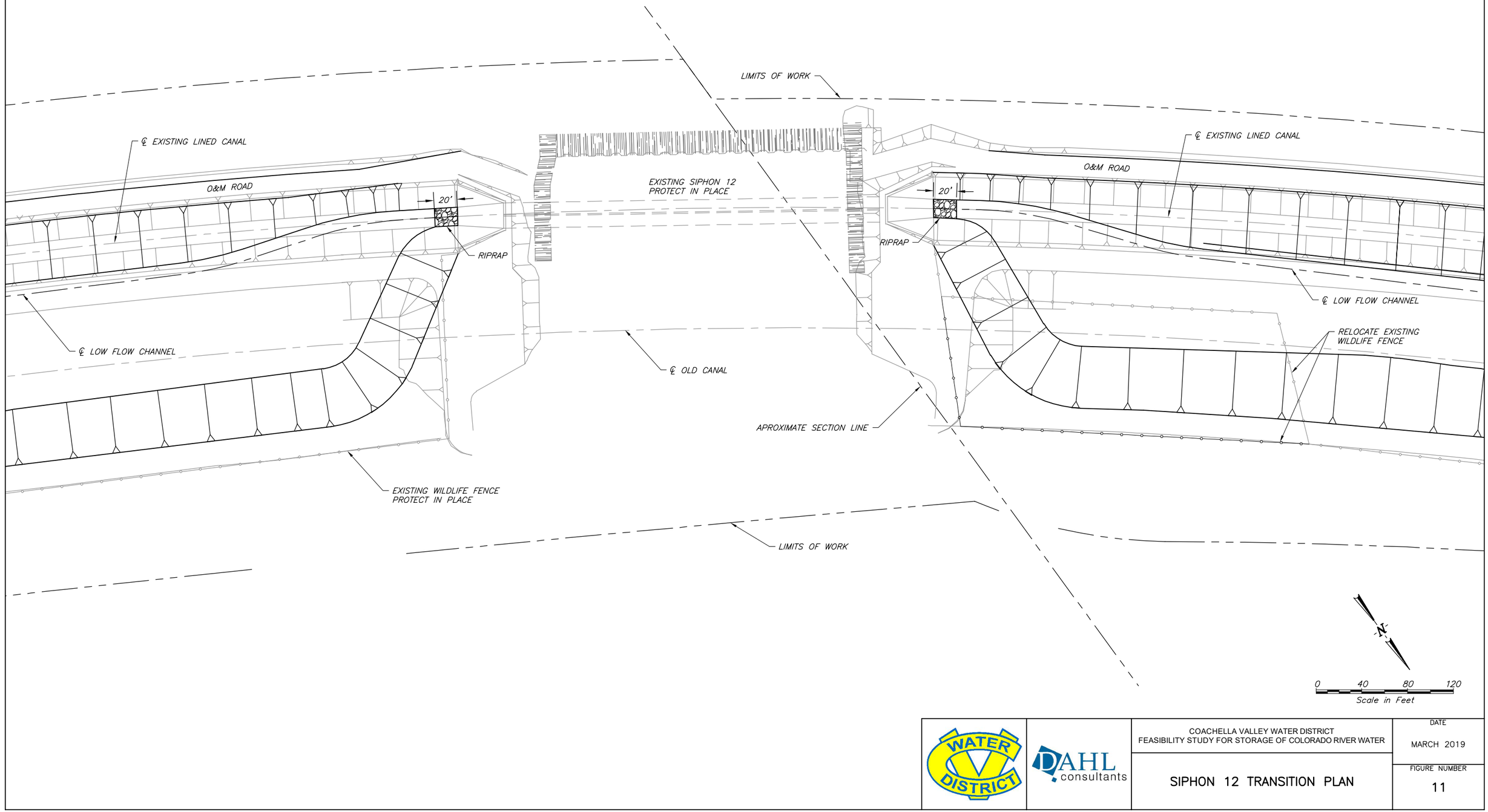
0 15 30
Scale in Feet

COACHELLA VALLEY WATER DISTRICT
FEASIBILITY STUDY FOR STORAGE OF COLORADO RIVER WATER

SEQUENCING PLAN
SHEET 3 OF 3

DATE
MARCH 2019

FIGURE NUMBER
10



WATER DISTRICT

DAHL consultants

COACHELLA VALLEY WATER DISTRICT
FEASIBILITY STUDY FOR STORAGE OF COLORADO RIVER WATER

SIPHON 12 TRANSITION PLAN

DATE
MARCH 2019

FIGURE NUMBER
11

6 Cost Estimates

The estimated project costs are considered between a Class 3 and a Class 4 according to the Cost Estimate Classification System. **Table 9** below shows a Cost Estimate Classification Matrix including Accuracy Ranges and Typical Contingencies. Initial construction cost estimates are shown in **Table 10**.

Table 9 – Cost Estimate Classification Matrix

Estimate Class	LEVEL OF PROJECT DEFINITION Expressed as % of Complete Project Definition	END USAGE Typical Purpose of Estimate	METHODOLOGY Typical Estimating Techniques	EXPECTED ACCURACY RANGE At 90% Confidence Level	TYPICAL CONTINGENCY To Achieve 50% Probability of Overrun/Underrun
5	<=5%	Preliminary Project Screening Estimate, Capital Budget OOM Estimate, Alternate Schemes Evaluation, Strategic Analysis	Capacity Factored, Parametric Models, Judgment, Analogy, Historical Project Comparison, Cost Unit Cost	Low: -20% to -50% High: +30% to +100%	15% to 40%
4	5% to 20%	Preliminary Project Estimate, Reality Check Estimate, Alternate Schemes Evaluation, Feasibility Study	Equipment Factored Parametric Models, Historical Relationship Factors, Broad Unit Cost Data	Low: -15% to -30% High: +20% to +50%	10% to 25%
3	20% to 60%	Project Funding Estimate, Fair Price Check Estimate, Alternate Schemes Evaluation	Semi-Detailed Unit Costs with Assembly Level Line Items by Trade, Historical Relationship Factors	Low: -10% to -20% High: +10% to +30%	5% to 15%
2	60% to 99%	Project Funding Estimate, Control Estimate, Bid Estimate	Detailed Estimating Data by Trade, with Detailed Takeoff Quantities	Low: -5% to -15% High: +5% to +20%	5% to 15% of unexpected funds
1	90% to 100%	Firm Bid Estimate	Detailed Estimating Data by Trade with Detailed Firm Takeoff Quantities	Low: -3% to -10% High: +3% to +15%	3% to 10% Of unexpected funds

*Note: Modified ACCE

Table 10 – Engineer's Opinion of Probable Construction Costs

Item No.	Item Description	Quantity	Unit	Unit Price	Amount
1	Mobilization and Demobilization	1	LS	$ 760,000	$ 760,000
2	Sheeting, Shoring, and Bracing	1	LS	$ 10,000	$ 10,000
3	Storm Water Pollution Prevention Plan (SWPPP)	1	LS	$ 50,000	$ 50,000
4	All-Risk Insurance	1	LS	$ 150,000	$ 150,000
	Cell 1				
5	Clear, scarify, and compact subgrade	1	LS	$ 48,100	$ 48,100
6	Excavation and embankment work	168,714	CY	$ 2.43	$ 409,500
7	Repair drain pipe and install riprap	1	LS	$ 19,000	$ 19,000
8	Construct diversion	1	LS	$ 52,700	$ 52,700
9	Riprap at diversion	200	CY	$ 126.50	$ 25,300
10	Structural concrete	9	CY	$ 2,500	$ 22,500
11	Slope Protection	5,927	CY	$ 20	$ 118,600
	Cell 2				
12	Clear, scarify, and compact subgrade	1	LS	$ 83,500	$ 83,500
13	Excavation and embankment work	275,920	CY	$ 2.56	$ 706,100
14	Repair drain pipe and install riprap	1	LS	$ 19,000	$ 19,000
15	Construct diversion	1	LS	$ 52,700	$ 52,700
16	Riprap at diversion	200	CY	$ 126.50	$ 25,300
17	Structural concrete	9	CY	$ 2,500	$ 22,500
18	Slope Protection	13,002	CY	$ 20	$ 260,100
	Cell 3				
19	Clear, scarify, and compact subgrade	1	LS	$ 66,600	$ 66,600
20	Excavation and embankment work	207,844	CY	$ 2.89	$ 601,500
21	Repair drain pipe and install riprap	1	LS	$ 19,000	$ 19,000
22	Construct diversion	1	LS	$ 52,700	$ 52,700
23	Riprap at diversion	200	CY	$ 126.50	$ 25,300
24	Structural concrete	24	CY	$ 2,500	$ 60,000
25	Slope Protection	11,208	CY	$ 20	$ 224,200
26	Electrical	1	LS	$ 1,200,000	$ 1,200,000
				SUBTOTAL	$ 5,084,200
				CONTINGENCY (25%)	$ 1,271,100
				CONSTRUCTION TOTAL	**$ 6,355,300**

Based on experience and evaluation of construction costs for numerous existing reservoirs, Dahl Consultants has adopted a budget number of about $10,000 per acre-ft as a “rule of thumb” cost for an optimally constructed reservoir. Generally, reservoirs that fit this category have a square footprint (equal sided) and good balance of earthwork i.e. excavation matches required fills. The square footprint minimizes the area of the plastic liner and corresponding concrete cover for any given storage capacity.

The North Shore sites that were evaluated in our previous study had costs as high as $36,000 per acre-ft for the long linear alternatives (in the old canal between Siphons 29 and 32). Other alternatives considered in that study required construction of a new reservoir on the steep terrain adjacent to the canal. That concept required embankments that would have the design water surface elevation at 25 feet or more above the original ground at the downstream toe of embankment. This would have required lengthy and costly approvals from DWR Division of Safety of Dams (DSOD). None of the sites identified in the North Shore area were found to be institutionally and/or economically feasible.

This long and relatively narrow reservoir shape does not match the traditional optimal configuration. However, cost reductions are created by the fact that the reservoir uses a previously excavated canal in a reach of the Coachella Canal that contains significant amounts of impermeable clay. Therefore, the normal costs for excavation, plastic liner, and concrete slope protection are avoided. Based on the preliminary cost estimate and volume of storage, this project can be constructed for less than the target $10,000 per acre-foot.

Appendix E:

Air Quality and GHG Model Data Outputs

Supporting Air Quality Calculations

CalEEMod Version 2020.4.0

1. Project Annual Emissions Output (20 pages)
2. Project Summer Emissions Output (17 page)
3. Project Winter Emissions Output (17 page)

CVWD Mid-Canal Storage Reservoir - Imperial County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

CVWD Mid-Canal Storage Reservoir

Imperial County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	120.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2025
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	189.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Footprint of storage system is approximately 120 acres

Construction Phase - Approximately 6-8 months construction - assume 8 months to be conservative

Off-road Equipment - Eqiupment list from project engineers - off-highway trucks consists of 2 water trucks.

Trips and VMT - Rock material haul length is approximately 5 miles

Grading - Imported rock material from Frink Pit (approx 5 mile trip) for eastern bank protection from wave erosion.

Area Coating -

Construction Off-road Equipment Mitigation - Fugitive Dust BMPs

Fleet Mix -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15

CVWD Mid-Canal Storage Reservoir - Imperial County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstructionPhase	NumDays	310.00	154.00
tblGrading	MaterialImported	0.00	45,700.00
tblLandUse	LotAcreage	0.00	120.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	5.00

2.0 Emissions Summary

CVWD Mid-Canal Storage Reservoir - Imperial County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.4336	4.3457	2.9289	7.9900e-003	25.9920	0.1739	26.1659	3.1549	0.1601	3.3150	0.0000	704.1489	704.1489	0.2129	5.4500e-003	711.0940
2024	0.1754	1.7065	1.1921	3.2900e-003	11.0480	0.0685	11.1165	1.3369	0.0630	1.3999	0.0000	290.2482	290.2482	0.0878	2.2000e-003	293.1001
Maximum	**0.4336**	**4.3457**	**2.9289**	**7.9900e-003**	**25.9920**	**0.1739**	**26.1659**	**3.1549**	**0.1601**	**3.3150**	**0.0000**	**704.1489**	**704.1489**	**0.2129**	**5.4500e-003**	**711.0940**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.4336	4.3457	2.9289	7.9900e-003	0.8128	0.1739	0.9867	0.3353	0.1601	0.4954	0.0000	704.1481	704.1481	0.2129	5.4500e-003	711.0932
2024	0.1754	1.7065	1.1921	3.2900e-003	0.4784	0.0685	0.5468	0.1539	0.0630	0.2169	0.0000	290.2479	290.2479	0.0878	2.2000e-003	293.0997
Maximum	**0.4336**	**4.3457**	**2.9289**	**7.9900e-003**	**0.8128**	**0.1739**	**0.9867**	**0.3353**	**0.1601**	**0.4954**	**0.0000**	**704.1481**	**704.1481**	**0.2129**	**5.4500e-003**	**711.0932**

CVWD Mid-Canal Storage Reservoir - Imperial County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**96.51**	**0.00**	**95.89**	**89.11**	**0.00**	**84.89**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**8-1-2023**	**10-31-2023**	2.8805	2.8805
2	**11-1-2023**	**1-31-2024**	2.8377	2.8377
3	**2-1-2024**	**4-30-2024**	0.8965	0.8965
		Highest	2.8805	2.8805

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	8/1/2023	3/1/2024	5	154	

Acres of Grading (Site Preparation Phase): 0

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Acres of Grading (Grading Phase): 1010.63

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading		0			
Grading	Excavators	1	7.50	158	0.38
Grading	Graders	2	7.50	187	0.41
Grading	Off-Highway Trucks	2	7.50	402	0.38
Grading	Plate Compactors	2	7.50	8	0.43
Grading	Rubber Tired Dozers	4	7.50	247	0.40
Grading	Scrapers	4	7.50	367	0.48
Grading	Tractors/Loaders/Backhoes	2	7.50	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	17	43.00	0.00	5,713.00	10.20	11.90	5.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.7712	0.0000	1.7712	0.7351	0.0000	0.7351	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.4206	4.2513	2.8141	7.5100e-003		0.1732	0.1732		0.1594	0.1594	0.0000	658.2939	658.2939	0.2122	0.0000	663.5990
Total	**0.4206**	**4.2513**	**2.8141**	**7.5100e-003**	**1.7712**	**0.1732**	**1.9444**	**0.7351**	**0.1594**	**0.8945**	**0.0000**	**658.2939**	**658.2939**	**0.2122**	**0.0000**	**663.5990**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.5100e-003	0.0888	0.0491	3.3000e-004	7.1996	6.4000e-004	7.2002	0.7195	6.1000e-004	0.7201	0.0000	31.7365	31.7365	1.7000e-004	4.9900e-003	33.2274
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.4900e-003	5.5700e-003	0.0657	1.5000e-004	17.0212	9.0000e-005	17.0213	1.7004	8.0000e-005	1.7004	0.0000	14.1185	14.1185	4.7000e-004	4.6000e-004	14.2676
Total	**0.0130**	**0.0943**	**0.1148**	**4.8000e-004**	**24.2208**	**7.3000e-004**	**24.2216**	**2.4198**	**6.9000e-004**	**2.4205**	**0.0000**	**45.8550**	**45.8550**	**6.4000e-004**	**5.4500e-003**	**47.4950**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Grading - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.7970	0.0000	0.7970	0.3308	0.0000	0.3308	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.4206	4.2513	2.8141	7.5100e-003		0.1732	0.1732		0.1594	0.1594	0.0000	658.2931	658.2931	0.2122	0.0000	663.5982
Total	**0.4206**	**4.2513**	**2.8141**	**7.5100e-003**	**0.7970**	**0.1732**	**0.9702**	**0.3308**	**0.1594**	**0.4902**	**0.0000**	**658.2931**	**658.2931**	**0.2122**	**0.0000**	**663.5982**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.5100e-003	0.0888	0.0491	3.3000e-004	5.5300e-003	6.4000e-004	6.1700e-003	1.6200e-003	6.1000e-004	2.2300e-003	0.0000	31.7365	31.7365	1.7000e-004	4.9900e-003	33.2274
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.4900e-003	5.5700e-003	0.0657	1.5000e-004	0.0102	9.0000e-005	0.0103	2.8700e-003	8.0000e-005	2.9500e-003	0.0000	14.1185	14.1185	4.7000e-004	4.6000e-004	14.2676
Total	**0.0130**	**0.0943**	**0.1148**	**4.8000e-004**	**0.0158**	**7.3000e-004**	**0.0165**	**4.4900e-003**	**6.9000e-004**	**5.1800e-003**	**0.0000**	**45.8550**	**45.8550**	**6.4000e-004**	**5.4500e-003**	**47.4950**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0486	0.0000	1.0486	0.3379	0.0000	0.3379	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1703	1.6677	1.1467	3.1000e-003		0.0682	0.0682		0.0628	0.0628	0.0000	271.7070	271.7070	0.0876	0.0000	273.8967
Total	**0.1703**	**1.6677**	**1.1467**	**3.1000e-003**	**1.0486**	**0.0682**	**1.1167**	**0.3379**	**0.0628**	**0.4006**	**0.0000**	**271.7070**	**271.7070**	**0.0876**	**0.0000**	**273.8967**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4500e-003	0.0367	0.0204	1.3000e-004	2.9723	2.6000e-004	2.9726	0.2970	2.5000e-004	0.2973	0.0000	12.8867	12.8867	7.0000e-005	2.0300e-003	13.4922
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.6400e-003	2.0400e-003	0.0250	6.0000e-005	7.0271	4.0000e-005	7.0271	0.7020	3.0000e-005	0.7020	0.0000	5.6545	5.6545	1.8000e-004	1.8000e-004	5.7112
Total	**5.0900e-003**	**0.0387**	**0.0454**	**1.9000e-004**	**9.9994**	**3.0000e-004**	**9.9997**	**0.9990**	**2.8000e-004**	**0.9993**	**0.0000**	**18.5412**	**18.5412**	**2.5000e-004**	**2.2100e-003**	**19.2034**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Grading - 2024

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4719	0.0000	0.4719	0.1520	0.0000	0.1520	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1703	1.6677	1.1467	3.1000e-003		0.0682	0.0682		0.0628	0.0628	0.0000	271.7067	271.7067	0.0876	0.0000	273.8963
Total	**0.1703**	**1.6677**	**1.1467**	**3.1000e-003**	**0.4719**	**0.0682**	**0.5400**	**0.1520**	**0.0628**	**0.2148**	**0.0000**	**271.7067**	**271.7067**	**0.0876**	**0.0000**	**273.8963**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.4500e-003	0.0367	0.0204	1.3000e-004	2.2800e-003	2.6000e-004	2.5500e-003	6.7000e-004	2.5000e-004	9.2000e-004	0.0000	12.8867	12.8867	7.0000e-005	2.0300e-003	13.4922
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.6400e-003	2.0400e-003	0.0250	6.0000e-005	4.2200e-003	4.0000e-005	4.2500e-003	1.1800e-003	3.0000e-005	1.2200e-003	0.0000	5.6545	5.6545	1.8000e-004	1.8000e-004	5.7112
Total	**5.0900e-003**	**0.0387**	**0.0454**	**1.9000e-004**	**6.5000e-003**	**3.0000e-004**	**6.8000e-003**	**1.8500e-003**	**2.8000e-004**	**2.1400e-003**	**0.0000**	**18.5412**	**18.5412**	**2.5000e-004**	**2.2100e-003**	**19.2034**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	16.40	9.50	11.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.530702	0.059328	0.179664	0.144474	0.026250	0.006790	0.008325	0.016302	0.000941	0.000118	0.022966	0.000752	0.003388

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

CVWD Mid-Canal Storage Reservoir - Imperial County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

CVWD Mid-Canal Storage Reservoir - Imperial County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

CVWD Mid-Canal Storage Reservoir - Imperial County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Unmitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

CVWD Mid-Canal Storage Reservoir - Imperial County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

CVWD Mid-Canal Storage Reservoir - Imperial County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

CVWD Mid-Canal Storage Reservoir - Imperial County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

CVWD Mid-Canal Storage Reservoir - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

CVWD Mid-Canal Storage Reservoir

Imperial County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	120.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2025
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	189.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Footprint of storage system is approximately 120 acres

Construction Phase - Approximately 6-8 months construction - assume 8 months to be conservative

Off-road Equipment - Eqiupment list from project engineers - off-highway trucks consists of 2 water trucks.

Trips and VMT - Rock material haul length is approximately 5 miles

Grading - Imported rock material from Frink Pit (approx 5 mile trip) for eastern bank protection from wave erosion.

Area Coating -

Construction Off-road Equipment Mitigation - Fugitive Dust BMPs

Fleet Mix -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15

CVWD Mid-Canal Storage Reservoir - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstructionPhase	NumDays	310.00	154.00
tblGrading	MaterialImported	0.00	45,700.00
tblLandUse	LotAcreage	0.00	120.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	5.00

2.0 Emissions Summary

CVWD Mid-Canal Storage Reservoir - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	8.0007	79.6355	54.0284	0.1469	489.1198	3.1908	492.3106	59.0816	2.9375	62.0190	0.0000	14,268.0492	14,268.0492	4.3055	0.1099	14,408.4223
2024	7.8351	75.7409	53.2454	0.1467	489.1198	3.0433	492.1631	59.0816	2.8017	61.8833	0.0000	14,244.8536	14,244.8536	4.3035	0.1075	14,384.4764
Maximum	**8.0007**	**79.6355**	**54.0284**	**0.1469**	**489.1198**	**3.1908**	**492.3106**	**59.0816**	**2.9375**	**62.0190**	**0.0000**	**14,268.0492**	**14,268.0492**	**4.3055**	**0.1099**	**14,408.4223**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	8.0007	79.6355	54.0284	0.1469	13.6113	3.1908	16.8021	6.0109	2.9375	8.9484	0.0000	14,268.0492	14,268.0492	4.3055	0.1099	14,408.4223
2024	7.8351	75.7409	53.2454	0.1467	13.6113	3.0433	16.6546	6.0109	2.8017	8.8126	0.0000	14,244.8535	14,244.8535	4.3035	0.1075	14,384.4764
Maximum	**8.0007**	**79.6355**	**54.0284**	**0.1469**	**13.6113**	**3.1908**	**16.8021**	**6.0109**	**2.9375**	**8.9484**	**0.0000**	**14,268.0492**	**14,268.0492**	**4.3055**	**0.1099**	**14,408.4223**

CVWD Mid-Canal Storage Reservoir - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	97.22	0.00	96.60	89.83	0.00	85.67	0.00	0.00	0.00	0.00	0.00	0.00

CVWD Mid-Canal Storage Reservoir - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

CVWD Mid-Canal Storage Reservoir - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	8/1/2023	3/1/2024	5	154	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1010.63

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading		0			
Grading	Excavators	1	7.50	158	0.38
Grading	Graders	2	7.50	187	0.41
Grading	Off-Highway Trucks	2	7.50	402	0.38
Grading	Plate Compactors	2	7.50	8	0.43
Grading	Rubber Tired Dozers	4	7.50	247	0.40
Grading	Scrapers	4	7.50	367	0.48
Grading	Tractors/Loaders/Backhoes	2	7.50	97	0.37

Trips and VMT

CVWD Mid-Canal Storage Reservoir - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	17	43.00	0.00	5,713.00	10.20	11.90	5.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					29.6015	0.0000	29.6015	13.1738	0.0000	13.1738			0.0000			0.0000
Off-Road	7.7175	78.0063	51.6347	0.1378		3.1775	3.1775		2.9248	2.9248		13,314.5838	13,314.5838	4.2920		13,421.8841
Total	**7.7175**	**78.0063**	**51.6347**	**0.1378**	**29.6015**	**3.1775**	**32.7790**	**13.1738**	**2.9248**	**16.0986**		**13,314.5838**	**13,314.5838**	**4.2920**		**13,421.8841**

CVWD Mid-Canal Storage Reservoir - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Grading - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0679	1.5296	0.8901	6.0400e-003	136.5906	0.0117	136.6022	13.6496	0.0112	13.6608		640.1663	640.1663	3.5700e-003	0.1006	670.2434
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.2153	0.0997	1.5036	3.1000e-003	322.9278	1.6500e-003	322.9294	32.2582	1.5200e-003	32.2597		313.2991	313.2991	9.9100e-003	9.2200e-003	316.2949
Total	**0.2832**	**1.6293**	**2.3937**	**9.1400e-003**	**459.5183**	**0.0133**	**459.5316**	**45.9078**	**0.0127**	**45.9205**		**953.4654**	**953.4654**	**0.0135**	**0.1099**	**986.5382**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					13.3207	0.0000	13.3207	5.9282	0.0000	5.9282			0.0000			0.0000
Off-Road	7.7175	78.0063	51.6347	0.1378		3.1775	3.1775		2.9248	2.9248	0.0000	13,314.5838	13,314.5838	4.2920		13,421.8840
Total	**7.7175**	**78.0063**	**51.6347**	**0.1378**	**13.3207**	**3.1775**	**16.4982**	**5.9282**	**2.9248**	**8.8530**	**0.0000**	**13,314.5838**	**13,314.5838**	**4.2920**		**13,421.8840**

CVWD Mid-Canal Storage Reservoir - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Grading - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0679	1.5296	0.8901	6.0400e-003	0.1020	0.0117	0.1136	0.0298	0.0112	0.0410		640.1663	640.1663	3.5700e-003	0.1006	670.2434
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.2153	0.0997	1.5036	3.1000e-003	0.1887	1.6500e-003	0.1903	0.0529	1.5200e-003	0.0544		313.2991	313.2991	9.9100e-003	9.2200e-003	316.2949
Total	**0.2832**	**1.6293**	**2.3937**	**9.1400e-003**	**0.2906**	**0.0133**	**0.3039**	**0.0827**	**0.0127**	**0.0954**		**953.4654**	**953.4654**	**0.0135**	**0.1099**	**986.5382**

3.2 Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					29.6015	0.0000	29.6015	13.1738	0.0000	13.1738			0.0000			0.0000
Off-Road	7.5676	74.1211	50.9652	0.1377		3.0301	3.0301		2.7891	2.7891		13,311.3651	13,311.3651	4.2910		13,418.6393
Total	**7.5676**	**74.1211**	**50.9652**	**0.1377**	**29.6015**	**3.0301**	**32.6316**	**13.1738**	**2.7891**	**15.9629**		**13,311.3651**	**13,311.3651**	**4.2910**		**13,418.6393**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Grading - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0680	1.5313	0.8937	5.9400e-003	136.5906	0.0116	136.6022	13.6496	0.0111	13.6608		629.6226	629.6226	3.6300e-003	0.0990	659.2072
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1995	0.0885	1.3866	3.0100e-003	322.9278	1.5700e-003	322.9293	32.2582	1.4400e-003	32.2596		303.8659	303.8659	8.9400e-003	8.5300e-003	306.6300
Total	**0.2676**	**1.6198**	**2.2803**	**8.9500e-003**	**459.5183**	**0.0132**	**459.5315**	**45.9078**	**0.0126**	**45.9204**		**933.4885**	**933.4885**	**0.0126**	**0.1075**	**965.8372**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					13.3207	0.0000	13.3207	5.9282	0.0000	5.9282			0.0000			0.0000
Off-Road	7.5676	74.1211	50.9652	0.1377		3.0301	3.0301		2.7891	2.7891	0.0000	13,311.3651	13,311.3651	4.2910		13,418.6393
Total	**7.5676**	**74.1211**	**50.9652**	**0.1377**	**13.3207**	**3.0301**	**16.3507**	**5.9282**	**2.7891**	**8.7173**	**0.0000**	**13,311.3651**	**13,311.3651**	**4.2910**		**13,418.6393**

CVWD Mid-Canal Storage Reservoir - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Grading - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0680	1.5313	0.8937	5.9400e-003	0.1020	0.0116	0.1136	0.0298	0.0111	0.0409		629.6226	629.6226	3.6300e-003	0.0990	659.2072
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1995	0.0885	1.3866	3.0100e-003	0.1887	1.5700e-003	0.1902	0.0529	1.4400e-003	0.0544		303.8659	303.8659	8.9400e-003	8.5300e-003	306.6300
Total	**0.2676**	**1.6198**	**2.2803**	**8.9500e-003**	**0.2906**	**0.0132**	**0.3038**	**0.0827**	**0.0126**	**0.0953**		**933.4885**	**933.4885**	**0.0126**	**0.1075**	**965.8372**

CVWD Mid-Canal Storage Reservoir - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	16.40	9.50	11.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.530702	0.059328	0.179664	0.144474	0.026250	0.006790	0.008325	0.016302	0.000941	0.000118	0.022966	0.000752	0.003388

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

CVWD Mid-Canal Storage Reservoir - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

CVWD Mid-Canal Storage Reservoir - Imperial County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

CVWD Mid-Canal Storage Reservoir - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

CVWD Mid-Canal Storage Reservoir

Imperial County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	120.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2025
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	189.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Footprint of storage system is approximately 120 acres

Construction Phase - Approximately 6-8 months construction - assume 8 months to be conservative

Off-road Equipment - Eqiupment list from project engineers - off-highway trucks consists of 2 water trucks.

Trips and VMT - Rock material haul length is approximately 5 miles

Grading - Imported rock material from Frink Pit (approx 5 mile trip) for eastern bank protection from wave erosion.

Area Coating -

Construction Off-road Equipment Mitigation - Fugitive Dust BMPs

Fleet Mix -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15

CVWD Mid-Canal Storage Reservoir - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstructionPhase	NumDays	310.00	154.00
tblGrading	MaterialImported	0.00	45,700.00
tblLandUse	LotAcreage	0.00	120.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50
tblOffRoadEquipment	UsageHours	8.00	7.50
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	5.00

2.0 Emissions Summary

CVWD Mid-Canal Storage Reservoir - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	7.9390	79.7924	53.6268	0.1465	489.1198	3.1909	492.3107	59.0816	2.9375	62.0191	0.0000	14,225.1799	14,225.1799	4.3052	0.1107	14,365.8041
2024	7.7781	75.8975	52.8790	0.1463	489.1198	3.0433	492.1632	59.0816	2.8018	61.8834	0.0000	14,203.4687	14,203.4687	4.3033	0.1083	14,343.3340
Maximum	**7.9390**	**79.7924**	**53.6268**	**0.1465**	**489.1198**	**3.1909**	**492.3107**	**59.0816**	**2.9375**	**62.0191**	**0.0000**	**14,225.1799**	**14,225.1799**	**4.3052**	**0.1107**	**14,365.8041**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	7.9390	79.7924	53.6268	0.1465	13.6113	3.1909	16.8022	6.0109	2.9375	8.9485	0.0000	14,225.1799	14,225.1799	4.3052	0.1107	14,365.8041
2024	7.7781	75.8975	52.8790	0.1463	13.6113	3.0433	16.6546	6.0109	2.8018	8.8127	0.0000	14,203.4687	14,203.4687	4.3033	0.1083	14,343.3340
Maximum	**7.9390**	**79.7924**	**53.6268**	**0.1465**	**13.6113**	**3.1909**	**16.8022**	**6.0109**	**2.9375**	**8.9485**	**0.0000**	**14,225.1799**	**14,225.1799**	**4.3052**	**0.1107**	**14,365.8041**

CVWD Mid-Canal Storage Reservoir - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	97.22	0.00	96.60	89.83	0.00	85.67	0.00	0.00	0.00	0.00	0.00	0.00

CVWD Mid-Canal Storage Reservoir - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

CVWD Mid-Canal Storage Reservoir - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	8/1/2023	3/1/2024	5	154	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1010.63

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading		0			
Grading	Excavators	1	7.50	158	0.38
Grading	Graders	2	7.50	187	0.41
Grading	Off-Highway Trucks	2	7.50	402	0.38
Grading	Plate Compactors	2	7.50	8	0.43
Grading	Rubber Tired Dozers	4	7.50	247	0.40
Grading	Scrapers	4	7.50	367	0.48
Grading	Tractors/Loaders/Backhoes	2	7.50	97	0.37

Trips and VMT

CVWD Mid-Canal Storage Reservoir - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	17	43.00	0.00	5,713.00	10.20	11.90	5.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					29.6015	0.0000	29.6015	13.1738	0.0000	13.1738			0.0000			0.0000
Off-Road	7.7175	78.0063	51.6347	0.1378		3.1775	3.1775		2.9248	2.9248		13,314.5838	13,314.5838	4.2920		13,421.8841
Total	**7.7175**	**78.0063**	**51.6347**	**0.1378**	**29.6015**	**3.1775**	**32.7790**	**13.1738**	**2.9248**	**16.0986**		**13,314.5838**	**13,314.5838**	**4.2920**		**13,421.8841**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Grading - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0598	1.6819	0.9166	6.0800e-003	136.5906	0.0117	136.6023	13.6496	0.0112	13.6609		644.2920	644.2920	3.2000e-003	0.1013	674.5538
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1617	0.1042	1.0754	2.6300e-003	322.9278	1.6500e-003	322.9294	32.2582	1.5200e-003	32.2597		266.3041	266.3041	0.0100	9.4400e-003	269.3662
Total	**0.2216**	**1.7861**	**1.9921**	**8.7100e-003**	**459.5183**	**0.0134**	**459.5317**	**45.9078**	**0.0128**	**45.9206**		**910.5960**	**910.5960**	**0.0132**	**0.1107**	**943.9200**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					13.3207	0.0000	13.3207	5.9282	0.0000	5.9282			0.0000			0.0000
Off-Road	7.7175	78.0063	51.6347	0.1378		3.1775	3.1775		2.9248	2.9248	0.0000	13,314.5838	13,314.5838	4.2920		13,421.8840
Total	**7.7175**	**78.0063**	**51.6347**	**0.1378**	**13.3207**	**3.1775**	**16.4982**	**5.9282**	**2.9248**	**8.8530**	**0.0000**	**13,314.5838**	**13,314.5838**	**4.2920**		**13,421.8840**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Grading - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0598	1.6819	0.9166	6.0800e-003	0.1020	0.0117	0.1137	0.0298	0.0112	0.0410		644.2920	644.2920	3.2000e-003	0.1013	674.5538
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1617	0.1042	1.0754	2.6300e-003	0.1887	1.6500e-003	0.1903	0.0529	1.5200e-003	0.0544		266.3041	266.3041	0.0100	9.4400e-003	269.3662
Total	**0.2216**	**1.7861**	**1.9921**	**8.7100e-003**	**0.2906**	**0.0134**	**0.3040**	**0.0827**	**0.0128**	**0.0955**		**910.5960**	**910.5960**	**0.0132**	**0.1107**	**943.9200**

3.2 Grading - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					29.6015	0.0000	29.6015	13.1738	0.0000	13.1738			0.0000			0.0000
Off-Road	7.5676	74.1211	50.9652	0.1377		3.0301	3.0301		2.7891	2.7891		13,311.3651	13,311.3651	4.2910		13,418.6393
Total	**7.5676**	**74.1211**	**50.9652**	**0.1377**	**29.6015**	**3.0301**	**32.6316**	**13.1738**	**2.7891**	**15.9629**		**13,311.3651**	**13,311.3651**	**4.2910**		**13,418.6393**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Grading - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0599	1.6841	0.9202	5.9800e-003	136.5906	0.0117	136.6023	13.6496	0.0112	13.6608		633.7159	633.7159	3.2600e-003	0.0996	663.4836
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1506	0.0924	0.9936	2.5600e-003	322.9278	1.5700e-003	322.9293	32.2582	1.4400e-003	32.2596		258.3878	258.3878	9.0600e-003	8.7100e-003	261.2112
Total	**0.2106**	**1.7764**	**1.9139**	**8.5400e-003**	**459.5183**	**0.0133**	**459.5316**	**45.9078**	**0.0126**	**45.9205**		**892.1036**	**892.1036**	**0.0123**	**0.1083**	**924.6948**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					13.3207	0.0000	13.3207	5.9282	0.0000	5.9282			0.0000			0.0000
Off-Road	7.5676	74.1211	50.9652	0.1377		3.0301	3.0301		2.7891	2.7891	0.0000	13,311.3651	13,311.3651	4.2910		13,418.6393
Total	**7.5676**	**74.1211**	**50.9652**	**0.1377**	**13.3207**	**3.0301**	**16.3507**	**5.9282**	**2.7891**	**8.7173**	**0.0000**	**13,311.3651**	**13,311.3651**	**4.2910**		**13,418.6393**

CVWD Mid-Canal Storage Reservoir - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Grading - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0599	1.6841	0.9202	5.9800e-003	0.1020	0.0117	0.1137	0.0298	0.0112	0.0410		633.7159	633.7159	3.2600e-003	0.0996	663.4836
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1506	0.0924	0.9936	2.5600e-003	0.1887	1.5700e-003	0.1902	0.0529	1.4400e-003	0.0544		258.3878	258.3878	9.0600e-003	8.7100e-003	261.2112
Total	**0.2106**	**1.7764**	**1.9139**	**8.5400e-003**	**0.2906**	**0.0133**	**0.3039**	**0.0827**	**0.0126**	**0.0954**		**892.1036**	**892.1036**	**0.0123**	**0.1083**	**924.6948**

CVWD Mid-Canal Storage Reservoir - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	16.40	9.50	11.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.530702	0.059328	0.179664	0.144474	0.026250	0.006790	0.008325	0.016302	0.000941	0.000118	0.022966	0.000752	0.003388

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

CVWD Mid-Canal Storage Reservoir - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

CVWD Mid-Canal Storage Reservoir - Imperial County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation