BUREAU OF RECLAMATION

DRAFT Environmental Assessment for the El Paso Aquifer Storage and Recovery Enhanced Arroyo Project

City of El Paso, El Paso County, Texas

U.S. Department of the Interior

August 2022

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 those 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.

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1.0 INTRODUCTION

This draft Environmental Assessment (EA) was prepared to examine the potential environmental impacts of the Northeast Aquifer Storage and Recovery (ASR) Phase 1 project. This action is proposed by the City of El Paso (the City) in El Paso County, Texas. Exhibit 1.0-1 shows the general project location. If approved, the U.S. Bureau of Reclamation (Reclamation) would authorize the use of Federal funds to construct an aquifer recharge infiltration basin and piping to convey treated water to the basin from an existing treated water pipeline. The proposed basin would be approximately 2 miles in length and be landscaped to resemble an arroyo feature. The proposed pipeline would tie into a treated water pipeline located approximately one mile west of McCombs St. and convey treated water to the basin, whose eastern extent would front Martin Luther King Jr. Blvd. The proposed project would be on city-owned land that is undeveloped. The basin would be landscaped with native vegetation to provide enhanced habitat value, and walking trails and other amenities would be added for recreational value.

This draft EA evaluates the potential effects of the Proposed Action to determine if it would cause significant impacts to the human or natural environment, as defined by the National Environmental Policy Act (NEPA) of 1969. If the draft EA shows no significant impacts associated with implementation of the Proposed Action, then a Finding of No Significant Impact (FONSI) would be issued by Reclamation. Otherwise, an Environmental Impact Statement (EIS) would be necessary prior to Implementation of the Proposed Action.



Legend

Study Area

0 2,000 4,000 8,000 Feet

N

DATA SOURCES:
City of El Paso
TXNDD
ESRI World Street Map

Project No.: 9422P002	**Vicinity Map**	**Exhibit**
Date: Jun 2022	City of El Paso City of El Paso ASR El Paso County, TX Center 106.4252°W 31.9572°N	**1.0-1**
Drawn By: SMS		
Reviewed By: JP		

1.1 Purpose and Need for Project

The proposed project is one phase of the City's ASR project. The City currently has an allocation water right for the withdrawal of raw water from the Rio Grande River. The proposed project would utilize treated water obtained from the Rio Grande River in times of excess supply to recharge the Hueco Bolson Aquifer underlying the City. During times of drought or decreased water supply from the Rio Grande River, the City could utilize water from the aquifer to augment their water needs. The Texas State Water Plan shows that the projected water demand for El Paso Water will exceed supply by approximately the Year 2045 unless additional measures are taken to increase supply (TWDB 2022). This proposed project provides one strategy for a sustained water supply to meet demand by adding 4,500 to 15,000 acre feet/year of recharge to the Hueco Bolson Aquifer for later withdrawal. Recurring drought conditions further emphasize the need for alternate water supplies, as well as the need to maintain aquifer water availability. The projected water supply needs of the City and uncertain climatic stressors on water supply demonstrate the need for the proposed project.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

The proposed action is to provide $3,250,000 in funding to the City from Reclamation through the Title XVI WIIN (Water Infrastructure Improvements for the Nation Act) Water Reclamation and Reuse Projects grant for the construction of the proposed project.

This action would lead to the construction of the proposed Phase 1 ASR Enhanced Arroyo project to support long-range drought resilience and groundwater sustainability for the City of El Paso and the Hueco Bolson Aquifer. The City proposes to construct an Enhanced Arroyo aquifer infiltration basin consisting of the excavation and construction of an infiltration basin shaped like a riparian arroyo system and treated water pipelines that would supply treated water to the basin for temporary surface storage and infiltration for aquifer recharge.

The proposed approximately 2-mile-long infiltration basin would be located in northeast El Paso. The proposed basin would occupy a 275' wide area. The basin would resemble a linear channel excavated with a bottom depth below restrictive ground layers to enhance infiltration of treated water into the Hueco Bolson Aquifer. The eastern extent of the basin would front McCombs Street, and the western extent would front Martin Luther King Jr. Blvd. The slope of the existing terrain where the basin is located is from the west to the east. The basin would also follow a west to east slope to reduce the amount of excavation. Treated water would be delivered to sections of the basin to allow infiltration of the water into the underlying aquifer. Phase 1 of the project would construct approximately one mile of the basin west from McCombs Street, and Phases 2 and 3 would continue the basin an additional mile west to Martin Luther King Jr. Blvd.

The treated water pipeline, with diameters ranging from 16 to 24 inches, would be installed parallel to the basin to supply treated water to the basin. The pipeline would be installed in a 27-foot-wide right of way on the north side of the basin project. From the treated water pipeline, treated water would be piped into concrete weir structures spaced laterally in the basin. The concrete weirs would allow for water to flow into different sections of the basin while controlling erosive velocities. At the center of the basin project connections to the existing treated water pipeline would include fittings for connecting to future treated water supply pipelines. Phase 1 of the proposed project would also involve connecting treated water lines feeding into the basin to existing water lines one mile west of McCombs Street. The segments of existing water line to be utilized are included within project limits. Design drawings of the proposed project are included in Appendix B; design sheet C2.1 illustrates the existing water line locations and sheet C4.0 depicts the overall site plan.

In addition to the basin excavation, access and utility maintenance roads on the edge of and in the basin would be constructed. A parking lot would be created immediately west of McCombs Street for facilitated basin access. During construction, the proposed parking lot area would be utilized as a staging area and concrete truck wash station (see design sheet C14.2 in Appendix B). Walking paths and park amenities would also be constructed to provide recreation value to the project. Native riparian vegetation would also be planted in the limits of the basin project to provide habitat value to the project (see design sheet C4.0).

Excavated soil would be stockpiled on-site and hauled off for use as fill off-site or at a suitable storage area.

Maintenance operations of the facility would include upkeep of recreational infrastructure and habitat landscaping. Maintenance earthwork would be minimal and primarily involve correction of erosional damage from stormflows, and removal of sediment accumulations from the basin bottom. This facility would be included in El Paso's city-wide facility operations and maintenance program.

Under the Proposed Action, the City and Reclamation would address the purpose and need of Rio Grande water to recharge the Hueco Bolson aquifer and ensure consistency with federal regulations. Upon completion of the project, the operation and maintenance of the facility will be solely by the City.

2.2 No Action Alternative

Under the no-action alternative, the proposed project would not be constructed and alternate plans for long-range drought resilience and groundwater sustainability for the City of El Paso and the Hueco Bolson Aquifer would need to be developed; however at the time of this document, alternative plans are unknown.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Several resources were considered for review but eliminated from further analysis because they did not occur in the Proposed Action area or the potential effect to the resource would be negligible. Table 3.0 lists resources that would not be impacted.

Table 3.0 Resources Eliminated from Further Analysis

Resource	Rationale for Elimination from Further Analysis
Energy	Energy would be consumed by the vehicles and equipment associated with the construction of the basin. Post-construction, minimal energy may be required for pumping water from the pipeline into the concrete weirs if existing water pressure is not sufficient to convey the treated water to the basin. There are currently no project considerations for pumps servicing the proposed project.
Formally Classified Land	The nearest protected area is the Franklin Mountains State Park located approximately two miles west of the project area, so there are no anticipated impacts to formally classified lands.
Growth and Population	Population levels and growth projections are not expected to change during or post-construction of the basin. The proposed project would be implemented to accommodate projected population growth and not to influence increased growth above projected amounts.
Important Farmland	The project area consists of undeveloped land wholly rated as "not prime farmland." Therefore, land within the study area is not subject to protection by the Farmland Protection Policy Act.
Topography	Elevation changes across the site are approximately 30 feet. During excavation and construction activities, the topography in the project area would be altered to allow for increased flow and water capacity to the site but the general topography in the vicinity and immediately surrounding the basin would remain the same.
Transportation	Commute to commercial properties within the northern and eastern project vicinity may be temporarily impacted during construction of the proposed project and temporary detours may be implemented, but there are no anticipated long-term impacts to traffic. Post-construction, visitors to the basin would be able to park on-site so McCombs Street would not be blocked. The industrial railroad and public bus routes do not travel nearer than one mile to the project area and therefore will not be impacted. There are no nearby airports.

3.1 General Setting

The proposed project would be located north of the City of El Paso on undeveloped land. The project would be bound on the west by Martin Luther King Jr Blvd, and the eastern limit would be McCombs St. East of the proposed project site is the Painted Dunes Desert Golf Course. To the south is an area that was formerly used for a landing strip. The project area has elevations that range between 4,000 feet above mean sea level (AMSL) in the east and 4,030 feet AMSL to the west (USGS 2019).

3.2 General Land Use

The proposed project would be constructed in undeveloped desert shrubland which features a linear drainage traversing the site from west to east. There is no evident land use associated with the project area with the exception of an abandoned/empty water storage tank located at the west end of the site, as well as two electrical pole right-of-ways (ROWs), and two intersecting graded dirt roadways/utility easements. The first ROW is at the west boundary of the site from north to south and the second ROW begins at the western boundary at Martin Luther King Jr. Blvd. and traverses east through the property to McCombs Street. The proposed project area is located within the Chihuahuan Basins and Playas and the Low Mountains and Bajadas ecoregions of the Chihuahuan Deserts. Land use in the project area consists of undeveloped land with shrub/scrub vegetation cover (Multi-Resolution 2022). Historic aerial photographs dated 2004, 2012, and 2020 were reviewed. Based upon the review of historic aerial photographs, there have been relatively no changes within the project area. The majority of the site vicinity has remained undeveloped through the present with the exception of the two electrical pole ROWs and the cleared area near the center of the site which features the apparent storage tank. The parcels containing the proposed project are owned by the City, and the six parcels surrounding the project area are private property owned by FSW Investments LP (El Paso CAD 2022). Future land use of the area is documented by the City of El Paso as urban expansion and general mixed use, the latter of which is defined as "large-scale developments that are able to function as individual neighborhoods, as small-scale developments requiring flexibility because of unique design characteristics, or as transitional areas between dissimilar land uses."

No Action Alternative: Under the no action alternative, land use within the project area would either continue as undeveloped shrub/scrub or would be utilized for residential or commercial properties in the future, as indicated by the El Paso Central Appraisal District (CAD).

Proposed Action: The proposed action would develop the desert shrubland into the aquifer recharge arroyo basin which would provide wetland and recreational areas with park amenities. The apparent storage tank to the west of the site may be removed. ROW easements would be utilized by equipment during construction of the basin, but this would be temporary. A pipeline would be inserted under the ROW to direct treated water into the basin. The pipeline would accommodate future city expansion by being built with fittings for future connections to existing treated water lines one mile west of

McCombs Street. The City has this area zoned for urban expansion, general mixed use and the proposed project would serve as a transitional area as dictated by the zoning definition. Future urban expansion may contribute contaminated stormwater to the basin, but water would be treated after aquifer extraction and prior to dispersal to the public water system. No zoning/land use changes are required and the proposed action allows for the intended use of adjacent properties; therefore there would be no anticipated significant impacts to general land use .

3.2.1 Soils and Geology

3.2.1.1 *Soils*

Data from the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (2019) was reviewed to characterize soils within the project area. There are two soil map units within the study site, and they are not rated as hydric soils. A soil survey map is below as Exhibit 3.2.1.1-1. Table 3.2.1.1 contains a summary of the mapped soil units within the project area and relevant physical characteristics.

Table 3.2.1.1 Project Area Mapped Soil Type

Map Unit Symbol	Map Unit Name	Landform	Natural Drainage Class	Frequency of Ponding	Frequency of Flooding	Depth to Water Table	Hydric Soil Rating
TBB	Turney-Berino association, undulating	Basin floors	Well drained	None	None	> 80 inches	No
PAA	Pajarito association, level	Alluvial fans	Well drained	None	None	> 80 inches	No

The Turney-Berino association, undulating (TBB) mapping unit makes up most of the project area and generally consists of shallow friable fine sandy loam over friable loam. The subsoil is clay loam with threads and concretions of lime above clay loam-textured caliche, which is underlain by fine sandy loam. Soils in this association are susceptible to erosion and have a K-Factor of 0.32 on a scale of 0.02 to 0.69, the greater values being more susceptible to erosion. Permeability is moderately slow. The Pajarito association, level (PAA) consists primarily of friable, calcareous, fine sandy loam. These soils are somewhat susceptible to erosion (K-Factor of 0.20) and are well drained and moderately permeable (USDA NRCS 2019). The geotechnical report similarly reported fine-grained clayey sands, fine-grained sands, gravel, and a 6- to 11.5-foot-deep layer of caliche (Terracon 2018). The report stated that excavation below caliche would improve infiltration rates. The geotechnical report is available for review in Appendix C.

No Action Alternative: Under the no action alternative, the site would remain in its existing state and there would be no alterations or impacts to soils if current maintenance and management is sustained.


AGB: Agustin association, undulating
PAA: Pajarito association, level
TBB: Turney-Berino association, undulating
TBB
PAA
AGB
Legend
Study Area
Soil Map Units
N
0 1,000 2,000 4,000
Feet
DATA SOURCES:
City of El Paso
SSURGO
ESRI World Imagery
Project No.: 9422P002
Date: Jun 2022
Drawn By: SMS
Reviewed By: JP
USDA Soil Survey Map
City of El Paso
City of El Paso ASR
El Paso County, TX
Center 106.4252°W 31.9572°N
Exhibit
3.2.1.1-1

Proposed Action: In areas of construction and paved parking services, topsoil would be stripped and stockpiled to conduct surface preparation. Construction staging areas and basin excavation would lead to the disturbance of surface and subsurface soil layers to depths of 11 to 20 feet. Excavated soil would be hauled off-site for use as fill or stored off-site. Construction, construction staging areas, parking, and excavation stockpiles will be contained within project limits.

During construction, erosion and sediment control measures would be implemented in accordance with Texas Commission on Environmental Quality (TCEQ) and U.S. Environmental Protection Agency (EPA) regulations for stormwater pollution prevention. Additionally, a Storm Water Pollution Prevention Plan (SWPPP) would be developed and included as part of the design and construction that complies with the City stormwater ordinances. The utilization of Best Management Practices (BMPs) during construction would minimize the introduction of pollutants, including sediment, to adjacent waters (El Paso Water 2018). BMPs could include erosion and sediment controls such as silt barriers, and stabilization practices such as grass planting to stabilize cut ground.

To prevent erosion in the finalized project, basin banks would utilize a minimum of 12-inch compacted and/or prepared earthen material over native soil. Around concrete weirs, gabion baskets or loose rock rip-rap would overlay compacted soil. At the east and west project boundaries where slopes are steepest, gabion baskets and mattresses would line the slopes to contain and protect the soil. Water would be piped into the basin via concrete weirs which would be spaced across the basin to distribute and reduce water velocity. Native riparian vegetation would also be planted in the limits of the basin to preserve existing soil. Overall there should be no significant impacts to soil or soil quality.

3.2.1.2 *Geology*

The underlying geology of the proposed project area is classified by three Quaternary-period map symbols (USGS 2005). The alluvial fan deposits (Qf) are characterized by colluvium and fan deposits which may include older Quaternary deposits in some areas. Sand sheet deposits (Qs) consist of windblown sand and areas of large dunes; there is sparse grass, moderate to very high permeability, low to moderate water-holding capacity, and a shallow water table. Bolson deposits (Qb) are described as lacustrine and fluviatile deposits of clay, silt, sand, and gypsum in bolsons, or desert valleys raised by aggradation. Quaternary basin-fill deposits extend several thousand feet deep within the Hueco Bolson in the project area vicinity (TWDB 2022). According to soil borings in the immediate proposed project area and surrounding areas, borehole termination occurred at depths ranging from 21.5 feet to 51.5 feet and the water table should not be reached (Terracon 2022).

No Action Alternative: Under the no action alternative, the proposed project site would not be altered, and no changes to geology would occur.

Proposed Action: Excavations would be up to 20 feet below the existing ground level within the project area. Removed surficial and bedrock deposits would be moved off-site for use as fill or stored in a

suitable area. Compacted and/or prepared earthen material and gabion baskets would stabilize newly-exposed surficial and bedrock deposits. There should be no changes to the water table as it is at depths greater than the proposed excavation. There would be no impacts to geological heritage as there are no listed sites in Texas nor are there significant geologic features, landforms, or landscapes within the project area or immediate vicinity. There would be no anticipated significant impacts to geology.

3.2.2 Floodplains

Executive Order (EO) 11988 requires federal agencies to avoid at all extents possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative (OFR 2016). The Federal Emergency Management Agency (FEMA) procedures for implementing EO 11988 include an eight-step process that decision-makers must use when considering projects that have potential impacts to or within a floodplain (eCFR "Title 44" 2022).

El Paso is a participant in the National Flood Insurance Program (NFIP). The FEMA Flood Insurance Rate Map (FIRM) Panel Nos. 4802140008C, effective June 15, 1988, and 4802140009D, effective January 3, 1997 were reviewed for the project area (El Paso County, Texas, the City of El Paso, and unincorporated areas of El Paso County, Texas).

The effective FEMA FIRMs identify portions of the project area located within the FEMA designated 100-year floodplain zone (Zone A1) and portions in Zone X. Zone X includes areas which are outside of the FEMA designated 100-year and 500-year floodplain zones. The floodplain zone layout across the project area can be seen in Exhibit 3.2.2-1 below.

No Action Alternative: Under the no action alternative, the proposed project site would remain undeveloped and unimproved. No alterations in grading or floodplain elevations would occur at the site.

Proposed Action: The proposed project area consists predominately of a natural arroyo feature surrounded by open rangeland, previously disturbed areas, existing maintained utility easements, and existing roadways. The basin and concrete weirs will be constructed almost completely within the mapped floodplain, and the pipeline that will feed treated water to the basin and weirs will be entirely within the floodplain zone. Basin construction will create permanent alterations of the floodplain and the pipeline would include temporary alterations. The project would comply with EO 11988 by following FEMA's eight-step decision-making process (eCFR "Title 44" 2022):



Project No.: 9422P002	**FEMA Flood Insurance Rate Map**	**Exhibit**
Date: Jun 2022	City of El Paso City of El Paso ASR El Paso County, TX Center 106.4252°W 31.9572°N	**3.2.2-1**
Drawn By: SMS		
Reviewed By: JP		

(1) Determine whether the proposed action is in a 100-year floodplain;
(2) Notify the public of intent to carry out an action in a floodplain, and involve the public in the decision-making process;
(3) Identify and evaluate practicable alternatives to action location;
(4) Identify potential direct and indirect impacts associated with floodplain modification;
(5) Minimize potential adverse impacts to floodplains, restore and preserve natural and beneficial values served by floodplains;
(6) Reevaluate the Proposed Action and alternative locations (step 3) considering the findings from steps 4 and 5. FEMA will not act in a floodplain unless it is the only practicable location;
(7) Prepare and provide the public with a finding and explanation of any final decision that the floodplain is the only practicable alternative; and
(8) Review the implementation and post-construction phases of the Proposed Action to ensure that any mitigation requirements are implemented.

Upon compliance with EO 11988, the eight-step process, and given that the proposed project would not involve the filling of the identified floodplain but rather would utilize excavations in the existing floodplain to enhance aquifer recharge, the proposed project should not have any negative impact on the special flood hazard areas downstream that are currently identified by FEMA's floodplain boundaries.

3.2.3 Wetlands

Section 404 of the Clean Water Act (CWA) authorizes the Secretary of the Army to issue permits for the discharge of dredged or fill material into waters of the U.S. (WOTUS), including wetlands (U.S. EPA 2022). In general, wetlands are those areas which are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. The U.S. Army Corps of Engineers (USACE) has published detailed guidelines for wetland determination and delineation including recent regional supplements that implement statutory requirements as well as judicial interpretation affecting the limits of Section 404 jurisdiction. Regulations and guidelines issued by the USACE similarly address the delineation criteria for mapping jurisdictional streams, lakes or ponds, and wetlands.

In addition to the protection afforded wetlands as WOTUS under Section 404, federal executive policies provide a measure of protection to all wetlands, regardless of their nexus to traditionally navigable waters. EO 11990 *Protection of Wetlands* establishes a national policy "to avoid to the extent possible the long-and short-term adverse impacts associated with the destruction or modification of wetlands, and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative (OFR 2016). The EO provides the following definition for wetlands:

"The term 'wetlands' means those areas that are inundated by surface or ground water with a frequency sufficient to support, and under normal circumstances do or would support, a prevalence of vegetative or aquatic life that requires saturated or seasonally inundated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds."

EO 11990 requires federal agencies to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities. The EO further instructs agencies to avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds, "(1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use." The EO does not define "practicable" but provides the following explanation as to the relevant criteria for making practicability determination: "In making this finding the head of the agency may take into account economic, environmental and other pertinent factors" (OFR 2016). The U.S. EPA has not issued implementing guidance for EO 11990; however, it addressed a similar "practicability" requirement for jurisdictional wetlands under its Section 404 (b)(1) regulations. Under the regulations, a Section 404 permit applicant must demonstrate that there is no "practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences." These regulations further proved: "The term practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purpose."

National Wetlands Inventory (NWI) data was reviewed to identify potential aquatic features within the study area. The data was published by the U.S. Department of the Interior's U.S. Fish & Wildlife Service (USFWS) and depicts potential wetland areas and other waterbodies based on stereoscopic analysis of high-altitude aerial photographs. It is understood that the published data is not regularly updated and has not been validated in the field. Presence of mapped NWI features is not always indicative of the presence of jurisdictional waterbodies. The review of the NWI data identified multiple aquatic features in the vicinity of the proposed project but none are mapped within the project area. The NWI map of the proposed project area can be seen as Exhibit 3.2.3-1 below.

Aquatic features are identified based on the presence of an ordinary high water mark (OHWM) and bed/bank features, or the presence of wetland indicators where applicable. For portions of the surface tributary system (i.e. streams and impoundments of streams), the OHWM is the limit of USACE jurisdiction under Section 404. In order to make a positive wetland determination, indicators of hydrophytic vegetation, hydric soil, and wetland hydrology must be observed and recorded. A qualified scientist conducted site reconnaissance March 4, 2022 to characterize and document aquatic resources within the alignment boundaries.



Project No.: 9422P002	National Wetlands Inventory Map	Exhibit
Date: Jun 2022	City of El Paso City of El Paso ASR El Paso County, TX Center 106.4252°W 31.9572°N	3.2.3-1
Drawn By: SMS		
Reviewed By: JP		

Consistent with the lack of features depicted in the NWI data, there were no aquatic features observed within the project area. Vegetation throughout the project area was sparse in the west and increasing in density toward the eastern boundary. It primarily consisted of upland scrub/pasture communities dominated by honey mesquite (*Prosopis glandulosa*), and creosote bush (*Larrea tridentata*). The soil types mapped in the project are Turney-Berino association, undulating (TBB) and Pajarito association, level (PAA), which do not have components with hydric ratings (see section 3.2.5.1 for detailed information on the soil). No wetland hydrology indicators were observed during the site investigation. Given the absence of aquatic features in the project area and the nature of the proposed undertaking, Section 404 of the CWA is not applicable to this project.

No Action Alternative: Under the no action alternative, the proposed project site would remain undeveloped and unimproved. No wetlands currently exist at the project site, and none would be potentially created under the no action alternative.

Proposed Action: The proposed project would potentially create and maintain wetland habitats at the proposed project site by the continual flow of treated water from the pipeline to concrete weirs in the basin; this flow should encourage both wetland vegetation and hydrology. Native riparian vegetation would also be planted in the limits of the basin project to provide habitat value to the area. There are anticipated beneficial impacts to wetland resources.

3.2.4 Water Resources

El Paso receives nearly half its annual water supply from the Rio Grande River. River flows that arrive in El Paso primarily originate from snowmelt runoff in southern Colorado and northern New Mexico. Spring runoff into the Rio Grande is eventually stored in Southern New Mexico's Elephant Butte Reservoir before releases are made for irrigation and municipal use in southern New Mexico and the El Paso area (El Paso Water 2018). Under the Proposed Action, the water going into the basin to recharge the aquifer would be tertiary treated water and not under the supervision of Reclamation.

3.2.4.1 *Surface Water*

Section 404 authorizes the Secretary of the Army to issue permits for the discharge of dredge or fill material into WOTUS. Federal regulations note that WOTUS may include intrastate rivers and streams, including impoundments and other waters. In response to a 2006 Supreme Court decision (Rapanos v. U.S., 547 S. Ct. 715), the USACE and U.S. EPA have issued further guidance, and require additional documentation to support jurisdiction. Currently, the USACE continues to assert jurisdiction over traditionally navigable waters (TNWs) and non-navigable tributaries of traditionally navigable waters where the tributaries are relatively permanent waters (RPWs) (i.e., tributaries that typically flow year-round or have continuous flow at least seasonally). Current USACE guidance requires a jurisdictional evaluation to determine if aquatic features have a significant nexus to TNWs for tributaries that are not RPWs (i.e. ephemeral). Typically, ephemeral tributaries that exhibit a direct surface connection to a WOTUS (i.e. continuous OHWM) are determined to have a significant nexus and are therefore considered WOTUS. Additionally, the USACE typically does not assert jurisdiction

over man-made features (i.e. ditches), constructed wholly in uplands, for the purpose of conveying upland drainage, where those features are not channelized portions of the historic surface tributary system and do not maintain perennial flow. Based on a review of U.S. Geological Survey (USGS) topographic maps and other available data (National Hydrography Dataset (NHD), soil surveys, aerial photography, etc.), portions of the surface tributary system, including open water impoundments of said tributaries, do not appear to be present within the project area.

Based on a review of available data, isolated open water features and open water impoundments of tributaries do not appear to be present within the project area. The project area is depicted on land historically vacant of open water and observations during the site reconnaissance confirmed this condition. The project area falls within the Rio Grande-Fort Quitman watershed (8-digit Hydrologic Unit Code (HUC) 13040100) and the nearest mapped portion of the surface tributary system is an unnamed ephemeral tributary to the north of the project area.

During the site investigation, a linear drainage feature was observed on the site. Signs of area drainage through the feature were observed, but the feature appears to be excavated or otherwise associated with an access road, and drainage flow was largely overland and outside of a natural channel. The drainage feature is ephemeral and flows in it are limited to direct response to precipitation events. On December 2, 2020 the drainage feature on the site was found to be non-jurisdictional under an Approved Jurisdictional Determination (AJD) issued by the USACE. A copy of the AJD is found in Appendix C.

No Action Alternative: Under the no action alternative, the proposed project site would remain undeveloped and unimproved. Surface tributary systems should not be impacted or changed in any way.

Proposed Action: The proposed ASR project would create a new surface water feature. The original feature was determined by the USACE to be excluded from Clean Water Act jurisdiction in December 2, 2020 (see USACE Approved Jurisdictional Determination Form in Appendix E). A Section 404 permit under the USACE is not required because the project would not result in the discharge of dredge or fill material into WOTUS. There is no planned outfall or connection of the new feature to downslope waters. If wetland conditions are created in the future after project completion, the City will reach out to the USACE to seek formal facility exemption. Construction activities are not anticipated to have an adverse impact on surface water quality. Nonetheless, best management practices (BMPs) would be exercised during construction of the effluent pipelines and basin to prevent the release of hazardous materials from the construction site and equipment into surface waters.

3.2.4.2 *Groundwater*

Federal laws focus on controlling potential sources of groundwater contamination on a national basis. Where federal laws have provided for general groundwater protection activities such as wellhead protection programs or development of state groundwater protection strategies, implementation of

these programs is typically delegated to the states, in cooperation with local governments. The Texas Water Development Board (TWDB) has established sixteen Groundwater Management Areas (GMAs) across Texas "in order to provide conservation, preservation, protection, recharging, and prevention of waste of groundwater, and of groundwater reservoirs and subdivisions, and to control subsidence caused by withdrawal of water from those groundwater reservoirs or their subdivisions…" The project area falls within TWDB GMA 5, and within the boundaries of the Hueco-Mesilla Bolsons Aquifer (TWDB 2022).

Straddling the Franklin Mountains, the Hueco Bolson (to the east) and the Mesilla Bolson (to the west) together are considered to be a major aquifer by the TWDB (2022). The aquifers stretch north into New Mexico and south into Mexico. The Hueco Bolson measures about 9,000 feet in depth, while the Mesilla Bolson is about 2,000 feet in depth. Although the Hueco and Mesilla bolsons share similar geology, very little water travels between them. The Hueco Bolson is the principal aquifer for both El Paso and Ciudad Juarez in Chihuahua, Mexico (Exhibit 3.2.9.2-1 in Appendix A). About 90% of water drawn from the aquifer is for public municipal use, serving homes and businesses. In a normal year, El Paso relies on the aquifer for about half of its water supply, other sources include the Rio Grande and desalinization. Currently the demand for potable water, per person in El Paso is 129 gallons per day, a 37 percent reduction since 1985 (El Paso Matters 2022). El Paso developed the first Aquifer Recharge facility in Texas in 1985. For decades, El Paso has been treating wastewater to drinking water standards and using it to recharge the Hueco Bolson aquifer. Historically, the City primarily used deep injection wells to put water directly into the Hueco Bolson aquifer. Research with the American Waterworks Research Foundation concluded that excavated infiltration ponds were a more economical method for recharging the Hueco Bolson in terms of both construction and recurring operations and maintenance costs (El Paso Water 2018). Since that time, El Paso Water has constructed four infiltration ponds and reduced its dependency on injection wells.

Section 1424(e) of the Safe Drinking Water Act (SDWA) authorizes the U.S. EPA to designate an aquifer for special protection if it is the sole or principal drinking water resource for an area, and if its contamination would create a significant hazard to public health. No federal financial assistance may be entered into for any project which may contaminate a designated aquifer through a recharge zone. The proposed project area is not located in an area designated as a Sole Source Aquifer.

No Action Alternative: Under the No Action Alternative, there would be no construction, demolition, expansion of utility infrastructure, acquisition of new land, or the relocation of groundwater wells; therefore, no impacts to water quality would be expected to occur. There would be a negative, but less than significant, impact to groundwater availability due to the continued withdrawal of groundwater, without replacing the quantity drawn without implementing an action to replace the drawn water. Overall, there would be no significant impacts under the No Action Alternative.

Proposed Action: The proposed ASR project should benefit the area groundwater resources by managing and conserving regional groundwater reserves. The proposed project and related operations are not

the Hueco Bolson Aquifer by recharging. El Paso Water provides historical water usage information for the City and post-construction potential water availability in the Feasibility Study and its proposal (El Paso Water 2016) that further indicate benefits of the basin construction.

3.2.5 Air Quality

Air quality is the measure of the atmospheric concentration of defined pollutants in a specific area. Air quality is affected by pollutant emission sources, as well as the movement of pollutants in the air via wind and other weather patterns. An air pollutant is any substance in the air that can cause harm to humans or the environment. Pollutants may be natural or anthropogenic and may take the form of solid particles, liquid droplets, or gases. Natural sources of air pollution include smoke from wildfires, dust, and wind erosion. Anthropogenic sources of air pollution include emissions from vehicles, industrial facilities, and general uses of fossil fuels; dust from unpaved roads, agriculture, or construction sites; and smoke from human-caused fires (DHS 2021).

Because air quality is measured and regulated on a regional level, the air quality analysis in this report utilizes air quality data from the El Paso-Las Cruces-Alamogordo Air Quality Control Region (AQCR) 153 (40 CFR § 81.82). The El Paso-Las Cruces-Alamogordo AQCR encompasses six counties in western Texas and four counties in southern New Mexico, including El Paso County, the area where the project would occur. El Paso shares an air basin with parts of Doña Ana County in New Mexico and with Ciudad Juárez in the Mexican state of Chihuahua. The Rio Grande River and the mountainous terrain are the defining characteristics of the air basin (eCFR "40" 2022).

The Clean Air Act (CAA) requires that states adopt ambient air quality standards. The standards have been established to protect the public from potentially harmful amounts of pollutants. Under the CAA, the U.S. EPA establishes primary and secondary air quality standards. Primary air quality standards protect the public health, including health of "sensitive populations, such as people with asthma, children and older adults." Secondary air quality standards protect public welfare by promoting ecosystem health and preventing decreased visibility and damage to crops and buildings (TCEQ 2022). Air quality in the project area is regulated by the TCEQ which administers federal air quality standards. Under these standards, a geographic location with pollutant levels below air quality standards is said to be in "attainment," while higher levels are in "nonattainment."

El Paso County is considered to be in nonattainment for three categories of air quality criteria pollutants. It is marginal in the 8-Hour Ozone (2015) classification, meaning ozone levels measured over eight hours are just above the air quality standards. Attainment levels of ozone are 0.070 ppm or below, and nonattainment begins at 0.071 (marginal) and goes up to 0.163 and above (extreme). El Paso County is PM-10 (1987) moderate within the City limits. In 1987 the EPA set the PM-10 standard at 150 $\mu g/m^3$ of inhalable particulate matter with diameters 10 micrometers and smaller. The last testing period (2018) recorded PM-10 levels 0.0 $\mu g/m^3$ above current design values. Design values are statistics describing the air quality status of a given location relative to the level of the National

Ambient Air Quality Standards (NAAQS), and areas are considered in nonattainment if they exceed the design value more than once per year on average over three years. Part of El Paso County is moderate for Carbon Monoxide (1971) with levels measured over eight hours less than or equal to 12.7 ppm; the standard level is 9 ppm. Only a small portion of El Paso City south of Interstate-10 is in nonattainment for carbon monoxide. The EPA utilizes nonattainment data to establish rules for state implementation plans to clean the air and meet federal air quality standards. For example, areas with an ozone classification of moderate or higher are required to develop attainment plans and achieve a 15% reduction in volatile organic compound emissions within a six-year period (US EPA 2022).

No Action Alternative: Under the no action alternative, no changes to air quality are anticipated; the proposed project site would remain in its current state and continue under existing use and management. There are no air pollutant emissions currently occurring on the site that would cease if the proposed project was not implemented.

Proposed Action: El Paso County is in nonattainment for ozone levels and the City, including the project area, is in nonattainment for PM-10. Temporary impacts on air quality are anticipated during the clearing, grading, and excavating of the site due to dust, or PM-10, generated from earthwork and construction. Fugitive dust emissions and emissions from construction vehicles may temporarily increase levels of air pollutants during excavation and construction. Impacts to ozone and PM-10 air quality are expected to be negligible and short-term and minor, respectively. The proposed project and related operations are not anticipated to result in air emissions of significant quantity to degrade the current air quality in the area due to the short-term duration of construction activities and the implementation of BMPs to reduce ozone and PM-10 emissions. The Texas Administrative Code Title 30 § 116.199(a) outlines facilities and sources that are considered to be de minimis and do not require air permits, and the Proposed Action should meet these conditions and therefore should not require an air permit nor written confirmation from the TCEQ prior to construction or as a condition of operation. There should be no short- or long-term significant impacts to air quality.

3.2.6 Biological Resources

3.2.6.1 *Vegetation*

The Chihuahuan Desert is generally characterized by flat and gently rolling landforms, often on gravelly alluvial plains occupying outwash plains and those on intermountain basins. Creosote bush is usually the clear dominant, though species such as mariola (*Parthenium incanum*), whitethorn acacia (*Acacia constricta*), tarbush (*Flourensia cernua*), and/or honey mesquite may be present. On some sites, particularly hot desert sites at low elevations, succulents such as ocotillo (*Fouquieria splendens*), lechuguilla (*Agave lechuguilla*), Torrey's yucca (*Yucca torreyi*), pricklypear (*Opuntia* spp.), and hedgehog cacti (*Echinocereus* spp.) may be conspicuous. Most of the eastern and central portion of the site consists of Native Invasive: Mesquite-Creosote Shrubland and the western portion of the site consisted of Native Invasive: Mesquite Shrubland. Vegetative species within the project area were observed to be

of Native Invasive: Mesquite-Creosote Shrubland and the western portion of the site consisted of Native Invasive: Mesquite Shrubland. Vegetative species within the project area were observed to be fairly consistent with the exception of an increased presence of canaigre dock (*Rumex hymenosepalus*), lechuguilla, and common sotol (*Dasylirion wheeleri*) along the western quarter of the site.

A Biological Resources Survey was conducted on March 4, 2022. The onsite conditions are represented in the site photographs in Appendix D. Vegetative species observed during the site visit are provided below. Plants identified during the site visits were compared with those on the USDA Noxious Weeds List for Texas (USDA 2022). Of the vegetative species observed within the project area, none of the above-listed species were identified on this list. The Noxious Weeds List for Texas is provided in Appendix C.

Table 3.2.6.1 Observed Vegetative Species

Scientific Name	Common Name
FORBS	
Salsola tragus	Prickly Russian-Thistle
Xanthium strumarium	Rough Cockleburr
Proboscidea altheaefolia	Devil's Claw
Rumex hymenosepalus	Canaigre Dock
Amaranthus retroflexus	Pigweed
SHRUBS	
Larrea tridentata	Creosote
Gutierrezia sarothrae	Broom Snakeweed
Prosopis glandulosa	Honey Mesquite
Vechellia constricta	Whitethorn Acacia
CACTUS	
Agave lechuguilla	Lechuguilla
Dasylirion wheeleri	Common Sotol
GRASSES	
Sporobolus cryptandrus	Sand Dropseed
Bouteloua gracilis	Blue Grama
Hilaria mutica	Tobosa
Bouteloua curtipendula	Sideoats Grama
TREES	
Vechellia constricta	Whitethorn Acacia

Data from the Texas Parks and Wildlife Department (TPWD) Ecological Mapping System of Texas (EMST) was used to estimate areas of major vegetation cover types within the project area. According to TPWD, the entirety of the study area is located in the Chihuahuan Desert ecosystem and mapped as Native Invasive: Mesquite-Creosote shrubland (2022).

No Action Alternative: Under the no action alternative, the observed vegetative species in the project area would not change, and the site would remain in its existing state if current maintenance and management is sustained.

Proposed Action: The proposed project scope consists of excavation and construction activities that would create a disturbance to vegetative communities within the soil disturbance limits. Surface soils and associated vegetative communities along ROWs and temporary equipment pathways would be disturbed until project activities are completed. Approximately 73 acres of mesquite-creosote shrubland communities within the basin boundaries (Phases 1 to 3) will be permanently altered due to excavations. However, this vegetation type is prolific throughout the vicinity so overall impacts will be minimal. To account for loss of desert shrubland, native tree and shrub species will be planted and irrigated throughout the basin. Upon completion of the project, the basin development would remove native vegetation but also would add value to the vegetative community by increasing vegetative diversity in the area and therefore also forage and cover types. The species planted will be native species that are adapted to potentially continuous moist conditions but not those that consume large volumes of water (ex: tamarisk – salt cedar) ensuring that the water is allowed to infiltrate. Overall negative impacts to vegetation should be minor and not significant.

3.2.6.2 *Wildlife*

The Biological Resources Survey included a wildlife habitat assessment. Several species of wildlife were observed during the site visits. Activity indicators of wildlife included depressions in vegetation, small rodent burrows, and uninhabited bird nests. Features which provide habitat for aquatic species were not observed within the project area. Wildlife species observed during the site visit are provided below.

Table 3.2.6.2 Observed Wildlife Species

Scientific Name	Common Name
BIRDS	
Buteo jamaicensis	Red-Tailed Hawk
Cathartes aura	Turkey Vulture
Columba livia	Rock Pigeon
Quiscalus quiscula	Common Grackle
MAMMALS	
Lepus californicus	Black-Tailed Jack Rabbit

No Action Alternative: Under the no action alternative, the observed wildlife species in the project area would not change, and the site would remain in its existing state if current maintenance and management is sustained.

Proposed Action: The proposed project scope consists of excavation and construction activities that would create temporary and permanent disturbances to wildlife communities both within the project area and the immediate areas. Temporary effects during construction activities would include increased

noise, increased vehicular traffic through the area, and disturbance of current habitat. Limited disturbance to wildlife communities is likely to occur until project activities are completed. There would be approximately 73 acres of existing native habitat converted to native riparian habitat within project boundaries. Overall impacts to wildlife communities should be minimal due to the abundance of similar native habitat surrounding the project area, and the temporary disturbance of habitat in the project area.

The proposed project should also create a positive impact and add value to the wildlife community by providing a more accessible water resource and riparian habitat, and more diverse vegetative community, which should result in increased diversity and availability of habitat for wildlife species relying on the area. Wildlife in the area may contribute additional fecal material into the surface water; however, the surface water would infiltrate into the aquifer removing some contaminants and would also be treated after aquifer extraction prior to dispersal to the public water system. Additionally, the design of the infiltration basin is not create a surface water feature (ponding) which would provide a watering area for wildlife. Overall, less than significant negative impacts to wildlife are anticipated to be minor due to the loss of desert scrub habitat. However, the addition of a riparian feature may enhance overall habitat value.

3.2.6.3 *Threatened and Endangered Species*

Section 7 of the Endangered Species Act (ESA) directs all Federal agencies to use their existing authorities to conserve threatened and endangered (T&E) species and, in consultation with the USFWS, to ensure that their actions (funded or carried out) do not jeopardize listed species or destroy or adversely modify critical habitat (USFWS 2022). USFWS has the authority under the ESA to list and monitor the status of species whose populations are considered imperiled. USFWS regulations that implement the ESA are codified and regularly updated in 50 CFR Part 17. The federal process identifies potential candidates based on biological vulnerability. The vulnerability assessment considers several factors affecting a species within its range and is linked to the best scientific data available to the USFWS. Species listed as endangered or threatened by the USFWS are afforded full protection under the ESA, including the prohibition of indirect "take" such as the destruction of designated critical habitat. The USFWS has responsibility for certain species of Texas wildlife under the ESA, the Migratory Bird Treaty Act (MBTA), and the Bald and Golden Eagle Protection Act (BGEPA). Federal agencies are required 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 Information for Planning and Consultation (IPaC) or from the local field office directly under the ESA. It is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with the USFWS further (USFWS 2022). Similarly, it is the responsibility of the Federal action agency or project proponent, not the USFWS, to make "no effect" determinations. According to the USFWS, if a "no effect"

An Official Species List dated March 17, 2022 was generated by USFWS IPaC and transmitted on behalf of the Austin Ecological Services Field Office. According to the formal letter received, a total of eight federally-designated threatened, endangered, or candidate species were identified to potentially occur in the vicinity of the project area in El Paso County, Texas (reference *IPaC Official Species List* in Appendix C). Table 3.7.3-1 below includes the species listed by the USFWS in El Paso County, Texas and their federal status, habitat descriptions, habitat presence opinion based on the site investigation, and findings of effect from the proposed project. T&E Species were not observed during the site reconnaissance; however, investigations did not include a formal presence/absence survey for any listed species. No critical habitats are documented within the project area. There is potentially suitable stopover habitat for the monarch butterfly to occur on the site. Monarch butterfly breeding habitat is associated with milkweed presence. No milkweed species were identified within site boundaries, so it is unlikely that breeding habitat is present.

Table 3.2.6.3-1 USFWS IPaC Species Listed for El Paso County

Species	USFWS Status	Habitat Description	Habitat Present	Findings
BIRDS				
Strix occidentalis lucida (Mexican Spotted Owl)	Threatened	Remote, shaded canyons of coniferous mountain woodlands (pine and fir); nocturnal predator of mostly small rodents and insects; day roosts in densely vegetated trees, rocky areas, or caves	No; absence of shaded canyons of coniferous mountain woodlands, densely vegetated trees, or rocky areas.	No effect
Falco femoralis septentrionalis (Northern Aplomado Falcon)	Endangered	Variable habitat throughout range. Includes palm and oak savannahs, various desert grassland associations, open pine woodlands. Essential habitat elements: open terrain with scattered trees, relatively low ground cover, abundance of insects and small- to medium-sized birds, supply of nest sites. Nest in abandoned stick platforms of corvids and other raptors.	Yes; habitat is ubiquitous, desert grassland, open terrain, low ground cover are present.	May temporarily affect
Charadrius melodus (Piping Plover)	Threatened	Wintering migrant along the Texas Gulf Coast; beaches and bayside mud flats	No; absence shoreline and mud flat habitat.	No effect
Calidris canutus rufa (Red Knot)	Threatened	Migrate northward through the U.S. Apr-Jun, southward Jul-Oct. Prefers shoreline of coast and bays, uses mud flats during rare inland encounters. Primarily inhabits seacoasts.	No; absence of shoreline and mud flat habitat.	No effect
Empidonax traillii extimus (Southwestern Willow Flycatcher)	Endangered	Thickets of willow, cottonwood, mesquite, and other species along desert streams.	No; desert stream thickets are absent.	No effect
Coccyzus americanus (Yellow-Billed Cuckoo)	Threatened	Breeds in riparian habitat and associated drainages; springs, developed wells, and earthen ponds supporting mesic vegetation; deciduous woodlands with cottonwoods and willows; dense understory foliage is important for nest site selection; nests in willow, mesquite, cottonwood, and hackberry.	No; absence of riparian habitat and dense understory.	No effect
INSECTS				

Danaus plexippus (Monarch Butterfly)	Candidate	Habitat is a complex issue for this species. In general, breeding areas are virtually all patches of milkweed in North America and some other regions. The critical conservation feature for North American populations is the overwintering habitats, which are certain high-altitude Mexican conifer forests or coastal California conifer, or Eucalyptus groves as identified in literature.	Unknown	Not likely to affect
FLOWERING PLANTS				
Coryphantha sneedii var. sneedii (Sneed Pincushion Cactus)	Endangered	Restricted to limestone, grows in cracks on vertical cliffs or ledges in Chihuahuan desert scrub at elevations 3,900-7,700 feet. Common associated plants include creosote, Torrey yucca, gramma grasses, sotol, ocotillo, lechuguilla, several cactus species. Flowers Mar-Jun; fruits May-Sep.	No; vertical cliffs and ledges absent from project area.	No effect

Texas enacted state-level endangered species legislation in 1973, and subsequent amendments to this legislation have established a regulatory program for the management and protection of endangered species (i.e. species in danger of extinction) and threatened species (i.e. species likely to become endangered in the foreseeable future). Chapters 67 and 68 of the TPWD Code authorize TPWD to formulate lists of T&E fish and wildlife and regulate "take" and possession of listed species (2022). Unlike the ESA, state laws make no provision for habitat protection or regulation of indirect "takes" but do outlaw killing or maiming individuals of listed species and regulate other aspects such as trade and transportation.

Seventy-three state-designated species (threatened, endangered, species of concern, sensitive taxa) were identified in El Paso County, Texas (reference *TPWD County List of Rare Species Report* in Appendix C). The following table includes the species listed as either threatened or endangered by the TPWD, their Federal and State listing statuses, habitat descriptions, habitat presence opinions, and impact determinations.

Table 3.2.6.3-2 State Species Listed for El Paso County

Species	Federal Status	State Status	Habitat Description	Habitat Present	Findings
BIRDS					
Falco peregrinus anatum (American Peregrine Falcon)	-	T	Breeds locally in mountainous areas, nests in tall cliff eyries. Statewide migrant, winters along coast. Wide habitat ranges during migration (ex. urban, coastal/barrier islands). Stopovers at leading landscape edges such as lake shores, coastlines, barrier islands.	No; may migrate over the area but no suitable habitat for nesting or stopovers within project area	No impact
Buteo plagiatus (Gray Hawk)	-	T	Along U.S.-Mexico border; mature riparian woodlands and nearby semiarid mesquite and scrub grasslands; breeding range formerly extended north to southernmost Rio Grande floodplain of Texas	No; mesquite and scrub grasslands are present but not near riparian habitat.	No impact

Strix occidentalis lucida (Mexican Spotted Owl)	LT	T	Remote, shaded canyons of coniferous mountain woodlands (pine and fir); nocturnal predator of mostly small rodents and insects; day roosts in densely vegetated trees, rocky areas, or caves.	No; absence of shaded canyons, densely vegetated trees, or rocky areas.	No impact
Empidonax traillii extimus (Southwestern Willow Flycatcher)	LE	E	Thickets of willow, cottonwood, mesquite, and other species along desert streams.	No; desert streams are absent.	No impact
Coccyzus americanus occidentalis (Western Yellow-Billed Cuckoo)	LT	-	Breeds in riparian habitat and associated drainages; springs, developed wells, and earthen ponds supporting mesic vegetation; deciduous woodlands with cottonwoods and willows; dense understory foliage is important for nest site selection; nests in willow, mesquite, cottonwood, and hackberry.	No; absence of riparian habitat and dense understory.	No impact
Plegadis chihi (White-Faced Ibis)	-	T	Freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.	No; absence of freshwater marshes or other riparian habitat.	No impact
FISH					
Macrhybopsis aestivalis (Speckled Chub)	-	T	Found throughout the Rio Grande and lower Pecos River but occurs most frequently between the Río Conchos confluence and the Pecos River. Flowing water over coarse sand and fine gravel substrates in streams; typically found in raceways and runs.	No; absence of rivers within project area.	No impact
REPTILES					
Phrynosoma hernandesi (Mountain Short-Horned Lizard)	-	T	High elevation grasslands and forested areas with open ground; soil may vary from rocky to sandy; burrows into soil or occupies rodent burrow when inactive.	No; absence of forested areas with open ground.	No impact
Phrynosoma cornutum (Texas Horned Lizard)	-	T	Open, arid, and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees. Soils may vary in texture from sandy to rocky.	Yes; presence of grass and scattered brush in semi-arid desert scrub.	May impact
PLANTS					
Escobaria sneedii var. sneedii (Sneed's Pinchusion Cactus)	LE	E	Restricted to limestone, grows in cracks on vertical cliffs or ledges in Chihuahuan desert scrub at elevations 3,900-7,700 feet. Common associated plants include creosote, Torrey yucca, gramma grasses, sotol, ocotillo, lechuguilla, several cactus species. Flowers Mar-Jun; fruits May-Sep.	No; vertical cliffs and ledges absent from project area.	No impact

Legend/Notes: TPWD County List of Rare Species Reports/Lists reviewed March 2022

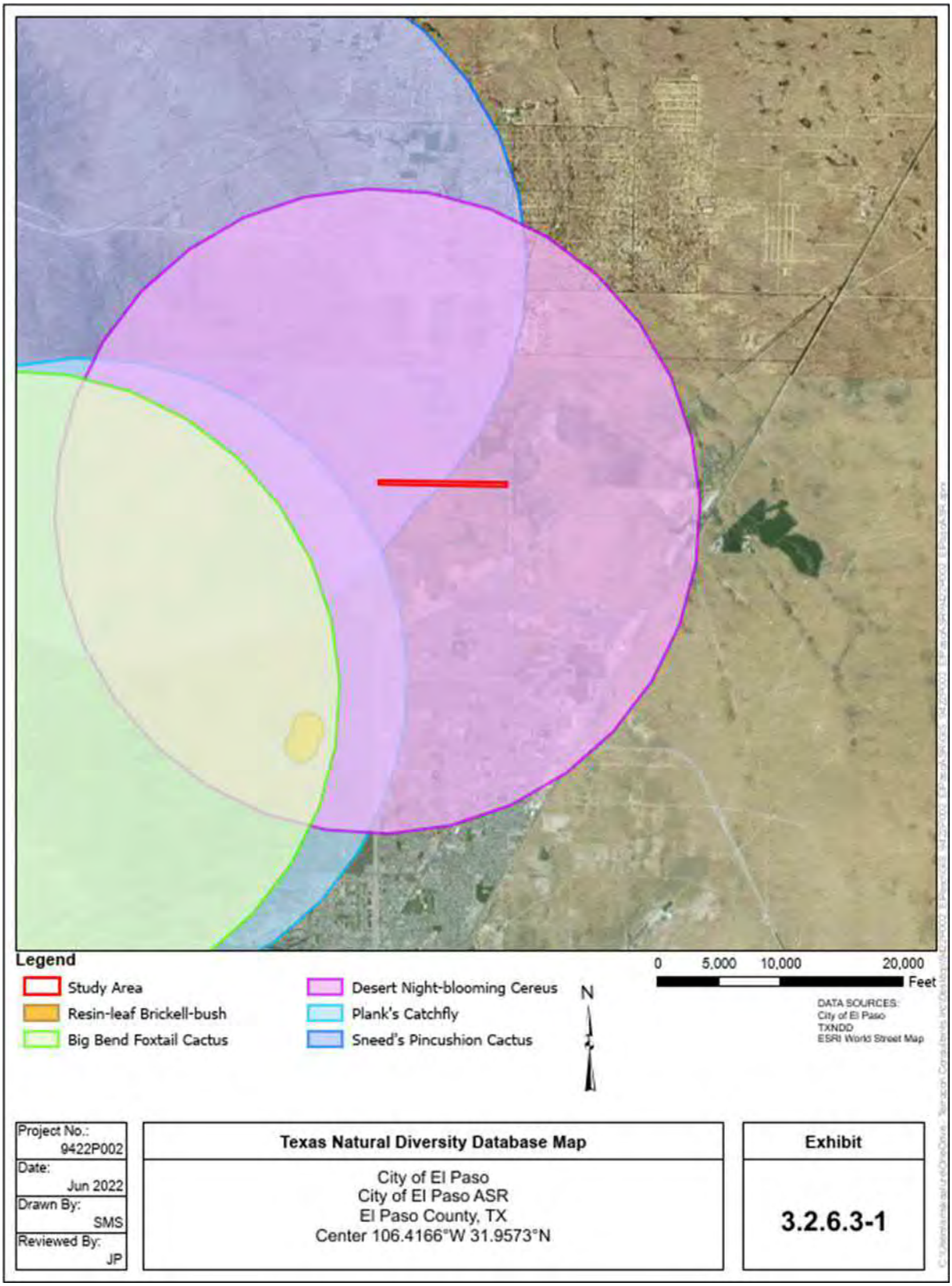
E = Endangered LE = Listed Endangered - = Federal and/or State status is not indicated
T = Threatened LT = Listed Threatened

ESA and State-listed avian species, as well as other migratory birds, are protected under the MBTA. The 1918 MBTA establishes a Federal prohibition "to pursue, hunt, capture, kill, collect, possess, buy,

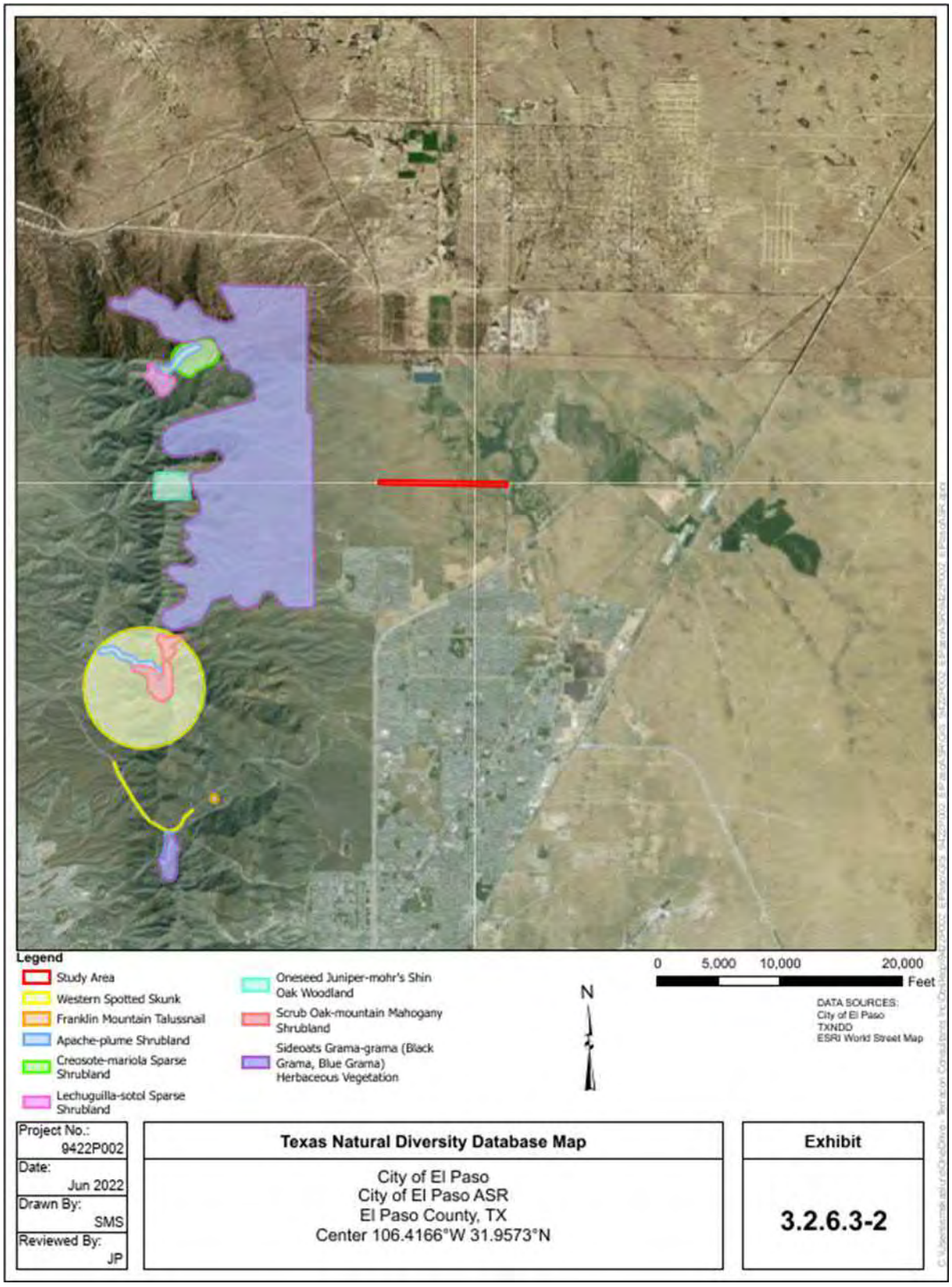
sell, trade, or transport any migratory bird, nest, young, feather, or egg, without a permit" issued in accordance with the policies and regulations of the MBTA. The MBTA does not prohibit the destruction of the bird nest alone (without birds or eggs) provided that no possession of the nest occurs during destruction. The USFWS is the lead agency determining permitting requirements for nest removal or destruction.

The Texas Natural Diversity Database (TXNDD) of TPWD provided a review for the North Franklin Mountain, TX quadrangle in El Paso County covering the project area. The TXNDD maintains information on over 700 natural resource "elements" including T&E species, native plant communities, and/or animal aggregations (e.g. rookeries). The TXNDD includes federal and state listed and tracked Threatened, Endangered, and Rare species. The TXNDD contains Element Occurrence Records (EORs) and spatial data representing the geographic locations of element observations. The data shows one EOR buffer that encompasses the project area, one that intersects it, and 11 in the vicinity. The EO Report and county list can be referenced in Appendix C.

Element occurrence record data was reviewed within a two-mile radius of the project site to account for potential species presence. A five-mile buffer radius for an EOR of desert night-blooming cereus (date unknown) completely overlaps the project area. The desert night-blooming cereus is not state- or federally-listed. A five-mile buffer radius for seven EORs of Sneed pincushion cactus (1977 - date unknown) encompasses the western half of the project area. Five of the seven EORs document the cactus location within the Franklin Mountains; the other two EORs have incomplete information. Sneed pincushion cactus is identified as federally and state endangered. Preferred habitat includes limestone cliffs or ledges. A five-mile buffer for six Plank's catchfly (1952 – 1981) EORs begins approximately 0.5 miles west of the project site, and all occurrence records indicate presence within the Franklin Mountains. The Plank's catchfly is not state- or federally-listed. A five-mile buffer for Big Bend foxtail cactus is approximately 1.5 miles west of the site; there are no listed EORs for the species and it is not state- or federally-listed. Two EORs for the sideoats grama-black grama native vegetation series (1989) are located approximately one mile west of the project area, at the lower slopes of the Franklin Mountains. The series is not state- or federally-listed. Other species and vegetation communities were provided by the TXNDD but are located greater than two miles from the proposed project site, which limits their potential presence.



Project No.: 9422P002	Texas Natural Diversity Database Map	Exhibit
Date: Jun 2022	City of El Paso City of El Paso ASR El Paso County, TX Center 106.4166°W 31.9573°N	3.2.6.3-1
Drawn By: SMS		
Reviewed By: JP		


Legend
Study Area
Western Spotted Skunk
Franklin Mountain Talussnail
Apache-plume Shrubland
Creosote-mariola Sparse Shrubland
Lechuguilla-sotol Sparse Shrubland
Oneseed Juniper-mohr's Shin Oak Woodland
Scrub Oak-mountain Mahogany Shrubland
Sideoats Grama-grama (Black Grama, Blue Grama) Herbaceous Vegetation
N
0 5,000 10,000 20,000
Feet
DATA SOURCES:
City of El Paso
TXNDD
ESRI World Street Map
Project No.: 9422P002
Date: Jun 2022
Drawn By: SMS
Reviewed By: JP
Texas Natural Diversity Database Map
City of El Paso
City of El Paso ASR
El Paso County, TX
Center 106.4166°W 31.9573°N
Exhibit
3.2.6.3-2

No Action Alternative: Under the No Action Alternative, there would be no changes to the current landscape and habitat conditions.

Proposed Action: Under the Proposed Action, the monarch butterfly is not likely to be affected, the Texas horned lizard has the potential to be affected, and the Northern Aplomado falcon and migratory birds through the area may be temporarily impacted during construction due to temporary habitat loss. The Proposed Action would create a temporary increase in construction noise, dust, emissions, and human activity throughout the project area during the construction phase causing temporary displacement of potential prey for some protected species. There would be a conversion of approximately 73 acres of existing habitat to enhanced riparian habitat at the basin site and existing vegetation would temporarily be removed for construction of the underground treated water pipeline. Once construction is complete, conditions in the pipeline area should be substantially similar to existing habitat conditions, and conditions in the basin area would become riparian rather than desert scrub.

Of the eight federally listed T&E species, three of the avian species are migrants through the project area. Piping plovers and red knots prefer coastal and shore type habitats while yellow-billed cuckoos utilize the area for breeding but prefer to nest in riparian woodlands of willows, cottonwoods, or dense stands of mesquite. Potential flyover habitat of impoundments, wetlands, and riparian areas is more suitable outside of the proposed project site in the site's current condition, but may provide suitable habitat post-project. Mexican spotted owls and southwestern willow flycatchers are primarily nonmigratory within the area, but preferred habitat is absent within and around the project area. The Sneed pincushion cactus is found in exposed areas of steep, sloping limestone in the shrublands or grasslands of the Chihuahuan Desert. While the project area contains calcic soils and species associated with Sneed pincushion cactus, it lacks the topography and exposed limestone surfaces preferred by the cactus. These conditions are more likely in the nearby Franklin Mountains. Additionally, wildflower species onsite may provide stopover habitat during migration for the monarch butterfly; however, consultation with USFWS should not be needed for the monarch butterfly as the species is not listed for protection. Due to the abundance of similar habitat outside of the project area and the potential for the project to create habitat for wetland flowering species, there would be no anticipated effect to monarch butterflies.

Northern Aplomado falcons are residents of desert and coastal grasslands with scattered yuccas and mesquites and are also found in coastal savannas and pastures with scattered palms. They are known to nest in trees and yuccas in open grasslands, power line poles, or directly on the ground. Northern Aplomado falcons were once common in Arizona, New Mexico, Texas, and northern Mexico, but by the 1930s they were extirpated from the U.S. In 1986 they were listed as endangered under the ESA and as a recovery effort, more than 1,500 captive-bred Aplomado falcons were released in Texas to breed in the wild (Cornell 2019). The birds can be sensitive to human disturbance, especially during the breeding season, and close or prolonged intrusion of territory can lead to nest abandonment. The ubiquitous nature of habitat for the falcon makes the presence of the species in the area possible.

However, the project would only result in minimal and temporary loss to the species' habitat as the project site and much of the vicinity are composed of the same ecosystem type. Prey for the species may be temporarily displaced to areas surrounding the proposed project areas. At the completion of the proposed project, the enhanced arroyo riparian system should still provide habitat for the species. Conservation measures such as avoidance of ground disturbing activities from March to June or nesting surveys during these months may be implemented to limit disturbance of nesting birds during construction. The species is federally endangered so consultation with USFWS may be needed to receive formal guidance on how to avoid potential impacts to the species and ensure compliance with the ESA. By following these conservation measures and USFWS guidance, there would be no overall anticipated effect to the Northern Aplomado falcon.

Of the 73 species identified by TPWD as either rare, threatened, or endangered in El Paso County, Texas, ten are listed as Federal and/or State T&E species. The American peregrine falcon, gray hawk, western yellow-billed cuckoo, and white-faced ibis are possible migrants through the project area but preferred riparian stopover habitats are absent. Mexican spotted owls and southwestern willow flycatchers are primarily nonmigratory within the area, but preferred habitat is absent within and around the project area. There are no rivers within the project site, so the speckled chub fish will not be impacted. High elevation habitat preferred by the mountain short-horned lizard and rocky ledges preferred by the Sneed pincushion cactus are absent from the project area.

Potentially suitable habitat for Texas horned lizards is present within and around the project site. The lizards are found in arid and semiarid habitats in open areas with sparse plant cover. They dig for hibernation, nesting, and insulation purposes, so they are commonly found in loose or loamy soils. It is recommended that the construction contractor be notified of the potential presence of the Texas horned lizard, and if the lizard is encountered it should be allowed to safely leave the project area. It is also recommended that TPWD be contacted prior to project development to receive guidance or BMPs to assist in avoidance of unauthorized "takes" under the TPWD Code. Following this guidance, there would be no anticipated impacts to Texas horned lizards.

Migratory birds are known to pass through and nest within and adjacent to the project area. If construction occurs during the nesting season of migratory species observed within or near the project site, pre-construction surveys will be needed to observe for the presence of active nests within the project area. A total of fifteen uninhabited bird nests were observed at the project site. Active nests were not observed during the site visit. Site construction activities would take place at ground level during excavation, construction, and completion of the proposed basin. Therefore, it is anticipated that the proposed project should not impact migratory birds.

According to the TXNDD and the assessed two-mile buffer of the project site, desert night-blooming cereus, Sneed pincushion cactus, Plank's catchfly, Big Bend foxtail cactus, and sideoats grama-black grama series have been identified in the general vicinity of the study area. There is no anticipated

negative impact to the endangered Sneed pincushion cactus nor other native vegetative species of conservation concern.

3.2.7 Archeological, Cultural and Historic Resources

An intensive pedestrian survey of the proposed project area was conducted. The archeological survey took place within the approximately 300-foot-wide right-of-way corridor of the proposed project area from Martin Luther King Junior Blvd. to McCombs St. The 10,560-foot-long by 300-foot-wide alignment was considered the area of potential effect (APE); the APE is approximately 73 acres.

Fieldwork was conducted by Terracon archaeologists John D. Hall (Principal Investigator, Antiquities Permit # 30506), Caitlin A. Gulihur, and Victoria C. Pagano on March 15–17, 2022. Project records will be curated at the Centennial Museum at the University of Texas at El Paso. The survey report including supplemental survey photos can be found in Appendix F. Detailed shovel test and provenience description (PD) maps and logs can be found in Appendix B of the report, and applicable site data and relevant historical topographic maps can be found in Appendix C of the survey report.

Two new historic-age archaeological sites were documented, and 42 shovel tests were excavated within the APE. Three shovel tests were placed within Site 41EP7327, one shovel test was excavated within Site 41EP7328, two shovel tests were placed at isolated prehistoric finds, and one shovel test was placed near the previously recorded Site 41EP352. The remaining 35 shovel tests were placed within the eastern 1,400 meters of the APE where ground surface visibility was below 50-percent. Shovel tests were devoid of archaeological materials, were excavated to an average depth of 45 centimeters below surface where they were terminated within subsoil or caliche gravels.

Observed deposits during visual inspection, shovel testing, and the geomorphic setting suggest a low potential for intact and/or buried cultural resources. Neither Site 41EP7327 or 41EP7328 demonstrated integrity or materials that would suggest potential for listing on the National Register of Historic Places (NRHP), or as a State Antiquities Landmark (SAL). Consultation with the SHPO, the Texas Historical Commission(THC), was conducted and on July 7, 2022 concurrence was received stating that none of the sites are eligible for designation as State Historic Landmarks and no historic properties are present.

No Action Alternative: There would be no change to the current conditions, and no impact to archeological, cultural and historic resources would occur with implementations of this alternative.

Proposed Action: Several sites were documented within the Proposed Action area. Concurrence on the findings and a determination of no affect has been received from the THC. The sites were found to not eligible under the NRHP or SAL, and no historic properties are present, therefore no impact to archeological, cultural, or historic resources are anticipated.

3.2.8 Socioeconomics and Environmental Justice

3.2.8.1 *Socioeconomic Issues*

The analysis of socioeconomic impacts identifies those aspects of the social and economic environment that are sensitive to change and that may be affected by activities associated with the Proposed Action. Socioeconomic factors describe the local demographics, income characteristics, and employment of the region of influence (ROI) that could be potentially be affected by the proposed project. The proposed ASR project is located in El Paso County, Texas. El Paso is the largest city in El Paso County, which shares its southeastern border with the U.S./Mexico border. For purposes of this analysis, El Paso County is the analytical ROI for consideration of socioeconomic effect.

Per the United States Census Bureau (USCB) 2020 Census, El Paso County has a population of 865,657, with 836,062 residing in the El Paso metropolitan area (USCB 2022). From 2010 to 2020, the City grew by 4.6% and the county grew by 8.1%. The City of El Paso has an estimated 230,905 households. Of the documented races within El Paso, in 2020 white was the majority at 69.6%. People identifying with Hispanic or Latino origin of any race made up 81.5%. El Paso reports 23% of the community as foreign born. The El Paso independent school district has approximately 50,000 students enrolled, and the makeup-of enrollment includes: 83.8% Hispanic, 8.9% White, 3.3% Black/African American, and 4% Other (El Paso Independent 2022). The 2020 census states that 60.5% of El Paso is between 18 and 65 years of age. The ratio between males and females is approximately equal, where females make up 51%. Per the USCB 2010 Census, the area north of Gateway Blvd S. and between Martin Luther King Jr. Blvd and McCombs St. that encompasses the project site has a population of 444. Within a 1-mile radius of the site, the population estimate is 1,216 individuals residing in 384 households.

Within the City area, the primary industry types are professional, scientific, administrative, waste management services, education, health care and social assistance, and retail trade. As there may be different economic conditions crossed, the median family income for the City of El Paso is approximately $54,013.

The local services in the City of El Paso include retail trade stores, waste management and remediation services, health care and social assistance facilities, religious facilities, parks, national monuments, museums, golf courses, and educational facilities for elementary through high school, specialty schools, and alternative schools. The Bureau of Labor Statistics (2022) records 8.4% unemployment in the City of El Paso in March 2012, with unemployment rates steadily decreasing to 4.3% in March 2022. There was a sharp increase in unemployment during summer 2020, but this was attributed to the COVID-19 pandemic. Texas unemployment rates were at 6.7% in March 2012, decreasing to 4.4% in March 2022. Statewide trends mirrored the sharp increase in unemployment seen in El Paso during summer 2020.

No Action Alternative: There would be no changes to socioeconomic conditions, industry types would not be affected, and there would be no construction within the project area.

Proposed Action: Development of the proposed project would increase construction expenditures within the area and potentially lead to the creation of construction jobs during the construction period. Materials for the project could also likely be sourced from local suppliers, which could temporarily increase profit margins in certain industries such as metal, stone, and landscape suppliers. The increased number of people in the area during construction may also increase retail revenues at local stores and restaurants. These potential impacts would be positive but minimal and temporary. Long-term impacts to the community could include increased growth of El Paso y which could benefit low-income and minority communities in the area through the increase in employment opportunities.

3.2.8.2 *Environmental Justice*

EO 12898 requires federal agencies to identify and address disproportionately adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. As defined by the U.S. EPA, environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (U.S. EPA 2022). The Council on Environmental Quality (CEQ) defines a minority population as an identifiable group of people with a population that is 50% minority or greater. A minority is considered someone who identifies as American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic Origin; or Hispanic (CEQ 1997). In 2010 the total non-Hispanic population of El Paso was 145,789 and the total Hispanic population was 690,273 (83%); the population within the project area and a one-mile buffer was 444 with 69% (307) identifying as a minority. From 2016 to 2020, there were 230,905 households with an average 2.92 people per household. The owner-occupied housing unit rate was 59.6%. Approximately 67.8% of people over the age of four speak a language other than English at home (US EPA 2022, see EJSCREEN Census 2010 Summary Report in Appendix C).

EO 13166 requires agencies to examine the services they provide, identify need for services to those with limited English proficiency (LEP), and develop and implement a system to provide those services so that LEP persons can have meaningful access to them (USDJ 2021). The proposed project area is located in an area in which approximately 2% of the residents speak English less than well (US EPA 2022).

No Action Alternative: There would be no change to the current conditions, and no impact to socioeconomics or environmental justice would occur with implementations of this alternative.

Proposed Action: Based on the location of the Proposed Action, a minority population is present. Minor adverse human health or environmental effects on minority and low-income populations in the area are anticipated, but effects should be temporary, and not significant. The use of heavy equipment

during construction should produce negligible to minor adverse air quality and noise impacts, but these potential effects would be short-term, temporary, and subject to current regulations. Traffic on Martin Luther King Jr. Blvd. and McCombs St may increase due to project worker commutes and equipment mobilization, but no road closures are anticipated. Traffic flows should return to current conditions post-construction. The Proposed Action may result in short-term hiring of local community members to aid in construction activities. Post-construction, the project is anticipated to have positive effects on minority populations by providing a recreational and scenic feature in the area. Due to the lack of significant LEP populations, foreign language signage should not be necessary during site construction.

3.2.9 Other Resources

3.2.9.1 *Public Health and Safety*

Design plans for Phase I of the project indicate site access solely via Martin Luther King Jr. Blvd. and McCombs Street, a two-lane road. Health and safety concerns would likely include traffic hazards from the type and number of vehicles and equipment that would use the existing road. Congestion problems may also arise when construction vehicles are entering and exiting the site. Three businesses are present in the northern and eastern vicinities.

The proposed project site is served by local municipal fire and police services and private ambulance services. Two fire stations are located within an approximate two miles of the project site. The closest fire hydrant is at the entrance to the Painted Dunes Desert Golf Course. The nearest hospital is located approximately 1.3 miles south of the site. The Northeast Regional Command Center is the El Paso Police Department substation that serves Northeast El Paso and encompasses the study site, and the El Paso County Sheriff's Department also holds jurisdiction (GIS 2020).

No Action Alternative: In the no action alternative, there would be no change to current conditions regarding public health and safety.

Proposed Action: The proposed project would implement BMPs to prevent and mitigate spills, and hazardous materials would be required to be properly contained, manifested, and managed in accordance with all federal, state, and local regulations. In the event of a spill which may be hazardous, site plans dictate that the contractor would contact the fire department and the TCEQ.

The contractor would adequately safeguard open excavations or other obstacles potentially dangerous to the public by providing temporary barricades, caution signs, and other means. A traffic control plan approved by the El Paso Street and Maintenance Department would be maintained by the contractor to indicate work zones and ensure safe traffic flow. Post-construction, visitors to the basin would be able to park on-site so McCombs Street and Martin Luther King Jr. Blvd. would not be blocked. The nearest homes are approximately one mile south of the proposed project site and likely would not be directly impacted by increased traffic.

There is no anticipated negative effect on fire, police, or medical services. Studies evaluating changes in crime rates and public health factors in communities in proximity to parks found fewer violent and property crimes and relief of mental fatigue (APP 2003). Additionally, the El Paso County Sheriff's Office maps the project site as an area with low crime. There should not be any significant negative impacts to public health and safety.

3.2.9.2 *Climate and Climate Change*

Climate change refers to any significant changes in average climatic conditions (such as mean temperature, precipitation, or wind) or variability (such as seasonality, storm frequency, etc.) lasting for an extended period (decades or longer). Recent reports by the U.S. Climate Change Science Program, the National Academy of Sciences, and the United Nations Intergovernmental Panel on Climate Change provide evidence that climate change is occurring and may accelerate in the coming decades. Strong evidence supports global climate change being driven by human activities worldwide, primarily the burning of fossil fuels and tropical deforestation. These activities release carbon dioxide and other heat-trapping gases, commonly called "greenhouse gases," into the atmosphere (Intergovernmental 2022).

The El Paso, Texas region tends to be arid through most of the year with average rainfall of approximately 9 inches (22.9 centimeters). Most rainfall occurs during July, August, and September with approximately 4.6 inches of precipitation. The hottest month of the year is June with a daily high average temperature of 95.2°F, and the coldest month of the year is January with a daily low average temperature of 32.2°F.

No Action Alternative: Under the no action alternative, there would be no additional greenhouse gas emissions into the atmosphere since construction vehicles or equipment would not be active on the site for the proposed project.

Proposed Action: The proposed project scope consists of excavation and construction activities that do not have an effect on general climate; therefore, there should be no significant impacts to climate in the project area. Anticipated impacts to climate change and greenhouse gas generation should be minimal. During construction, greenhouse gases would be emitted by workers traveling to and from the site and construction equipment. Post-construction, visitors to the basin will discharge emissions during their commute to the site. The overall emissions discharged during and post-construction should be minimal because the construction period is short-term and temporary and as a recreational area, the basin is not expected to continually draw large crowds. The project may aid in reducing greenhouse gasses by providing increased vegetative coverage throughout the project area. The nature of the proposed project should not cause a significant negative impact related to climate change.

3.2.9.3 *Visual Impacts*

A visual resource (or aesthetics) encompasses scenic view corridors, vistas, viewing areas, or other scenic resources. There are several designated visual resources in the vicinity of the site. Franklin Mountain State Park is to the west and multiple parks are located within the neighborhoods to the south. The state park and city parks offer walking or biking paths and opportunities to appreciate natural scenic beauty and historic significance (City 2020; El Paso Parks 2020).

The proposed project site is in an undeveloped shrub/scrub area. The northern, southern, and western boundaries of the project area abut land of a similar nature. McCombs St. and the Painted Dunes Desert Golf Course are adjacent to the eastern boundary. The nearest neighborhoods are approximately one mile south of the project site.

No Action Alternative: In the no action alternative, no changes to visual resources are anticipated because the area would remain in its current state.

Proposed Action: Upper limits of the basin would be at existing ground levels and the majority of the project would occur below ground level in the excavated opening. During construction temporary visual impacts to viewpoints from McCombs St. and Martin Luther King Jr. Blvd. due to the presence of machinery and work equipment at the project site are anticipated. Upon project completion, views of the Franklin Mountains would likely be unobstructed and all machinery would be removed. The completed project would offer enhanced visual impacts to travelers on Martin Luther King Jr. Blvd. and McCombs Street and visitors of the basin due to the ample herbaceous, arboreal, and hardscape landscaping. Similarly, the recreational value of the site would increase significantly due to the addition of hike and bike paths, walkways, and benches within the basin. Overall, there should be no negative impacts to visual resources.

3.2.9.4 *Noise*

The purpose of noise regulations is to either protect human health by regulating occupational noise hazards or to protect human health from environmental noise pollution. In El Paso, noise regulations are included in Chapter 9.40 of the El Paso, Texas City Code (2022), and identify noise sensitive zones as schools, hospitals or similar, churches, and libraries. The Code allows construction activity noise levels up to 65 dBA except for industrial property activities, which may reach 70 dBA from 7:00 am to 10:00 pm. Adequate mufflers or sound dissipative devices are required on any operated motor vehicle or motorcycle.

Ambient noise around the proposed project site is created by urban traffic from Martin Luther King Jr. Blvd., McCombs Street and U.S. Highway 54, El Paso Electric Newman Power Station, and the El Paso Natural Gas Company. The intersection of McCombs Street and US-59 and McCombs Street north thereof exhibit noise levels is projected to be from 50.0 to 69.9 dBA (Bureau of Transportation Noise Map 2018). The Occupation Health and Safety Administration (OSHA) allows a maximum noise level of 85 dBA within operating power plants. Gas pipelines like those used by El Paso Natural

Gas are known to create deep low-frequency soundwaves that are often heard as a hum or felt as vibration. The nearest noise sensitive zone within the vicinity is the Richardson Middle School, approximately one mile south of the project area.

No Action Alternative: In the no action alternative, no changes to noise levels are anticipated.

Proposed Action: During construction of the proposed project, construction activities would cause increased noise within the vicinity. Noise control would follow regulations (volume and time ranges) set by the City, and measures would be taken to reduce excess noise, such as utilizing equipment equipped with silencers or mufflers or other measures. Construction activities would be limited to daytime hours. In the short-term, construction activities would cause increased noise levels but these are not anticipated to have significant impacts on the nearest noise sensitive zone considering current ambient noise. The nearest sensitive zones are the Nolan Richardson Middle School and neighborhoods, both approximately one mile south of the project area. Post-construction, noise levels are expected to be minimal to none and therefore no significant long-term noise impacts should occur.

3.2.10 Cumulative Impacts

A cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (Council on Environmental Quality (CEQ)). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR §1508.7). Potential area developments that could result in cumulative impacts are discussed below.

No Action Alternative: In the no action alternative, no changes to cumulative impacts are anticipated.

Proposed Action: There are not anticipated to be any long-term cumulative impacts of negative significance from implementation of the Proposed Action as well as Phases 2 through 3 of the Proposed Action. There would be some impacts of small significance during construction of the facility and in the general area within and near residential development, which would consist mostly of short-term noise and dust levels. Other negative impacts include the conversion of natural habitat within the basin boundaries. Phases 2 and 3 of the project would include additional periods of noise and dust, and the basin and pipeline would be extended to Martin Luther King Jr. Boulevard. However, noise and dust should remain as minimal, temporary impacts, and cumulative impacts to wildlife, vegetation, and T&E species should also be minimal as there is ample similar habitat surrounding the entire area. Long-term positive impacts would potentially include conserving regional groundwater reserves, recharging the aquifer, the positive use of excess Rio Grande water, and providing a wetland habitat to benefit wildlife, including several listed T&E species. There would be a potential increase in recreational value as walking paths and park amenities would be constructed. Overall, the Proposed Action is anticipated to have cumulative beneficial impacts to the El Paso community.

3.3 Summary

Table 3.3 Summary of Impacts for the No Action Alternative and Proposed Action

Resource	Impacts: No Action Alternative	Impacts: Proposed Action
Air Quality	No effect	Minor short-term impacts during construction phase. No permanent impacts.
Archeological, Cultural and Historic Resources	No effect	Sites are present but there is no anticipated significant impact. Consultation with SHPO is necessary. Sites are not likely eligible under the NRHP.
Climate and Climate Change	No effect	Minimal impacts to climate change due to emissions during construction and by visitors post-construction. Increased vegetative cover within completed basin may assist in greenhouse gas removal.
Environmental Justice	No effect	Minor, temporary effects to human health and environment in the form of increased noise, dust during construction. Post-construction effects are positive by creation of a recreational area.
Floodplains	No effect	Most of the project area is within the floodplain, and parts of the floodplain would be permanently excavated to create the basin and temporarily excavated to lay the pipeline. There would be no negative impacts to floodplain function as the floodplain would not be filled.
Geology	No effect	No impacts. The water table is deeper than planned excavations; exposed bedrock would be stabilized; there are no geological heritage sites within or around the project area.
Groundwater	Negative impact, but less than significant due to the continued withdrawal of groundwater, without replacing the quantity drawn.	Overall positive impact by conserving regional groundwater reserves and supporting long-range drought resilience. There is no anticipated contamination of the aquifer.

Noise	No effect	Minimal impacts to noise levels during construction. No significant long-term noise impacts.
Public Health and Safety	No effect	No significant negative effects; spills would be prevented and mitigated; excavations would be barricaded; a traffic control plan will be implemented.
Socioeconomic Issues	No effect	Positive but minimal and temporary impacts. A small number of construction jobs would be created and revenues within several industry types may increase temporarily as a result of project materials purchases and increased number of people (workers) in the area.
Soils	No effect	Topsoil and subsurface soil would be disturbed to a depth of 20 feet. Erosion and sediment control measures would be implemented. Overall impacts would not be significant.
Surface Water	No effect	No adverse impacts; BMPs would be utilized to prevent contamination. The basin would be a new surface water feature.
Threatened and Endangered Species	No habitat loss or disturbance to area.	Habitat loss poses a minor, temporary impact, while construction (noise, dust, people) poses a minor, temporary impact to species utilizing the area. Timing restrictions or nest surveys would mitigate effects to Northern Aplomado falcons and Texas horned lizard BMPs would be followed to prevent unauthorized "takes."
Vegetation	No effect.	Minor negative impacts. Land within basin boundaries would be permanently altered, but vegetation diversity would increase via native arboreal landscaping.
Visual Impacts	No effect	No negative impacts, project is subsurface and scenic views of Franklin Mountains will be unobstructed.
Wetlands	No effect	Beneficial impacts because the project would create a wetland where there previously was none.
Wildlife	No effect	Temporary and permanent impacts to wildlife communities due to lost habitat.

		However, the project would provide a new water resource and riparian habitat

4.0 ENVIRONMENTAL COMMITMENTS

This section discusses the environmental commitments developed to protect resources and reduce unavoidable adverse impacts to a non-significant level, along with the regulatory authority for those commitments. If the Proposed Action is implemented, these BMPs should be administered and followed. See design sheet C14.0 in Appendix B for specific construction and SWPPP BMPs.

Table 4.0 Environmental Commitments

Environmental Commitment	Affected Resource	Authority
A Stormwater Pollution Prevention Plan will be prepared and implemented in accordance with TCEQ TXR150000 Construction General Permit and the City of El Paso's stormwater ordinances.	Water Resources	Clean Water Act, Texas Surface Water Quality Standards (Texas Water Code)
Water flushed from structures or pipelines after disinfection that contains Cl2 residue > 0.099 mg/L shall be collected and removed from the site. Contractor shall obtain Engineer's approval for method of disposal.	Water Resources	Clean Water Act, Texas Commission on Environmental Quality
Land resources within the project boundaries and outside the limits of permanent work shall be restored to a condition that will appear natural. Confine all construction activities to existing public rights-of-way, permanent and temporary easements.	Soils and Geology	N/A
Outside of areas requiring earthwork, the Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval, nor utilize them for anchorage without approval. Trees not noted to be removed must be protected from injury. Tree scars > 1" in diameter shall be coated as soon as possible with approved tree wound dressing. Trimming and pruning shall be performed by experienced workmen with appropriate tools.	Vegetation	N/A
Any tree or other landscape feature noted to remain that is scarred or damaged by equipment or operations shall be restored as nearly as possible to its original condition. The Engineer will decide what method and whether damaged trees shall be treated or healed or removed and disposed of.	Vegetation	Project Specifications
Dust will be controlled within all excavations, embankments, stockpiles, access roads, plant sites, waste areas, borrow areas, and all other work areas within or around project boundaries so standards of air pollution	Air Quality, Socioeconomics, Environmental Justice	Clean Air Act, Texas Commission on Environmental Quality, City of El Paso

will not be exceeded nor cause a hazard or nuisance to others.		Environmental Management Division
Sprinkling or other similar methods will be permitted to control dust. The use of petroleum products is prohibited. The use of chlorides is not permitted. Sprinkling must be repeated in intervals to satisfactorily prevent dust.	Air Quality, Environmental Justice	Clean Air Act, Texas Commission on Environmental Quality, City of El Paso Environmental Management Division
The Contractor shall make every effort to minimize the noises caused by operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with local, state, and federal regulations.	Noise, Environmental Justice	El Paso, Texas City Code Noise Control Act of 1972
Site clearing may include an EPA-approved herbicide for pre-construction treatment to minimize weed spread during construction.	Vegetation	The Plant Protection Act
In the event that T&E species are discovered during construction, construction activities shall halt until consultation is completed with the USFWS and protection measures are implemented. It may be recommended that woody vegetation removal occur outside of Northern Aplomado falcon nesting season, March to June, or that a nest survey be completed prior to construction.	Threatened and Endangered Species	Endangered Species Act
If migratory birds are observed within or near the project site, pre-construction nest surveys may be required to observe for active nests. It may be recommended that woody vegetation removal occur outside of species-specific nesting seasons.	Biological Resources	Migratory Bird Treaty Act
If previously undiscovered cultural or paleontological resources are discovered during construction, activities must cease immediately in the vicinity of the discovery and the State Historic Preservation Officer must be notified. Work shall not resume until consultation has been completed.	Archeological, Cultural and Historic Resources	National Historic Preservation Act

5.0 CONSULTATION AND COORDINATION

Reclamation's public involvement process presents the public with opportunities to obtain information about a given project, and allows interested parties to participate in the project through written comments. This chapter discusses public involvement activities anticipated or taken to date for the Proposed Action.

5.1 Agencies Consulted

The following agencies have been consulted prior to delivery of draft EA to Reclamation. Comments and responses - adverse or otherwise - will be included in Appendix E..

Texas Historical Commission
U.S. Fish and Wildlife Service - Austin Ecological Services Field Office
Texas Parks and Wildlife Department
US Army Corps of Engineers – Albuquerque District
National Resource Conservation Service
Apache Tribe of Oklahoma
Comanche Nation
Fort Sill Apache Tribe of Oklahoma
Mescalero Apache Tribe of the Mescalero Reservation
Tonkawa Tribe of Indians of Oklahoma
White Mountain Apache Tribe of the Fort Apache Reservation, Arizona
Wichita and Affiliated Tribes
Ysleta del Sur Pueblo

5.2 Public Involvement

This draft document will be available for public review on Reclamation's website beginning on xx/xx/xxxx and notice of the review period will be provided by the El Paso Times newspaper.

5.3 Responsiveness Summary

Upon received consultation and coordination from Reclamation, tribal authorities, and various agencies, this section will be updated.

Table 5.3 Agency Responses

Table 5.3 Agency Responses

Agency	Sent	Response Date	Comments
Texas Historical Commission	N/A	7/7/2022	THC/SHPO concurs with information provided.

N/R = No Response

N/A = Not Applicable

6.0 PREPARERS

Name	Title	Agency	Areas of Responsibility
Jennifer Peters	NEPA Specialist	Terracon	Quality Assurance
Tim Capps	Natural Resources Specialist	Terracon	Introduction, Proposed Action and Alternatives, General Setting
John Hall	Archaeologist	Terracon	Cultural Resources
Fabian Uribarri	Natural Resources Specialist	Terracon	Biological Resources
Nicole Marshall	Natural Resources Specialist	Terracon	Affected Resources, Water Resources, Air Quality
Robyn Gray	Natural Resources Specialist	Terracon	Socioeconomics and Environmental Justice
Shannon Skaalure	Natural Resources Specialist	Terracon	GIS, Affected Resources, Other Resources

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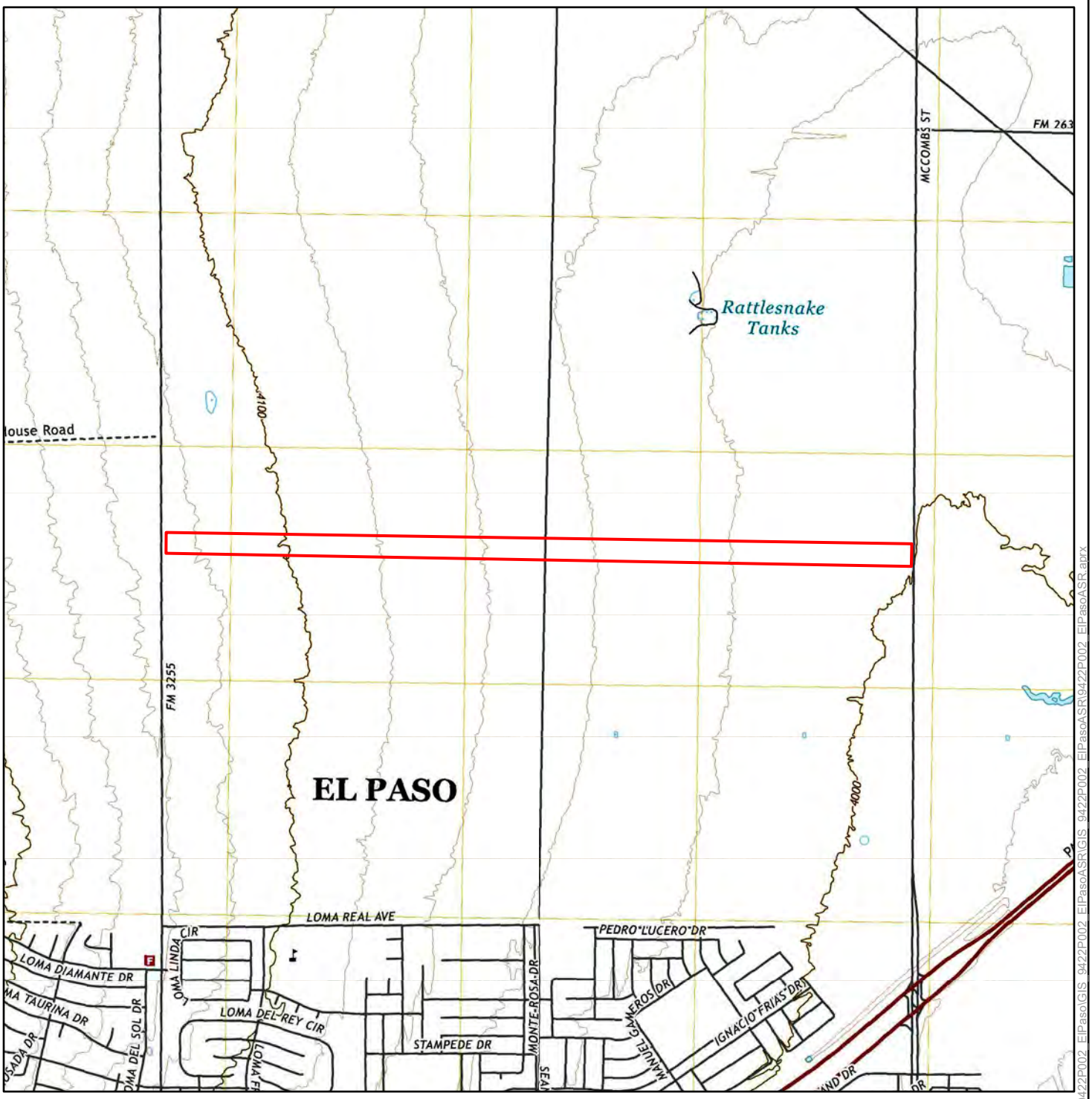
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8.0 ACRONYMS

Abbreviation or Acronym	Definition
ASR	Aquifer Storage and Recharge
CAD	Central Appraisal District
CWA	Clean Water Act
EA	Environmental Assessment
EO	Executive Order
EOR	Element Occurrence Record
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NRCS	Natural Resource Conservation Service
NWI	National Wetlands Inventory
OHWM	Ordinary High Water Mark
ROW	Right-of-Way
SWPPP	Stormwater Pollution Prevention Plan
T&E	Threatened and Endangered
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
TPWD	Texas Parks and Wildlife Department
TXNDD	Texas Natural Diversity Database
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
WOTUS	Waters of the U.S.

APPENDIX A: EXHIBITS



Legend

Study Area

0 1,000 2,000 4,000 Feet

N

DATA SOURCES:
City of El Paso
USGS Protected Areas Database of the U.S.
ESRI World Imagery

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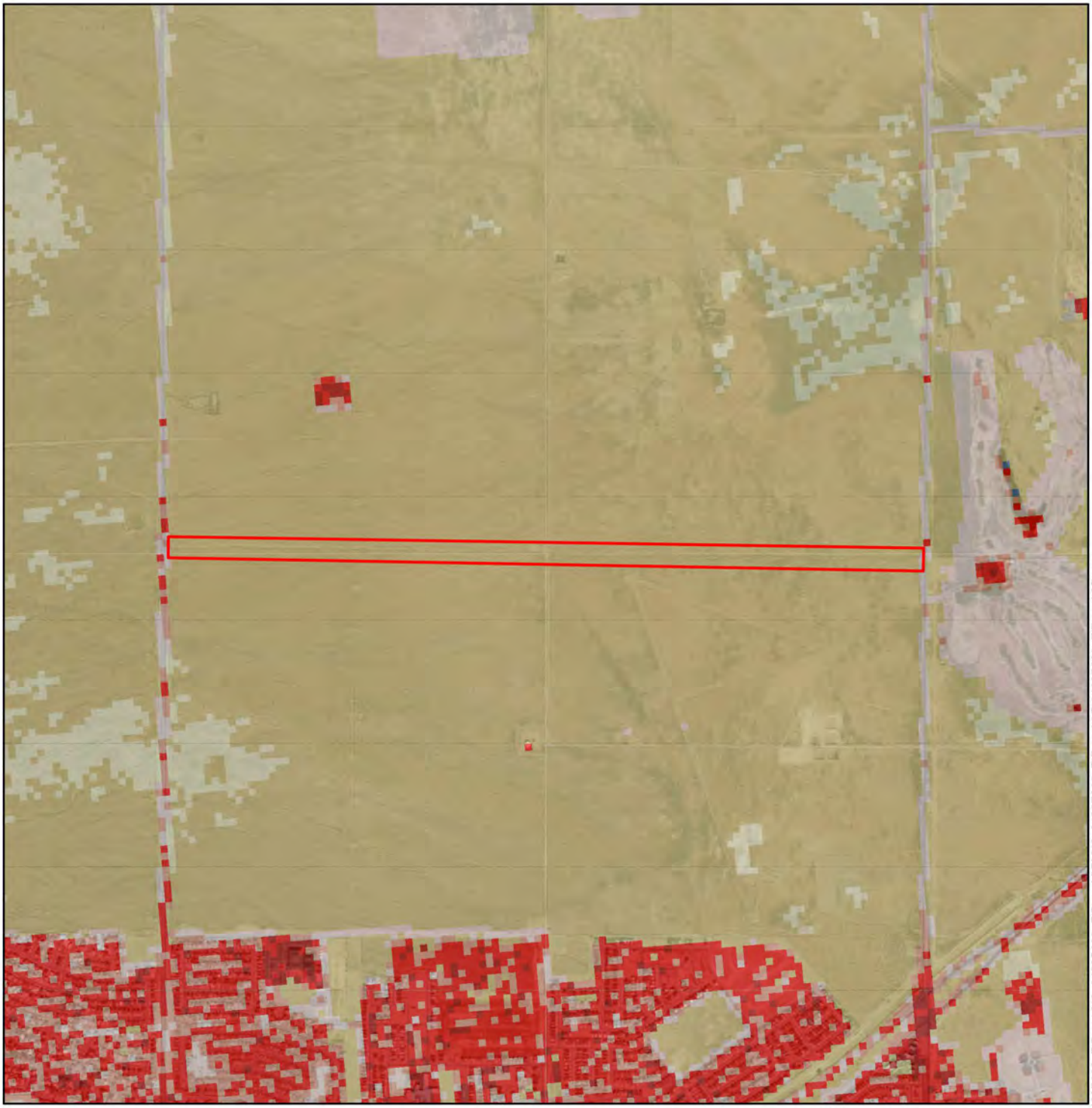
Project No.:	9422P002
Date:	Jun 2022
Drawn By:	SMS
Reviewed By:	JP

USGS Topographic Map 2019

City of El Paso
City of El Paso ASR
El Paso County, TX
Center 106.4252°W 31.9572°N

Exhibit

A



Legend

- Study Area
- 11 Open Water
- 21 Developed, Open Space
- 22 Developed, Low Intensity
- 23 Developed, Medium Intensity
- 24 Developed High Intensity
- 31 Barren Land (Rock/Sand/Clay)
- 52 Shrub/Scrub
- 71 Grassland/Herbaceous

N

0 1,000 2,000 4,000 Feet

DATA SOURCES:
City of El Paso
TPWD EMST
ESRI World Imagery

Proposal No.:	9422P002
Date:	Jun 2022
Drawn By:	SMS
Reviewed By:	JP

National Land Cover Database Map

City of El Paso
City of El Paso ASR
El Paso County, TX
Center 106.4252°W 31.9572°N

Exhibit

B

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Legend

Study Area

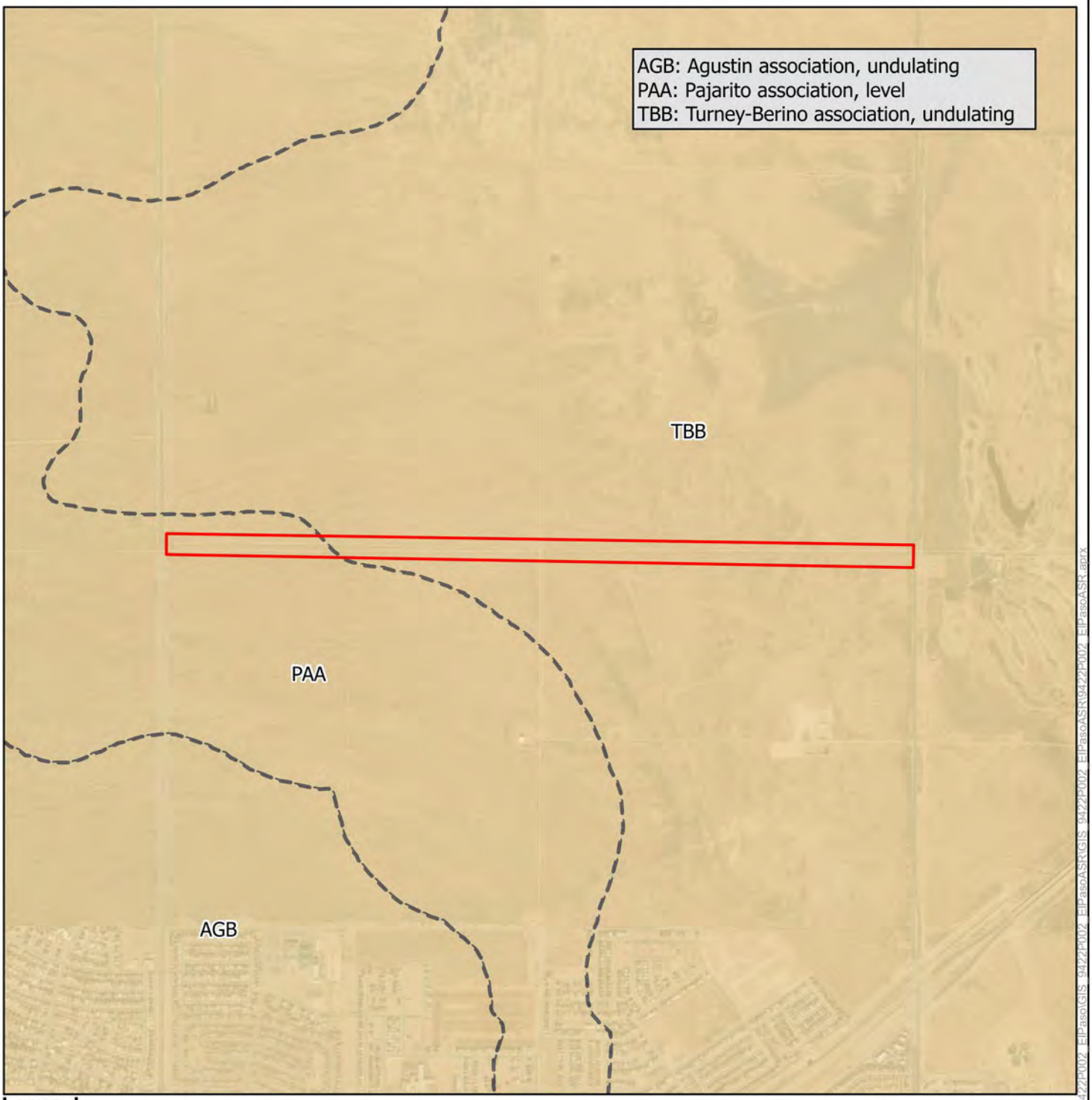
N

0 1,750 3,500 7,000 Feet

DATA SOURCES:
City of El Paso
TNRIS NAIP Imagery

Project No.: 9422P002	**2020 Aerial Imagery**	**Exhibit**
Date: Jun 2022	City of El Paso City of El Paso ASR El Paso County, TX Center 106.4252°W 31.9572°N	**C**
Drawn By: SMS		
Reviewed By: JP		

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Legend

- Study Area
- Soil Map Units
- Not prime farmland

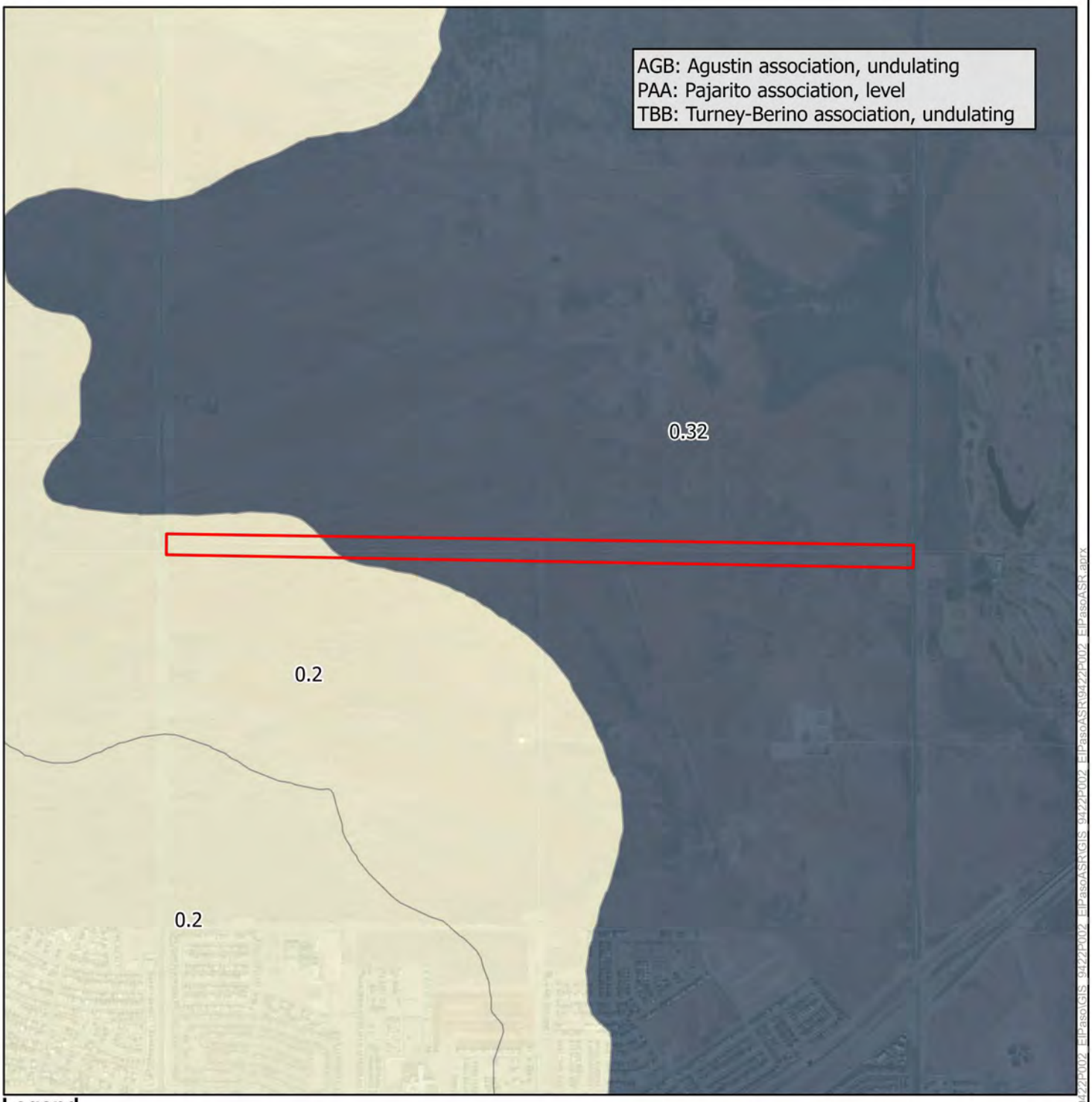
N

0 1,000 2,000 4,000 Feet

DATA SOURCES:
City of El Paso
SSURGO
ESRI World Imagery

Project No.: 9422P002 Date: Jun 2022 Drawn By: SMS Reviewed By: JP	**USDA Farmland Ratings Map** City of El Paso City of El Paso ASR El Paso County, TX Center 106.4252°W 31.9572°N	**Exhibit** **D**

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Legend

Study Area

Soil Map Units

KFactor

0.02

0.69

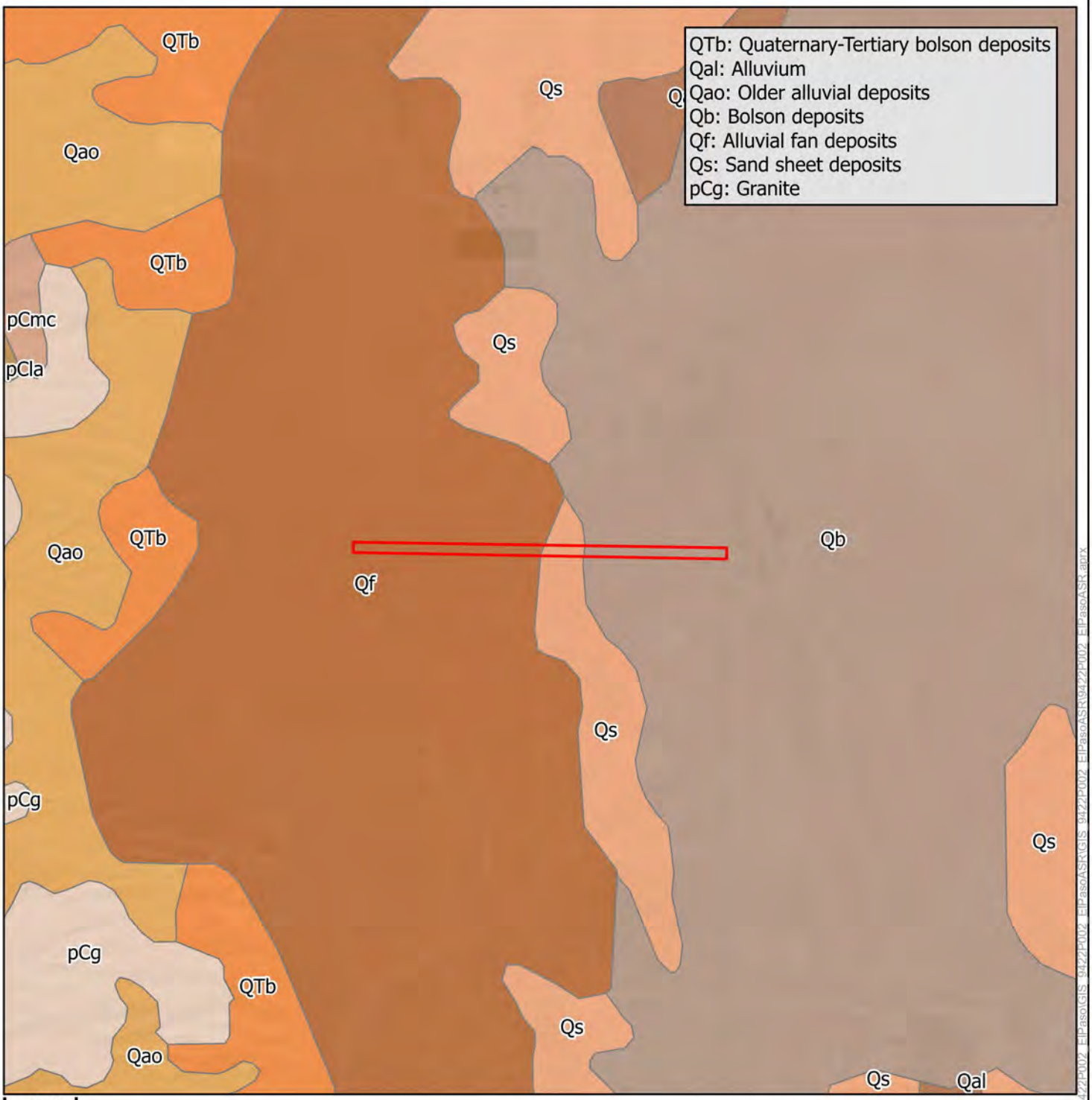
N

0 1,000 2,000 4,000 Feet

DATA SOURCES:
City of El Paso
SSURGO
ESRI World Imagery

Project No.: 9422P002	**USDA K Factors for Erodibility Map**	**Exhibit**
Date: Jun 2022	City of El Paso City of El Paso ASR El Paso County, TX Center 106.4252°W 31.9572°N	**E**
Drawn By: SMS		
Reviewed By: JP		

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Legend

- Study Area
- QTb
- Qal
- Qao
- Qb
- Qf
- Qs
- pCg
- pCla
- pCmc

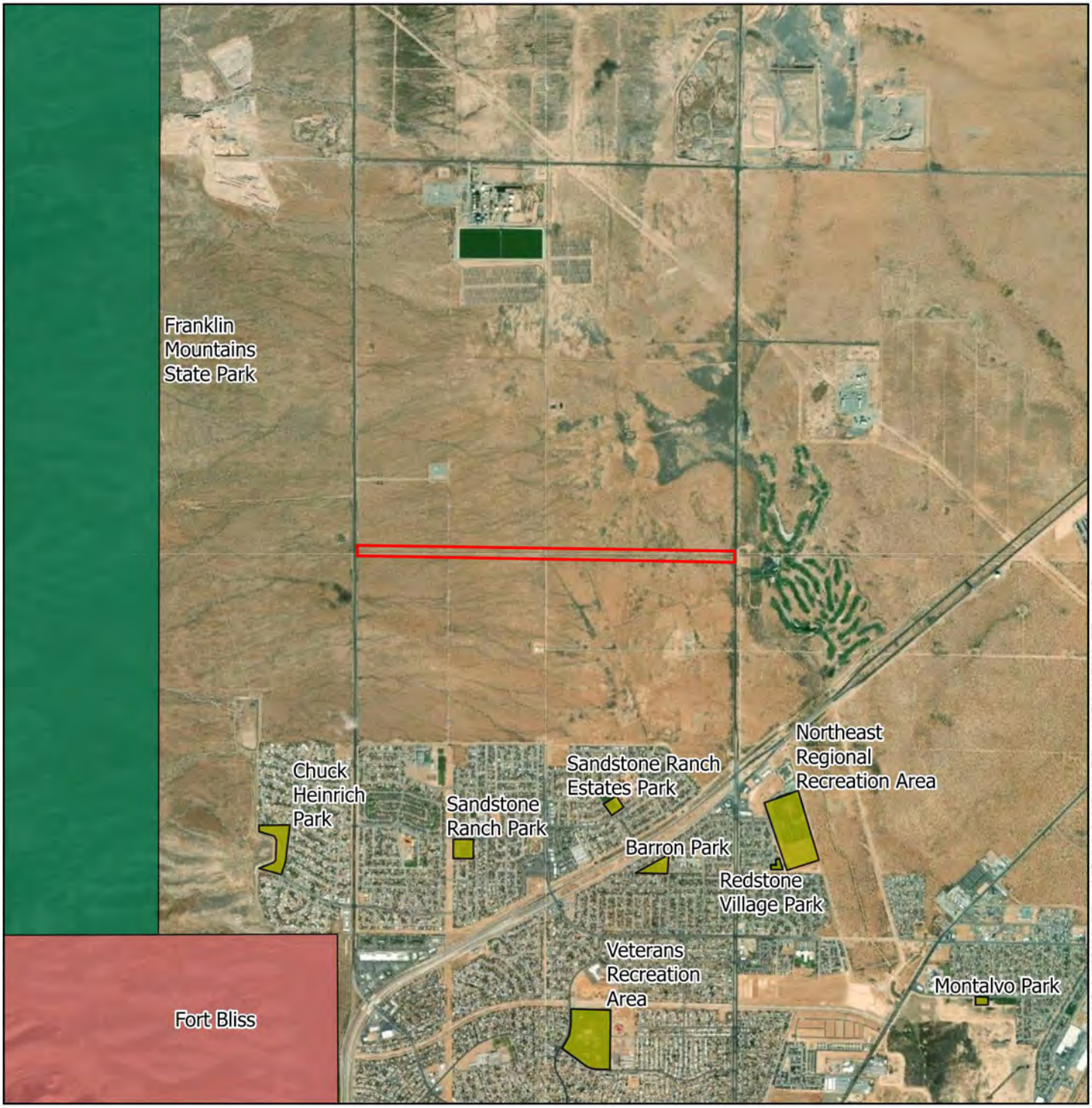
N

0 2,000 4,000 8,000 Feet

DATA SOURCES:
City of El Paso
SSURGO
ESRI World Imagery

Project No.: 9422P002	**USGS Geologic Map**	**Exhibit**
Date: Jun 2022	City of El Paso City of El Paso ASR El Paso County, TX Center 106.4252°W 31.9572°N	**F**
Drawn By: SMS		
Reviewed By: JP		

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Legend

- Study Area
- Local Government
- State
- Federal

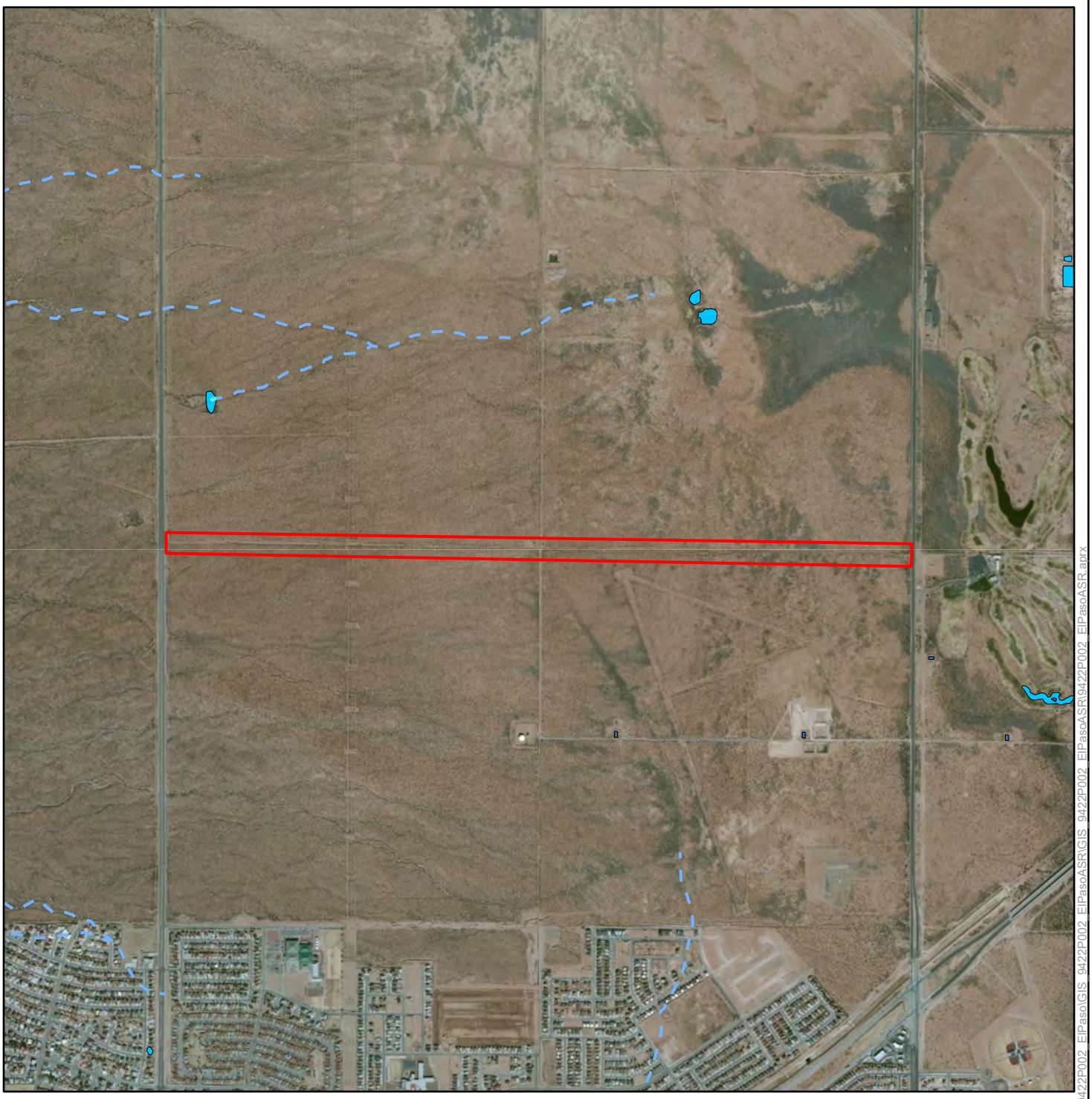
0 2,000 4,000 8,000 Feet

N

DATA SOURCES:
City of El Paso
USGS Protected Areas Database of the U.S.
ESRI World Imagery

Project No.: 9422P002 Date: Jun 2022 Drawn By: SMS Reviewed By: JP	**Formally Classified Lands** City of El Paso City of El Paso ASR El Paso County, TX Center 106.4252°W 31.9572°N	**Exhibit** **G**

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Legend

- Study Area
- Artificial Path
- Stream/River: Hydrographic Category = Ephemeral
- Lake/Pond
- Reservoir

0 1,000 2,000 4,000 Feet

N

DATA SOURCES:
City of El Paso
USFWS
ESRI World Imagery

Project No.:	9422P002
Date:	Jun 2022
Drawn By:	SMS
Reviewed By:	JP

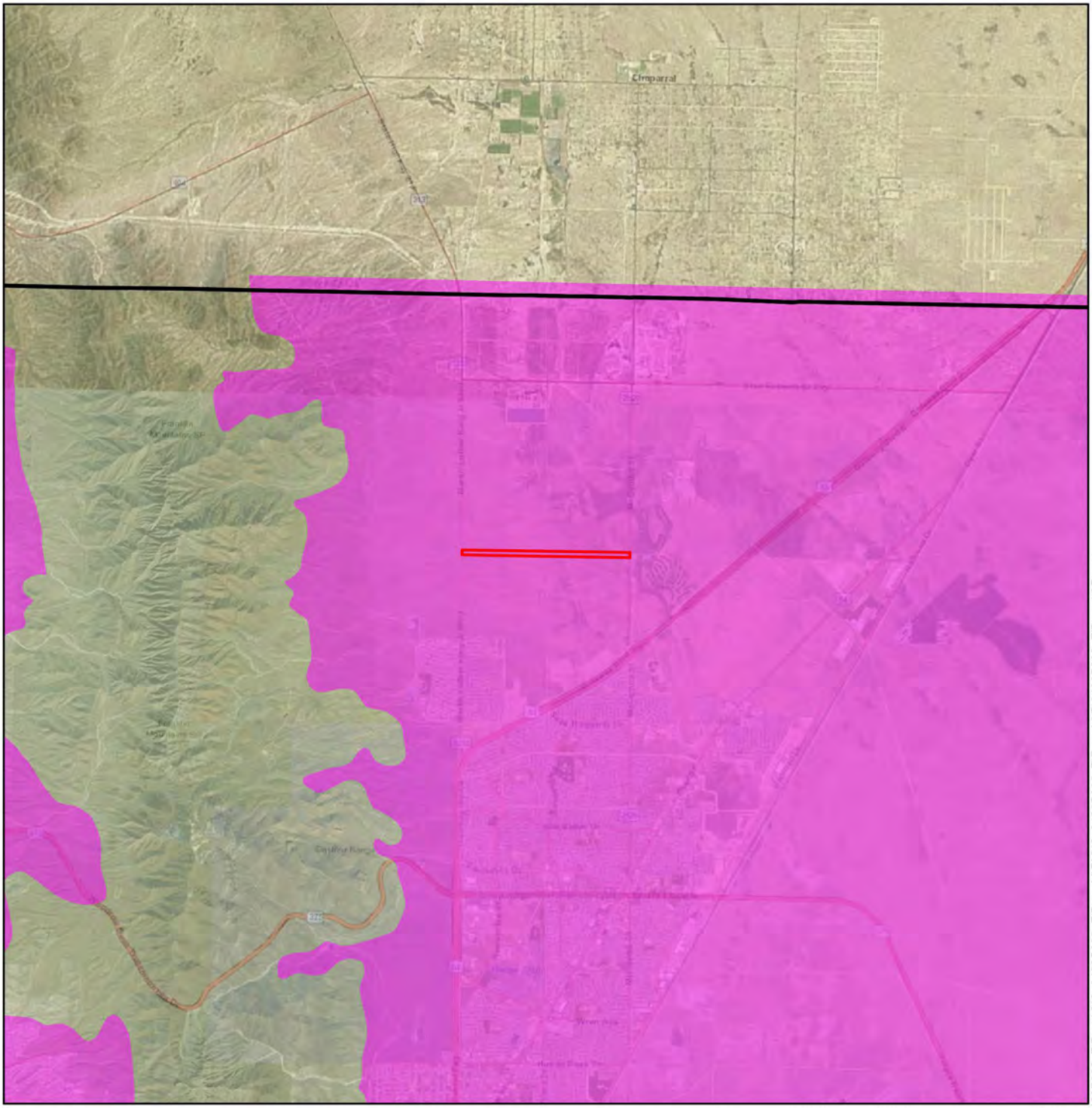
National Hydrography Dataset Map

City of El Paso
City of El Paso ASR
El Paso County, TX
Center 106.4252°W 31.9572°N

Exhibit

H

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Project No.: 9422P002	**Aquifers of Texas Map**	**Exhibit**
Date: Jun 2022	City of El Paso City of El Paso ASR El Paso County, TX Center 106.4252°W 31.9572°N	I
Drawn By: SMS		
Reviewed By: JP		

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Legend

- Study Area
- State Lines
- Sole Source Aquifers

0 325,000 650,000 1,300,000 Feet

N

DATA SOURCES:
City of El Paso
EPA
ESRI World Imagery

Project No.: 9422P002 Date: Apr 2022 Drawn By: SMS Reviewed By: JP	**Sole Source Aquifers Map** City of El Paso City of El Paso ASR El Paso County, TX Center 106.4166°W 31.9573°N	**Exhibit** **J**

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Legend

- Study Area
- Native Invasive: Mesquite - Creosotebush Shrubland
- Native Invasive: Mesquite Shrubland
- Row Crops
- Trans-Pecos: Creosotebush Scrub
- Trans-Pecos: Loamy Plains Grassland
- Trans-Pecos: Lower Montane Riparian Shrubland
- Trans-Pecos: Sandy Desert Grassland
- Trans-Pecos: Sparse Creosotebush Scrub
- Urban High Intensity
- Urban Low Intensity

N

0 1,000 2,000 4,000 Feet

DATA SOURCES:
City of El Paso
TPWD EMST
ESRI World Imagery

Proposal No.:	9422P002
Date:	Jun 2022
Drawn By:	SMS
Reviewed By:	JP

Ecological Mapping System of Texas Map

City of El Paso
City of El Paso ASR
El Paso County, TX
Center 106.4252°W 31.9572°N

Exhibit

K

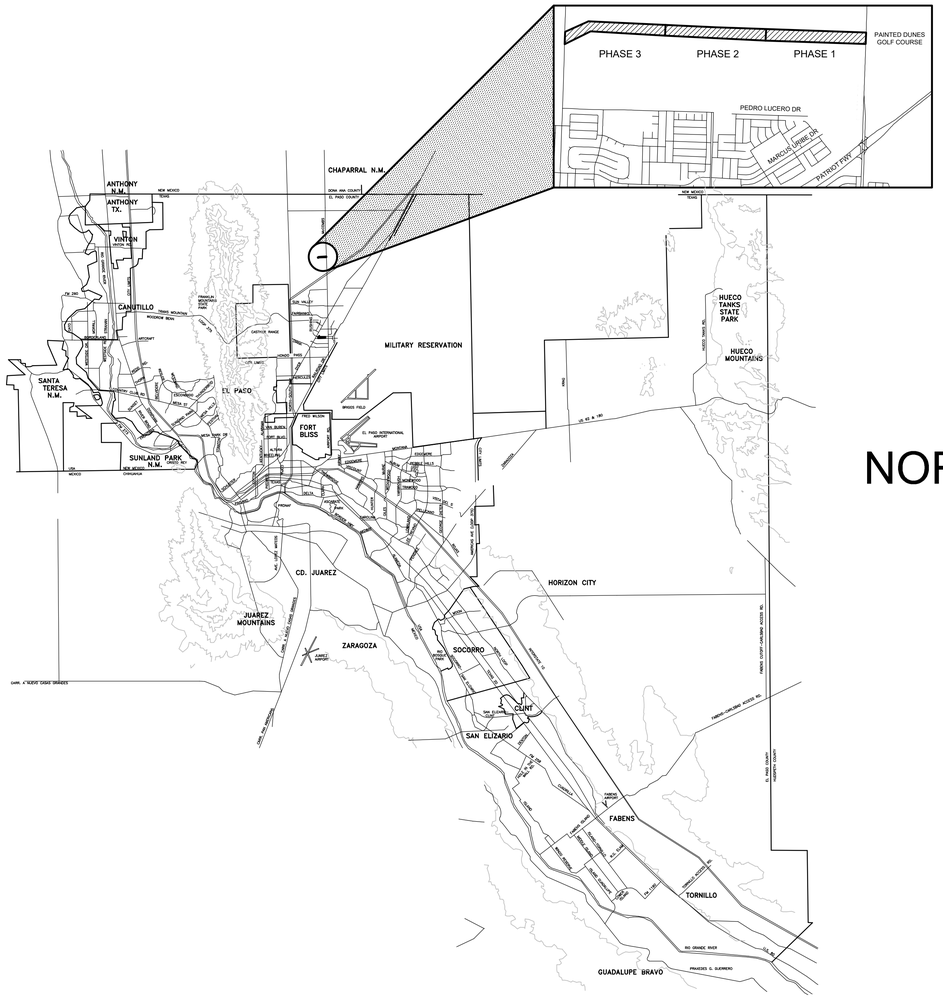
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Project No.: 9422P002	**FAA Airports Map**	**Exhibit**
Date: Jun 2022	City of El Paso City of El Paso ASR El Paso County, TX Center 106.4161°W 31.8944°N	**L**
Drawn By: SMS		
Reviewed By: JP		

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APPENDIX B: DESIGN DRAWINGS



PROJECT LOCATION
SCALE: 1"=2500'

LOCATION MAP
SCALE: 1"=2 MILES

el paso WATER

NORTHEAST AQUIFER STORAGE & RECOVERY (ASR)
ENHANCED ARROYO PHASE I

BID NUMBER: XX–XX

SEPTEMBER 2021

PUBLIC SERVICE BOARD MEMBERS

KRISTINA MENA	CHAIR
IVONNE SANTIAGO	VICE CHAIR
CHRISTOPHER ANTCLIFF	SECRETARY–TREASURER
BRYAN MORRIS	MEMBER
CHARLIE INTEBI	MEMBER
LISA SAENZ	MEMBER
MAYOR OSCAR LEESER	EX–OFFICIO MEMBER

JOHN E. BALLIEW, P.E.	PRESIDENT/CEO
MARCELA NAVARRETE, C.P.A.	VICE PRESIDENT
ALAN SHUBERT, P.E.	VICE PRESIDENT
GILBERT TREJO, P.E.	CHIEF TECHNICAL OFFICER
FELIPE LOPEZ, P.E.	CHIEF OPERATIONS OFFICER–DISTRIBUTION AND COLLECTION
MARTIN NORIEGA, P.E.	CHIEF OPERATIONS OFFICER–SUPPORT
PAUL RIVAS, P.E.	CHIEF OPERATIONS OFFICER–PRODUCTION AND TREATMENT

OWNER

el paso WATER

1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594–5500

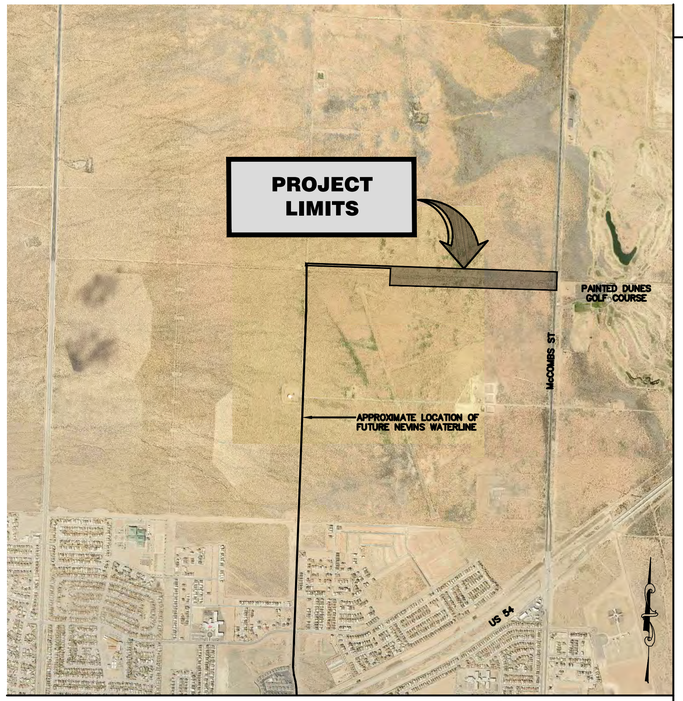
CONSULTANT

PLANNING ENGINEERING PROJECT MANAGEMENT
MCi Moreno Cardenas Inc.
EL PASO • SAN ANTONIO
2505 E. Missouri Ave. El Paso, TX 79903 (915) 532-2091
9601 McAllister Freeway #207, San Antonio TX 78216 (210) 314-3553
Texas Board of Professional Engineers Registration No. F-000554

THESE PLANS WERE RELEASED UNDER THE AUTHORITY OF MARCOS MEDINA, PE #93830 TO BE ISSUED AS A **95% SUBMITTAL** TO EL PASO WATER FOR REVIEW. IT IS NOT TO BE USED FOR CONSTRUCTION OR FINAL PERMIT ISSUANCE.

95% SUBMITTAL -- FOR ENGINEERING REVIEW ONLY NOT TO BE USED FOR CONSTRUCTION

VOLUME 1 OF 2



PROJECT VICINITY MAP SCALE 1" = 1500'

THE PROPOSED PROJECT CONSISTS OF WIDENING THE EXISTING ARROYO, ROUTING THE PIPING THAT WILL CONNECT TO THE EXISTING RECLAIM PIPE, AND LANDSCAPING AMENITIES TO PROVIDE AN AESTHETIC APPEARANCE TO THE OVERALL SITE. THE ENHANCED ARROYO DESIGN CONSISTS OF MULTIPLE INFILTRATION BASINS SEPARATED BY CONCRETE WEIRS AND A DEDICATED HIKE AND BIKE TRAIL LOCATED ON THE SOUTH SIDE OF THE ENHANCED ARROYO. THE ENTRANCE TO THE PROPOSED PARKING AREA WILL BE LOCATED ON McCOMBS STREET.

GENERAL NOTES:

1. THE CONTRACTOR SHALL VISIT AND BECOME FAMILIAR WITH THE PROJECT SITE PRIOR TO SUBMITTING BIDS.
2. SCHEDULE AND PERFORM WORK SO AS TO PROVIDE PROPER PASSAGE OF ANY STORM WATER DURING THE COURSE OF CONTRACTOR OPERATIONS. ALL LABOR, TOOLS, EQUIPMENT AND SUPERVISION REQUIRED TO ASSURE SUCH PROPER PASSAGE OF RUNOFF WATER AND ANY REMOVAL OR HANDLING OF WATER IN ORDER TO MAINTAIN DRY CONDITIONS SHALL BE CONSIDERED AS INCIDENTAL TO THE REMAINDER OF THE WORK AND SHALL BE AT THE EXPENSE OF THE CONTRACTOR. CONTRACTOR SHALL PUMP THE WATER OUT OF THE ARROYO AFTER A STORM EVENT. THE PUMPING OPERATIONS AND DISCHARGE POINTS SHALL BE COORDINATED AND APPROVED BY EL PASO WATER. CONTRACTOR IS RESPONSIBLE FOR FULL PROJECT SITE ONCE THE NOTICE TO PROCEED IS ISSUED. THE CONTRACTOR SHALL PROTECT NEW DRAINAGE STRUCTURES FROM ALL STORM EVENTS. STRUCTURES THAT ARE DAMAGED SHALL BE REMOVED AND REPLACED AT CONTRACTOR'S EXPENSE. CONTRACTOR SHALL PROVIDE A PLAN ON HOW THIS WILL BE HANDLED DURING THE FIRST 15-DAYS OF CONSTRUCTION FOR ENGINEERS REVIEW AND APPROVAL.
3. VERIFY ALL DIMENSIONS AND GRADES BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR IMMEDIATELY NOTIFYING THE ENGINEER AND THE OWNER OF ANY DISCREPANCIES.
4. ESTABLISH A TRUCK ROUTE AND OBTAIN ITS APPROVAL. TRUCK ROUTE MUST BE APPROVED BY THE CITY OF EL PASO, STREET & MAINTENANCE DEPARTMENT, AND TxDOT. CONTRACTOR SHALL MAINTAIN UPDATED PERMITS AT ALL TIMES.
5. ACQUIRE REQUIRED PERMITS FROM THE CITY OF EL PASO PRIOR TO DEMOLITION AND NEW CONSTRUCTION. THE COST OF THE PERMITS WILL BE AT THE CONTRACTOR'S EXPENSE.
6. THE CONTRACTOR SHALL COMPLY WITH ALL STATE STATUTES, MUNICIPAL AND LOCAL ORDINANCES, RULES AND REGULATIONS, PERTAINING TO THE LOCATION OF ALL UTILITY FACILITIES. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES CAUSED BY HIS FAILURE TO LOCATE, IDENTIFY AND PRESERVE ANY AND ALL EXISTING UTILITIES IN THE PLANNING AND CONDUCTING OF EXCAVATION. EL PASO WATER MAKES NO REPRESENTATION PERTAINING THERETO AND ASSUMES NO RESPONSIBILITY OF LIABILITY. THEREFORE, IF THE UTILITY FACILITIES ARE DAMAGED DURING CONSTRUCTION, ALL PAVEMENT, ADJACENT UTILITIES, STRUCTURES, ETC. DISTURBED OR DAMAGED AS A RESULT OF CONSTRUCTION SHALL BE REPLACED TO ORIGINAL OR BETTER CONDITION BY THE CONTRACTOR AT NO ADDITIONAL COST TO EL PASO WATER. UNDERGROUND/OVERHEAD UTILITY FACILITIES SHOWN ON THESE DRAWINGS ARE FOR PLANNING DESIGN PURPOSES ONLY. OTHER UTILITY FACILITIES MAY EXIST WHICH ARE NOT SHOWN ON THE DRAWINGS. THE LOCATION, DEPTH AND SIZE OF THESE UTILITIES SHOWN ARE FOR INFORMATION PURPOSES ONLY AND MUST BE VERIFIED BY THE CONTRACTOR. THE CONTRACTOR SHALL CONTACT A NOTIFICATION CENTER OR THE PROPER UTILITY COMPANY 48 HOURS PRIOR TO PERFORMING ANY EXCAVATION. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE FACILITY'S EXACT DEPTH AND LOCATION BY SAFE AND ACCEPTABLE MEANS WITHIN THE MARKED FACILITY AREA. THE CONTRACTOR IS EXPECTED TO MAINTAIN A MINIMUM CLEARANCE OF (2) TWO FEET PLUS THE WIDTH OF THE LINE BETWEEN MARKED AND UNEXPOSED FACILITIES AND THE CUTTING EDGE OR POINT OF ANY POWER-OPERATED EXCAVATION OR EARTH-MOVING EQUIPMENT. EXCAVATION SHOULD BE PERFORMED VERY CAREFULLY WITH HAND TOOLS AND WITHOUT DAMAGE AND SHALL BE DONE AT NO ADDITIONAL COST TO THE OWNER.
7. THE UNDERGROUND UTILITIES SHOWN ON THE SURVEY HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND UTILITY COMPANY AS-BUILT DRAWINGS. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES ARE IN THE EXACT LOCATION INDICATED. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.
8. CONTRACTOR SHALL NOTIFY NEIGHBORING PROPERTY OWNERS (PAINTED DUNES GOLF COURSE) OF CONSTRUCTION ACTIVITIES A WEEK BEFORE CONSTRUCTION BEGINS.
9. DO NOT ENTER PRIVATE PROPERTY WITHOUT PRIOR WRITTEN APPROVAL BY THE OWNER.
10. SHOP DRAWINGS SHALL BE PREPARED WITH SUFFICIENT DETAIL AND NOTATION FOR FIELD ERECTION AND INSTALLATION. SHOP DRAWINGS SHALL BE SEPARATE DRAWINGS PREPARED BY THE SUPPLIER OF MATERIALS. PHOTO COPIES OF THE CONTRACT DRAWINGS FOR USE AS SHOP DRAWINGS WILL NOT BE PERMITTED.
11. CONTACT A NOTIFICATION CENTER OR THE PROPER UTILITY COMPANY UTILITY LOCATOR SERVICES 48 HRS. PRIOR TO PERFORMING ANY EXCAVATION. ADDITIONALLY, THE FOLLOWNG LOCAL PERSONNEL SHALL BE CONTACTED BY THE CONTRACTOR PRIOR TO COMMENCING WORK.

UTILITY AND AGENCY CONTACTS		
COMPANY NAME	CONTACT	PHONE NUMBER
EL PASO ELECTRIC CO.	ANDREW DELGADO	(915) 543-5842
AT&T	SHAWN L. SATHER	(915) 342-3172
TEXAS GAS SERVICE	FRANCISCO CAMPA	(915) 680-7275
TxDOT	MARGARITA MONTES	(915) 790-4270
CITY OF EL PASO	TUULI MARTIN	(915) 212-1561
EL PASO WATER	ADRIANA CASTILLO	(915) 544-5538
EMERGENCIES		911
HAZMAT		(800)-467-4922
DIGTESS		811

12. CONTRACTOR SHALL PROCURE AND PAY FOR THE NECESSARY PERMIT(S) FROM THE CITY OF EL PASO FOR REMOVAL OF CONSTRUCTION OVERBURDEN DEBRIS TO THE DUMP SITE LOCATION.
13. KEEP THE TOTAL PROJECT LIMITS IN A CLEAN AND SAFE CONDITION. SEQUENCING OF WORK DOES NOT RELIEVE THE CONTRACTOR OF HOUSE CLEANING THROUGHOUT THE COMPLETE PROJECT LIMITS. ACTIVITIES INCLUDED, BUT ARE NOT LIMITED TO, WATER EXTRACTION, STREET SWEEPING, DEBRIS REMOVAL, ETC.
14. PROTECT THE NEW CONSTRUCTION FROM DAMAGE.
15. GEOTECHNICAL REPORT IS AVAILABLE AT THE ENGINEER'S OFFICES FOR CONTRACTOR'S INFORMATION ONLY. THE GEOTECHNICAL REPORT IS NOT PART OF THE CONTRACT DOCUMENTS. ENGINEER'S OFFICE INFORMATION: MORENO CARDENAS INC., 2505 E. MISSOURI AVE., EL PASO, TX - 79903. HOURS OF OPERATION: MONDAY THROUGH THURSDAY 7:30 AM TO 5:30 PM; FRIDAY 8:00 AM TO 12:00 PM.
16. SUBMITTALS WHICH UTILIZE ELECTRONIC FILES OF ANY OF THE DRAWINGS IN THE CONTRACT DOCUMENTS MAY NOT BE USED, UNLESS A WRITTEN AGREEMENT THAT STIPULATES THE CONDITION UNDER WHICH THESE DOCUMENTS MAY BE USED, IS EXECUTED BETWEEN THE USER AND THE ENGINEER OF RECORD.
17. MATERIALS BEING EXCAVATED ARE UNCLASSIFIED. MATERIALS SHALL BE CONSIDERED UNCLASSIFIED THROUGHOUT THE ENTIRE PROJECT LIMITS. REMOVAL OF UNCLASSIFIED MATERIALS ENCOUNTERED DURING EXCAVATION SUCH AS LUMPED SUBSOIL, BOULDERS, ROCK, DEBRIS AND CONCRETE, OF ANY TYPE AND SIZE WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO THE EXCAVATION ITEM.
18. SURVEY WAS PREPARED BY BROCK & BUSTILLOS INC. ON FEBRUARY 20TH, 2019 (SEE SURVEYORS GENERAL NOTES IN THIS SHEET FOR DATUM INFORMATION).
19. IF DURING CONSTRUCTION ACTIVITIES, CONTRACTOR FORESEES WORK MAY AFFECT PRIVATE STRUCTURES, HE MUST NOTIFY THE ENGINEER IMMEDIATELY.
20. CONTRACTOR SHALL AVOID THE USE OF HEAVY MACHINERY NEAR OR ADJACENT TO CONCRETE STRUCTURES AND CONDUITS. ANY DAMAGE CAUSED TO SUCH STRUCTURES SHALL BE REPLACED AT THE CONTRACTOR'S COST.

PROJECT CONTROL/BENCHMARK REFERENCE/LEGENDS

- TRACT/LOT LINE
- RIGHT-OF-WAY LINE
- CENTER OF RIGHT-OF-WAY
- EASEMENT LINE
- SECTION LINE
- GAS LINE
- OHE OVERHEAD ELECTRIC LINE
- CHAIN LINK FENCE
- 3995 MAJOR CONTOUR
- 3992 MINOR CONTOUR
- GUY ANCHOR
- POWER/UTILITY POLE

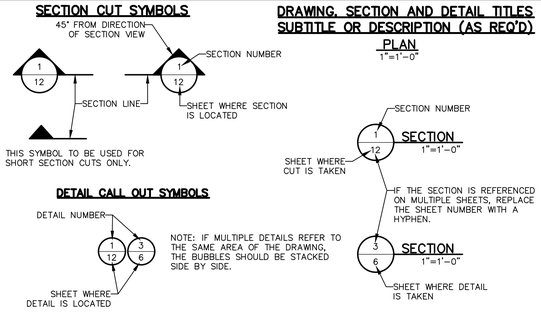
ABBREVIATIONS

- ASV.....ANTI-SIPHON VALVE
- CATV.....CABLE TV PEDESTAL
- CC.....CONCRETE
- EBX.....ELECTRIC BOX
- FH.....FIRE HYDRANT
- FOMKR.....FIBER OPTIC MARKER
- GM.....GAS METER
- GP.....GUARDPOST
- GR.....NATURAL GROUND
- GU.....GUTTER
- GV.....GAS VALVE
- IV.....IRRIGATION VALVE
- LP.....LIGHT POLE
- MBX.....MAILBOX
- NOM.....NOMINAL
- OC.....OF CENTER
- OCEW.....OF CENTER EACH WAY
- PP.....POWER POLE
- ROE.....RIGHT OF ENTRY
- ROW.....RIGHT OF WAY
- SCO.....SEWER CLEANOUT
- SP.....0.2'ø SIGNPOST
- TBA.....TO BE ABANDONED
- TBR.....TO BE REMOVED
- TBX.....TELEPHONE PEDESTAL
- TC.....TOP OF CURB
- TD.....TOP OF DRIVEWAY
- TG.....TOP OF GROUND
- TMH.....TELEPHONE MANHOLE
- TP.....TOP OF PAVEMENT
- TS.....TOP OF SIDEWALK
- TSBX.....TRAFFIC SIGNAL BOX
- TW.....TOP OF WALL
- WV.....WATER VALVE
- WM.....WATER METER

SURVEYORS GENERAL NOTES:

1. BASIS OF BEARING IS THE TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE NO. 4203, NORTH AMERICAN DATUM OF 1983, OBTAINED BY G.P.S. OBSERVATION AT N.G.S. HORIZONTAL MONUMENT "CELIA" FOUND AT 2.9 MILES NORTH OF THE INTERSECTION OF TRANSMOUNTAIN ROAD (LOOP 375) AND TEXAS FARM ROAD 3255 (GATEWAY BOULEVARD NORTH), 38.0' SOUTHEAST FROM TELEPHONE POLE NO. 9 WITH EMERGENCY TELEPHONE ATTACHED AND 22.3' EAST FROM A FENCE AND METAL WITNESS POST. ALL DISTANCES AND COORDINATES SHOWN HAVE BEEN SCALED TO SURFACE, CENTERED AT "CELIA".
2. ELEVATIONS AND CONTOURS SHOWN ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (N.A.V.D. 88) DETERMINED VIA G.P.S. OBSERVATIONS AT N.G.S. BENCHMARK MONUMENT "F 1383" FOUND ALONG THE UNION PACIFIC RAILROAD TRACKS, 2,825 FEET NORTHEAST FROM THE INTERSECTION OF RAILROAD DRIVE AND DEER AVENUE HAVING AN ELEVATION OF 3928.37 FEET (NAVD88).
3. THIS PROPERTY MAY BE SUBJECT TO EASEMENTS WHETHER OF RECORD OR NOT. (NOT SHOWN).

SECTION AND DETAIL CROSS REFERENCING



SPECIFICATION REFERENCE:

XX XXX SERIES OF NUMBERS ON PLANS USED TO CROSS-REFERENCE THE APPLICABLE TECHNICAL SPECIFICATION SECTION.

SHEET INDEX

DESCRIPTION	SHEET NO.
COVER SHEET	C1.0
AREA MAPS, ABBREVIATIONS, SHEET INDEX, GENERAL NOTES, BENCHMARK REFERENCING AND LEGEND	C2.0
OVERALL PROJECT LIMITS MAP	C2.1
SURVEY/MAPPING	
TOPOGRAPHIC SURVEY	
CIVIL	
OVERALL WATERSHED MAP	C3.0
OVERALL SITE PLAN	C4.0
DEMOLITION PLAN	C5.0-C5.1
HORIZONTAL CONTROL PLAN	C6.0-C6.2
CHANNEL PLAN AND PROFILE	C7.0-C7.4
TYPICAL SECTIONS	C8.0-C8.4
STANDARD DETAILS	C9.0
DRAINAGE STRUCTURE DETAILS	C10.0-C10.2
OVERALL WATERLINE PLAN	C11.0
WATERLINE PLAN & PROFILES AND SECTION	C12.0-C12.5
WATERLINE DETAILS	C13.0-C13.2
SWPPP - NOTES, PLAN AND DETAILS	C14.0-C14.3
LANDSCAPE	
LANDSCAPE PLAN	L1.1-L1.2
IRRIGATION PLAN	L2.1-L2.2
LANDSCAPE PLANTING NOTES	L3.1
IRRIGATION GENERAL NOTES	L3.2
LANDSCAPE AMENITY DETAILS	L3.3-L3.5
LANDSCAPE PLANTING DETAILS	L3.6
IRRIGATION DETAILS	L3.7-L3.8

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DESIGNED F.S.
DRAWN E.G./E.C.
CHECKED M.M./B.K.
DATE 09/30/2021

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EL PASO, TEXAS 79925
(915) 594-5500

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9601 McAllister Freeway #207, San Antonio TX 78216 (210) 314-3553
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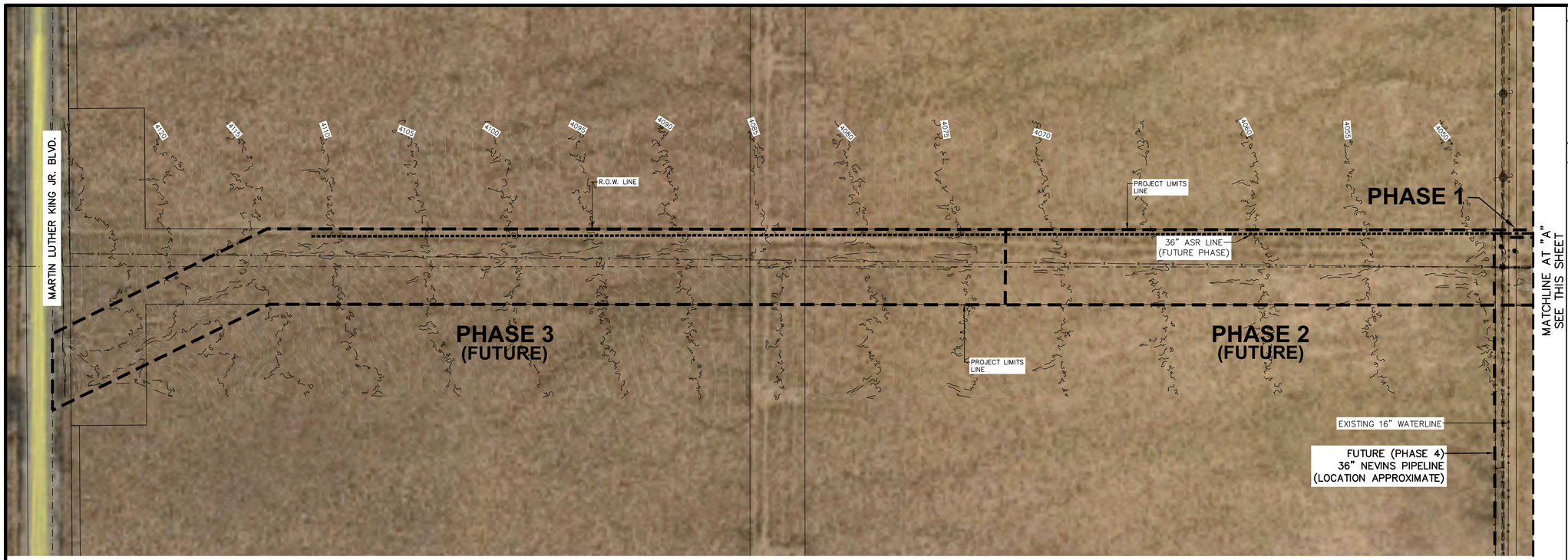
NE ASR ENHANCED ARROYO PHASE I

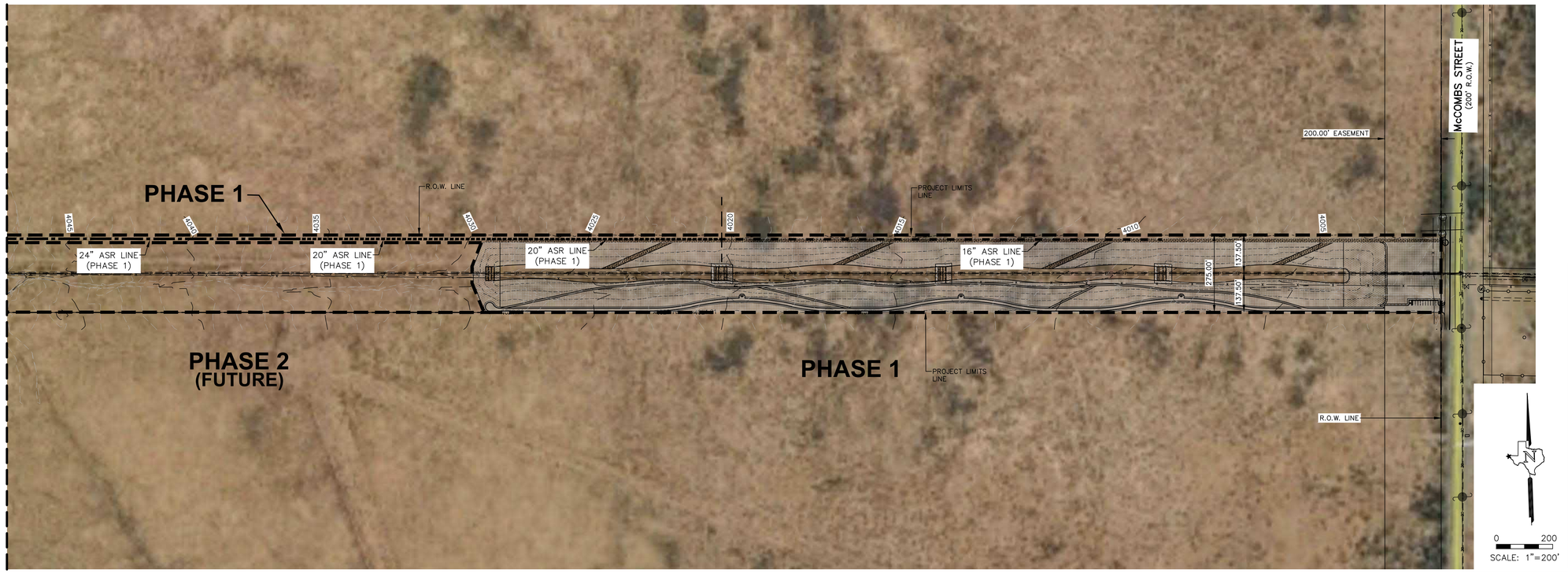
PROJECT VICINITY MAP, GENERAL NOTES, PROJECT CONTROL, BENCHMARK REFERENCE, LEGEND & SHEET INDEX PLAN

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JOB NO. 20-110
SEQUENCE NO. 1 OF 1
SHEET NO. C2.0

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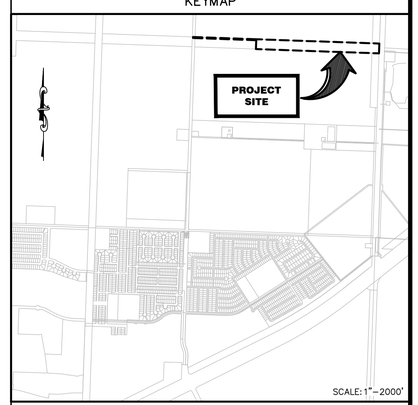


LEGEND

- PROJECT LIMITS
- RIGHT-OF-WAY LINE
- 4XXX — EXISTING MAJOR CONTOUR
- 4XXX — EXISTING MINOR CONTOUR
- MATCHLINE

NOTES

KEYMAP



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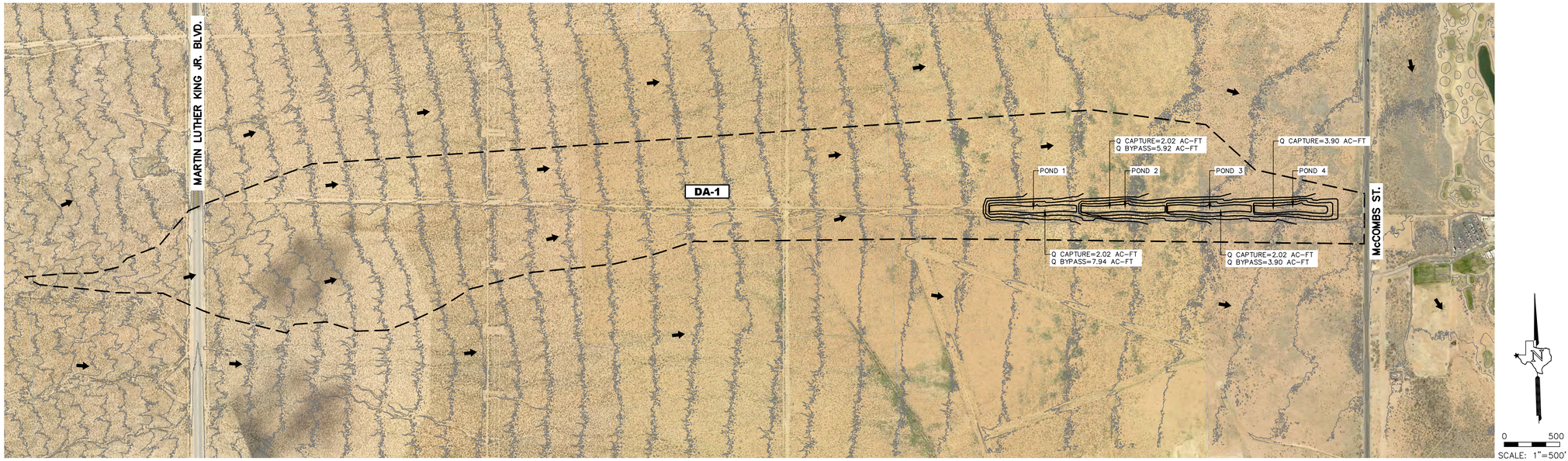
NE ASR ENHANCED ARROYO PHASE I

OVERALL PROJECT LOCATION
PHASING & CONTROL MAP

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SEQUENCE NO. 1 OF 1
SHEET NO. C2.1

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DRAINAGE AREA				
DRAINAGE AREA ID (1)	DRAINAGE AREA ACRES (2)	CURVE NUMBER	LAG TIME (HR)	100-YR DISHARGE (CFS)
DA-1	273	64	3.04	26.40

POND CAPACITY COMPUTATIONS	
POND 1	
CONTOUR ELEVATION (FT)	CUMULATIVE STORAGE CAPACITY (AC-FT)
4008.76	0
4009.76	0.95
4010.76	2.02

REQUIRED CAPACITY	9.96 AC-FT
POND CAPACITY	2.02 AC-FT

POND CAPACITY COMPUTATIONS	
POND 2	
CONTOUR ELEVATION (FT)	CUMULATIVE STORAGE CAPACITY (AC-FT)
4008.76	0
4009.76	0.95
4010.76	2.02

REQUIRED CAPACITY	7.94 AC-FT
POND CAPACITY	2.02 AC-FT

POND CAPACITY COMPUTATIONS	
POND 3	
CONTOUR ELEVATION (FT)	CUMULATIVE STORAGE CAPACITY (AC-FT)
4008.76	0
4009.76	0.95
4010.76	2.02

REQUIRED CAPACITY	5.92 AC-FT
POND CAPACITY	2.02 AC-FT

POND CAPACITY COMPUTATIONS	
POND 4	
CONTOUR ELEVATION (FT)	CUMULATIVE STORAGE CAPACITY (AC-FT)
3988	0
3989	0.83
3990	1.76
3991	2.85
3992	4.09
3993	5.51
3994	7.11
3995	8.89

REQUIRED CAPACITY	3.90 AC-FT
POND CAPACITY	8.89 AC-FT

FLOOD ZONE "A1"
AREAS OF 100-YEAR FLOOD; BASE FLOOD ELEVATIONS AND FLOOD HAZARD FACTORS DETERMINED.

FIRM – FLOOD INSURANCE RATE MAP CITY OF EL PASO, EL PASO COUNTY, TX.

THIS PROJECT IS LOCATED WITHIN ZONE "A1" AS DESIGNATED IN PANEL NO. 480214-008 C AND 480214-009 D, DATED JUNE 15, 1988 OF THE FLOOD INSURANCE RATE MAPS IN THE AREAS OF CITY OF EL PASO, EL PASO COUNTY, TEXAS.

LEGEND

DA - X	DRAINAGE AREA IDENTIFICATION
— — — —	DRAINAGE AREA BOUNDARY
	EXISTING CONTOUR LINES
	PROPOSED CONTOUR LINES
	FLOW DIRECTION

REFERENCE DATA

REFERENCE:
CITY OF EL PASO DRAINAGE DESIGN MANUAL (JUNE 2008)

(1) WATERSHED IDENTIFICATION
(2) AREA FROM DRAINAGE PLAN IN ACRES
(3) TIME OF CONCENTRATION: TC = 10 MINUTES (MIN.)
(4) RUNOFF COEFFICIENT => TABLE 4-5
MULTI FAMILY APARTMENT C=0.94 100 YEARS

(5) RAINFALL INTENSITY WEST REGION INTENSITY EQUATION 4-16

$$I_{100} = \frac{111.04}{(Tc + 26.090)^{0.9177}}$$

(6) $Q_{100} = C \times I \times A$ I = 4.13
(7) $Q_T = A \times \frac{R}{12} \times C$ R = 4 INCHES

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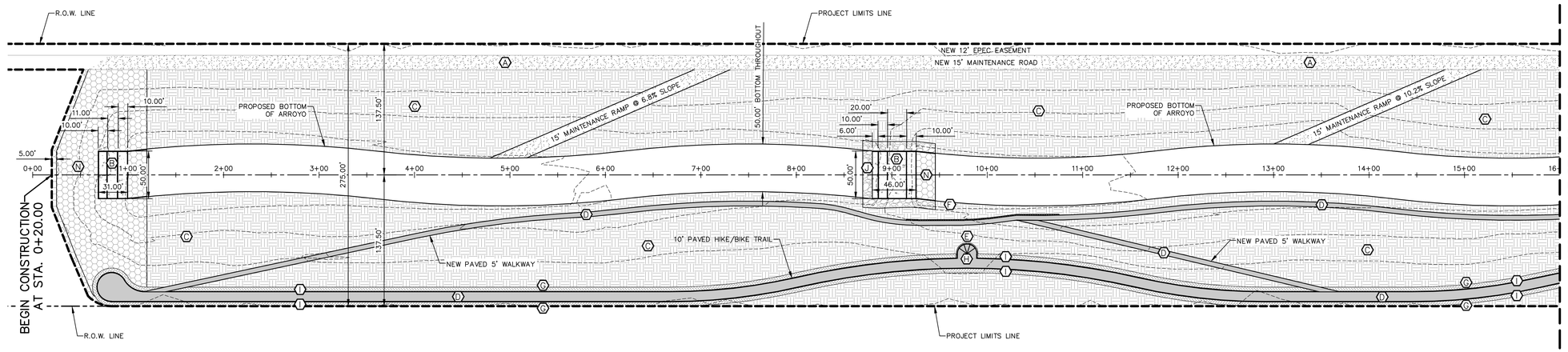
NE ASR ENHANCED ARROYO PHASE I

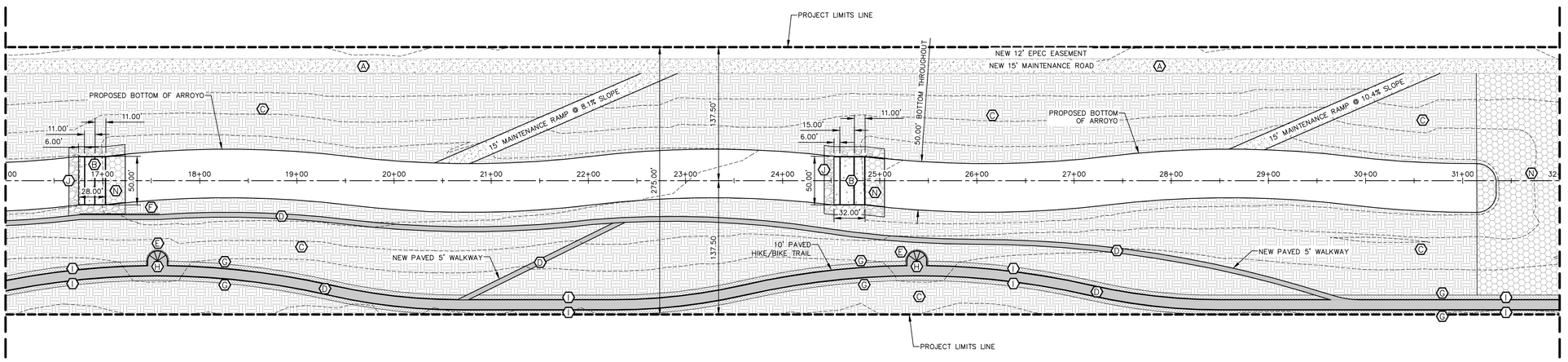
OVERALL
WATERSHED MAP

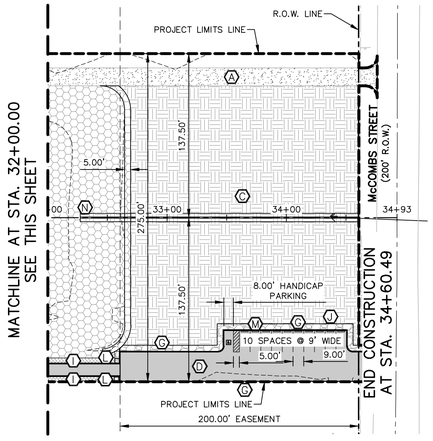
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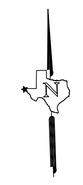
JOB NO. **20-110**
SEQUENCE NO. 1 OF 1
SHEET NO. **C3.0**

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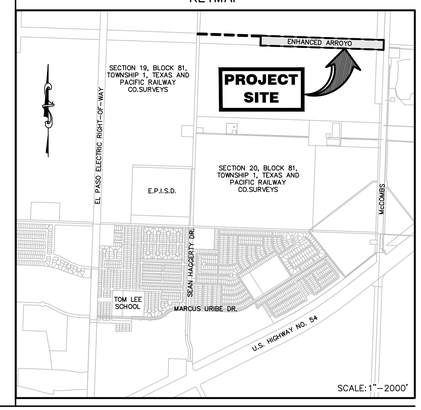


LEGEND

- PROJECT LIMITS/LIMITS OF DEMOLITION
- RIGHT-OF-WAY LINE
- 4XXX EXISTING MAJOR CONTOUR
- 4XXX EXISTING MINOR CONTOUR
- MATCHLINE
- 2+00 STATIONING / CENTERLINE ALIGNMENT

A	3" SCREENING	1 C9.0
B	NEW CONCRETE WEIR STRUCTURE	1&2 C10.0 / 3&4 C10.1
C	COMPACTED AND/OR PREPARED EARTHEN MATERIAL	
D	NEW ASPHALTIC PAVEMENT	3 C9.0 / 4 C9.0
E	NEW OVERLOOK ROCKWALL	3 L3.2
F	NEW RETAINING ROCKWALL	10 C9.0
G	NEW 6 INCH HEADER CURB	5 C9.0
H	NEW LOOKOUT	2 L3.2
I	5' BENCH	L1.1 / L1.2
J	NEW 6"-8" LOOSE ROCK RIP-RAP	2 C9.0
K	NEW PARKING	7 C9.0 / 8 C9.0
L	NEW TRAILHEAD ENTRY MONUMENT	1 L3.2
M	NEW WHEEL STOP	6 C9.0
N	NEW GABION BASKET / MATTRESS	1 C10.2 / 2 C10.2

KEYMAP



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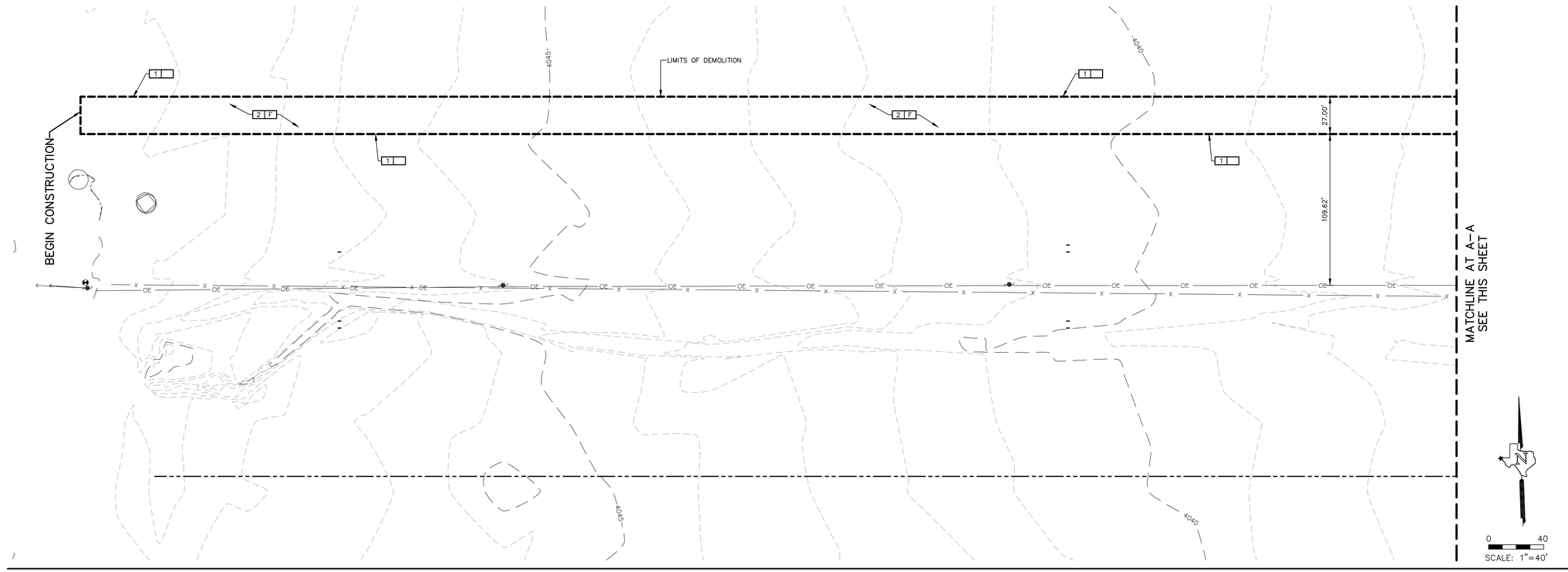
NE ASR ENHANCED ARROYO PHASE I

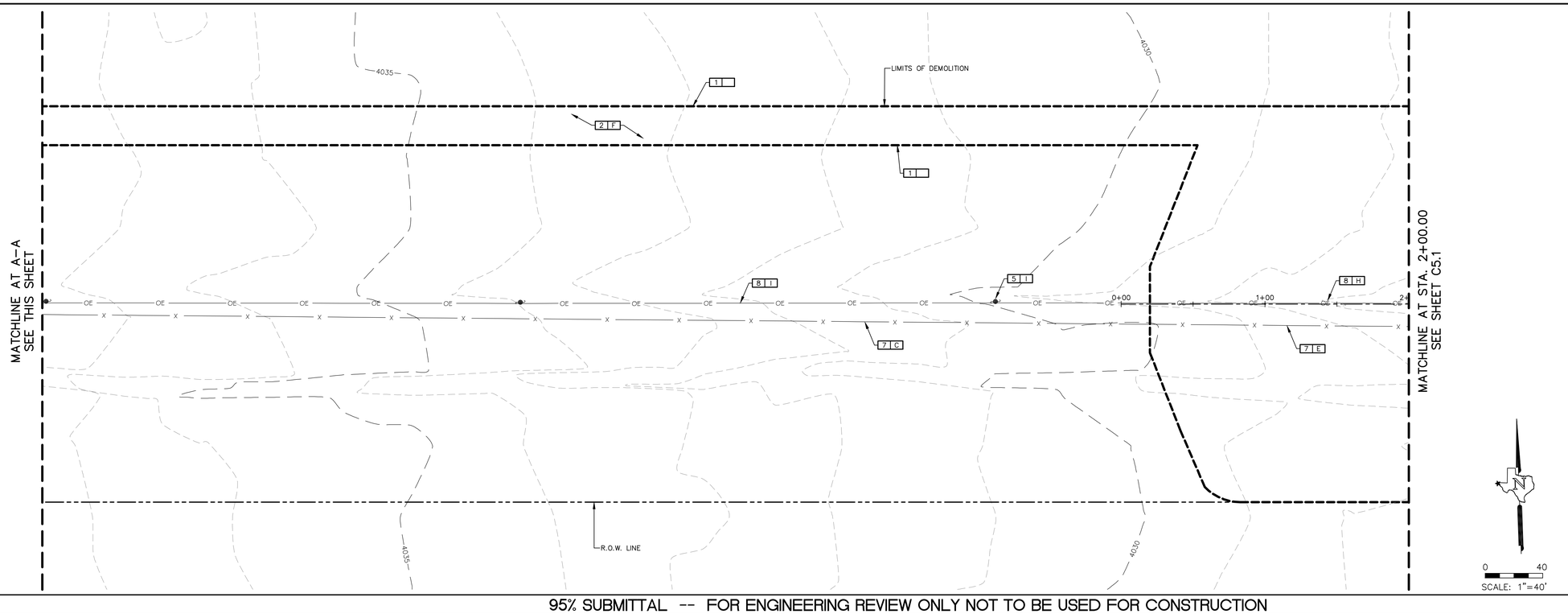
OVERALL SITE PLAN

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JOB NO. 20-110
SEQUENCE NO. 1 OF 1
SHEET NO. C4.0

F:_20110\DWG\05_20110 - C4.0_DWG_Overall Site Plan.dwg Time:Dec01,2021 - 04:16pm Login:edgar





LEGEND

- PROJECT LIMITS/LIMITS OF DEMOLITION
- RIGHT-OF-WAY LINE
- EXISTING STREET CENTERLINE
- 4XXX EXISTING MAJOR CONTOUR
- 4XXX EXISTING MINOR CONTOUR
- MATCHLINE
- EXISTING FENCE LINE
- OE EXISTING OVERHEAD POWER LINES
- G EXISTING GAS LINE
- 2+00 STATIONING / CENTERLINE ALIGNMENT
- 1 A KEYNOTE

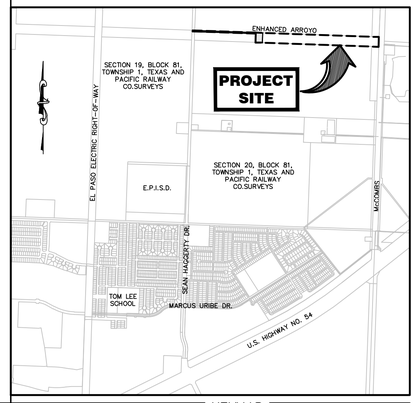
KEYED NOTES

00

1	LIMITS OF DEMOLITION, SAW-CUT EXISTING PAVEMENT/SIDEWALK
2	EXISTING TERRAIN
3	EXISTING SIGN
4	EXISTING GAS LINE
5	EXISTING POWER POLE
6	EXISTING GUY WIRE
7	EXISTING CHAINLINK FNECE
8	EXISTING OVERHEAD POWER LINES

A

A	REMOVE AND REPLACE
B	REMOVE AND RELOCATE
C	REMAIN UNDISTURBED AND PROTECTED
D	ADJUST TO NEW GRADE
E	REMOVE AND PROPERLY DISPOSE OF
F	CLEAR AND GRUB
G	REMOVE AND SALVAGE
H	COORDINATE REMOVAL/RELOCATION WITH APPROPRIATE UTILITY
I	COORDINATE WITH APPROPRIATE UTILITY AND PROTECT IN PLACE



KEYMAP
SCALE:1"=2000'

95% SUBMITTAL -- FOR ENGINEERING REVIEW ONLY NOT TO BE USED FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION

WARNING ! BEFORE YOU DIG
CALL
1-800-DIG-TESS
1-800-344-8377
FOR FIELD LOCATING EXISTING UTILITIES

ENGINEER'S SEAL

THESE PLANS WERE RELEASED UNDER THE AUTHORITY OF MARCOS MEDINA, PE #93830 TO BE ISSUED AS A **95% SUBMITTAL** TO EL PASO WATER FOR REVIEW. IT IS NOT TO BE USED FOR CONSTRUCTION OR FINAL PERMIT ISSUANCE.

DESIGNED	F.S.
DRAWN	E.G./E.C.
CHECKED	M.M./B.K.
DATE	09/30/2021

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

CONSULTANT
PLANNING ENGINEERING PROJECT MANAGEMENT
MCi Moreno Cardenas Inc.
EL PASO • SAN ANTONIO
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9601 McAllister Freeway #207, San Antonio TX 78216 (210) 314-3553
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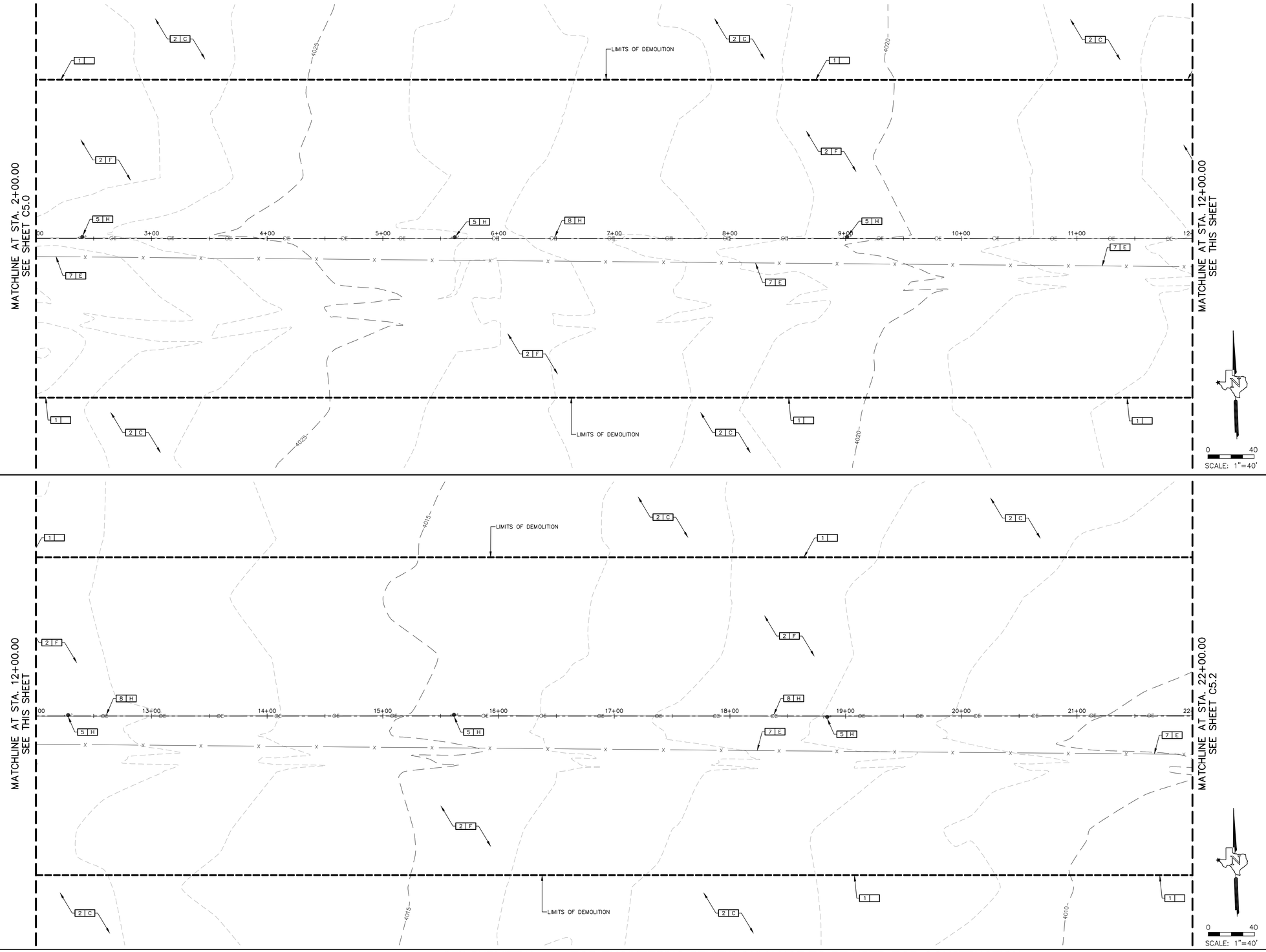
NE ASR ENHANCED ARROYO PHASE I

DEMOLITION PLAN
(STA. 0+25.00 TO STA. 2+00.00)

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JOB NO.	20-110
SEQUENCE NO.	1 OF 3
SHEET NO.	C5.0

F:\20110\DWG\06_20110 - C5.0-C5.1_DWG_Demolition Plan.dwg Time:Nov23,2021 - 03:39pm Login:edgar



LEGEND

- PROJECT LIMITS/LIMITS OF DEMOLITION
- RIGHT-OF-WAY LINE
- EXISTING STREET CENTERLINE
- 4XXX EXISTING MAJOR CONTOUR
- 4XXX EXISTING MINOR CONTOUR
- MATCHLINE
- EXISTING FENCE LINE
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- G EXISTING GAS LINE
- 2+00 STATIONING / CENTERLINE ALIGNMENT
- 1 A KEYNOTE

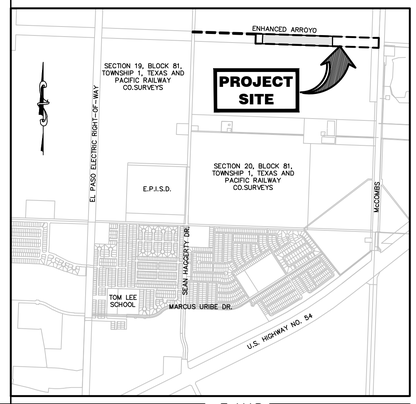
KEYED NOTES

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MAP
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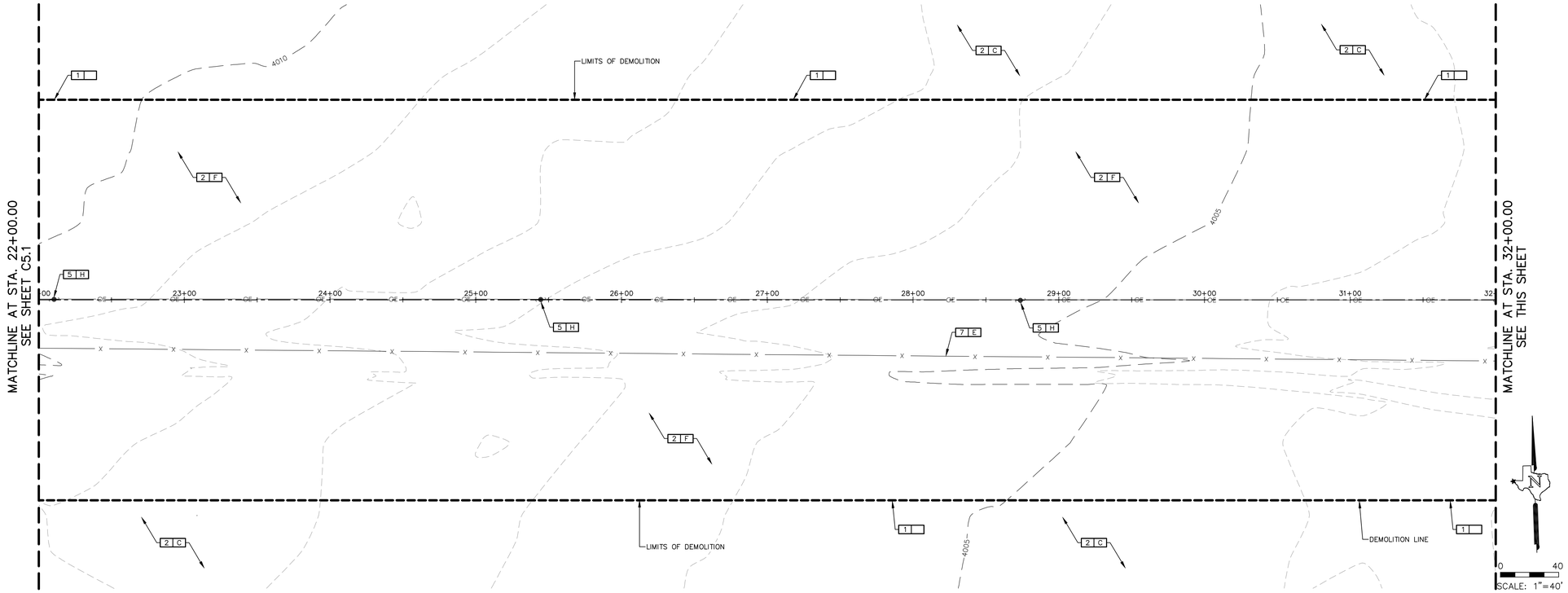
NE ASR ENHANCED ARROYO PHASE I

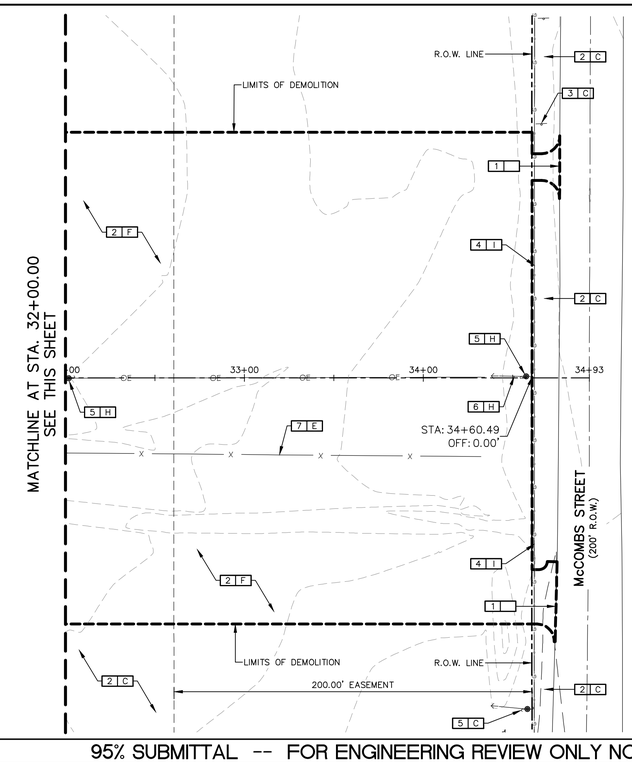
DEMOLITION PLAN
(STA. 2+00.00 TO STA. 22+00.00)

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JOB NO. 20-110
SEQUENCE NO. 2 OF 3
SHEET NO. C5.1

F:\20110\DWG\06_20110 - C5.0-C5.1_DWG_Demolition Plan.dwg Time:Nov23,2021 - 03:48pm Login:edgar







LEGEND

- PROJECT LIMITS/LIMITS OF DEMOLITION
- RIGHT-OF-WAY LINE
- EXISTING STREET CENTERLINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- MATCHLINE
- EXISTING FENCE LINE
- EXISTING OVERHEAD POWER LINES
- EXISTING GAS LINE
- STATIONING / CENTERLINE ALIGNMENT
- KEYNOTE

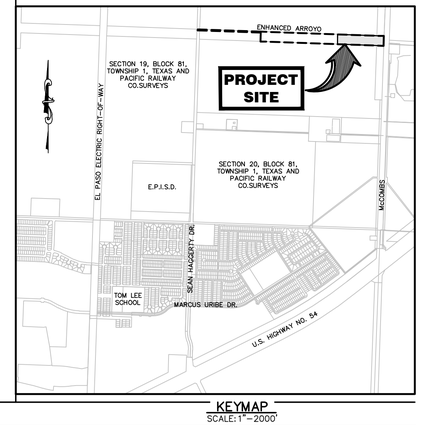
KEYED NOTES

[00]

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[A]

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KEYMAP
SCALE:1"=2000'

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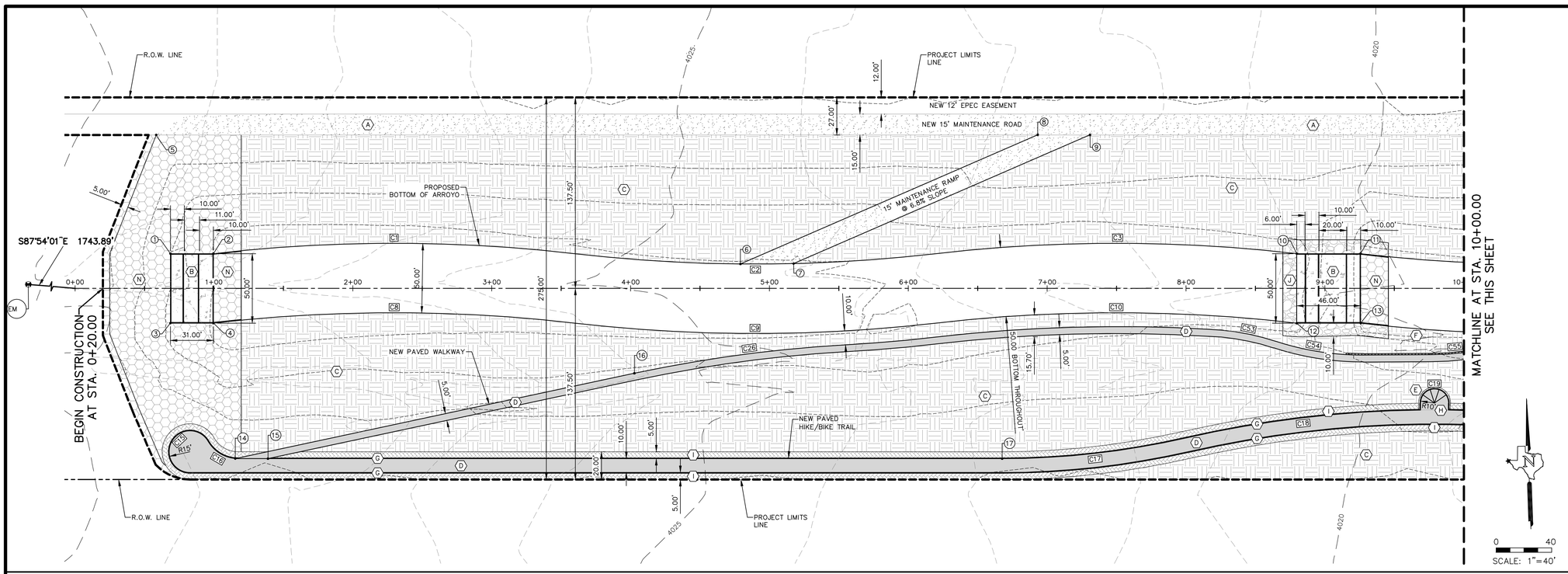
NE ASR ENHANCED ARROYO PHASE I

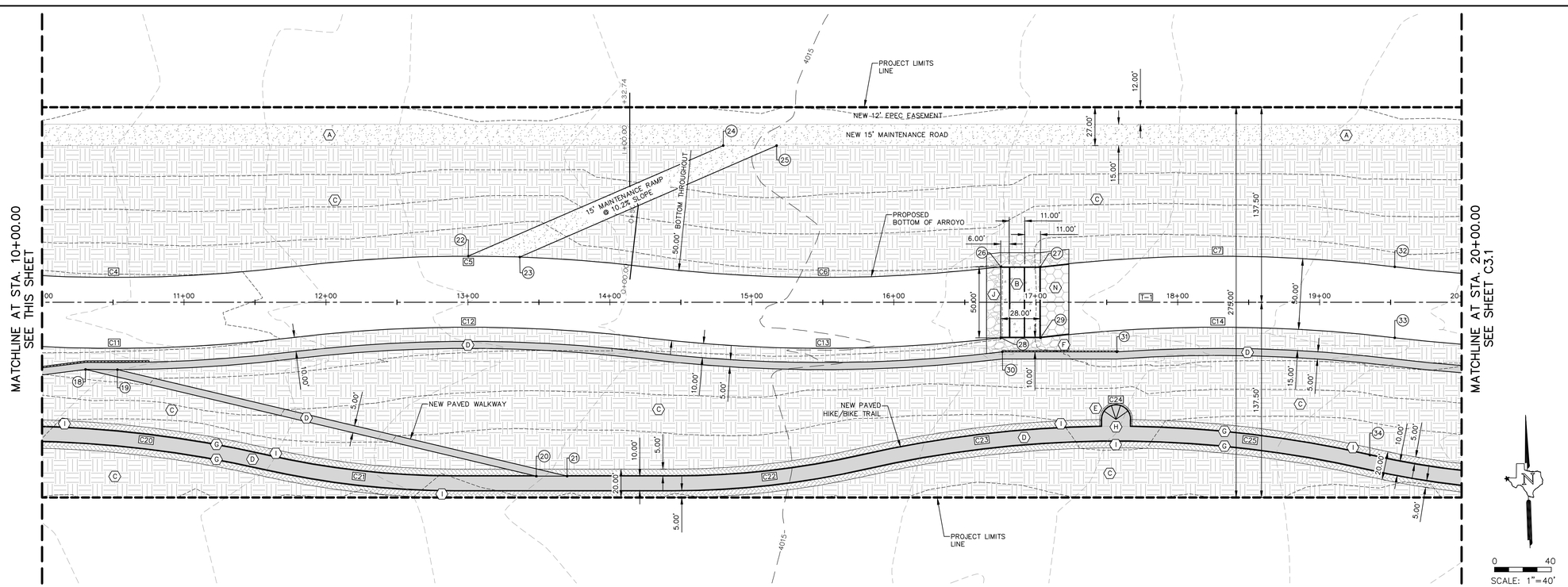
DEMOLITION PLAN
(STA. 22+00.00 TO STA. 34+92.68)

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JOB NO.	20-110
SEQUENCE NO.	3 OF 3
SHEET NO.	C5.2

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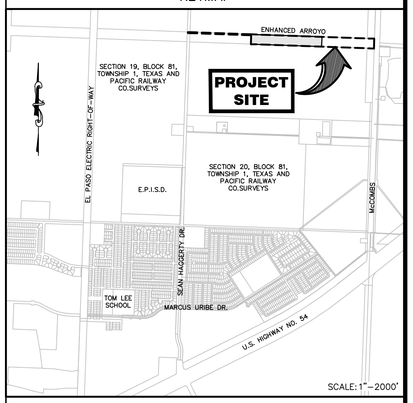
LEGEND

- PROJECT LIMITS
- RIGHT-OF-WAY LINE
- 4XXX EXISTING MAJOR CONTOUR
- 4XXX EXISTING MINOR CONTOUR
- MATCHLINE
- 2+00 STATIONING / CENTERLINE ALIGNMENT
- PGL PROPOSED GRADE LINE (PGL)
- EXISTING CONTROL POINT
- EXISTING MONUMENT LABEL
- (A) 3" SCREENING ..... 1 / C9.0
- (B) NEW CONCRETE WEIR STRUCTURE ..... 1&2 / C10.0, 3&4 / C10.1
- (C) COMPACTED AND/OR PREPARED EARTHEN MATERIAL
- (D) NEW ASPHALTIC PAVEMENT ..... 3 / C9.0, 4 / C9.0
- (E) NEW OVERLOOK ROCKWALL ..... 3 / L3.2
- (F) NEW RETAINING ROCKWALL ..... 10 / C9.0
- (G) NEW 6 INCH HEADER CURB ..... 5 / C9.0
- (H) NEW LOOKOUT ..... 2 / L3.2
- (I) 5' BENCH L1.1, L1.2
- (J) NEW 6"-8" LOOSE ROCK RIP-RAP ..... 2 / C9.0
- (K) NEW PARKING ..... 7 / C9.0, 8 / C9.0
- (L) NEW TRAILHEAD ENTRY MONUMENT ..... 1 / L3.2
- (M) NEW WHEEL STOP ..... 6 / C9.0
- (N) NEW GABION BASKET / MATTRESS ..... 1 / C10.2, 2 / C10.2

NOTES

1. REFER TO SHEET C3.2 FOR LINE, CURVE, AND POINTS TABLES.

KEYMAP



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REV.	DATE	BY	DESCRIPTION

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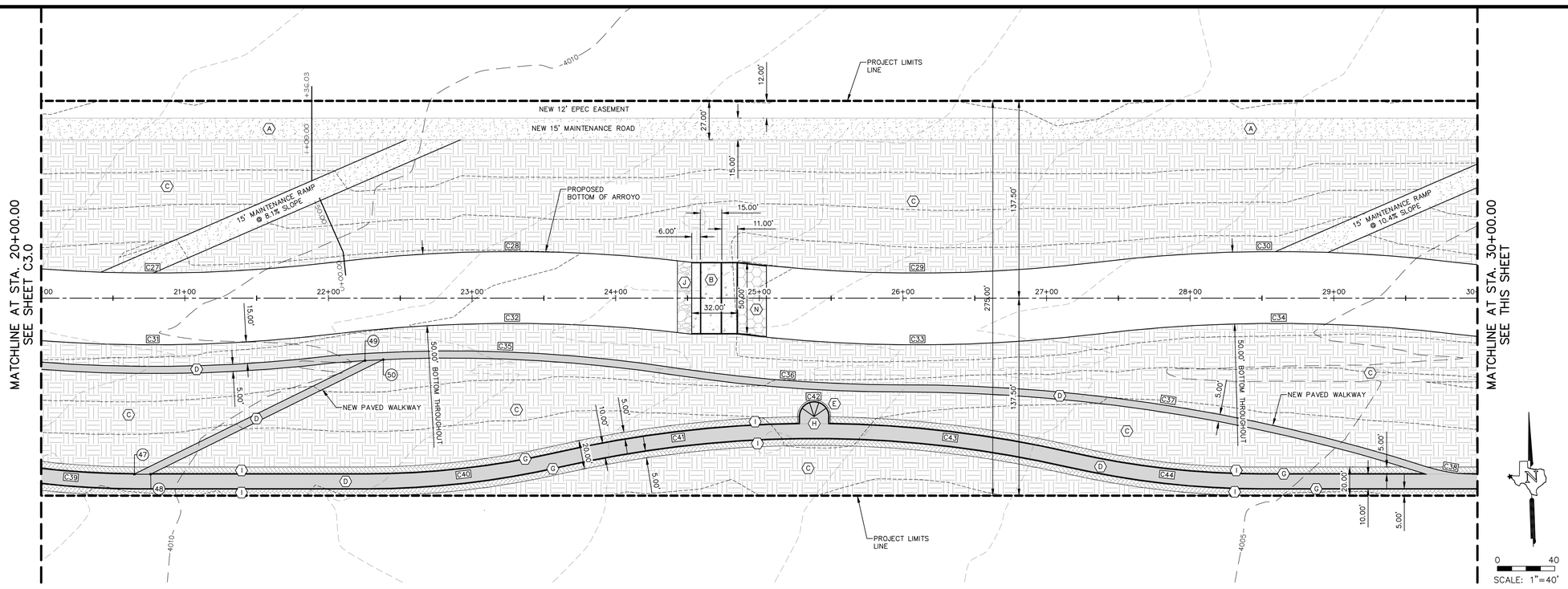
NE ASR ENHANCED ARROYO PHASE I

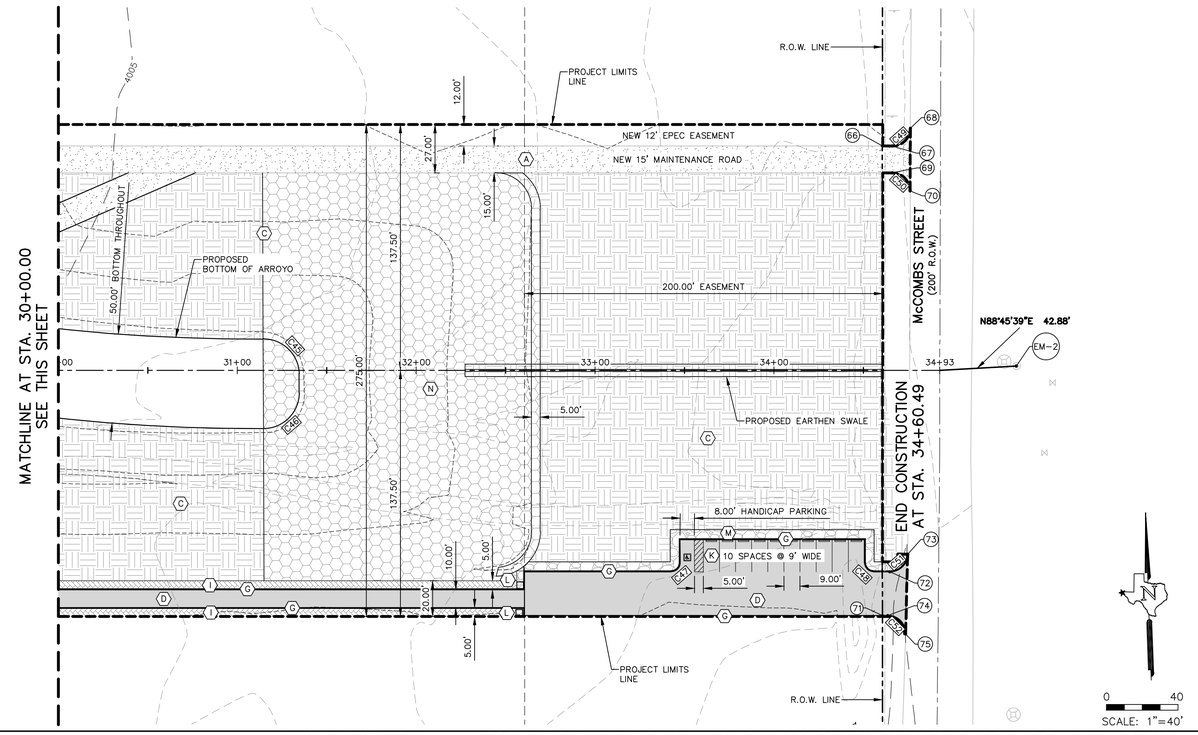
HORIZONTAL CONTROL AND SITE PLAN
(STA. 0+25.00 TO STA. 20+00.00)

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JOB NO. 20-110
SEQUENCE NO. 1 OF 3
SHEET NO. C6.0

F:\2011\D\DWG\07_20110 - C6.0-C6.2_DWG_Horizontal Control Plan.dwg Time:Dec01,2021 - 04:51pm Login:edgar





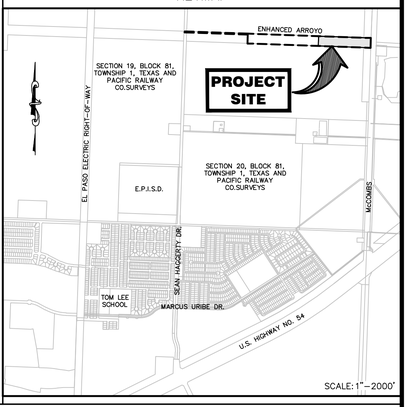
LEGEND

- PROJECT LIMITS
- RIGHT-OF-WAY LINE
- 4XXX — EXISTING MAJOR CONTOUR
- 4XXX — EXISTING MINOR CONTOUR
- MATCHLINE
- 2+00 — STATIONING / CENTERLINE ALIGNMENT
- PGL — PROPOSED GRADE LINE (PGL)
- EXISTING CONTROL POINT
- EXISTING MONUMENT LABEL
- (A) 3" SCREENING — 1 / C9.0
- (B) NEW CONCRETE WEIR STRUCTURE — 1&2 / C10.0 — 3&4 / C10.1
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NOTES

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KEYMAP



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NE ASR ENHANCED ARROYO PHASE I

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SEQUENCE NO. 2 OF 3
SHEET NO. C6.1

F:\2011\D\DWG\07_2011D - C6.0-C6.2_DWG_Horizontal Control Plan.dwg Time:Nov23,2021 - 04:45pm Login:edgar

HORIZONTAL CONTROL TABLE

POINT NO.	DESCRIPTION	NORTHING	EASTING
1	NEW WEIR WALL	10727295.30	409858.55
2	NEW WEIR WALL	10727294.21	409889.53
3	NEW WEIR WALL	10727245.33	409856.80
4	NEW WEIR WALL	10727244.24	409887.78
5	NEW MAINTENANCE ROAD	10727381.05	409851.27
6	BOTTOM OF NEW MAINTENANCE RAMP	10727273.48	410268.49
7	BOTTOM OF NEW MAINTENANCE RAMP	10727272.43	410306.81
8	TOP OF NEW MAINTENANCE RAMP	10727358.87	410485.70
9	TOP OF NEW MAINTENANCE RAMP	10727357.53	410523.30
10	NEW WEIR WALL	10727266.90	410669.10
11	NEW WEIR WALL	10727265.29	410715.07
12	NEW WEIR WALL	10727216.94	410667.35
13	NEW WEIR WALL	10727215.32	410713.32
14	NEW PAVED WALKWAY	10727146.27	409900.02
15	NEW PAVED WALKWAY	10727145.37	409923.57
16	NEW PAVED WALKWAY	10727197.57	410189.42
17	NEW PAVED HIKE/BIKE TRAIL	10727126.86	410451.90
18	NEW PAVED WALKWAY	10727189.34	410817.44
19	NEW PAVED WALKWAY	10727188.38	410839.86
20	NEW PAVED WALKWAY	10727103.03	411132.15
21	NEW PAVED WALKWAY	10727102.27	411153.82
22	BOTTOM OF NEW MAINTENANCE RAMP	10727259.67	411089.69
23	BOTTOM OF NEW MAINTENANCE RAMP	10727257.78	411125.87
24	TOP OF NEW MAINTENANCE RAMP	10727331.27	411271.83
25	TOP OF NEW MAINTENANCE RAMP	10727329.96	411309.47
26	NEW WEIR WALL	10727239.05	411464.20
27	NEW WEIR WALL	10727238.07	411492.18
28	NEW WEIR WALL	10727189.08	411462.45
29	NEW WEIR WALL	10727188.10	411490.43
30	NEW PAVED WALKWAY	10727179.11	411463.25
31	NEW PAVED WALKWAY	10727176.29	411543.88
32	BOTTOM OF CHANNEL	10727229.33	411741.63
33	BOTTOM OF CHANNEL	10727179.36	411739.88
34	NEW PAVED HIKE/BIKE TRAIL	10727097.33	411719.44
35	BOTTOM OF NEW MAINTENANCE RAMP	10727219.36	411830.10
36	BOTTOM OF NEW MAINTENANCE RAMP	10727217.46	411866.29
37	TOP OF NEW MAINTENANCE RAMP	10727304.16	412045.84
38	TOP OF NEW MAINTENANCE RAMP	10727302.84	412083.48
39	NEW WEIR WALL	10727211.83	412241.32
40	NEW WEIR WALL	10727210.71	412273.30

HORIZONTAL CONTROL TABLE

POINT NO.	DESCRIPTION	NORTHING	EASTING
41	NEW WEIR WALL	10727161.86	412239.57
42	NEW WEIR WALL	10727160.74	412271.55
43	BOTTOM OF NEW MAINTENANCE RAMP	10727205.08	412648.03
44	BOTTOM OF NEW MAINTENANCE RAMP	10727203.19	412684.21
45	BOTTOM OF CHANNEL	10727193.21	412772.70
46	BOTTOM OF CHANNEL	10727143.24	412770.95
47	NEW PAVED WALKWAY	10727077.94	411848.42
48	NEW PAVED WALKWAY	10727077.53	411859.72
49	NEW PAVED WALKWAY	10727151.34	412011.66
50	NEW PAVED WALKWAY	10727151.56	412024.33
51	NEW PAVED WALKWAY	10727046.44	412747.23
52	NEW PAVED WALKWAY	10727045.32	412779.23
53	NEW PAVED HIKE/BIKE TRAIL	10727036.06	413043.39
54	NEW PAVED HIKE/BIKE TRAIL	10727026.07	413043.04
55	NEW HEADER CURB	10727046.05	413043.74
56	NEW HEADER CURB	10727021.07	413042.86
57	NEW HEADER CURB	10727043.17	413125.62
58	NEW HEADER CURB	10727061.00	413131.24
59	NEW HEADER CURB	10727057.39	413234.17
60	NEW HEADER CURB	10727044.40	413233.73
61	NEW HEADER CURB	10727039.05	413243.59
62	NEW MAINTENANCE ROAD	10727261.92	413251.39
63	TOP OF NEW MAINTENANCE RAMP	10727276.68	412830.15
64	TOP OF NEW MAINTENANCE RAMP	10727275.40	412867.92
65	BOTTOM OF CHANNEL	10727161.19	412921.65
66	NEW MAINTENANCE ROAD	10727276.91	413251.93
67	NEW DRIVEWAY	10727276.71	413257.58
68	NEW DRIVEWAY	10727286.28	413267.92
69	NEW DRIVEWAY	10727261.72	413256.90
70	NEW DRIVEWAY	10727251.33	413266.54
71	NEW HEADER CURB	10727014.57	413242.76
72	NEW DRIVEWAY	10727038.91	413247.73
73	NEW DRIVEWAY	10727048.42	413258.07
74	NEW DRIVEWAY	10727014.46	413245.73
75	NEW DRIVEWAY	10727003.87	413255.36
76	NEW PAVED WALKWAY	10727214.66	410603.92
77	NEW PAVED WALKWAY	10727204.37	410651.82
78	NEW ROCKWALL	10727193.05	410702.09
79	NEW ROCKWALL	10727190.80	410763.13
80	NEW ROCKWALL	10727191.56	410787.66

HORIZONTAL CONTROL TABLE

POINT NO.	DESCRIPTION	NORTHING	EASTING
81	NEW ROCKWALL	10727194.34	410817.71
82	NEW ROCKWALL	10727192.90	410862.29

EXISTING CONTROL DATA TABLE

POINT NO.	DESCRIPTION	NORTHING	EASTING
EM-1	EXISTING MONUMENT	10727336.61	408046.33
EM-2	EXISTING MONUMENT	10727151.37	413322.46

CURVE DATA TABLE

CURVE	RADIUS	LENGTH	TANGENT	CHORD	DELTA	(X , Y) COORDINATE	(X , Y) COORDINATE
C1	1133.84'	260.74'	130.95'	260.17'	13°10'33"	409889.53 , 10727294.21	410149.53 , 10727285.10
C2	1131.43'	260.52'	130.84'	259.94'	13°11'33"	410149.53 , 10727285.10	410409.32 , 10727276.00
C3	1131.43'	260.52'	130.84'	259.94'	13°11'33"	410409.32 , 10727276.00	410669.10 , 10727266.90
C4	1041.99'	250.19'	125.70'	249.59'	13°45'26"	410715.07 , 10727265.29	410964.50 , 10727256.56
C5	1045.42'	250.60'	125.90'	250.00'	13°44'04"	410964.50 , 10727256.56	411214.35 , 10727247.80
C6	1045.42'	250.60'	125.90'	250.00'	13°44'04"	411214.35 , 10727247.80	411464.20 , 10727239.05
C7	1042.07'	250.20'	125.70'	249.60'	13°45'24"	411492.18 , 10727238.07	411741.63 , 10727229.33
C8	1133.84'	260.74'	130.95'	260.17'	13°10'33"	409887.78 , 10727244.24	410147.78 , 10727235.13
C9	1131.43'	260.52'	130.84'	259.94'	13°11'33"	410147.78 , 10727235.13	410407.57 , 10727226.03
C10	1131.43'	260.52'	130.84'	259.94'	13°11'33"	410407.57 , 10727226.03	410667.35 , 10727216.94
C11	1041.99'	250.19'	125.70'	249.59'	13°45'26"	410713.32 , 10727215.32	410962.75 , 10727206.59
C12	1045.42'	250.60'	125.90'	250.00'	13°44'04"	410962.75 , 10727206.59	411212.60 , 10727197.83
C13	1045.42'	250.60'	125.90'	250.00'	13°44'04"	411212.60 , 10727197.83	411462.45 , 10727189.08
C14	1042.07'	250.20'	125.70'	249.60'	13°45'24"	411490.43 , 10727188.10	411739.88 , 10727179.36
C15	15.00'	62.83'	25.98'	25.98'	240°00'00"	409867.02 , 10727137.35	409880.79 , 10727159.38
C16	25.00'	26.18'	14.43'	25.00'	60°00'00"	409880.79 , 10727159.38	409901.99 , 10727146.13
C17	595.00'	133.43'	67.00'	133.15'	12°50'55"	410451.90 , 10727126.86	410584.65 , 10727137.12
C18	805.00'	170.52'	85.58'	170.20'	12°08'13"	410584.65 , 10727137.12	410754.27 , 10727151.28
C19	10.00'	31.89'	419.88'	19.99'	182°43'43"	410754.44 , 10727156.10	410774.42 , 10727155.40
C20	805.00'	170.52'	85.58'	170.20'	12°08'13"	410774.25 , 10727150.58	410942.46 , 10727124.58
C21	595.00'	133.43'	67.00'	133.15'	12°50'55"	410942.46 , 10727124.58	411074.17 , 10727105.06
C22	595.00'	133.32'	66.94'	133.05'	12°50'19"	411229.26 , 10727099.62	411361.91 , 10727109.86
C23	805.00'	170.38'	85.51'	170.07'	12°07'37"	411361.91 , 10727109.86	411531.39 , 10727124.00
C24	10.00'	31.89'	419.88'	19.99'	182°43'43"	411531.56 , 10727128.82	411551.54 , 10727128.12
C25	805.00'	170.38'	85.51'	170.07'	12°07'37"	411551.37 , 10727123.30	411719.44 , 10727097.33
C26	1000.00'	153.51'	76.91'	153.36'	8°47'44"	410189.42 , 10727197.57	410342.04 , 10727212.68
C27	1045.42'	250.60'	125.90'	250.00'	13°44'04"	411741.63 , 10727229.33	411991.47 , 10727220.58
C28	1045.42'	250.60'	125.90'	250.00'	13°44'04"	411991.47 , 10727220.58	412241.32 , 10727211.83
C29	1042.88'	250.30'	125.75'	249.70'	13°45'05"	412273.30 , 10727210.71	412522.84 , 10727201.96
C30	1045.51'	250.61'	125.91'	250.01'	13°44'02"	412522.84 , 10727201.96	412772.70 , 10727193.21
C31	1045.42'	250.60'	125.90'	250.00'	13°44'04"	411739.88 , 10727179.36	411989.72 , 10727170.61
C32	1045.42'	250.60'	125.90'	250.00'	13°44'04"	411989.72 , 10727170.61	412239.57 , 10727161.86
C33	1042.88'	250.30'	125.75'	249.70'	13°45'05"	412271.55 , 10727160.74	412521.09 , 10727152.00
C34	1045.51'	250.61'	125.91'	250.01'	13°44'02"	412521.09 , 10727152.00	412770.95 , 10727143.24
C35	1035.42'	237.28'	119.16'	236.76'	13°07'48"	411990.76 , 10727155.65	412226.92 , 10727138.81
C36	1045.00'	157.91'	79.10'	157.76'	8°39'28"	412226.92 , 10727138.81	412383.72 , 10727121.47
C37	1200.00'	373.33'	188.18'	371.82'	17°49'30"	412383.72 , 10727121.47	412748.84 , 10727051.17
C38	100.00'	31.07'	15.66'	30.95'	17°48'11"	412748.84 , 10727051.17	412779.23 , 10727045.32
C39	595.00'	133.32'	66.94'	133.05'	12°50'19"	411719.44 , 10727097.33	411851.05 , 10727077.84
C40	595.00'	133.48'	67.02'	133.20'	12°51'12"	412010.09 , 10727072.27	412142.89 , 10727082.53

CURVE DATA TABLE

CURVE	RADIUS	LENGTH	TANGENT	CHORD	DELTA	(X , Y) COORDINATE	(X , Y) COORDINATE
C41	805.00'	170.59'	85.62'	170.27'	12°08'31"	412142.89 , 10727082.53	412312.57 , 10727096.71
C42	10.00'	31.89'	419.88'	19.99'	182°43'43"	412312.74 , 10727101.53	412332.72 , 10727100.83
C43	805.00'	170.59'	85.62'	170.27'	12°08'31"	412332.56 , 10727096.01	412500.83 , 10727069.99
C44	595.00'	133.48'	67.02'	133.20'	12°51'12"	412500.83 , 10727069.99	412632.59 , 10727050.45
C45	20.00'	30.81'	19.40'	27.85'	88°15'40"	412902.24 , 10727181.18	412921.64 , 10727161.19
C46	20.00'	31.31'	19.90'	28.21'	89°42'13"	412900.67 , 10727131.21	412921.27 , 10727150.49
C47	5.00'	7.86'	5.01'	7.07'	90°03'27"	413125.62 , 10727043.17	413130.79 , 10727048.00
C48	5.00'	7.85'	4.99'	7.07'	89°56'33"	413233.73 , 10727044.40	413238.55 , 10727039.23
C49	10.00'	15.64'	9.93'	14.09'	89°35'30"	413257.58 , 10727276.71	413267.92 , 10727286.28
C50	10.00'	15.75'	10.05'	14.18'	90°16'03"	413256.90 , 10727261.72	413266.54 , 10727251.33
C51	10.00'	15.58'	9.87'	14.05'	89°15'18"	413247.73 , 10727038.91	413258.07 , 10727048.42
C52	10.00'	15.95'	10.25'	14.31'	91°24'09"	413245.73 , 10727014.46	413255.36 , 10727003.87
C53	176.68'	49.15'	24.73'	48.99'	15°56'18"	410651.82 , 10727204.37	410603.92 , 10727214.66
C54	200.00'	64.07'	32.31'	63.79'	18°21'12"	410714.45 , 10727192.28	410651.82 , 10727204.37
C55	199.00'	24.43'	12.23'	24.42'	7°02'05"	410787.56 , 10727192.55	410763.16 , 10727191.80

LINE TABLE

LINE	BEARING	LENGTH	(X, Y) COORDINATE	(X , Y) COORDINATE
T-1	S87°59'37"E	3430.01'	409851.68 , 10727270.52	413279.59 , 10727150.44

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CHECKED M.M./B.K.
DATE 09/30/2021

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1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

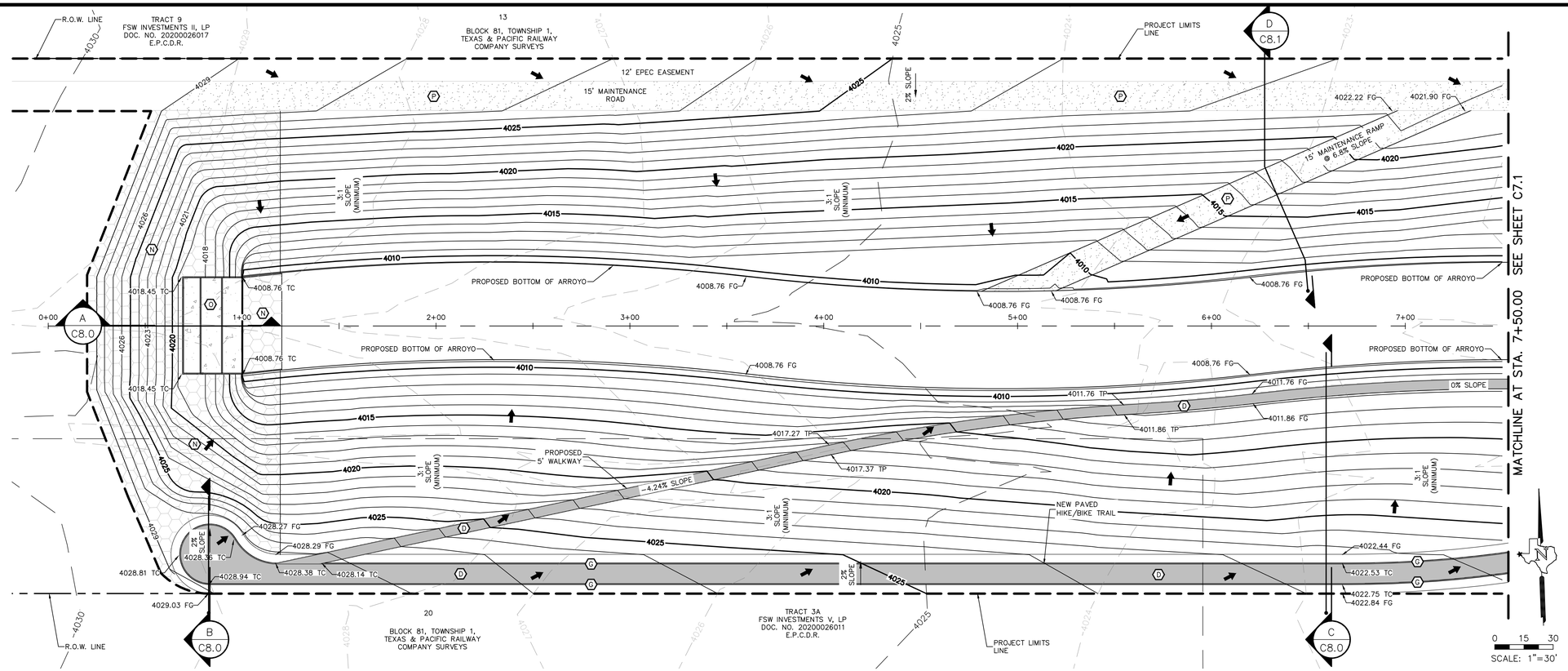
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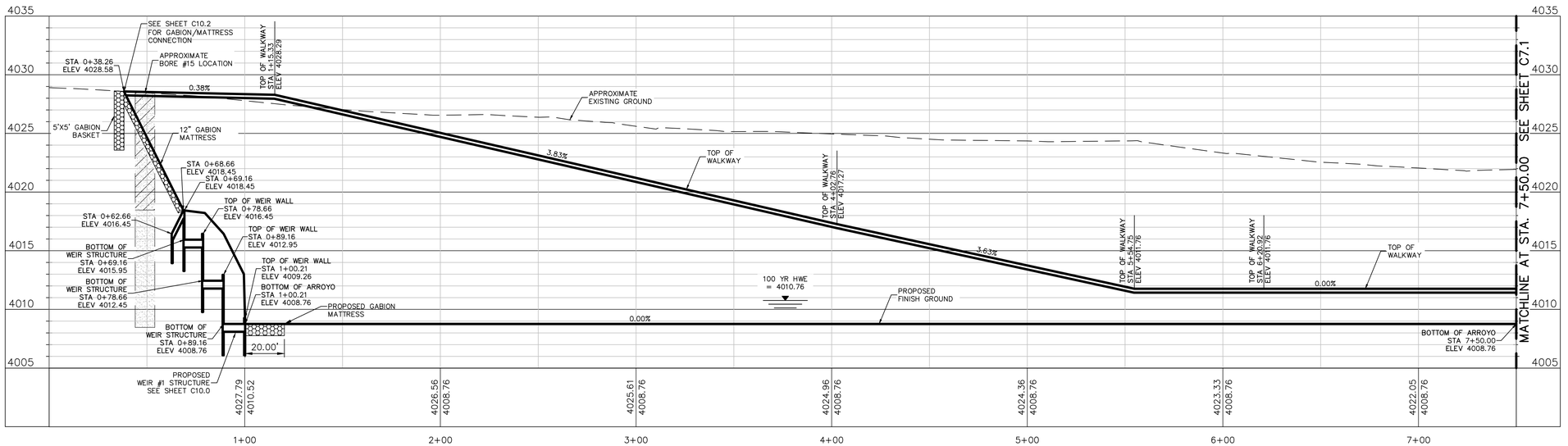
NE ASR ENHANCED ARROYO PHASE I

HORIZONTAL CONTROL AND SITE PLAN
(LINE, CURVE, AND POINTS TABLES)

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JOB NO. **20-110**
SEQUENCE NO. **3** OF **3**
SHEET NO. **C6.2**





KEYED LEGEND

- PROJECT LIMITS/MATCH PROPOSED GROUND WITH EXISTING GROUND
- EXISTING RIGHT-OF-WAY
- 1+00 STATIONING AND NEW GRADE CENTERLINE (CL)
- 4XXX PROPOSED MAJOR CONTOUR
- 4XXX PROPOSED MINOR CONTOUR
- 4XXX EXISTING MAJOR CONTOUR
- 4XXX EXISTING MINOR CONTOUR
- FLOW DIRECTION
- XXXX.XX SPOT ELEVATION
  - TC TOP OF CURB
  - FG FINISH GRADE
  - TP TOP OF PAVEMENT
- A CX.X CROSS SECTION
- (C) COMPACTED AND/OR PREPARED EARTHEN MATERIAL
- (D) NEW ASPHALTIC PAVEMENT — 3 C9.0 / 4 C9.0
- (E) NEW OVERLOOK ROCKWALL — 3 L3.2
- (F) NEW RETAINING ROCKWALL — 10 C9.0
- (G) NEW 6 INCH HEADER CURB — 5 C9.0
- (H) NEW LOOKOUT — 2 L3.2
- (J) 6"–8" LOOSE ROCK RIP–RAP — 2 C9.0
- (K) NEW PARKING — 7 C9.0 / 8 C9.0
- (L) NEW TRAILHEAD ENTRY MONUMENT — 1 L3.2
- (M) NEW WHEEL STOP — 6 C9.0
- (N) NEW GABION BASKET / MATTRESS — 1 C10.0 / 2 C10.2
- (O) NEW CONCRETE WEIR — C10.0 C10.1
- (P) 3" THICK COMPACTED SCREENING SURFACE — 1 C9.0

BENCHMARK

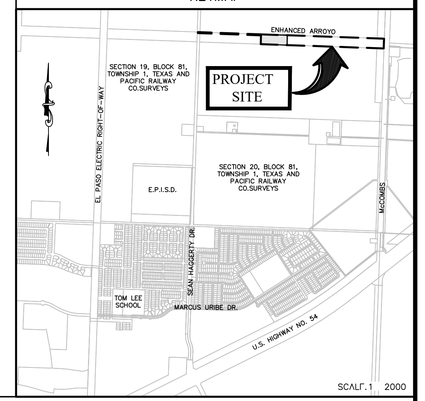
ELEVATIONS AND CONTOURS SHOWN ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (N.A.V.D. 88) DETERMINED VIA G.P.S. OBSERVATIONS AT N.G.S. BENCHMARK MONUMENT "F 1383" FOUND ALONG THE UNION PACIFIC RAILROAD TRACKS, 2,825 FEET NORTHEAST FROM THE INTERSECTION OF RAILROAD DRIVE AND DEER AVENUE HAVING AN ELEVATION OF 3928.37 FEET (NAVD88).

BORING LOG LEGEND

- SAND: FINE GRAINED, CLAYEY, BROWN, VERY LOOSE, DRY TO MOIST
- SAND: MEDIUM GRAINED, POORLY GRADED, BROWN, MEDIUM DENSE, DRY

*REFER TO TEST BORING LOGS PROVIDED BY LOI ENGINEERS FILE NO. LOI18–031

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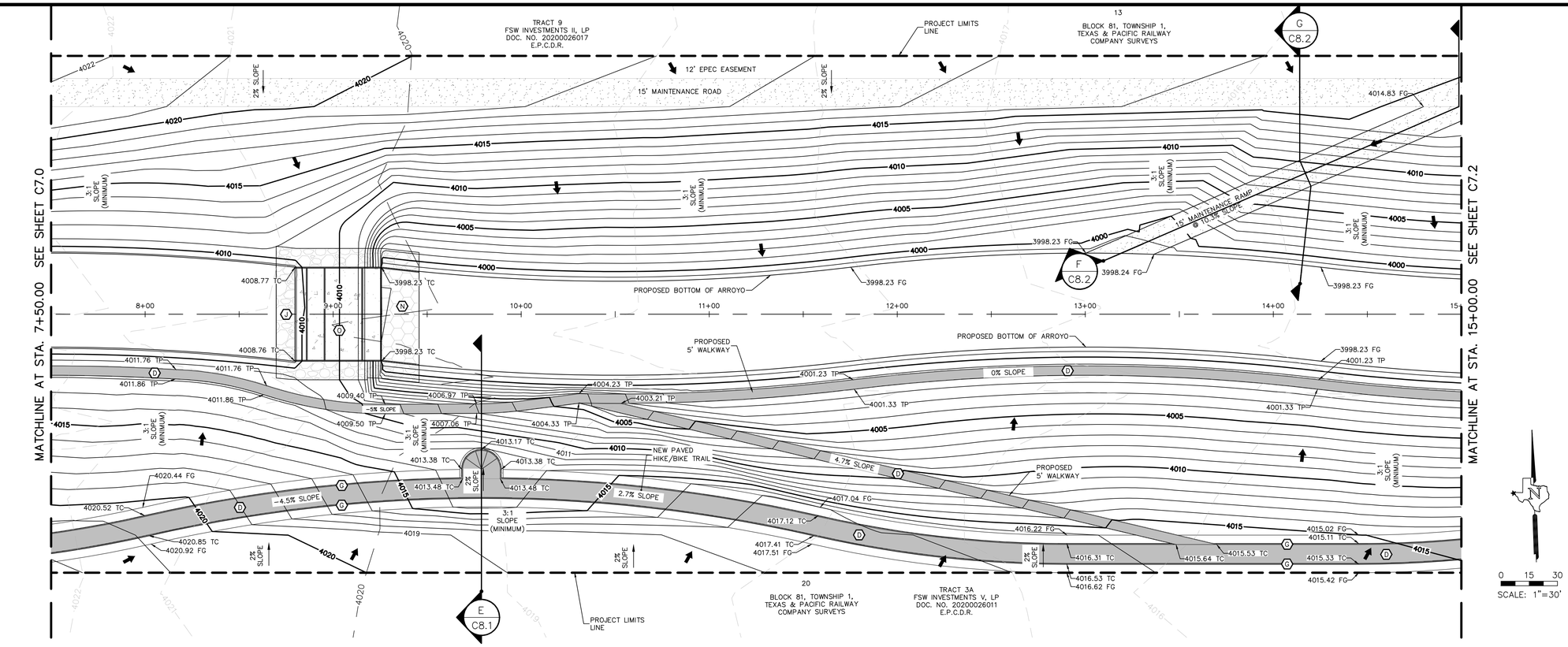
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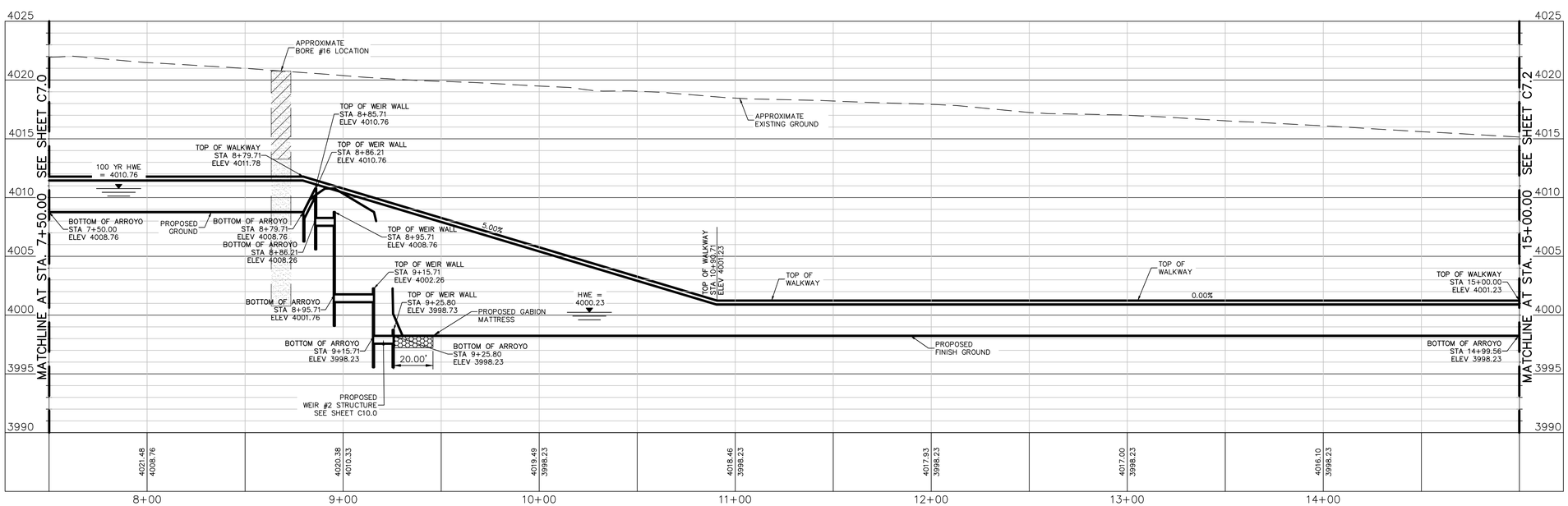
ENHANCED ARROYO PLAN AND PROFILE
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JOB NO. **20–110**
SEQUENCE NO. 1 OF 5
SHEET NO. **C7.0**

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KEYED LEGEND

- PROJECT LIMITS/MATCHED PROPERTY GROUND WITH EXISTING GROUND
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- (D) NEW ASPHALTIC PAVEMENT 3/C9.0, 4/C9.0
- (E) NEW OVERLOOK ROCKWALL 3/L3.2
- (F) NEW RETAINING ROCKWALL 10/C9.0
- (G) NEW 6 INCH HEADER CURB 5/C9.0
- (H) NEW LOOKOUT 2/L3.2
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- (K) NEW PARKING 7/C9.0, 8/C9.0
- (L) NEW TRAILHEAD ENTRY MONUMENT 1/L3.2
- (M) NEW WHEEL STOP 6/C9.0
- (N) NEW GABION BASKET / MATTRESS 1/C10.1, 2/C10.2
- (O) NEW CONCRETE WEIR C10.0, C10.1
- (P) 3" THICK COMPACTED SCREENING SURFACE 1/C9.0

BENCHMARK

ELEVATIONS AND CONTOURS SHOWN ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (N.A.V.D. 88) DETERMINED VIA G.P.S. OBSERVATIONS AT N.G.S. BENCHMARK MONUMENT "F 1383" FOUND ALONG THE UNION PACIFIC RAILROAD TRACKS, 2,825 FEET NORTHEAST FROM THE INTERSECTION OF RAILROAD DRIVE AND DEER AVENUE HAVING AN ELEVATION OF 3928.37 FEET (NAVD88).

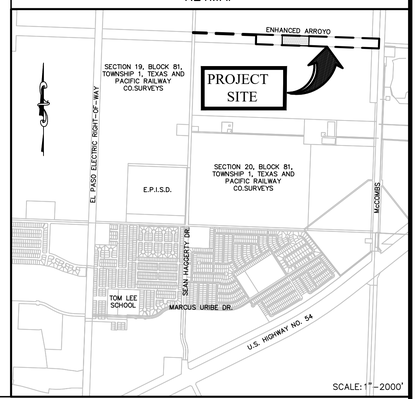
BORING LOG LEGEND

SAND: FINE GRAINED, CLAYEY, BROWN, VERY LOOSE, DRY TO MOIST

SAND: MEDIUM GRAINED, POORLY GRADED, BROWN, MEDIUM DENSE, DRY

*REFER TO TEST BORING LOGS PROVIDED BY LOI ENGINEERS FILE NO. LOI18-031

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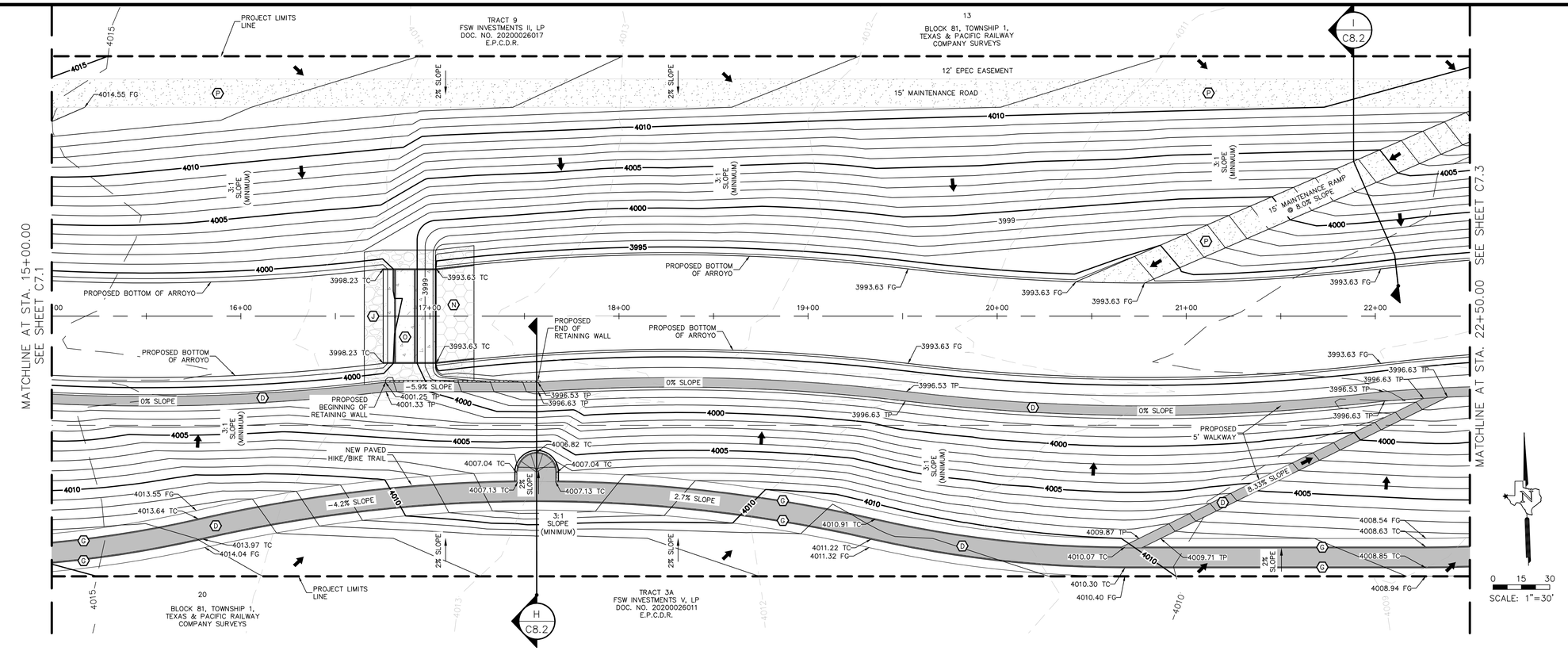
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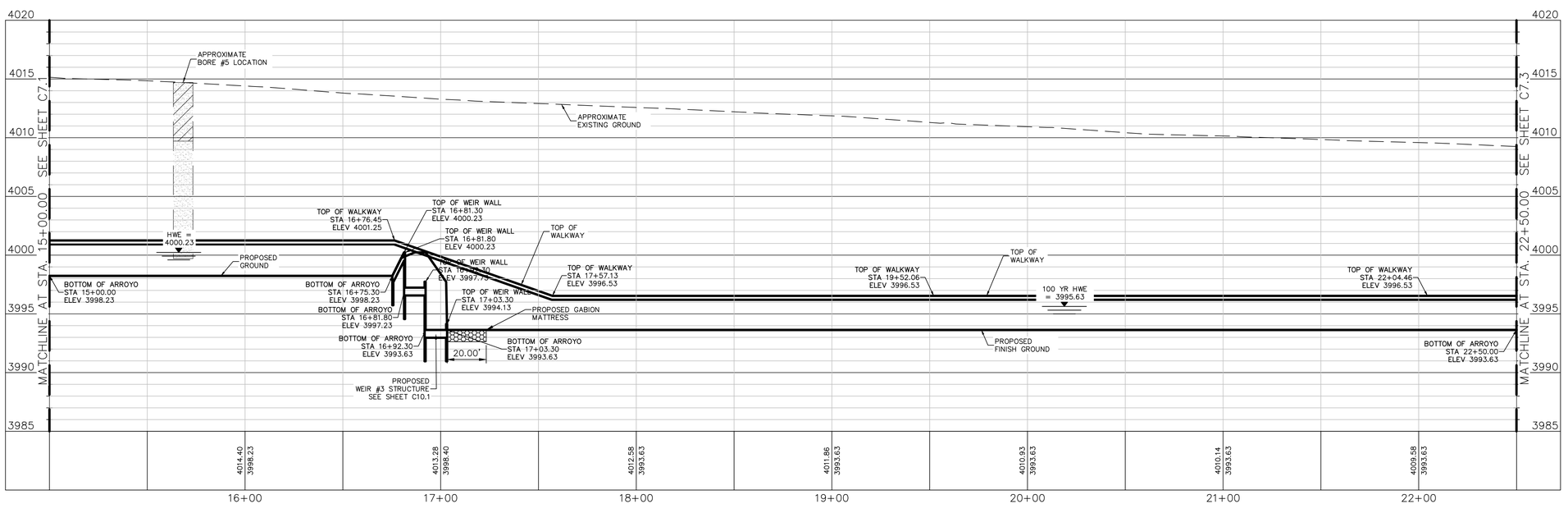
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JOB NO. 20-110
SEQUENCE NO. 2 OF 5
SHEET NO. C7.1

F:\20110\DWG\08_20110 - C7.0-C7.4_DWG_Channel Plan & Profile REV.dwg Time:Dec01,2021 - 02:56pm Login:edgarc





KEYED LEGEND

- PROJECT LIMITS/MATCH PROPOSED GROUND WITH EXISTING GROUND
- EXISTING RIGHT-OF-WAY
- 1+00 STATIONING AND NEW GRADE CENTERLINE (CL)
- 4XXX PROPOSED MAJOR CONTOUR
- 4XXX PROPOSED MINOR CONTOUR
- 4XXX EXISTING MAJOR CONTOUR
- 4XXX EXISTING MINOR CONTOUR
- FLOW DIRECTION
- XXXX.XX SPOT ELEVATION
- TC TOP OF CURB
- FG FINISH GRADE
- TP TOP OF PAVEMENT
- A / CX.X CROSS SECTION
- (C) COMPACTED AND/OR PREPARED EARTHEN MATERIAL
- (D) NEW ASPHALTIC PAVEMENT — 3/C9.0, 4/C9.0
- (E) NEW OVERLOOK ROCKWALL — 3/L3.2
- (F) NEW RETAINING ROCKWALL — 10/C9.0
- (G) NEW 6 INCH HEADER CURB — 5/C9.0
- (H) NEW LOOKOUT — 2/L3.2
- (J) 6"-8" LOOSE ROCK RIP-RAP — 2/C9.0
- (K) NEW PARKING — 7/C9.0, 8/C9.0
- (L) NEW TRAILHEAD ENTRY MONUMENT — 1/L3.2
- (M) NEW WHEEL STOP — 6/C9.0
- (N) NEW GABION BASKET / MATTRESS — 1/C10.0, 2/C10.2
- (O) NEW CONCRETE WEIR — C10.0, C10.1
- (P) 3" THICK COMPACTED SCREENING SURFACE — 1/C9.0

BENCHMARK

ELEVATIONS AND CONTOURS SHOWN ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (N.A.V.D. 88) DETERMINED VIA G.P.S. OBSERVATIONS AT N.G.S. BENCHMARK MONUMENT "F 1383" FOUND ALONG THE UNION PACIFIC RAILROAD TRACKS, 2,825 FEET NORTHEAST FROM THE INTERSECTION OF RAILROAD DRIVE AND DEER AVENUE HAVING AN ELEVATION OF 3928.37 FEET (NAVD88).

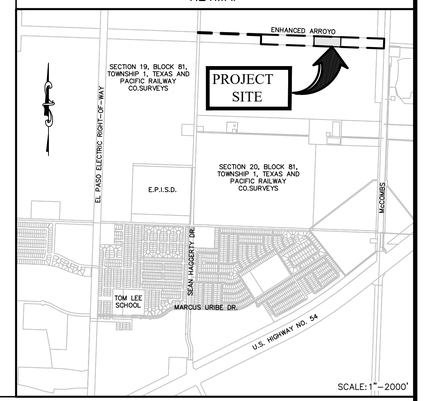
BORING LOG LEGEND

SAND: FINE GRAINED, CLAYEY, BROWN, VERY LOOSE, DRY TO MOIST

SAND: MEDIUM GRAINED, POORLY GRADED, BROWN, MEDIUM DENSE, DRY

*REFER TO TEST BORING LOGS PROVIDED BY LOI ENGINEERS FILE NO. LOI18-031

KEYMAP



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REV.	DATE	BY	DESCRIPTION

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CALL
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1-800-344-8377
FOR FIELD LOCATING EXISTING UTILITIES

ENGINEER'S SEAL

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DESIGNED	DRAWN	CHECKED	DATE
F.S.	E.G./E.C.	M.M./B.K.	09/30/2021

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

CONSULTANT
PLANNING ENGINEERING PROJECT MANAGEMENT
MCi Moreno Cardenas Inc.
EL PASO • SAN ANTONIO
2505 E. Missouri Ave. El Paso, TX 79903 (915) 532-2091
9601 McAllister Freeway #207, San Antonio TX 78216 (210) 314-3553
Texas Board of Professional Engineers Registration No. F-000554

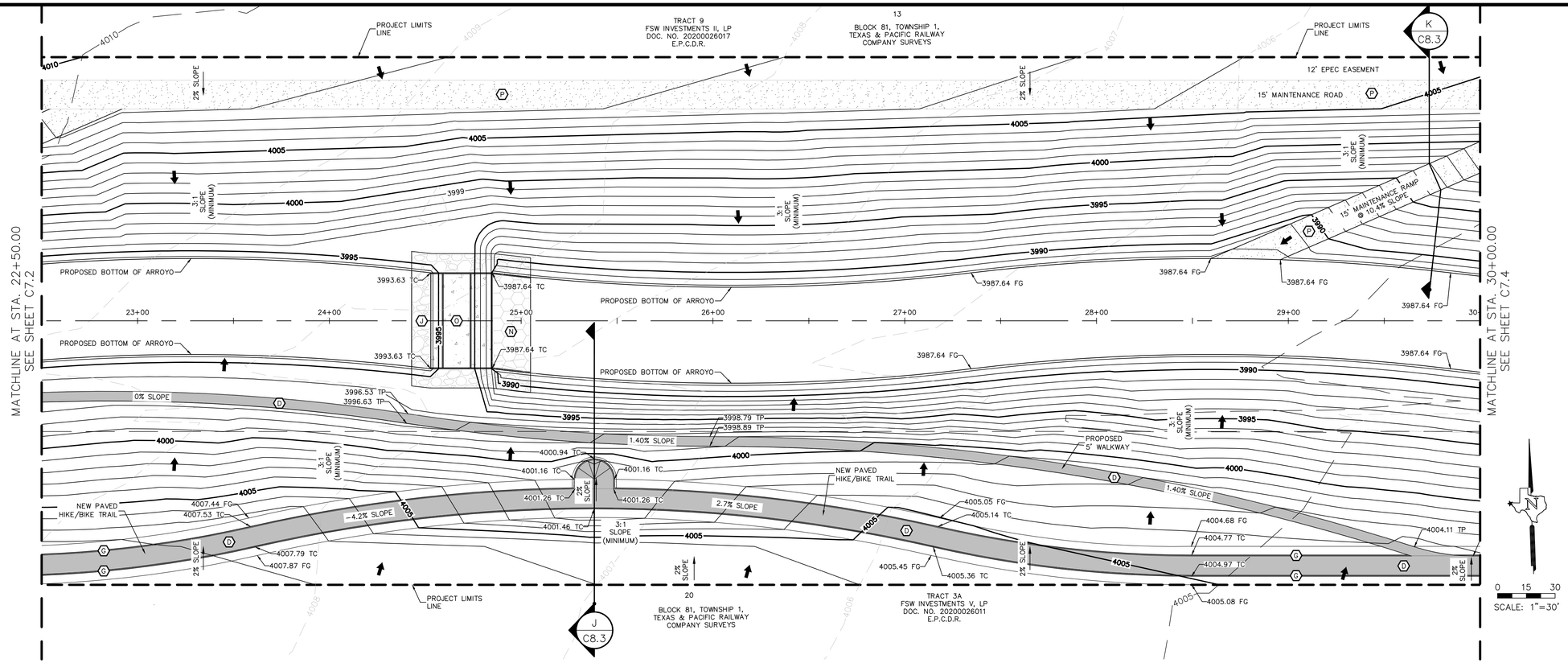
NE ASR ENHANCED ARROYO PHASE I

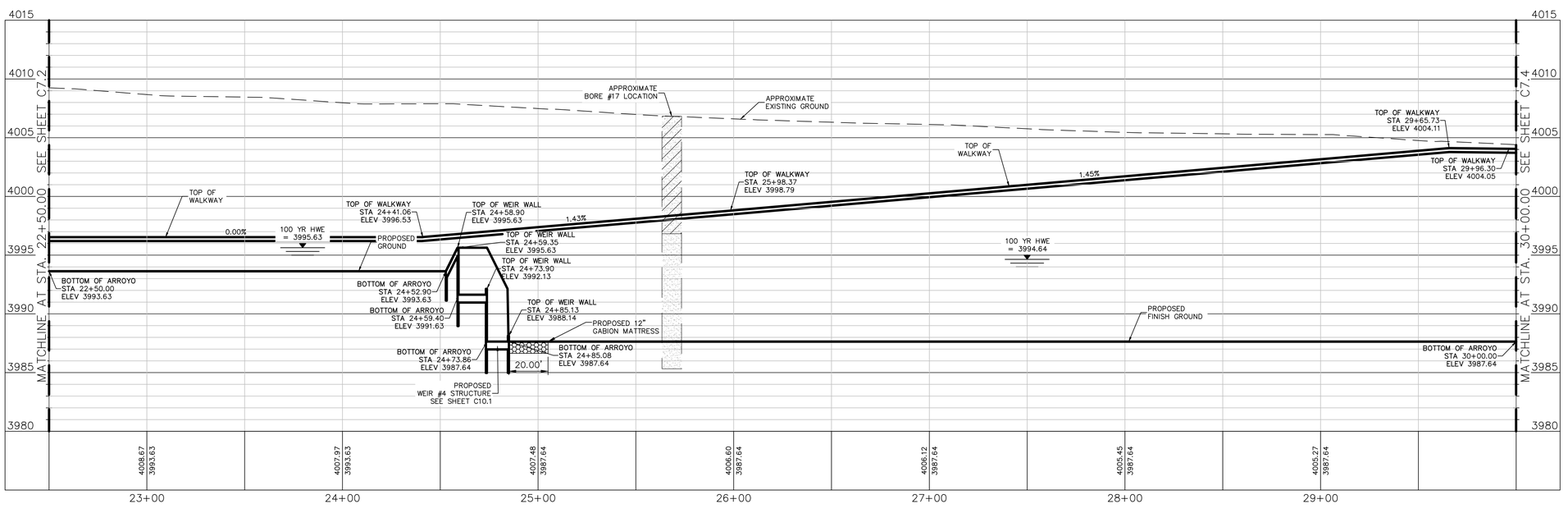
ENHANCED ARROYO PLAN AND PROFILE
(STA. 15+00.00 TO STA. 22+50.00)

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JOB NO. 20-110
SEQUENCE NO. 3 OF 5
SHEET NO. C7.2

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KEYED LEGEND

- PROJECT LIMITS/MATCH PROPOSED GROUND WITH EXISTING GROUND
- EXISTING RIGHT-OF-WAY
- 1+00 STATIONING AND NEW GRADE CENTERLINE (CL)
- 4XXX PROPOSED MAJOR CONTOUR
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- A / CX.X CROSS SECTION
- (C) COMPACTED AND/OR PREPARED EARTHEN MATERIAL
- (D) NEW ASPHALTIC PAVEMENT ..... 3 C9.0 | 4 C9.0
- (E) NEW OVERLOOK ROCKWALL 3 L3.2
- (F) NEW RETAINING ROCKWALL 10 C9.0
- (G) NEW 6 INCH HEADER CURB 5 C9.0
- (H) NEW LOOKOUT 2 L3.2
- (J) 6"-8" LOOSE ROCK RIP-RAP 2 C9.0
- (K) NEW PARKING ..... 7 C9.0 | 8 C9.0
- (L) NEW TRAILHEAD ENTRY MONUMENT 1 L3.2
- (M) NEW WHEEL STOP 6 C9.0
- (N) NEW GABION BASKET / MATTRESS ..... 1 C10.1 | 2 C10.2
- (O) NEW CONCRETE WEIR ..... C10.0 | C10.1
- (P) 3" THICK COMPACTED SCREENING SURFACE 1 C9.0

BENCHMARK

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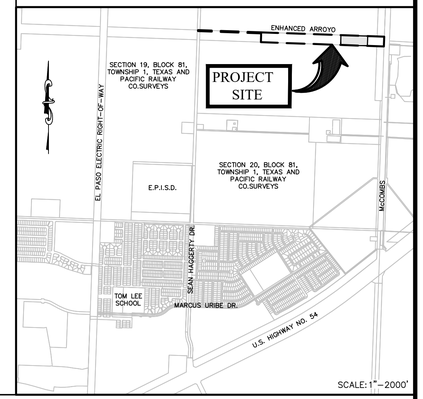
BORING LOG LEGEND

SAND: FINE GRAINED, CLAYEY, BROWN, VERY LOOSE, DRY TO MOIST

SAND: MEDIUM GRAINED, POORLY GRADED, BROWN, MEDIUM DENSE, DRY

*REFER TO TEST BORING LOGS PROVIDED BY LOI ENGINEERS FILE NO. LOI18-031

KEYMAP



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DESIGNED F.S.
DRAWN E.G./E.C.
CHECKED M.M./B.K.
DATE 09/30/2021

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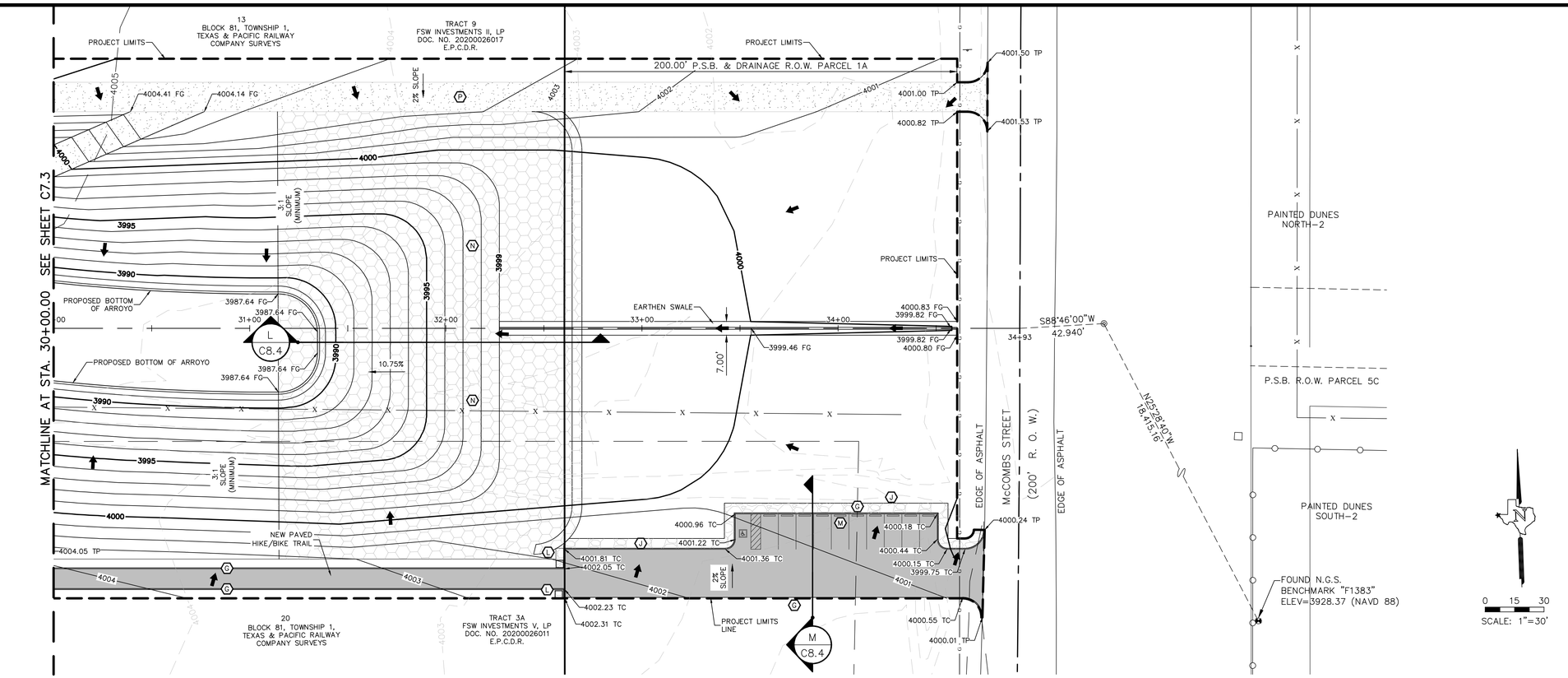
NE ASR ENHANCED ARROYO PHASE I

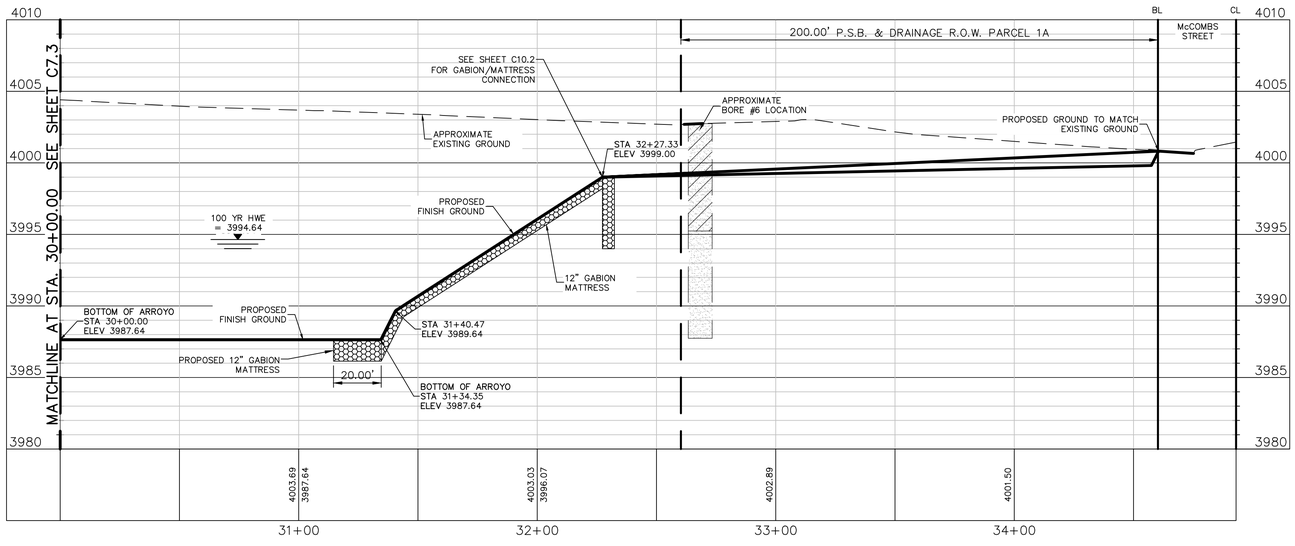
ENHANCED ARROYO PLAN AND PROFILE
(STA. 22+50.00 TO STA. 30+00.00)

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JOB NO. 20-110
SEQUENCE NO. 4 OF 5
SHEET NO. C7.3

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KEYED LEGEND

- PROJECT LIMITS/MATCH PROPOSED GROUND WITH EXISTING GROUND
- EXISTING RIGHT-OF-WAY
- 1+00 — STATIONING AND NEW GRADE CENTERLINE (CL)
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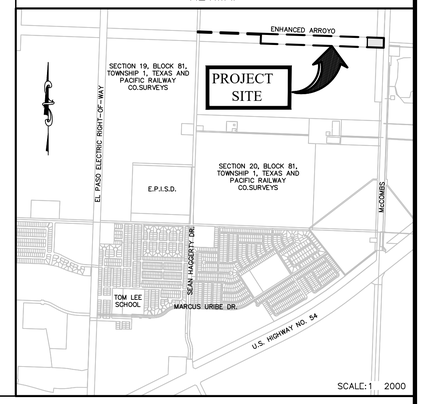
BORING LOG LEGEND

SAND: FINE GRAINED, CLAYEY, BROWN, VERY LOOSE, DRY TO MOIST

SAND: MEDIUM GRAINED, POORLY GRADED, BROWN, MEDIUM DENSE, DRY

*REFER TO TEST BORING LOGS PROVIDED BY LOI ENGINEERS FILE NO. LO18–031

KEYMAP



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1–800–344–8377
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DESIGNED	DRAWN	CHECKED	DATE
F.S.	E.G./E.C.	M.M./B.K.	09/30/2021

UTILITY OWNER
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Texas Board of Professional Engineers Registration No. F-000554

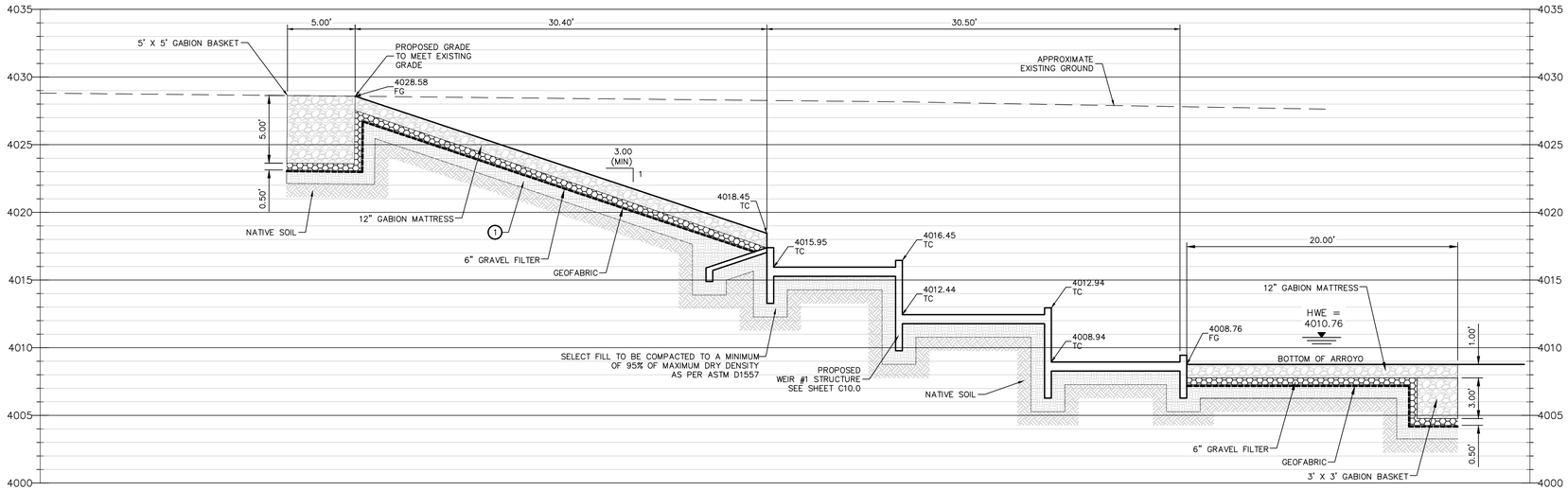
NE ASR ENHANCED ARROYO PHASE I

ENHANCED ARROYO PLAN AND PROFILE
(STA. 30+00.00 TO STA. 34+60.49)

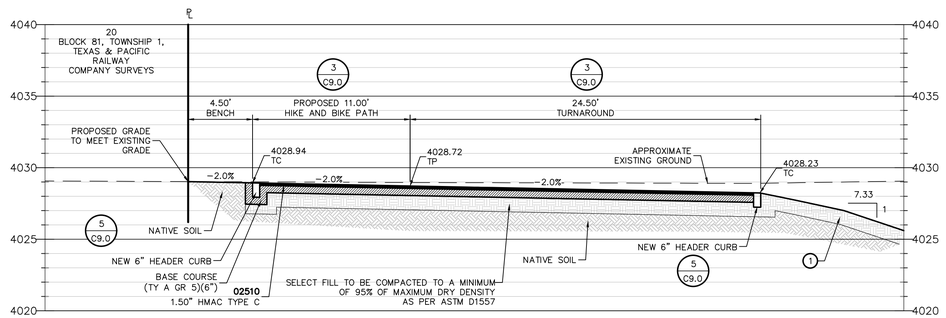
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JOB NO.	SEQUENCE NO.	SHEET NO.
20–110	5 OF 5	C7.4

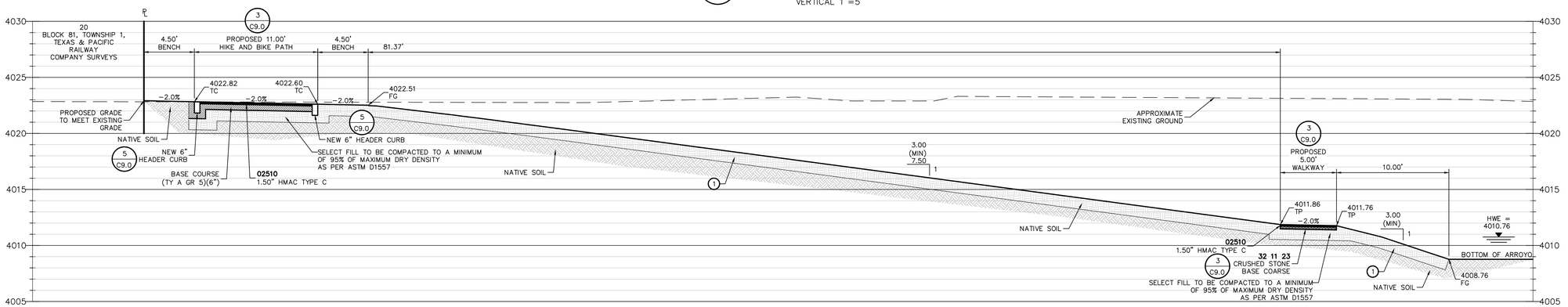
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A / C8.0 **SECTION**
SCALE: HORIZONTAL 1"=5'
VERTICAL 1"=5'



B / C8.0 **SECTION**
SCALE: HORIZONTAL 1"=5'
VERTICAL 1"=5'



C / C8.0 **SECTION**
SCALE: HORIZONTAL 1"=5'
VERTICAL 1"=5'

(1) CUT SLOPES SHALL BE COMPACTED (MIN. 12" THICKNESS) TO A MINIMUM OF 90% OF MAXIMUM DRY DENSITY AS PER ASTM D 1557. MOISTURE CONTENT SHOULD BE MAINTAINED WITHIN ±2% OF OPTIMUM MOISTURE CONTENT UNTIL COVERED.

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DATE 09/30/2021

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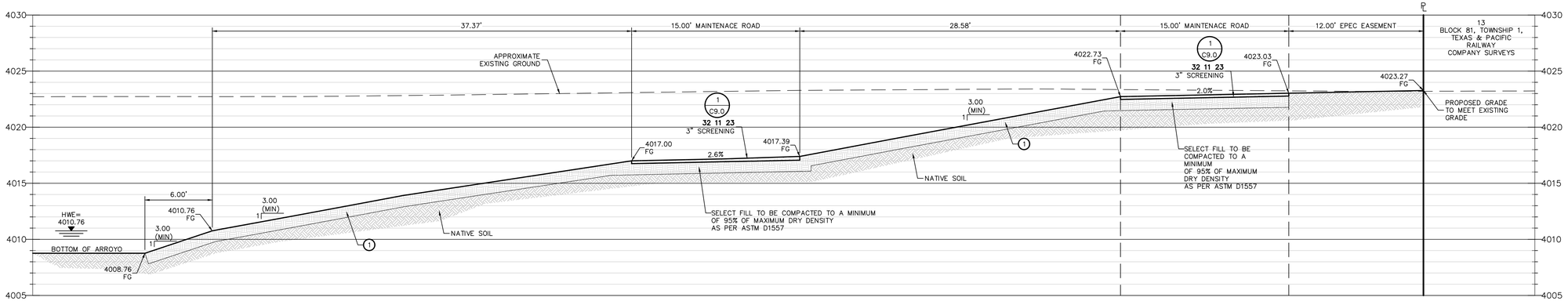
NE ASR ENHANCED ARROYO PHASE I

TYPICAL SECTIONS

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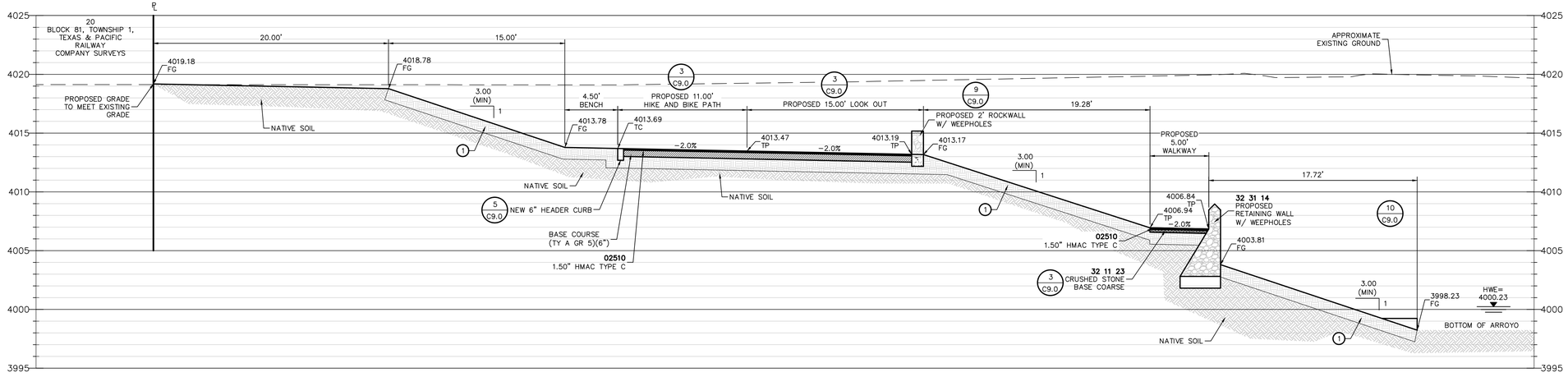
JOB NO. **20-110**
SEQUENCE NO. 1 OF 5
SHEET NO. **C8.0**

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D / C8.1 **SECTION**
SCALE: HORIZONTAL 1"=5'
VERTICAL 1"=5'

(1) CUT SLOPES SHALL BE COMPACTED TO A MINIMUM OF 90% OF MAXIMUM DRY DENSITY AS PER ASTM D 1557. MOISTURE CONTENT SHOULD BE MAINTAINED WITHIN ±2% OF OPTIMUM MOISTURE CONTENT UNTIL COVERED.



E / C8.1 **SECTION**
SCALE: HORIZONTAL 1"=5'
VERTICAL 1"=5'

F:\20110\DWG\09_20110 - C8.0-C8.4_DWG_Typical Sections.dwg Time:Dec01,2021 - 03:17pm Login:edgarc

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REV.	DATE	BY	DESCRIPTION

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ENGINEER'S SEAL
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DESIGNED F.S.
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DATE 09/30/2021

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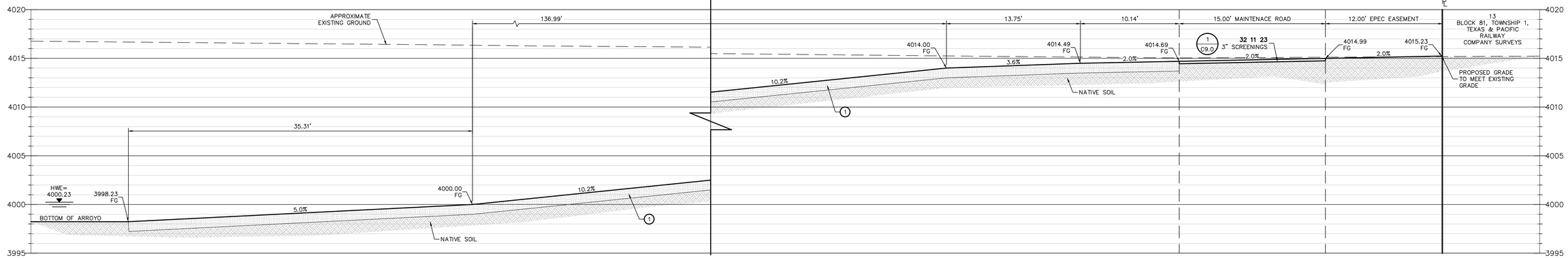
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NE ASR ENHANCED ARROYO PHASE I

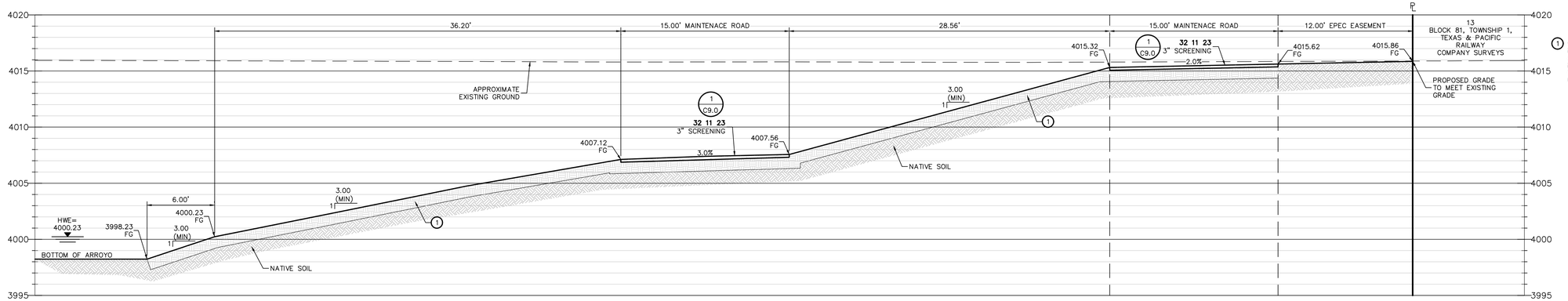
TYPICAL
SECTIONS

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JOB NO. **20-110**
SEQUENCE NO. 2 OF 5
SHEET NO. **C8.1**

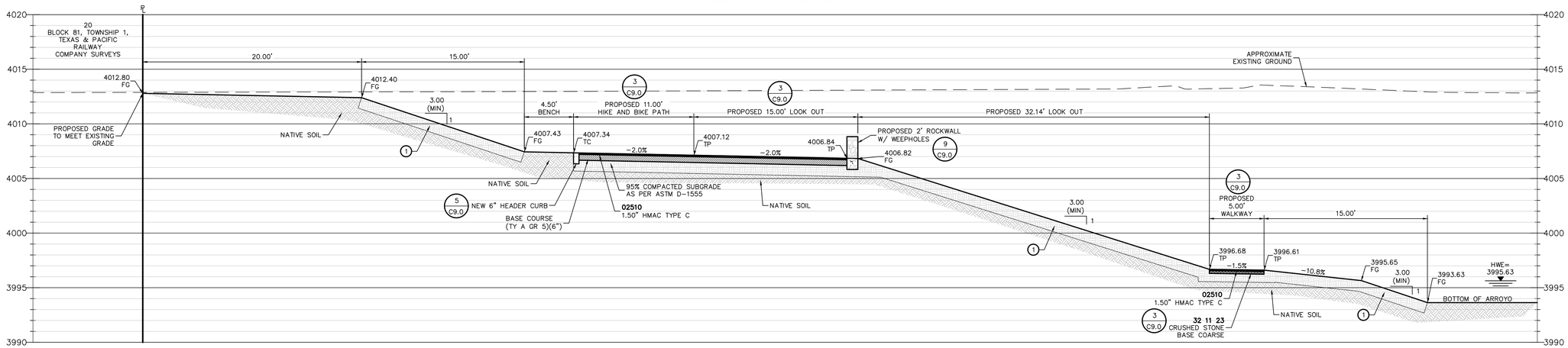


F C8.2 SECTION
SCALE: HORIZONTAL 1"=5'
VERTICAL 1"=5'



1 CUT SLOPES SHALL BE COMPACTED TO A MINIMUM OF 90% OF MAXIMUM DRY DENSITY AS PER ASTM D 1557. MOISTURE CONTENT SHOULD BE MAINTAINED WITHIN ±2% OF OPTIMUM MOISTURE CONTENT UNTIL COVERED.

G C8.2 SECTION
SCALE: HORIZONTAL 1"=5'
VERTICAL 1"=5'



H C8.2 SECTION
SCALE: HORIZONTAL 1"=5'
VERTICAL 1"=5'

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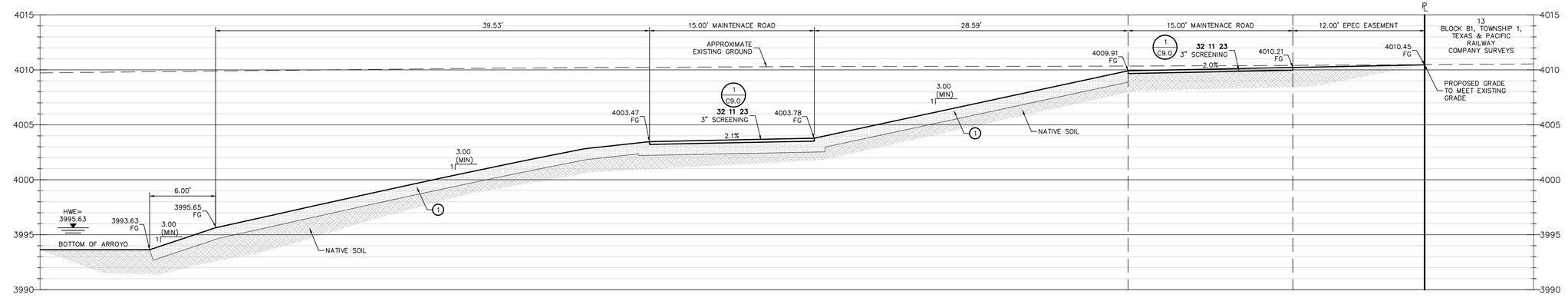
NE ASR ENHANCED ARROYO PHASE I

TYPICAL SECTIONS

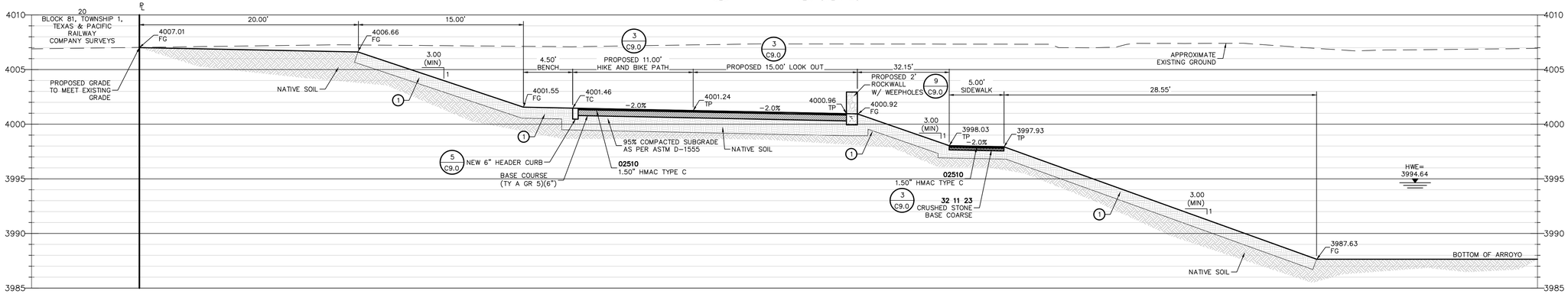
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JOB NO. 20-110
SEQUENCE NO. 3 OF 5
SHEET NO. C8.2

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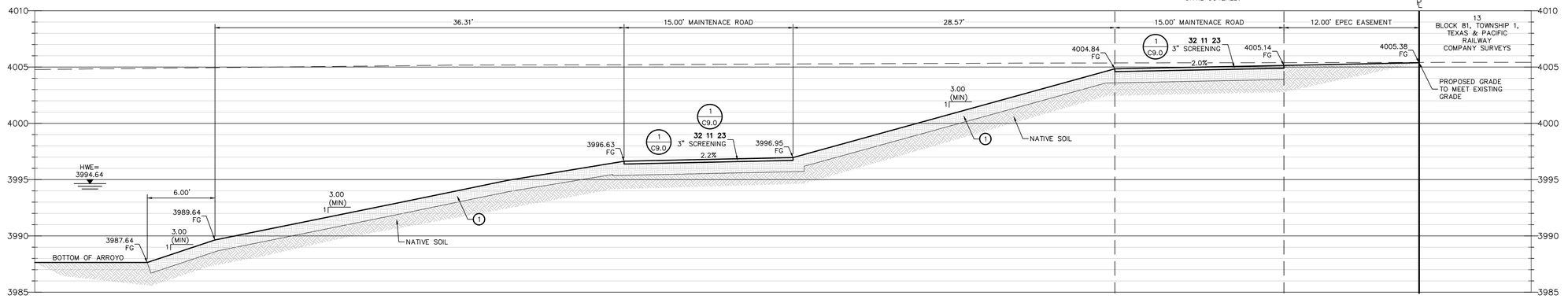


I C8.3 **SECTION**
SCALE: HORIZONTAL 1"=5'
VERTICAL 1"=5'



J C8.3 **SECTION**
SCALE: HORIZONTAL 1"=5'
VERTICAL 1"=5'

1. CUT SLOPES SHALL BE COMPACTED TO A MINIMUM OF 90% OF MAXIMUM DRY DENSITY AS PER ASTM D 1557. MOISTURE CONTENT SHOULD BE MAINTAINED WITHIN ±2% OF OPTIMUM MOISTURE CONTENT UNTIL COVERED.



K C8.3 **SECTION**
SCALE: HORIZONTAL 1"=5'
VERTICAL 1"=5'

F:\20110\DWG\09_20110 - C8.0-C8.4_DWG_Typical Sections.dwg Time:Dec01,2021 - 10:09am Login:edgarc

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REV.	DATE	BY	DESCRIPTION

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DESIGNED F.S.
DRAWN E.G./E.C.
CHECKED M.M./B.K.
DATE 09/30/2021

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

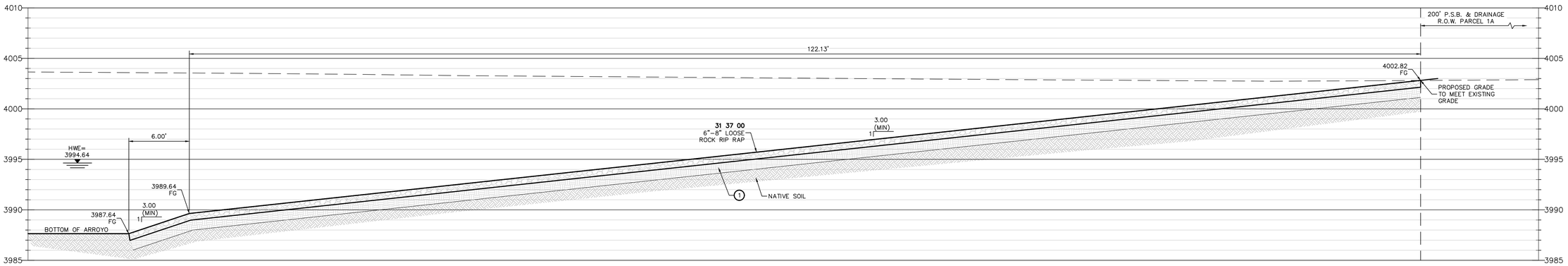
CONSULTANT
PLANNING ENGINEERING PROJECT MANAGEMENT
MCi Moreno Cardenas Inc.
EL PASO • SAN ANTONIO
2505 E. Missouri Ave. El Paso, TX 79903 (915) 532-2091
9601 McAllister Freeway #207, San Antonio TX 78216 (210) 314-3553
Texas Board of Professional Engineers Registration No. F-000554

NE ASR ENHANCED ARROYO PHASE I

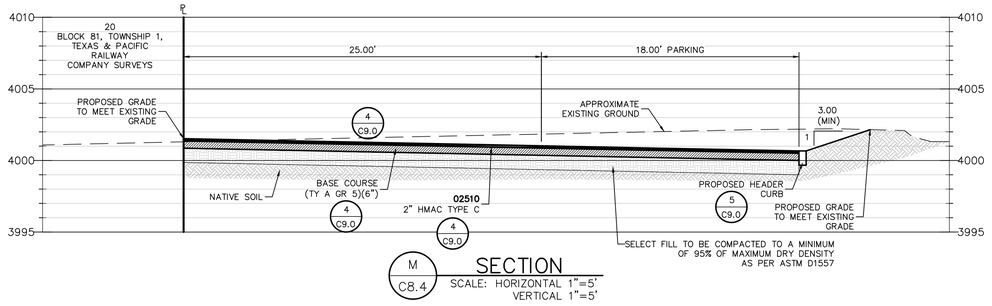
TYPICAL SECTIONS

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JOB NO. **20-110**
SEQUENCE NO. **4** OF **5**
SHEET NO. **C8.3**



L / C8.4 SECTION
SCALE: HORIZONTAL 1"=5'
VERTICAL 1"=5'



M / C8.4 SECTION
SCALE: HORIZONTAL 1"=5'
VERTICAL 1"=5'

(1) CUT SLOPES SHALL BE COMPACTED TO A MINIMUM OF 90% OF MAXIMUM DRY DENSITY AS PER ASTM D 1557. MOISTURE CONTENT SHOULD BE MAINTAINED WITHIN ±2% OF OPTIMUM MOISTURE CONTENT UNTIL COVERED.

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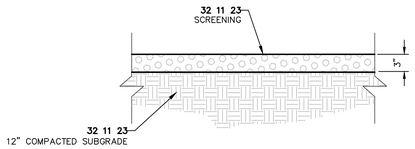
NE ASR ENHANCED ARROYO PHASE I

TYPICAL
SECTIONS

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SEQUENCE NO. 5 OF 5
SHEET NO. **C8.4**

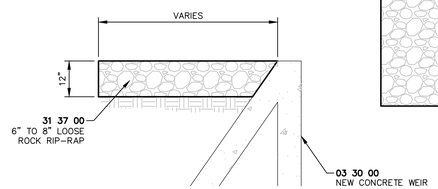
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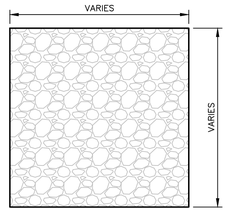


1 C9.0 **3" SCREENING**
SCALE: 1"= 1'-0"

GENERAL NOTE:

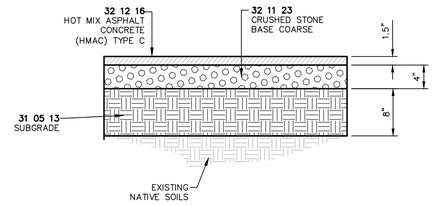
1. STONE FOR RIP-RAP SHALL BE 6" TO 8" AS NEARLY UNIFORM IN SECTION AS PRACTICABLE. STONE SHALL BE QUARRIED; FRACTURED RIVERROCK SHALL NOT BE PERMITTED.
2. REFER TO SITE PLAN FOR DIMENSIONS.



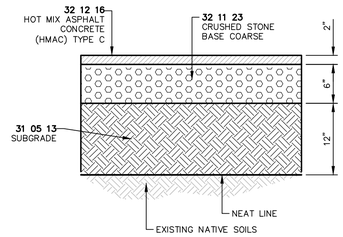


PLAN

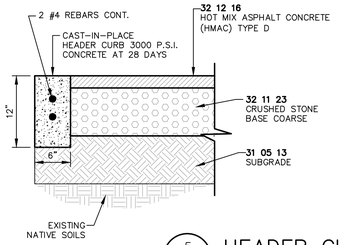
2 C9.0 **LOOSE ROCK RIP-RAP DETAIL**
SCALE: 1/2"=1'-0"



3 C9.0 **HIKE & BIKE TRAIL / LOOKOUT / WALKWAY**
02510 SCALE: 1"=1'-0"



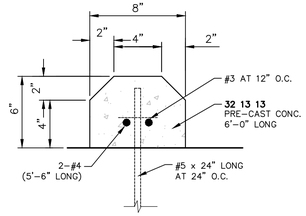
4 C9.0 **ASPHALT CONCRETE PAVEMENT PARKING LOTS**
SCALE: 1"=1'-0"



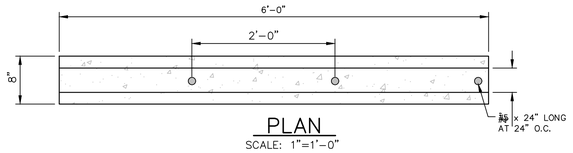
NOTES:

1. DUMMY JOINTS REQUIRED AT 10' O.C.
2. CONCRETE HEADER CURB AND RETURNS SHALL BE 3,000 P.S.I. MIN.
3. 1/2" PREMOLDED BITUMINOUS EXPANSION JOINT (AASHTO M-33) IS REQUIRED FOR ALL CURBS RETURNS. TRIM BITUMINOUS MATERIAL 1/4" LESS THAN NEAT CURB DIMENSION.
4. SUBGRADE UNDER CURBS MUST BE FORMED AND COMPACTED TO 95% ASTM D1557.
5. EXPANSION JOINTS REQUIRED AT 50' O.C. WHEN FORMING FOR CURBS.

5 C9.0 **HEADER CURB DETAIL**
SCALE: 1" = 1'-0"

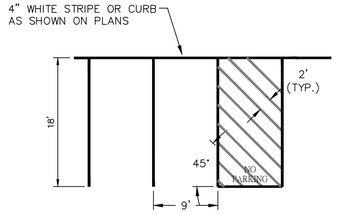


SECTION
SCALE: 2"=1'-0"



PLAN
SCALE: 1"=1'-0"

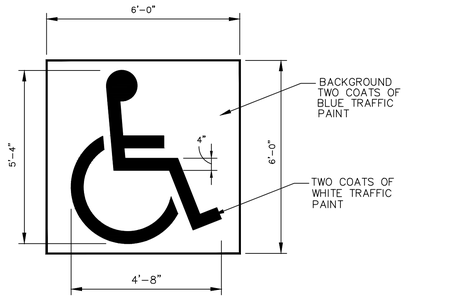
6 C9.0 **CONCRETE WHEEL STOP DETAIL**
SCALE: AS SHOWN



GENERAL NOTE

1. ALL STRIPING TO BE 4" WIDE WHITE TRAFFIC PAINT.

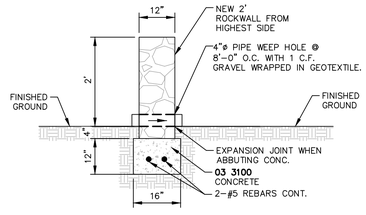
7 C9.0 **TYPICAL STRIPING DETAIL**
SCALE: AS SHOWN



8 C9.0 **HANDICAPPED PAVEMENT MARKING DETAIL**
SCALE: AS SHOWN

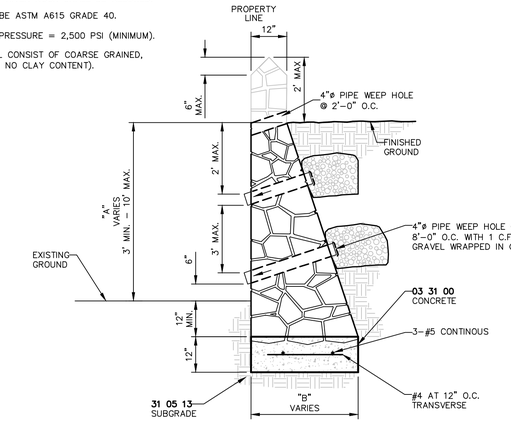
ROCKWALL GENERAL NOTES

1. STONE FOR ROCKWALL SHALL BE NEARLY UNIFORM IN SECTIONS AS IN PRACTICABLE. THE STONE SHALL BE DENSE AND RESISTANT OF AIR AND WATER.
2. MORTAR MUST BE TYPE "S" 1800 P.S.I. AS PER ASTM C270.
3. MASONRY WALL OVER SIX (6) FEET IN HEIGHT AND THOSE USED FOR EARTH RETENTION OVER TWO (2) FEET MUST BE DESIGNED AS STRUCTURAL WALLS.
4. PROVIDE ONE (1) INCH EXPANSION JOINTS AT EVERY 100 FEET.
5. ALL STONE SHALL BE THOROUGHLY SOAKED BEFORE BEING PLACED.
6. ALL STONE FOR ROCKWALLS SHALL BE FRACTURED QUARRIED ROCK OR ROUND ROCK, NO RIVER ROCK SHALL BE ALLOWED.
7. REINFORCED STEEL SHALL BE ASTM A615 GRADE 40.
8. ALLOWABLE SOIL BEARING PRESSURE = 2,500 PSI (MINIMUM).
9. BACKFILL MATERIALS SHALL CONSIST OF COARSE GRAINED, WELL-DRIANED SOILS (WITH NO CLAY CONTENT).



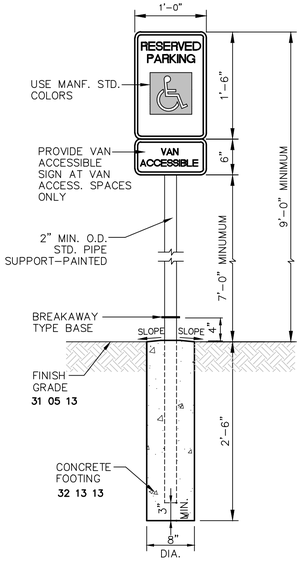
ROCKWALL SECTION

9 C9.0 **TYPICAL ROCKWALL DETAILS**
32 31 14 SCALE: 1/2"=1'-0"



RETAINING ROCK WALL	
"A"	"B"
3'	2'-6"
4'	2'-10"
5'	3'-3"
6'	3'-8"
7'	4'-0"
8'	4'-5"
9'	4'-10"
10'	6'-6"

10 C9.0 **RETAINING WALL SECTION**
SCALE: AS SHOWN 32 31 14 (3' MIN. TO 10' MAX.)



11 C9.0 **TYPICAL HANDICAPPED PARKING SIGN DETAIL**
SCALE: AS SHOWN

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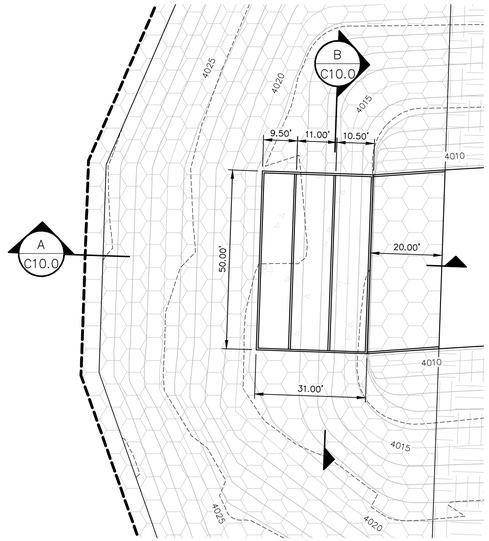
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TYPICAL STANDARD DETAILS

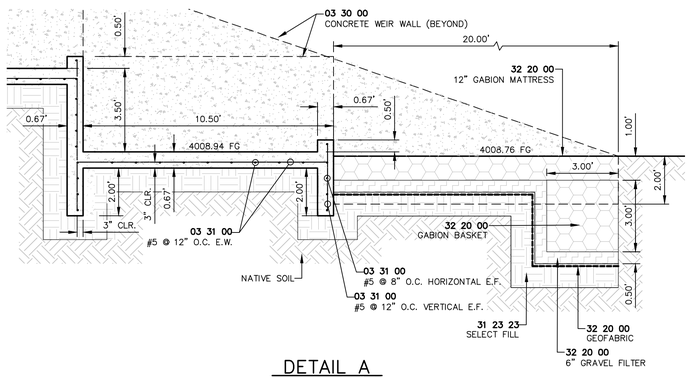
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JOB NO. **20-110**
SEQUENCE NO. **1 OF 1**
SHEET NO. **C9.0**

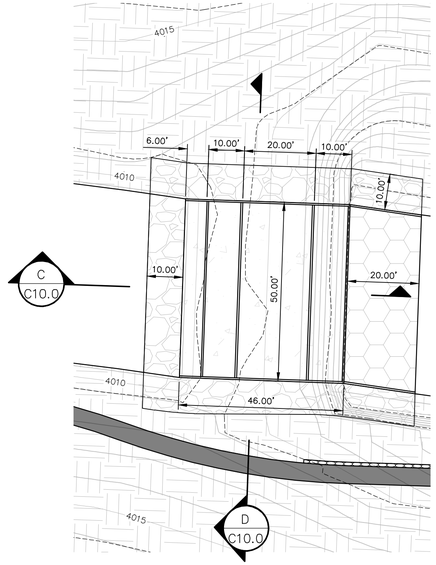
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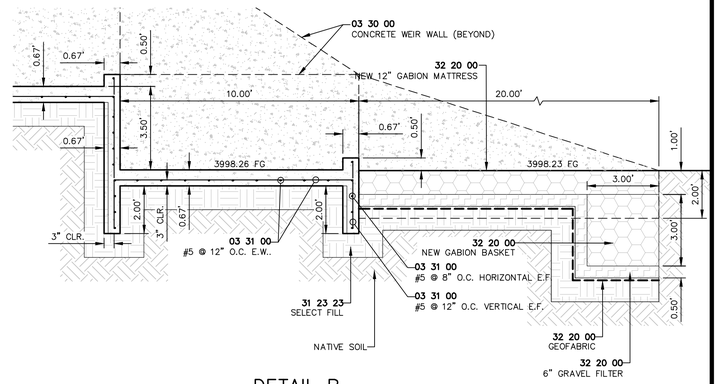
WEIR STRUCTURE #1 PLAN VIEW
SCALE: 1"=20'



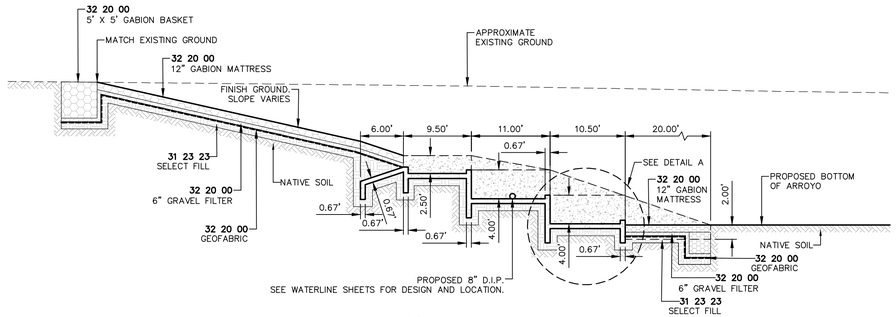
DETAIL A
SCALE: 1"=3'



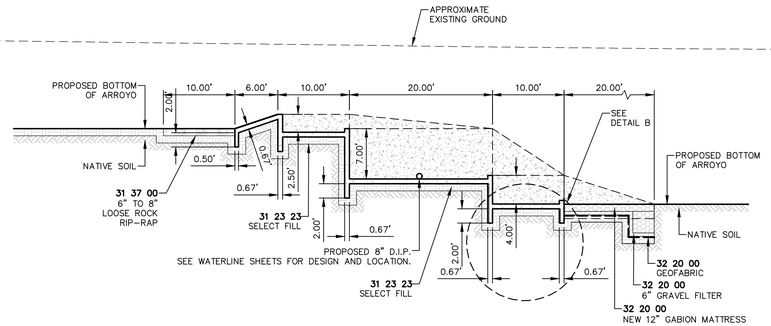
WEIR STRUCTURE #2 PLAN VIEW
SCALE: 1"=20'



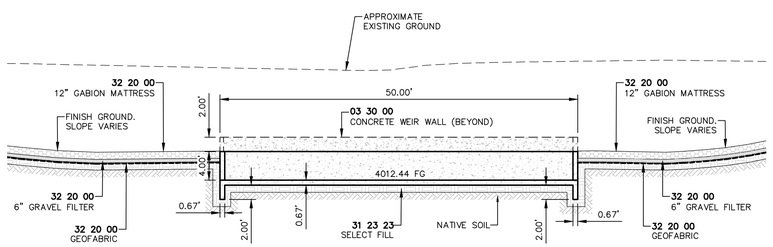
DETAIL B
SCALE: 1"=3'



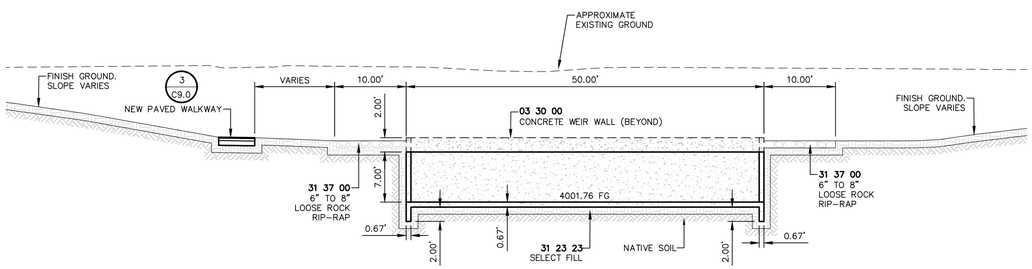
A C10.0 SECTION A
SCALE: 1"=10'



C C10.0 SECTION C
SCALE: 1"=10'



B C10.0 SECTION B
SCALE: 1"=10'



D C10.0 SECTION D
SCALE: 1"=10'

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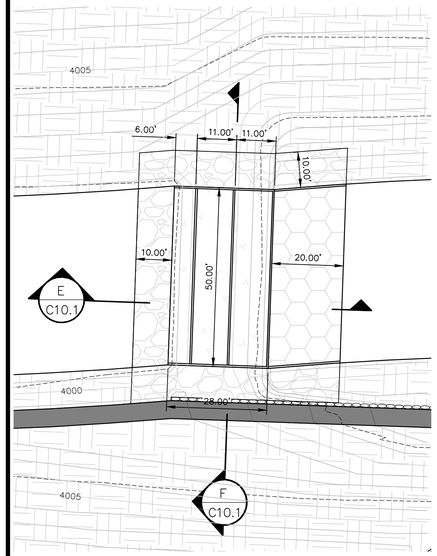
NE ASR ENHANCED ARROYO PHASE I

DRAINAGE STRUCTURE DETAILS

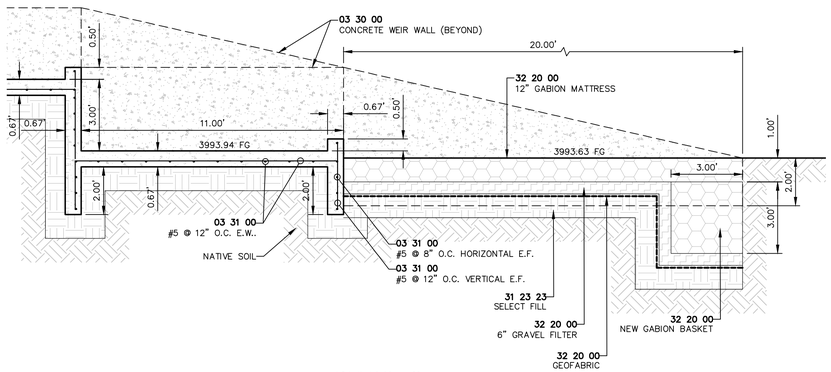
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JOB NO. 20-110
SEQUENCE NO. 1 OF 3
SHEET NO. C10.0

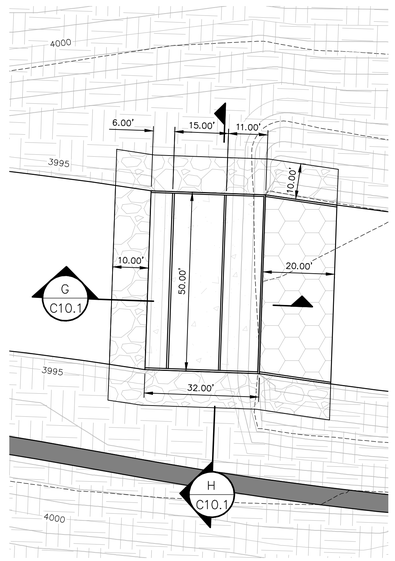
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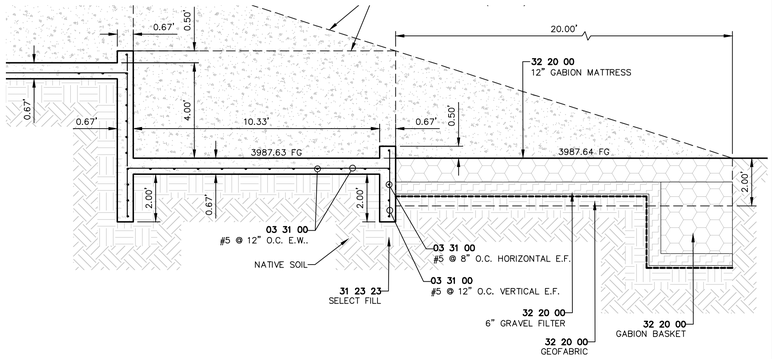
WEIR STRUCTURE #3 PLAN VIEW
SCALE: 1"=20'



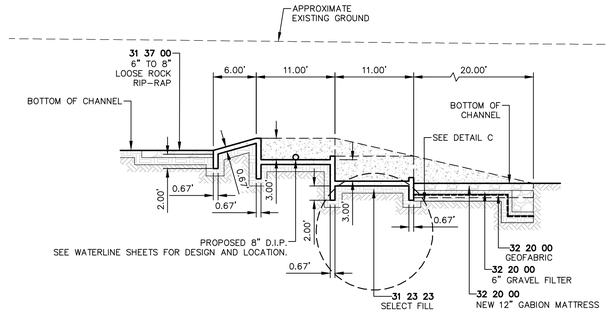
DETAIL C
SCALE: 1"=3'



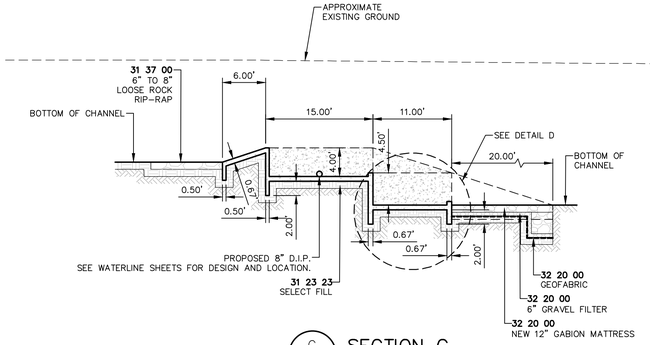
WEIR STRUCTURE #4 PLAN VIEW
SCALE: 1"=40'



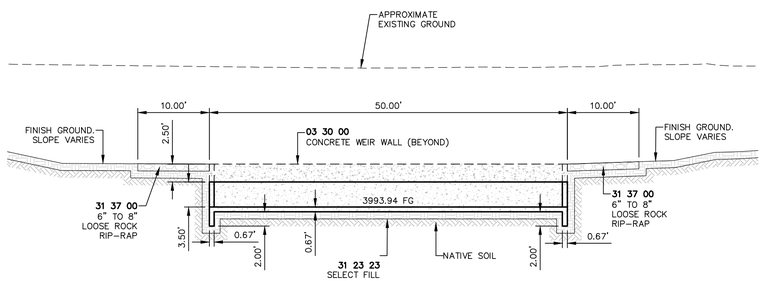
DETAIL D
SCALE: 1"=3'



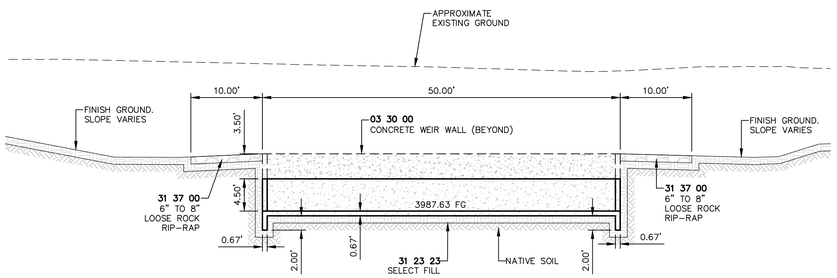
E C10.1 SECTION E
SCALE: 1"=10'



G C10.1 SECTION G
SCALE: 1"=10'



F C10.1 SECTION F
SCALE: 1"=10'



H C10.1 SECTION H
SCALE: 1"=10'

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REV.	DATE	BY	DESCRIPTION

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DESIGNED F.S.
DRAWN E.G./E.C.
CHECKED M.M./B.K.
DATE 09/30/2021

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

CONSULTANT
PLANNING ENGINEERING PROJECT MANAGEMENT
MCi Moreno Cardenas Inc.
EL PASO · SAN ANTONIO
2505 E. Missouri Ave. El Paso, TX 79903 (915) 532-2091
9601 McAllister Freeway #207, San Antonio TX 78216 (210) 314-3553
Texas Board of Professional Engineers Registration No. F-000554

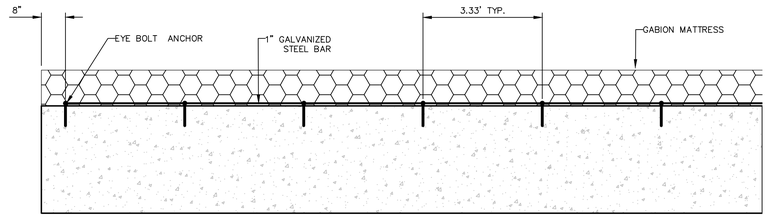
NE ASR ENHANCED ARROYO PHASE I

DRAINAGE STRUCTURE DETAILS

THESE CONTRACT DOCUMENTS HAVE BEEN PREPARED SPECIFICALLY AND EXCLUSIVELY FOR THE DESIGN OF "NE ASR ENHANCED ARROYO PHASE I" MORENO CARDENAS INC. IS NOT RESPONSIBLE FOR THEIR USE ON ANY OTHER PROJECT OR APPLICATION.

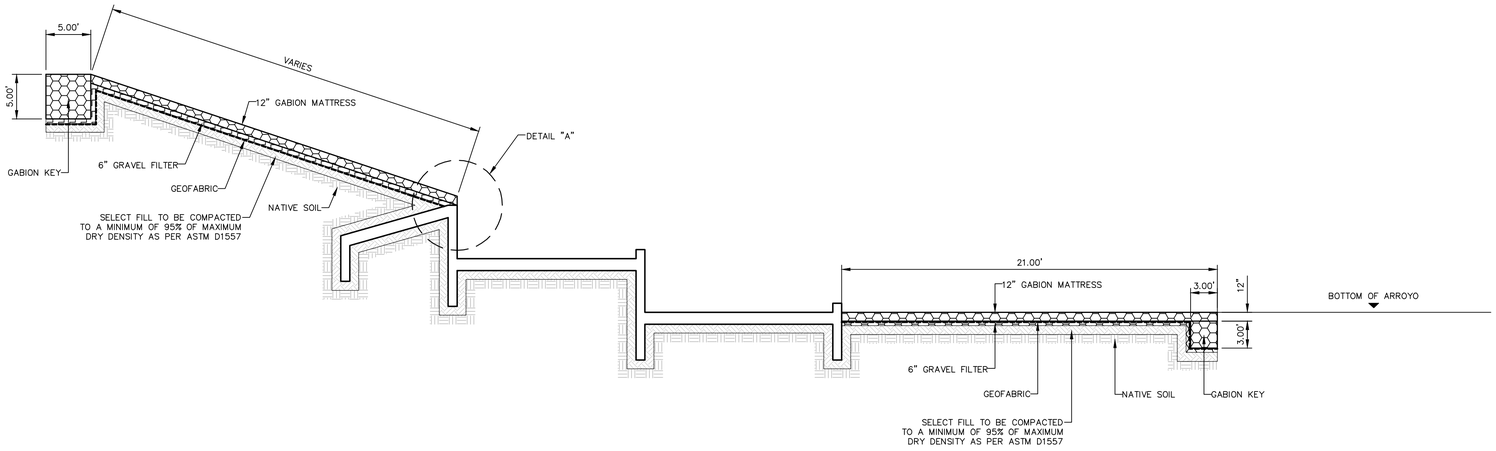
JOB NO. 20-110
SEQUENCE NO. 2 OF 3
SHEET NO. C10.1

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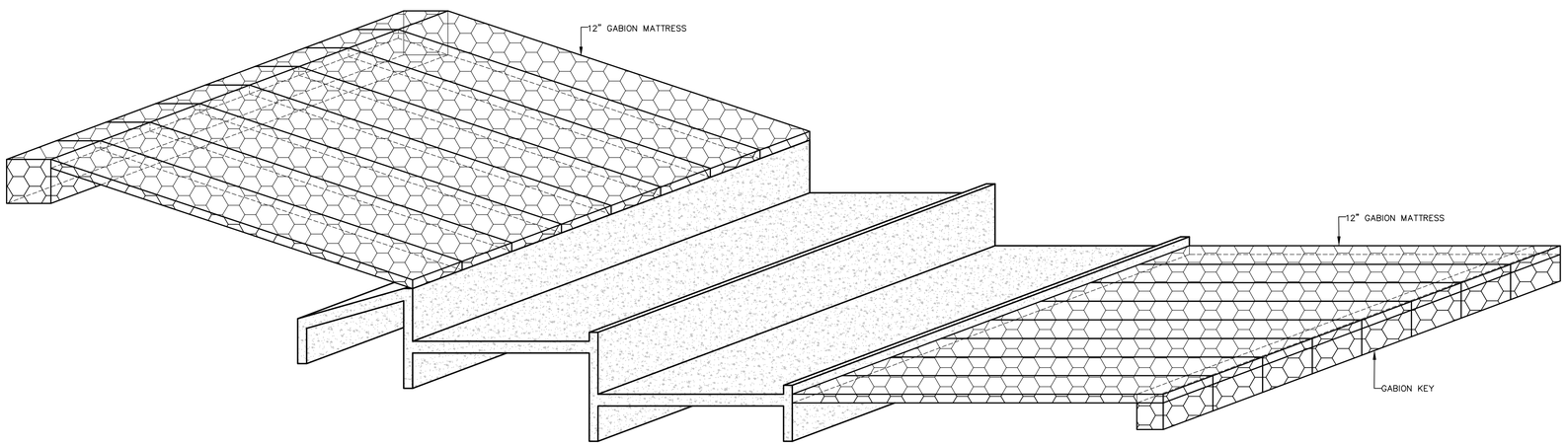


NOTE:
SEE CONNECTION DETAIL 4 THIS SHEET

DETAIL "A"
SCALE: 1"=2'



1 C10.2 GABION MATTRESS FOR CONCRETE WEIR
SCALE: 1"=4'



2 C10.2 GABION MATTRESS FOR CONCRETE WEIR ISOMETRIC
SCALE: 1"=4'

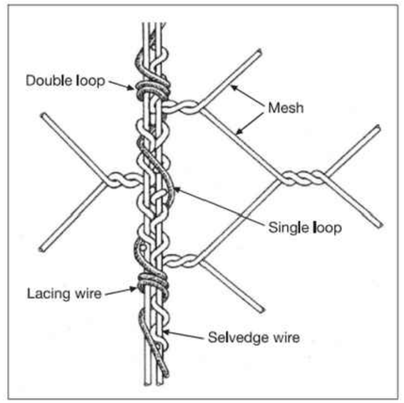
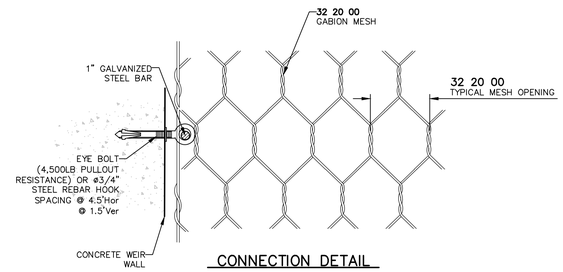


Figure 40 - Link Gabion and Mattress lacing technique.

6.3.2 Joining/connection techniques

Where a connection is to be made, the traditional manner is to take a piece of tie wire and lace it in and out of the mesh openings at approximately 150 mm centres in a continuous manner, alternating between a single loop and a double loop around the selvedge wire (see Figure 40).

3 C10.2 GABION BASKET/MATTRESS CONNECTION
SCALE: 1"=1'



CONNECTION DETAIL

4 C10.2 GABION BASKET/MATTRESS CONNECTION
SCALE: 1"=2'

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DESIGNED	DRAWN	CHECKED	DATE
F.S.	E.G./E.C.	M.M./B.K.	09/30/2021

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

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9601 McAllister Freeway #207, San Antonio TX 78216 (210) 314-3553
Texas Board of Professional Engineers Registration No. F-000554

NE ASR ENHANCED ARROYO PHASE I

DRAINAGE STRUCTURE DETAILS

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JOB NO. 20-110
SEQUENCE NO. 3 OF 3
SHEET NO. C10.2

F:\20110\DWG\11_20110 - C10.2_DWG_Drainage Structure Details.dwg Time:Dec03,2021-02:13pm Login:edgar

SECTION 14
BLOCK 81, TOWNSHIP 1,
TEXAS & PACIFIC RAILWAY
COMPANY SURVEYS

SECTION 13
BLOCK 81, TOWNSHIP 1,
TEXAS AND PACIFIC RAILWAY
COMPANY SURVEYS

TRACT 9
FSW INVESTMENTS II, LP
DOC. NO. 20200026017
E.P.C.D.R.

FOUND 1/2" REBAR W/CAP "TX 5337" (SECTION CORNER)

WATERLINE A
NEW 24"ø D.I.P.
SEE SHEET C12.0
L=900'

WATERLINE A
NEW 24"ø AND 20"ø D.I.P.
SEE SHEET C12.1
L=900'

WATERLINE A
NEW 20"ø D.I.P. AND 16"ø P.V.C.
SEE SHEET C12.2
L=900'

WATERLINE A
NEW 16"ø P.V.C.
SEE SHEET C12.3
L=900'

WATERLINE A
NEW 16"ø P.V.C.
SEE SHEET C12.4
L=610'

SEE SHEET C12.5

NE ASR ENHANCED ARROYO PHASE I
P.S.B. R.O.W. ARROYO PARCEL 3A

275'

PAINTED DUNES
NORTH–2

FOUND IRON PIPE
(SECTION CORNER)

McCOMBS STREET

PAINTED DUNES
SOUTH–2

TRACT 3A
FSW INVESTMENTS V, LP
DOC. NO. 20200026011
E.P.C.D.R.

SECTION 19
BLOCK 81, TOWNSHIP 1,
TEXAS & PACIFIC RAILWAY
COMPANY SURVEYS

SECTION 20
BLOCK 81, TOWNSHIP 1,
TEXAS AND PACIFIC RAILWAY
COMPANY SURVEYS

GRAPHIC SCALE
200' 0 100' 200' 400'
SCALE: 1"=200'

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REV.	DATE	BY	DESCRIPTION

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1–800–344–8377
FOR FIELD LOCATING EXISTING UTILITIES

ENGINEER'S SEAL
STATE OF TEXAS
BRIAN J. KLAES
94659
LICENSED
PROFESSIONAL ENGINEER
12.15.2021

DESIGNED S.T.
DRAWN A.B.
CHECKED B.J.K.
DATE 12/15/2021

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594–5500

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Texas Board of Professional Engineers Registration No. F-000554

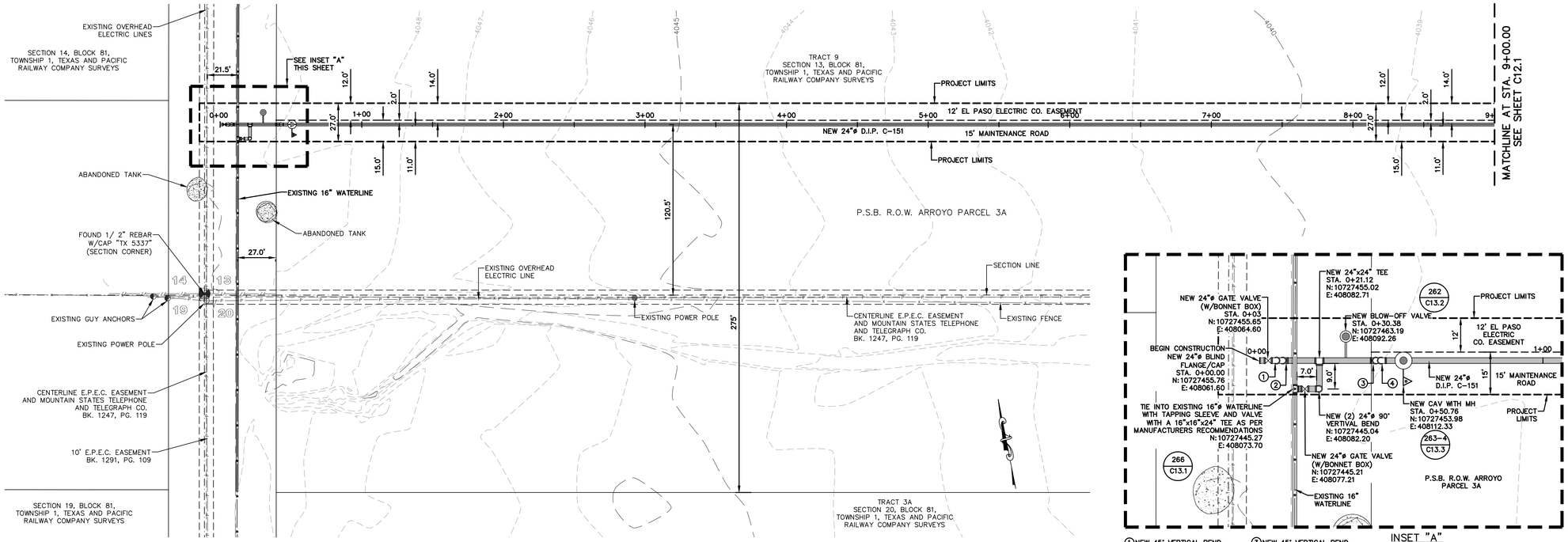
NE ASR ENHANCED ARROYO PHASE I

WATERLINE PLAN

THESE CONTRACT DOCUMENTS HAVE BEEN PREPARED SPECIFICALLY AND EXCLUSIVELY FOR THE DESIGN OF
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JOB NO. 20–110
SHEET 1 OF 1
SHEET NO. C11.0

Filename:F:\2019\DWG\12_20110 – C11.0_DWG_OVERALL WATERLINE PLAN.DWG
Plot Date:12/8/2021 2:53:23 PM By:Arturo Barragan



INSET "A"
SCALE: 1"=20'

① NEW 45° VERTICAL BEND
STA. 0+06
N: 10727455.56
E: 408067.30

② NEW 45° VERTICAL BEND
STA. 0+09
N: 10727455.44
E: 408071.10

③ NEW 45° VERTICAL BEND
STA. 0+40
N: 10727454.37
E: 408101.20

④ NEW 45° VERTICAL BEND
STA. 0+43
N: 10727454.25
E: 408104.58

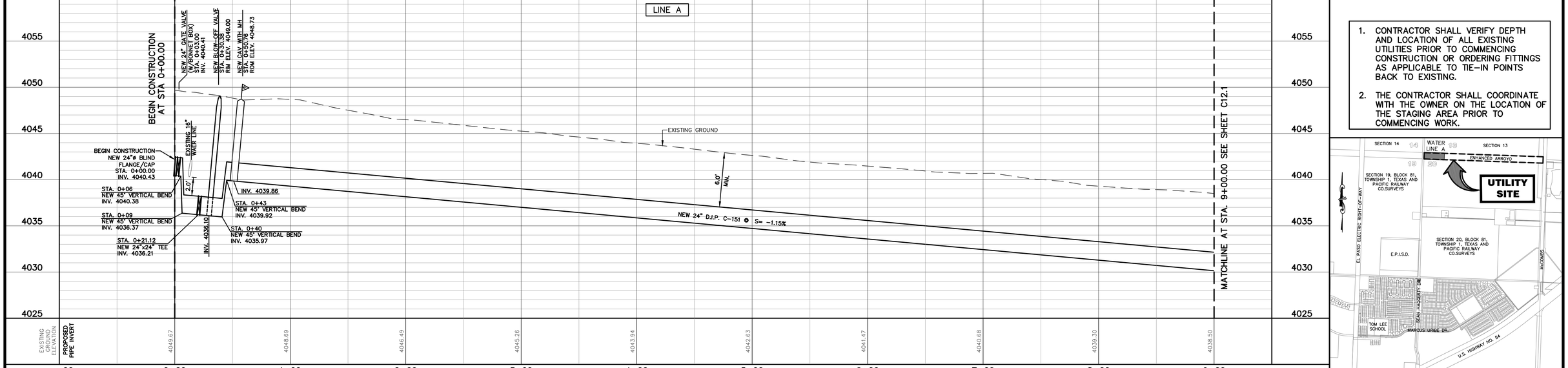
LEGEND

SYMBOL	DESCRIPTION
NEW D.I.P. SIZE VARIES	NEW D.I.P. (PLAN VIEW)
	EXISTING WATER LINE (PLAN VIEW)
	NEW CAP/PLUG
	NEW GATE VALVE (W/MOV)
	NEW TEE
	NEW 45° BEND
	EXISTING SECTION CORNER
	EXISTING POWER POLE
	EXISTING GUY ANCHOR
	TRACT/LOT LINE
	RIGHT-OF-WAY LINE
	EASEMENT LINE
	SECTION LINE
	GAS LINE
	OVERHEAD ELECTRIC LINE
	CHAINLINK FENCE
4040	1' CONTOUR INTERVAL
4039	5' CONTOUR INTERVAL
19	SECTION NUMBER

LEGEND

SYMBOL	DESCRIPTION
	NEW D.I.P. C-151 (PROFILE VIEW)
	NEW TEE (PROFILE VIEW)
	NEW GATE VALVE (PROFILE VIEW)
	NEW BEND (PROFILE VIEW)
	GATE VALVE WITH MANHOLE (PROFILE VIEW)

1. CONTRACTOR SHALL VERIFY DEPTH AND LOCATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION OR ORDERING FITTINGS AS APPLICABLE TO TIE-IN POINTS BACK TO EXISTING.
2. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER ON THE LOCATION OF THE STAGING AREA PRIOR TO COMMENCING WORK.



KEYMAP
SCALE: 1"=2000'

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HORIZONTAL 40 0 VERTICAL 0 5

REV.	DATE	BY	DESCRIPTION

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DESIGNED S.T.
DRAWN A.B.
CHECKED B.J.K.
DATE 09/30/2021

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

CONSULTANT
PLANNING•ENGINEERING•PROJECT MANAGEMENT
MCi Moreno Cardenas Inc.
EL PASO · SAN ANTONIO
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9601 McAllister Freeway #507, San Antonio TX 78216 (210) 314-3553
Texas Board of Professional Engineers Registration No. F-000554

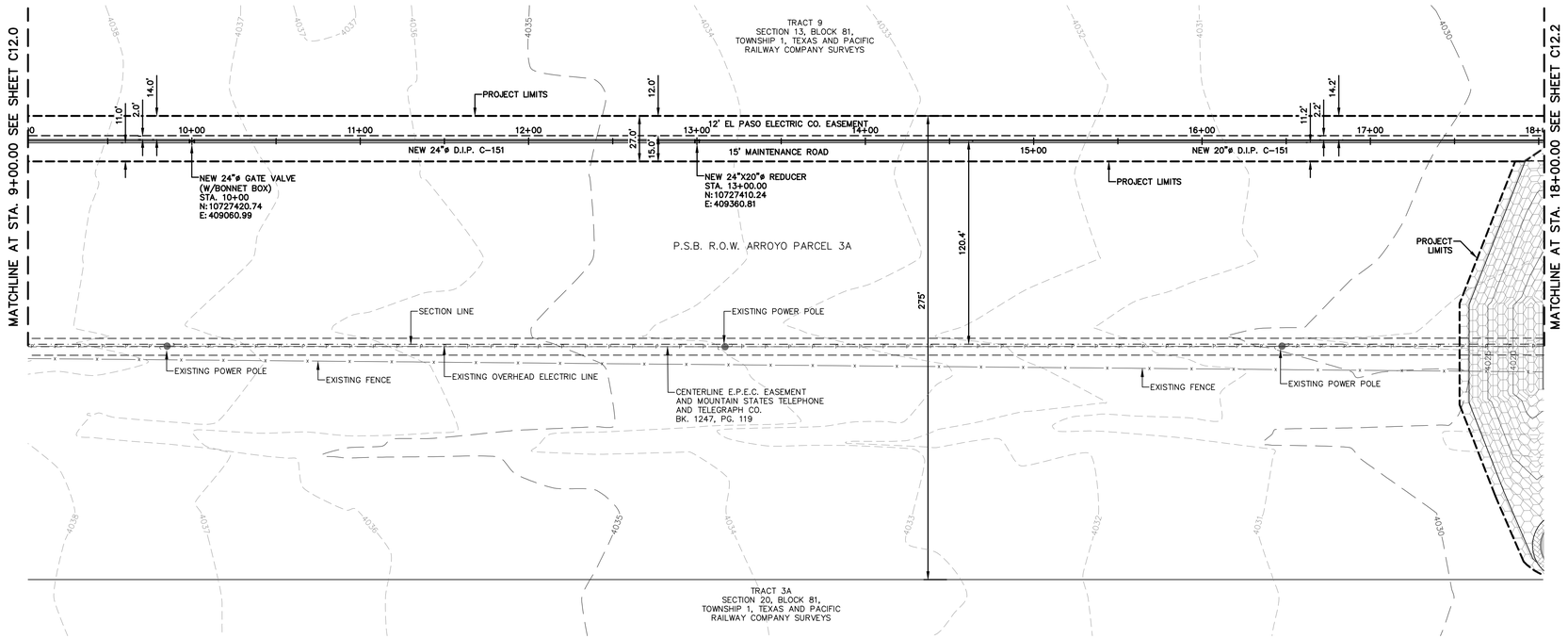
NE ASR ENHANCED ARROYO PHASE I

WATERLINE A
STA. 0+00.00 – STA. 9+00.00

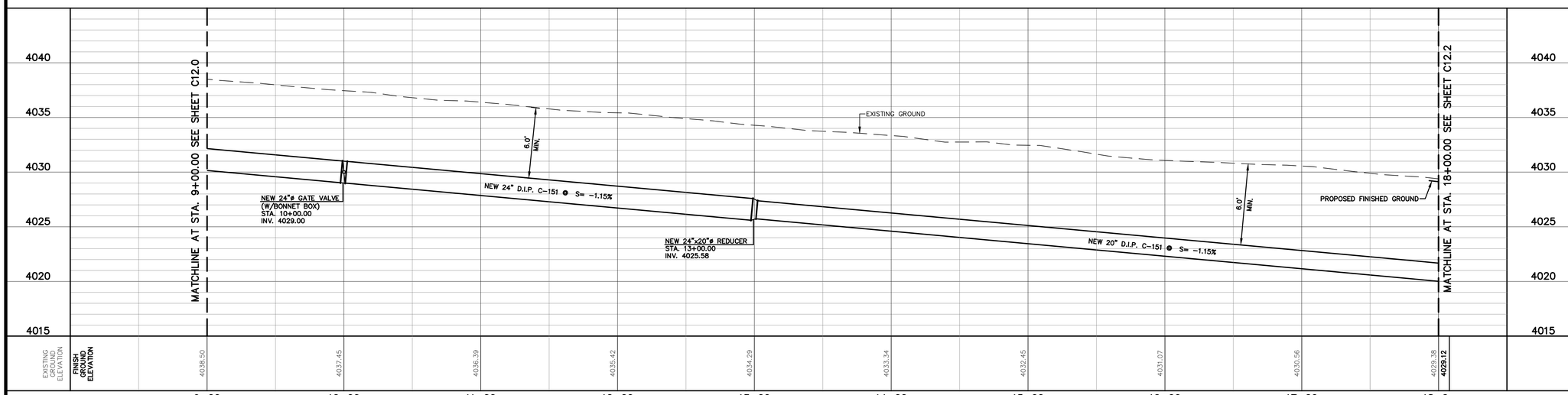
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JOB NO. 20-110
SHEET 1 OF 5
SHEET NO. C12.0

Filename:F:\20110\DWG\13_20110 - C12.0-C12.4_DWG_WATERLINE PLAN & PROFILE.DWG
Plot Date:12/6/2021 2:32:56 PM By:Arturo Barragan



LINE A



HORIZONTAL 40 0 0 5 VERTICAL

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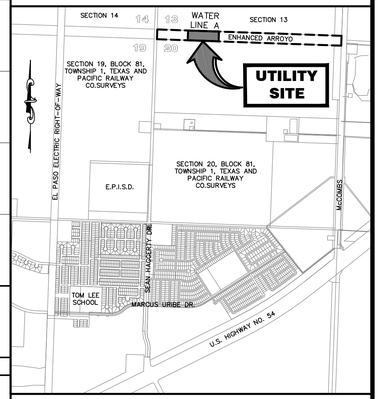
LEGEND

SYMBOL	DESCRIPTION
NEW D.I.P. SIZE VARIES	NEW D.I.P. C-151 (PLAN VIEW)
	EXISTING WATER LINE (PLAN VIEW)
	NEW CAP/PLUG
	NEW GATE VALVE (W/MOV)
	NEW TEE
	NEW 45° BEND
	EXISTING SECTION CORNER
	EXISTING POWER POLE
	EXISTING GUY ANCHOR
	TRACT/LOT LINE
	RIGHT-OF-WAY LINE
	EASEMENT LINE
	SECTION LINE
	GAS LINE
OE OE	OVERHEAD ELECTRIC LINE
X X	CHAINLINK FENCE
4040	1' CONTOUR INTERVAL
4039	5' CONTOUR INTERVAL
19	SECTION NUMBER

LEGEND

SYMBOL	DESCRIPTION
D.I.P. C-151	NEW D.I.P. C-151 (PROFILE VIEW)
	NEW TEE – SIZES VARIES (PROFILE VIEW)
	NEW GATE VALVE – SIZES VARIES (PROFILE VIEW)
	NEW BEND – SIZES VARIES (PROFILE VIEW)
	GATE VALVE WITH MANHOLE (PROFILE VIEW)

1. CONTRACTOR SHALL VERIFY DEPTH AND LOCATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION OR ORDERING FITTINGS AS APPLICABLE TO TIE-IN POINTS BACK TO EXISTING.
2. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER ON THE LOCATION OF THE STAGING AREA PRIOR TO COMMENCING WORK.



KEYMAP
SCALE: 1"=2000'

REV.	DATE	BY	DESCRIPTION

WARNING ! BEFORE YOU DIG
CALL
1-800-DIG-TESS
1-800-344-8377
FOR FIELD LOCATING EXISTING UTILITIES

ENGINEER'S SEAL
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DESIGNED	S.T.
DRAWN	A.B.
CHECKED	B.J.K.
DATE	09/30/2021

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

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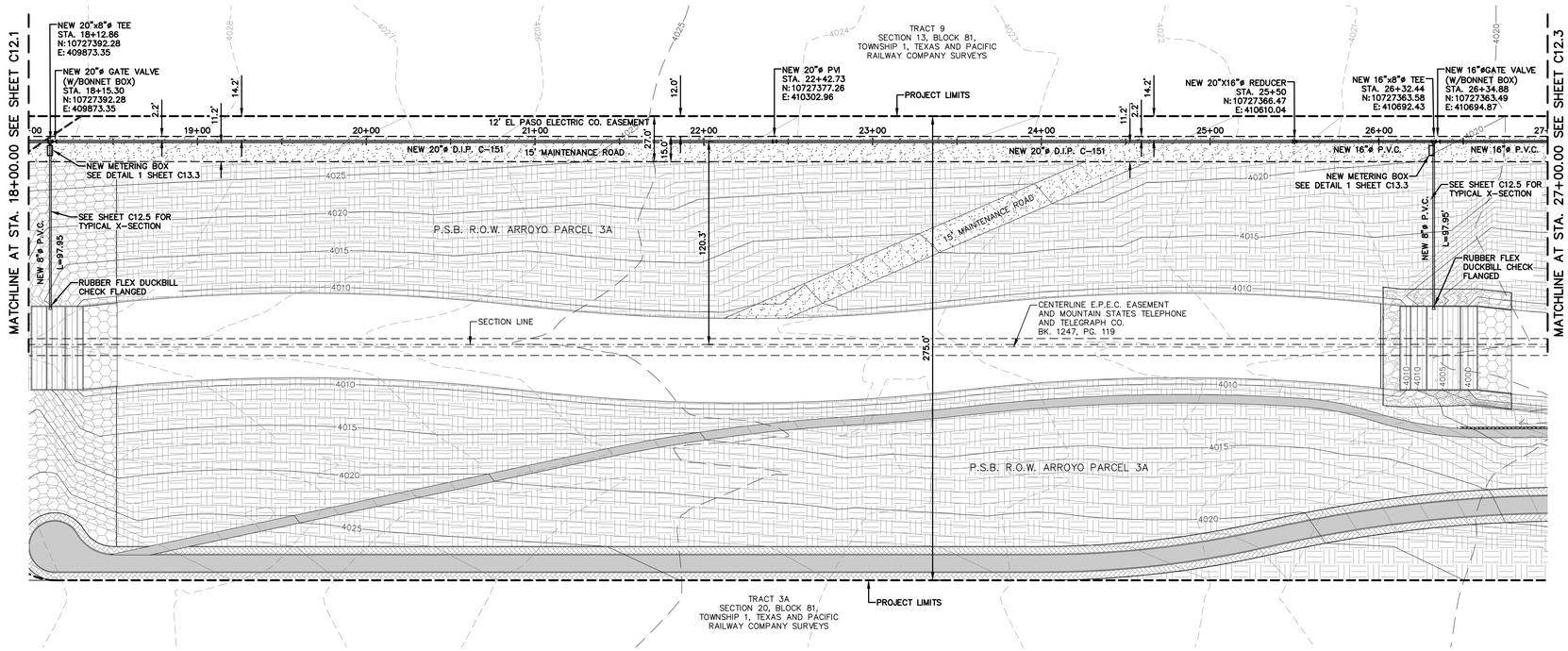
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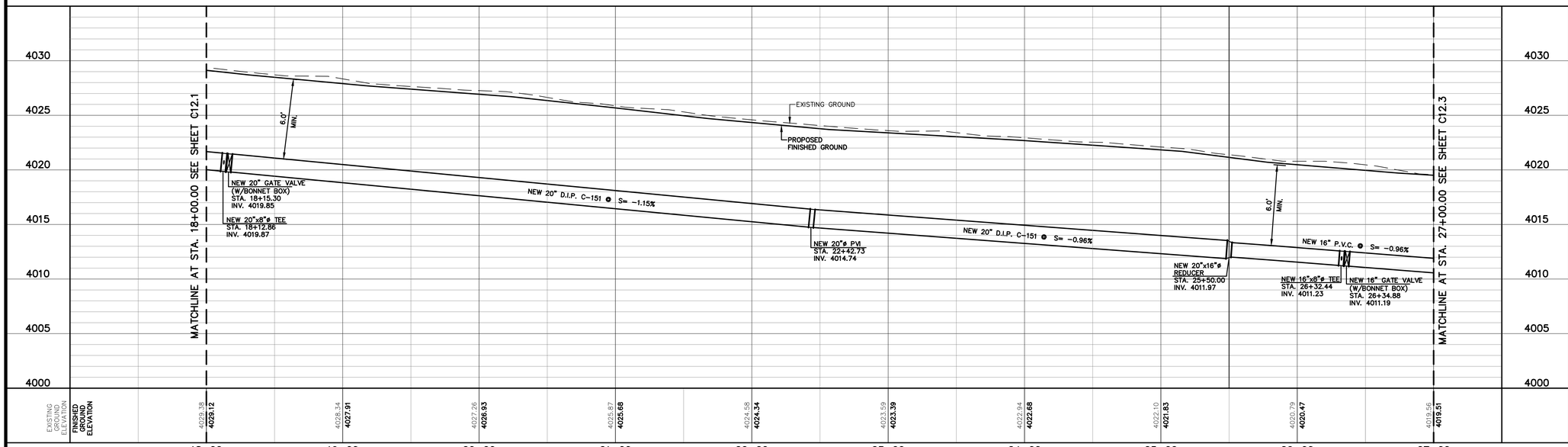
WATERLINE A
STA. 9+00.00 – STA. 18+00.00

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JOB NO.	20-110
SHEET	2 OF 5
SHEET NO.	C12.1

Filename:F:\2010\01WC\13_20110 - C12.0-C12.4_DWG_WATERLINE PLAN & PROFILE.DWG
Plot Date:12/6/2021 2:34:13 PM By:Arturo Barragan





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HORIZONTAL 40 0 VERTICAL 0 5

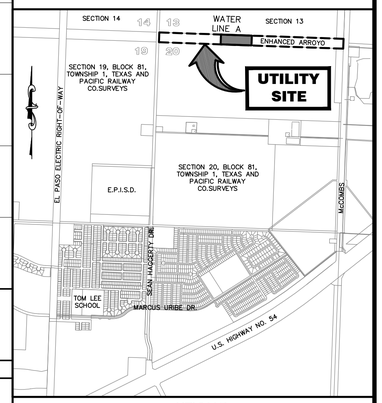
LEGEND

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NEW D.I.P. SIZE VARIES	NEW D.I.P. C-151 (PLAN VIEW)
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	NEW CAP/PLUG
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4040	1' CONTOUR INTERVAL
4039	5' CONTOUR INTERVAL
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LEGEND

SYMBOL	DESCRIPTION
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	NEW TEE – SIZES VARIES (PROFILE VIEW)
	NEW GATE VALVE – SIZES VARIES (PROFILE VIEW)
	NEW BEND – SIZES VARIES (PROFILE VIEW)
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KEYMAP
SCALE: 1" = 2000'

REV.	DATE	BY	DESCRIPTION

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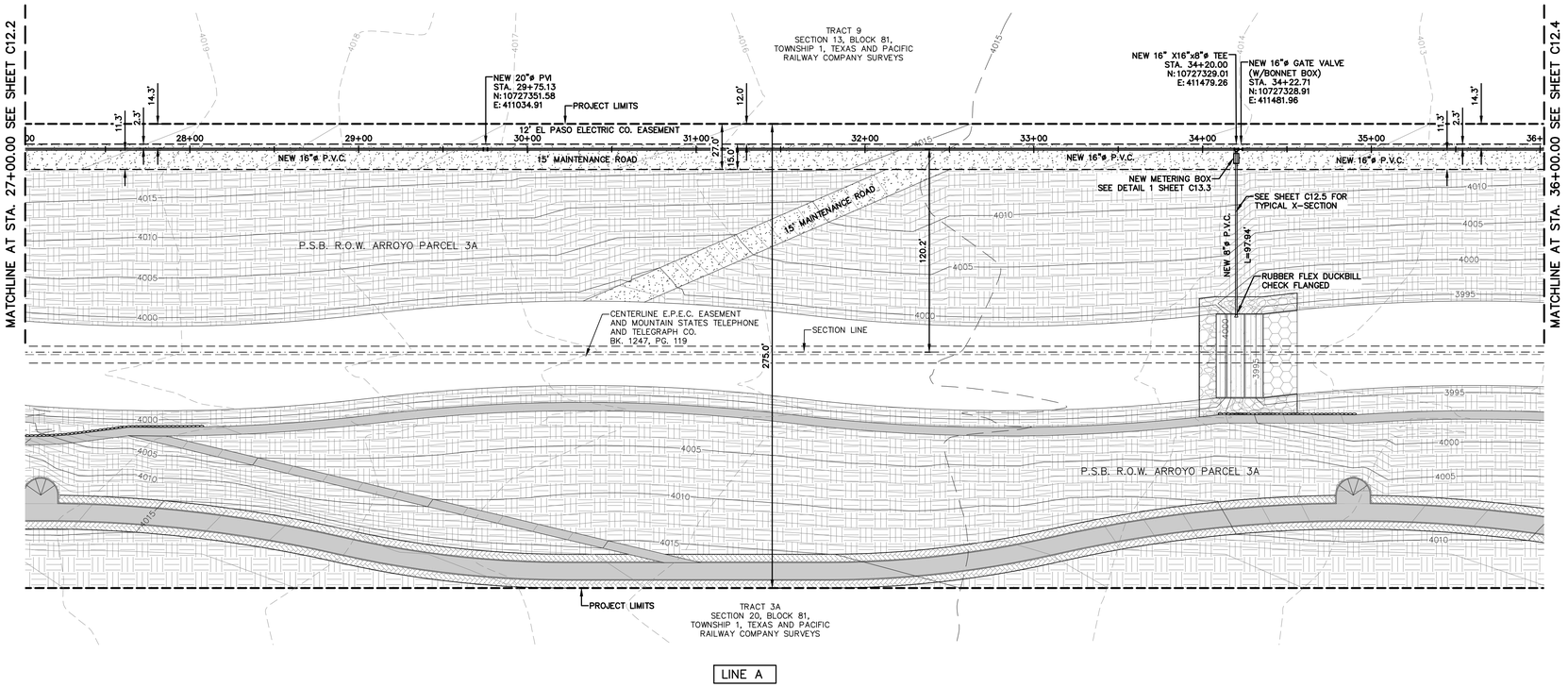
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WATERLINE A
STA. 18+00.00 – STA. 27+00.00

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JOB NO. 20-110
SHEET 3 OF 5
SHEET NO. C12.2

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Plot Date:12/6/2021 2:36:03 PM By:Arturo Barragan



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HORIZONTAL 40 0 VERTICAL 0 5

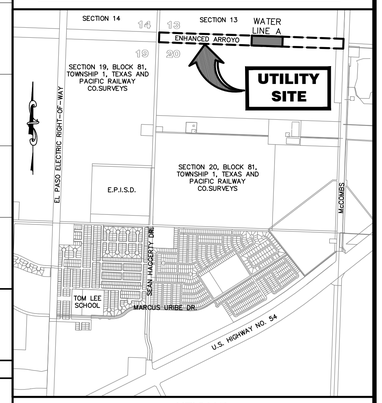
LEGEND

SYMBOL	DESCRIPTION
NEW D.I.P. SIZE VARIES	NEW D.I.P. C-151 (PLAN VIEW)
	EXISTING WATER LINE (PLAN VIEW)
	NEW CAP/PLUG
	NEW GATE VALVE (W/MOV)
	NEW TEE
	NEW 45° BEND
	EXISTING SECTION CORNER
	EXISTING POWER POLE
	EXISTING GUY ANCHOR
	TRACT/LOT LINE
	RIGHT-OF-WAY LINE
	EASEMENT LINE
	SECTION LINE
	GAS LINE
OE OE	OVERHEAD ELECTRIC LINE
X X	CHAINLINK FENCE
4040	1' CONTOUR INTERVAL
4039	5' CONTOUR INTERVAL
19	SECTION NUMBER

LEGEND

SYMBOL	DESCRIPTION
D.I.P. C-151	NEW D.I.P. C-151 (PROFILE VIEW)
	NEW TEE - SIZES VARIES (PROFILE VIEW)
	NEW GATE VALVE - SIZES VARIES (PROFILE VIEW)
	NEW BEND - SIZES VARIES (PROFILE VIEW)
	GATE VALVE WITH MANHOLE (PROFILE VIEW)

CONTRACTOR SHALL VERIFY DEPTH AND LOCATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION OR ORDERING FITTINGS AS APPLICABLE TO TIE-IN POINTS BACK TO EXISTING.



KEYMAP
SCALE: 1" = 2000'

REV.	DATE	BY	DESCRIPTION

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1-800-344-8377
FOR FIELD LOCATING EXISTING UTILITIES

ENGINEER'S SEAL
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DESIGNED S.T.
DRAWN A.B.
CHECKED B.J.K.
DATE 09/30/2021

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

CONSULTANT
PLANNING•ENGINEERING•PROJECT MANAGEMENT
MCi MORENO Cardenas Inc.
EL PASO • SAN ANTONIO
2505 E. Missouri Ave. El Paso, TX 79903 (915) 532-2091
9601 McAllister Freeway #507, San Antonio TX 78216 (210) 314-3553
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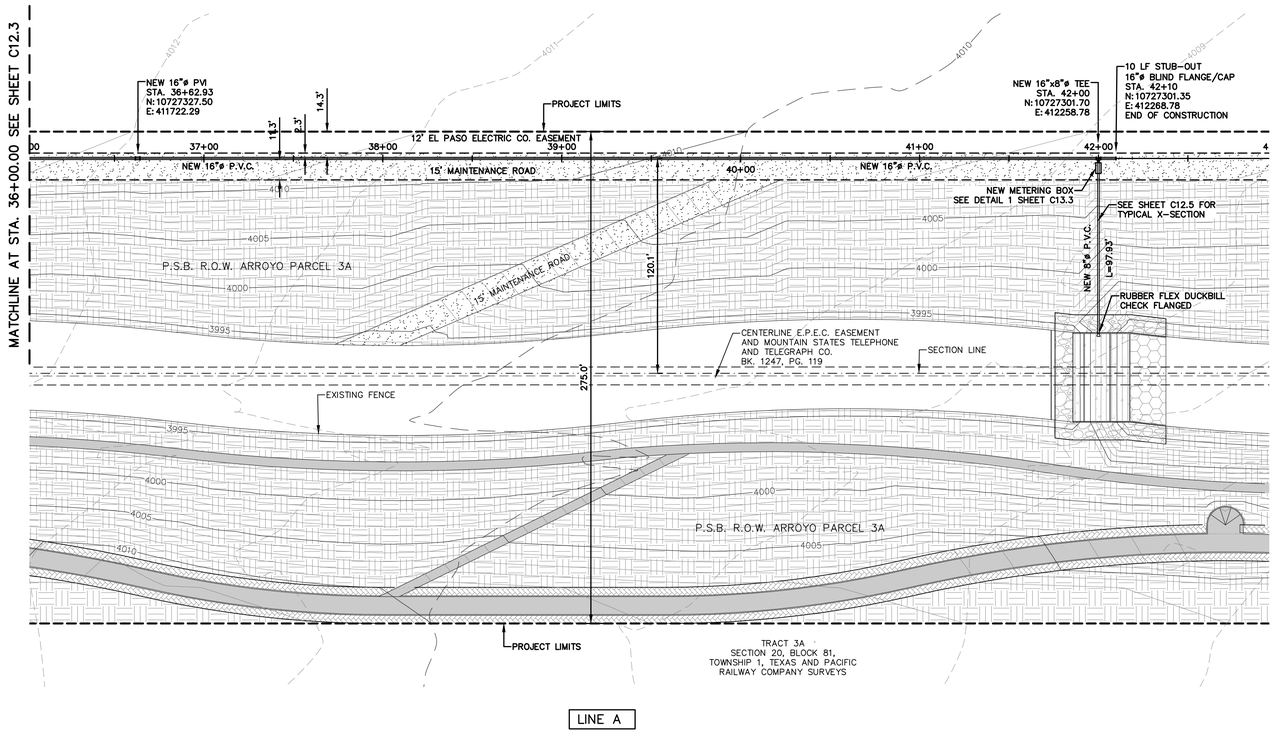
NE ASR ENHANCED ARROYO PHASE I

WATERLINE A
STA. 27+00.00 - STA. 36+00.00

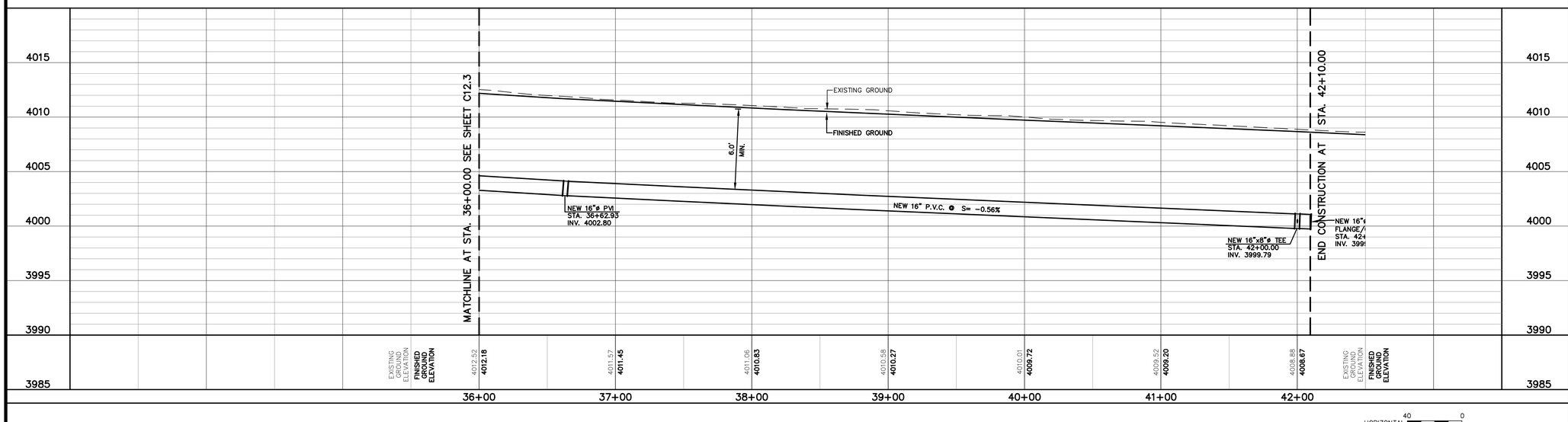
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JOB NO. 20-110
SHEET 4 OF 5
SHEET NO. C12.3

Filename:F:\20110\DWG\13_20110 - C12.0-C12.4_DWG_WATERLINE PLAN & PROFILE.DWG
Plot Date:12/6/2021 2:38:19 PM By:Arturo Borrogan



LINE A



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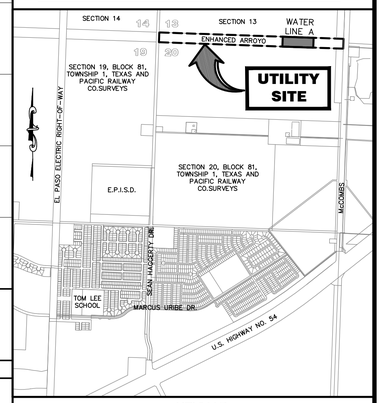
LEGEND

SYMBOL	DESCRIPTION
NEW D.I.P. SIZE VARIES	NEW D.I.P. C-151 (PLAN VIEW)
	EXISTING WATER LINE (PLAN VIEW)
	NEW CAP/PLUG
	NEW GATE VALVE (W/MOV)
	NEW TEE
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	EXISTING GUY ANCHOR
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	GAS LINE
OE OE	OVERHEAD ELECTRIC LINE
X X	CHAINLINK FENCE
4040	1' CONTOUR INTERVAL
4039	5' CONTOUR INTERVAL
19	SECTION NUMBER

LEGEND

SYMBOL	DESCRIPTION
D.I.P. C-151	NEW D.I.P. C-151 (PROFILE VIEW)
	NEW TEE - SIZES VARIES (PROFILE VIEW)
	NEW GATE VALVE - SIZES VARIES (PROFILE VIEW)
	NEW BEND - SIZES VARIES (PROFILE VIEW)
	GATE VALVE WITH MANHOLE (PROFILE VIEW)

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KEYMAP
SCALE: 1" = 2000'

HORIZONTAL 40 0 VERTICAL 0 5

REV.	DATE	BY	DESCRIPTION

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DESIGNED	DRAWN	CHECKED	DATE
S.T.	A.B.	B.J.K.	09/30/2021

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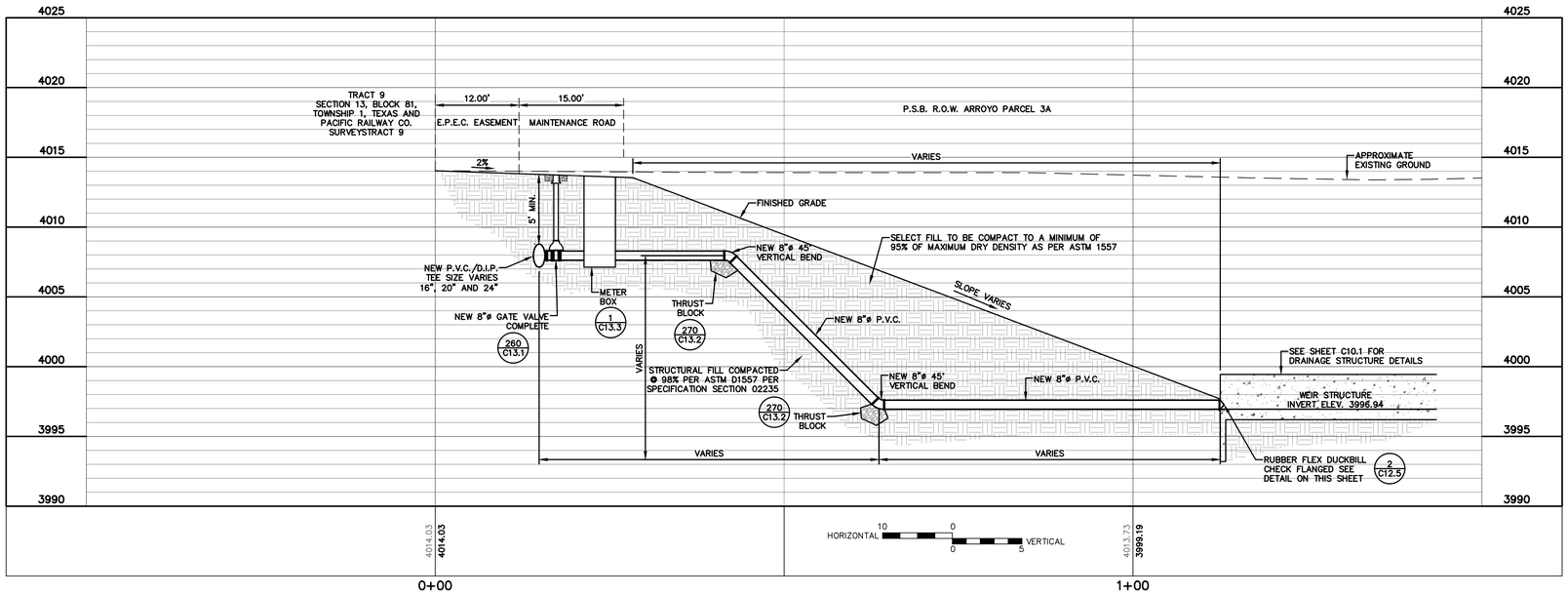
NE ASR ENHANCED ARROYO PHASE I

WATERLINE A
STA. 36+00.00 - STA. 42+10.00

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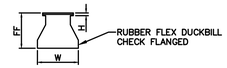
JOB NO.	SHEET	SHEET NO.
20-110	5 OF 5	C12.4

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Plot Date:12/6/2021 2:45:00 PM By:Arturo Barragan



1 C12.5 **TYPICAL SECTION**
SCALE: AS SHOWN

SERIES RF–DBF					
RUBBER FLEX DUCKBILL CHECK VALVE FLANGE STYLE					
SIZE ID	F/F	H	W	WT. LBS	
8"	14"	1 3/8"	13 3/4"	25	SECTION



2 C12.5 **RUBBER FLEX DUCKBILL CHECK FLANGED DETAIL**

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REV.	DATE	BY	DESCRIPTION

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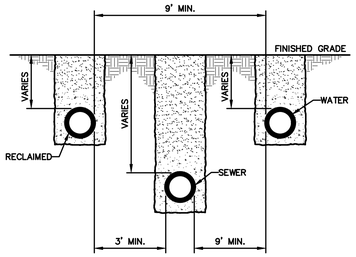
NE ASR ENHANCED ARROYO PHASE I

TYPICAL SECTION

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JOB NO. 20–110
SHEET 1 OF 1
SHEET NO. C12.5

Filename:F:\2010\DWG\14_20110 - C12.5_DWG_WATERLINE SECTION.DWG
Plot Date:12/6/2021 2:43:08 PM By:Arturo Barragan

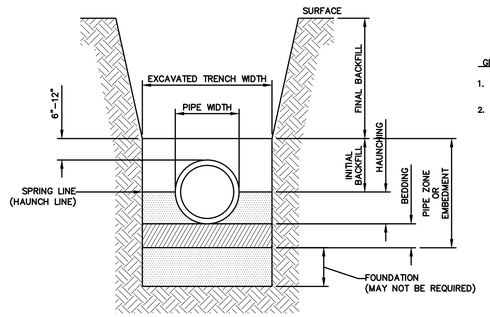


SECTION

GENERAL NOTES:

1. SEPARATION DISTANCES SHALL FOLLOW TEXAS COMMISSION ON ENVIRONMENTAL QUALITY STANDARD REQUIREMENTS.
2. MINIMUM SEPARATION DISTANCES SHOWN. IF CONDITIONS DO NOT ALLOW FOR INDICATED DISTANCES REFER TO DETAILS 161, 162 & 163.
3. RECLAIMED WATER LINE AT OR ABOVE SEWER LINE.

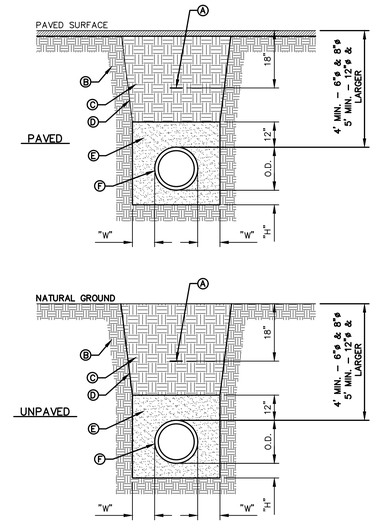
STANDARD DETAIL	DATE: 8/3/2006 REV: 3/28/2007	SEPARATION DISTANCE POTABLE WATER, SANITARY SEWER AND RECLAIMED WATER	N.T.S.	el paso WATER	DETAIL No. 160



GENERAL NOTES:

1. DETAIL DRAWING TERMINOLOGY IS IN ACCORDANCE WITH ASTM D-2321.
2. UNLESS OTHERWISE PERMITTED BY THE ENGINEER. ALL MATERIAL IN THE EMBEDMENT ZONE SHALL BE HOMOGENOUS.

STANDARD DETAIL	DATE: 11/1992 REV: 3/28/2007	TRENCH CROSS SECTION TERMINOLOGY	N.T.S.	el paso WATER	DETAIL No. 170



GENERAL NOTES:

1. BEDDING FOR PRESSURE AND GRAVITY PIPE IN DRY CONDITIONS.
2. PROVIDE TRENCH SAFETY SYSTEM FOR TRENCH DEPTHS GREATER THAN 5 FEET.
3. IF THE NATIVE MATERIAL EXCAVATED FROM THE TRENCH IS UNSUITABLE AS BACKFILL MATERIAL, OR THE REQUIRED COMPACTION IS UNATTAINABLE, THE CONTRACTOR SHALL, AT HIS EXPENSE, IMPORT SELECT MATERIAL TO BE MIXED WITH OR USED IN PLACE OF THE NATIVE MATERIAL. SELECT MATERIAL MUST BE APPROVED BY EPWU. SUBSTITUTE SOIL CEMENT SLURRY (1-SACK) IF REQUIRED IN SPECS.

CONSTRUCTION KEY NOTES:

A. APPROVED MARKING TAPE.

B. UNDISTURBED STABLE MATERIAL.

C. NATIVE MATERIAL BACKFILL.
PAVED CONDITION: COMPACT TO 90% DENSITY PER ASTM D-1557 MODIFIED PROCTOR.
UNPAVED CONDITION: COMPACT TO 85% DENSITY PER ASTM D-1557 MODIFIED PROCTOR.
(*SEE NOTE #3 IF THESE PREVIOUS CONDITIONS CANNOT BE MET.)

D. SLOPE TRENCH IN SANDY SOIL CONDITIONS.

E. USE CLASS II OR CLASS III SAND PER ASTM D-2487. NATIVE MATERIAL OR IMPORTED SELECT MATERIAL MEETING OR EXCEEDING THIS REQUIREMENT MAY BE USED. COMPACT TO 85% DENSITY PER ASTM D-1557 MODIFIED PROCTOR (OR 90% D-698 STANDARD PROCTOR).

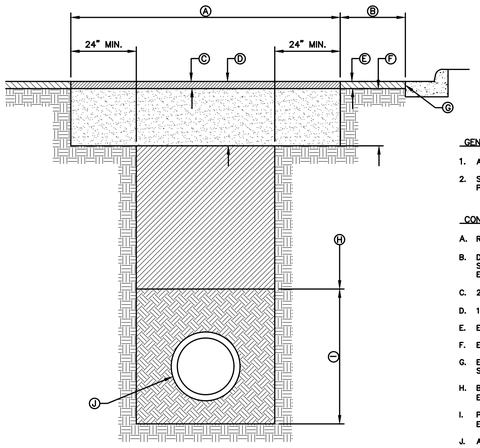
F. APPROVED PIPE.

G. TRENCH DIMENSIONS AS FOLLOWS:

PIPE DIAMETER	"H"
6" - 30"	4"
GREATER THAN 30"	6"

PIPE DIAMETER	"W"
6" - 30"	8"
GREATER THAN 30"	12"

STANDARD DETAIL	DATE: 4/24/2007 REV: 2/21/2011	EMBEDMENT CLASS "A" FOR PRESSURE PIPE AND GRAVITY PIPE DRY CONDITIONS	N.T.S.	el paso WATER	DETAIL No. 171



GENERAL NOTES:

1. ALL ASPHALT CUTS MUST BE SAW CUT.
2. SOIL CEMENT SLURRY SHALL BE ALLOWED TO CURE BEFORE PAVING OR OPENING TO ALL TRAFFIC.

CONSTRUCTION KEY NOTES:

A. REFER TO SPECS FOR LIMIT OF PAVING WIDTH.

B. DIMENSION VARIES. WHERE GUTTER FACE, ETC. IS WITHIN 3' OF SAW CUT EDGE, CONTRACTOR SHALL REMOVE & REPLACE EXISTING HMAC IN THIS AREA.

C. 2" ASPHALT MIN.

D. 12" THICK SOIL CEMENT BACKFILL (2 SACK PER C.Y. OF SOIL).

E. EXISTING HMAC-THICKNESS MAY VARY.

F. EXISTING BASE COURSE-THICKNESS MAY VARY.

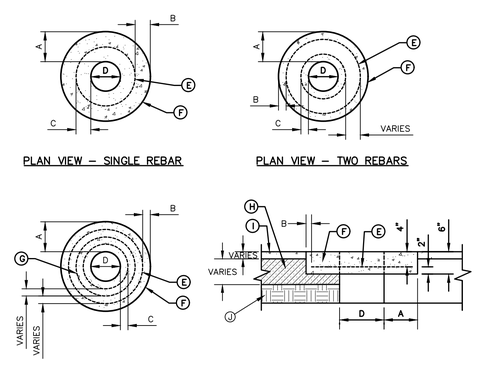
G. EXISTING GUTTER FACE, EDGE OF PAVEMENT OR BEGINNING OF SHOULDER.

H. BACKFILL DEPTH VARIES, REFER TO REQUIREMENTS LISTED IN EMBEDMENT DETAILS (DETAIL 171 THRU DETAIL 173).

I. PIPE BEDDING AS SPECIFIED, REFER TO APPROPRIATE EMBEDMENT DETAIL (DETAIL 171 THRU DETAIL 173).

J. APPROVED PIPE.

STANDARD DETAIL	DATE: 10/1992 REV: 5/9/2011	PAVEMENT REPLACEMENT DETAIL	N.T.S.	el paso WATER	DETAIL No. 179



PLAN VIEW - SINGLE REBAR

PLAN VIEW - TWO REBARS

PLAN VIEW - THREE REBARS

SECTION VIEW - ASPHALT JUNCTURE

GENERAL NOTES:

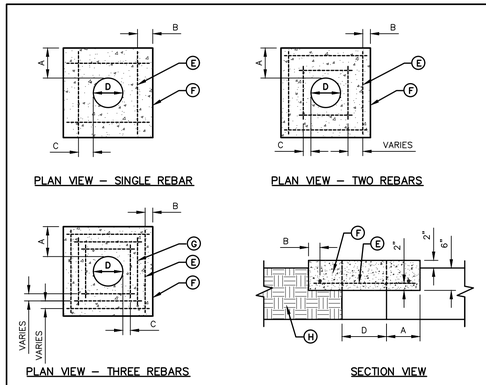
1. THE CONCRETE COLLAR SHOULD BE CAST IN-PLACE CONCRETE. (MINIMUM 28 DAY COMPRESSIVE STRENGTH 4000 PSI HIGH EARLY CONCRETE IS REQUIRED).
2. TOPS OF CONCRETE COLLAR SHALL BE FLUSH WITH ROADWAY SURFACE OR FINISHED GRADE UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
3. ANY DISTURBED SUBGRADE UNDER THE CONCRETE COLLAR SHALL BE COMPACTED TO 95% DENSITY ± 3% OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH ASTM D-1557.
4. ANY DISTURBED BASE COARSE UNDER THE CONCRETE COLLAR SHALL BE COMPACTED TO 100% DENSITY ± 2% OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH ASTM D-1557.
5. PROVIDE A MINIMUM OF 1 1/2" OF CONCRETE COVER FOR ALL REINFORCEMENT STEEL.
6. REINFORCING SHALL MEET ASTM C-478 AND TRAFFIC LOADING (HS-20).
7. NO. 3 REINFORCING STEEL HOOPS SHALL BE SPACED EQUALLY.

CONSTRUCTION KEY NOTES:

E. #3 REINFORCING STEEL TYP.
F. CONCRETE COLLAR.
G. #3 REINFORCING STEEL EQUALLY SPACED.
H. COMPACTED BASE COARSE.
I. PAVEMENT.
J. COMPACTED SUBGRADE.

"D" DIAMETER OF PENETRATION	NUMBER OF #3 REINFORCING STEEL BARS	"A" MINIMUM CONCRETE HORIZONTAL DIMENSION FROM PENETRATION	"B" MINIMUM CLEARANCE FROM EDGE OF CONCRETE APRON TO CENTER OF NEAREST REBAR	"C" MINIMUM CLEARANCE FROM PENETRATION EDGE TO CENTER OF NEAREST REBAR
0" TO 6"	1	6"	1½"	1½"
6.1" TO 18"	2	8"	1½"	1½"
18.1" AND OVER	3	12"	1½"	1½"

STANDARD DETAIL	DATE: 8/9/2006 REV: 5/11/2017	CONCRETE COLLAR INSTALLATION IN PAVED AREAS	N.T.S.	el paso WATER	DETAIL No. 184-1



PLAN VIEW - SINGLE REBAR

PLAN VIEW - TWO REBARS

PLAN VIEW - THREE REBARS

SECTION VIEW

GENERAL NOTES:

1. THE CONCRETE APRON SHOULD BE CAST IN-PLACE CONCRETE. (MINIMUM 28 DAY COMPRESSIVE STRENGTH 4000 PSI. HIGH EARLY CONCRETE IS REQUIRED).
2. TOPS OF CONCRETE APRON SHALL BE FLUSH WITH ROADWAY SURFACE OR FINISHED GRADE UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
3. PROVIDE A MINIMUM OF 1 1/2" OF CONCRETE COVER FOR ALL REINFORCEMENT STEEL.
4. REINFORCING SHALL MEET ASTM C-478 AND TRAFFIC LOADING (HS-20).
5. NO. 3 REBARS SPACED EQUALLY MAY BE LAP TIED OR SQUARE HOOPS.

CONSTRUCTION KEY NOTES:

E. #3 REINFORCING STEEL TYP.
F. CONCRETE APRON.
G. #3 REINFORCING STEEL EQUALLY SPACED.
H. COMPACTED BACKFILL.

"D" DIAMETER OF PENETRATION	NUMBER OF #3 REINFORCING STEEL BARS	"A" MINIMUM CONCRETE HORIZONTAL DIMENSION FROM PENETRATION	"B" MINIMUM CLEARANCE FROM EDGE OF CONCRETE APRON TO CENTER OF NEAREST REBAR	"C" MINIMUM CLEARANCE FROM PENETRATION EDGE TO CENTER OF NEAREST REBAR
0" TO 6"	1	4"	1½"	4½"
6.1" TO 18"	2	6"	1½"	1½"
18.1" AND OVER	3	8"	1½"	1½"

STANDARD DETAIL	DATE: 11/6/2008 REV:	CONCRETE APRON INSTALLATION IN NON PAVED AREAS	N.T.S.	el paso WATER	DETAIL No. 184-2

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REV.	DATE	BY	DESCRIPTION

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DESIGNED S.T.
DRAWN A.B.
CHECKED B.J.K.
DATE 09/30/2021

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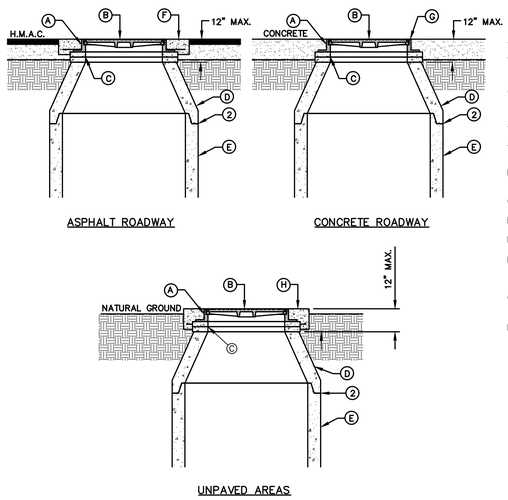
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TYPICAL WATER DETAILS
(SHEET 1 OF 3)

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JOB NO. 20-110
SHEET 1 OF 4
SHEET NO. C13.0

Filename:F:\20110\DWG\15_20110 - C13.0-C13.2_DWG_WATERLINE DETAILS.DWG
Plot Date:12/6/2021 2:44:34 PM By:Arturo Barragan



ASPHALT ROADWAY

CONCRETE ROADWAY

UNPAVED AREAS

GENERAL NOTES:

1. MANHOLE TYPE SHALL BE AS SHOWN ON THE PLANS.
2. SEAL JOINTS PER SPECIFICATIONS.

CONSTRUCTION KEY NOTES:

A. MANHOLE RINGS, (SEE DETAIL 377)

B. MANHOLE COVER, (SEE DETAIL 378)

C. CONCRETE ADJUSTMENT RINGS AS REQUIRED.

D. MANHOLE CONE SECTION.

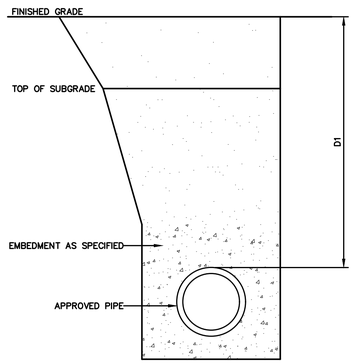
E. MANHOLE BARREL SECTION.

F. CONCRETE COLLAR (SEE DETAIL 184–1) FLUSH WITH TOP OF H.M.A.C OR SEE PENETRATION DETAIL.

G. MANHOLE RING FLUSH WITH TOP OF CONCRETE, CONCRETE COLLAR NOT NEEDED.

H. CONCRETE APRON (SEE DETAIL 184–2) FLUSH WITH MANHOLE RING AND 2" ABOVE NATURAL GROUND.

STANDARD DETAIL	DATE: 6/22/2009 REV:	MANHOLE COVER RING AND COVER INSTALLATION	N.T.S.	el paso WATER	DETAIL No. 185



GENERAL NOTES:

1. REFER TO UTILITY DETAIL FOR PAVEMENT REPLACEMENT AND BACKFILL REQUIREMENTS.
2. TRENCH SAFETY SYSTEMS SHALL BE USED WHEN TRENCH DEPTH EXCEEDS 5 FEET.

CONSTRUCTION KEY NOTES:

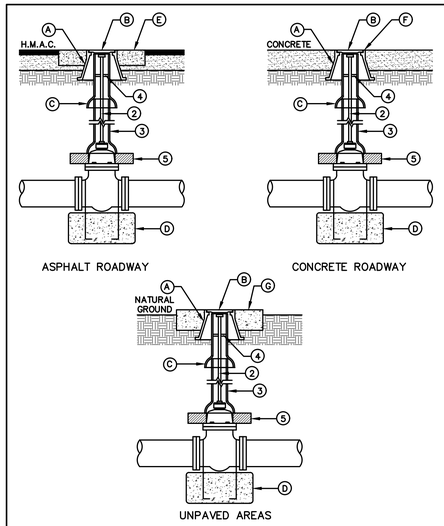
A. COVER FOR WATER MAINS SHALL DEPEND ON THE PIPE SIZE AND THE FOLLOWING INSTALLATION CONDITIONS,

CONDITION A – NORMAL LINE INSTALLATION, STREET AND DRAINAGE PROJECTS, WATERLINE RELOCATION

CONDITION B – NEW SUBDIVISIONS, NON–PAVED AREA AND SHALL BE AS FOLLOWS.

PIPE SIZE	CONDITIONS	DIMENSIONS
6", 8"	A	D=4'
6", 8"	B	D1=4'
12" & LARGER	A OR B	D1=5'

STANDARD DETAIL	DATE: 1994 REV: 8/3/2006	COVER FOR WATER MAINS	N.T.S.	el paso WATER	DETAIL No. 250



ASPHALT ROADWAY

CONCRETE ROADWAY

UNPAVED AREAS

GENERAL NOTES:

1. VALVE TYPE AND VALVE ENDS SHALL BE AS SHOWN ON THE PLANS.
2. ALL BURIED VALVES 5' AND DEEPER SHALL BE PROVIDED WITH SOLID STEEL EXTENSION STEM OPERATOR WITH 2" SQUARE AWWA NUT WITHIN 36" OF VALVE BOX COVER. NUT IS TO INDICATE DIRECTION OF ROTATION TO OPEN VALVE.
3. 8" DIA. MINIMUM VITRIFIED CLAY OR SDR 35 P.V.C. PIPE, PIPE SHALL NOT REST ON VALVE BODY.
4. ¼" THICK STEEL TRASH RING VALVE BOX INSIDE DIAMETER MINUS ⅛".
5. MINIMUM 2½" CONCRETE OR BRICK ALL AROUND.
6. CLEAN BONNET BOX OF ALL DEBRIS AND SOIL.
7. COAT BURIED PIPE AND BONNET BOX PER SPECIFICATIONS, VALVE SHALL BE WRAPPED IN POLYETHYLENE IN ACCORDANCE WITH SPECIFICATIONS.

CONSTRUCTION KEY NOTES:

A. BONNET BOX (SEE DETAIL 268).

B. BONNET BOX COVER (SEE DETAILS 269–1 & 269–2).

C. FINAL EXTENSION TO BONNET BOX SHALL BE WITH BELL AND SPIGOT ENDS (CLAY OR SDR 35 P.V.C. SPOOL).

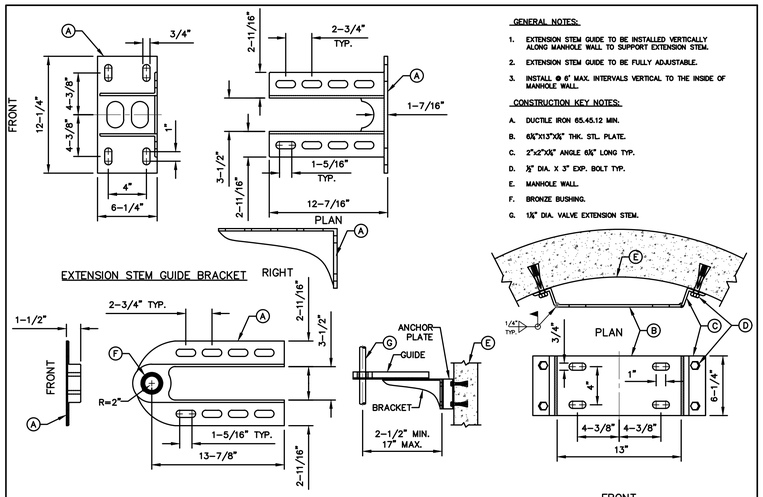
D. CONCRETE VALVE ANCHOR (SEE DETAIL 271).

E. CONCRETE COLLAR (SEE DET 184–1) FLUSH WITH TOP OF H.M.A.C.

F. BONNET BOX FLUSH WITH TOP OF CONCRETE, CONCRETE COLLAR NOT NEEDED.

G. CONCRETE APRON (SEE DETAIL 184–2) FLUSH WITH BONNET BOX AND 2" ABOVE NATURAL GROUND.

STANDARD DETAIL	DATE: 5/1994 REV: 6/22/2009	GATE VALVE INSTALLATION	N.T.S.	el paso WATER	DETAIL No. 260



EXTENSION STEM GUIDE BRACKET

PLAN

EXTENSION STEM GUIDE

COMPLETED ASSEMBLY

FRONT

EXTENSION STEM GUIDE MANHOLE ANCHOR PLATE

GENERAL NOTES:

1. EXTENSION STEM GUIDE TO BE INSTALLED VERTICALLY ALONG MANHOLE WALL TO SUPPORT EXTENSION STEM.
2. EXTENSION STEM GUIDE TO BE FULLY ADJUSTABLE.
3. INSTALL @ 6' MAX. INTERVALS VERTICAL TO THE INSIDE OF MANHOLE WALL.

CONSTRUCTION KEY NOTES:

A. DUCTILE IRON 65.45.12 MIN.

B. 6⅜"X13"X⅜" THK. STL. PLATE.

C. 2"x2"X⅛" ANGLE 6⅜" LONG TYP.

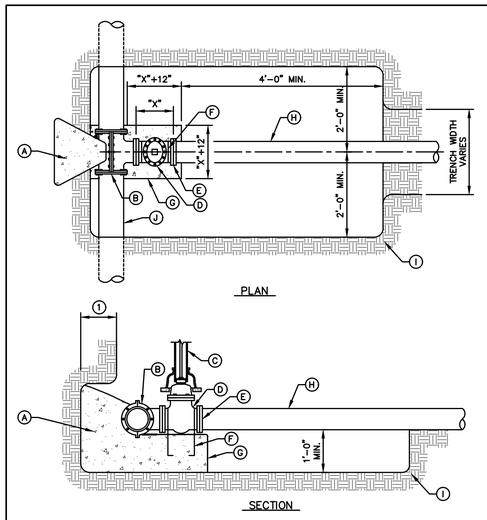
D. ⅝" DIA. X 3" EXP. BOLT TYP.

E. MANHOLE WALL.

F. BRONZE BUSHING.

G. 1¾" DIA. VALVE EXTENSION STEM.

STANDARD DETAIL	DATE: 3/1994 REV: 3/13/2008	EXTENSION STEM GUIDE	N.T.S.	el paso WATER	DETAIL No. 261–3



GENERAL NOTES:

1. THRUST BLOCKING SHALL EXTEND TO UNDISTURBED EARTH.
2. TAPPING SLEEVE SHALL BE 18" MINIMUM FROM ANY BELL, COUPLING, VALVE OR FITTING LOCATED ALONG EXISTING WATER LINE TO BE TAPPED.
3. REPLACE EXCAVATED MATERIAL WITH CEMENT STABILIZED BACKFILL PRIOR TO PAVING.
4. JOINTS AND BOLTS SHALL BE CLEAR OF CONCRETE.
5. INSTALL PERMANENT THRUST BLOCKING UNDER VALVE BEFORE TAP IS MADE. JOINTS AND BOLTS TO BE CLEAR OF CONCRETE.

CONSTRUCTION KEY NOTES:

A. CONCRETE THRUST BLOCKING, PER DETAIL 270.

B. TAPPING SLEEVE.

C. RISER INSTALLATION, PER DETAIL 260.

D. TAPPING VALVE.

E. VALVE ENDS FOR TYPE OF PIPE INSTALLED.

F. 2–#5 REBAR HAIRPINS, PAINT UNEMBEDDED PORTION OF BARS WITH 2–COATS OF COAL TAR EPOXY, THEN COVER WITH 2" MINIMUM OF CEMENT MORTAR.

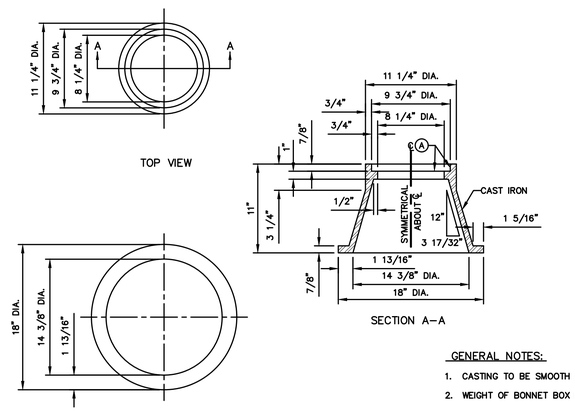
G. CONCRETE VALVE SUPPORT, PER DETAIL 271.

H. NEW WATER LINE TO BE INSTALLED.

I. UNDISTURBED EARTH.

J. EXISTING WATER MAIN TO BE TAPPED.

STANDARD DETAIL	DATE: 9/1994 REV: 8/9/2006	TAPPING SLEEVE AND VALVE INSTALLATION	N.T.S.	el paso WATER	DETAIL No. 266



GENERAL NOTES:

1. CASTING TO BE SMOOTH AND VOID OF AIR HOLES.
2. WEIGHT OF BONNET BOX IS 95 POUNDS.

CONSTRUCTION KEY NOTES:

A. TO BE ROUGH GROUND OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.

STANDARD DETAIL	DATE: 2/1994 REV:	BONNET BOX	N.T.S.	el paso WATER	DETAIL No. 268

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REV.	DATE	BY	DESCRIPTION

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ENGINEER'S SEAL

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DESIGNED S.T.
DRAWN A.B.
CHECKED B.J.K.
DATE 09/30/2021

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594–5500

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9601 McAllister Freeway #307, San Antonio TX 78216 (210) 314-3553
Texas Board of Professional Engineers Registration No. F-000554

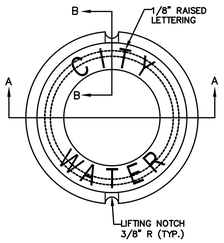
NE ASR ENHANCED ARROYO PHASE I

TYPICAL WATER DETAILS (SHEET 2 OF 3)

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JOB NO. 20–110
SHEET 2 OF 4
SHEET NO. C13.1

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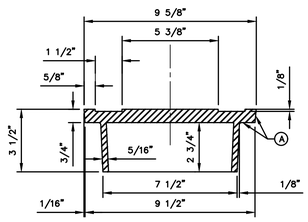


GENERAL NOTES:

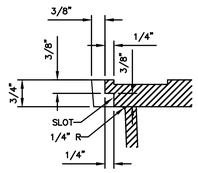
1. CASTINGS TO SMOOTH AND VOID OF AIR HOLES.
2. WEIGHT OF COVER IS 18 POUNDS.

CONSTRUCTION KEY NOTES:

A. TO BE ROUGH GROUND OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.

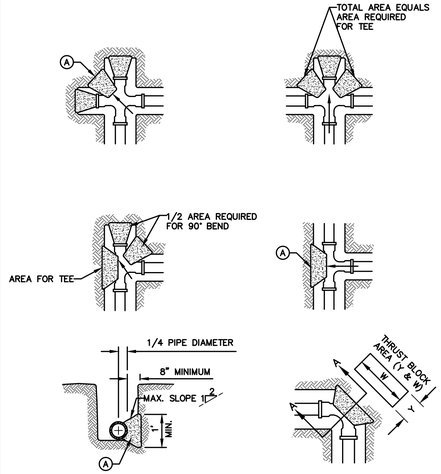


SECTION A–A



SECTION B–B

STANDARD DETAIL	DATE: 2/16/2006 REV: 12/14/2007	BONNET BOX COVER (FLIP RESISTANT) N.T.S.	el paso WATER	DETAIL No. 269–2



SECTION "A"

CONCRETE THRUST BLOCKING

GENERAL NOTES:

1. TABLE IS BASED ON 2000#/SQ. FT. SOIL. IF CONDITIONS ARE FOUND TO INDICATE SOIL BEARING IS LESS, THE AREAS SHALL BE INCREASED ACCORDINGLY.
2. AREAS FOR PIPE LARGER THAN 18" SHALL BE CALCULATED.
3. CONCRETE SHALL HAVE A MINIMUM COMPRESSION STRENGTH OF 2500 PSI.
4. THRUST BLOCK IS TO EXTEND TO UNDISTURBED SOIL.
5. SIZE MAY BE DECREASED FOR LESSER DEGREE BENDS AS DETERMINED BY ENGINEER.
6. KEEP CONCRETE CLEAR OF M.J. OR BELL AND SPIGOT JOINTS.
7. BLOCK IN A SIMILAR MANNER AT TEES, HYDRANTS, PLUG OR OTHER LOCATIONS AS REQUIRED.
8. WHEN NECESSARY ADDITIONAL THRUST RESTRAINT METHODS MAY BE USED, SUCH AS MECHANICAL JOINT RESTRAINTS, TIE–RODS (INSTALLED PER MANUFACTURERS' RECOMMENDATIONS) OR OTHER APPROVED METHODS.

CONSTRUCTION KEY NOTES:

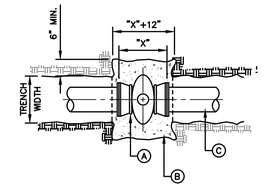
A. LENGTH "Y & W" AS REQUIRED TO OBTAIN BEARING AREA AGAINST UNDISTURBED SOIL.

B. ADDITIONAL EXCAVATION IF NECESSARY TO OBTAIN REQUIRED BEARING AREA.

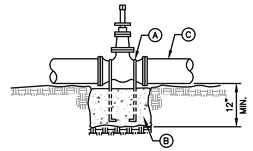
C. MINIMUM THRUST BLOCK AREA REQUIREMENTS FOR (Y & W) AS FOLLOWS:

PIPE SIZE	WATER PIPE	
	TEE, DEAD END 90° BEND	45° AND 22 1/2° BENDS
4" & LESS	3 SQ. FEET	3 SQ. FEET
6"	4 SQ. FEET	3 SQ. FEET
8"	6 SQ. FEET	3 SQ. FEET
10"	9 SQ. FEET	5 SQ. FEET
12" N.T.S.	13 SQ. FEET	7 SQ. FEET
16"	23 SQ. FEET	12 SQ. FEET
18"	29 SQ. FEET	15 SQ. FEET

STANDARD DETAIL	DATE: 2/1994 REV: 8/7/2006	CONCRETE THRUST BLOCKING	el paso WATER	DETAIL No. 270



PLAN



SECTION

GENERAL NOTES:

1. THE ENGINEER SHALL PROVIDE DESIGN FOR ALL VALVES GREATER THAN 12".
2. COMPLY WITH REQUIREMENTS OF AWWA C–550, PROTECTIVE EPOXY INTERIOR COATINGS FOR VALVES.

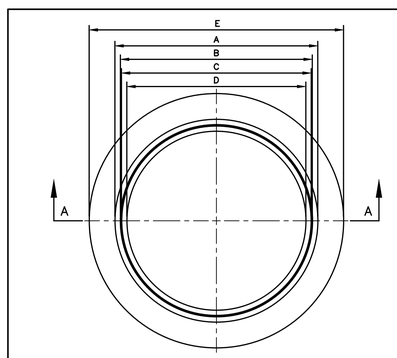
CONSTRUCTION KEY NOTES:

A. TWO NO. 5 REBAR HAIR PINS. PAINT UNEMBEDDED PORTION OF REBARS WITH TWO COATS OF COAL TAR EPOXY.

B. CONCRETE VALVE SUPPORT, 2500 PSI. CONCRETE.

C. APPROVED PIPE.

STANDARD DETAIL	DATE: 2/1994 REV: 12/12/2011	VALVE ANCHOR N.T.S.	el paso WATER	DETAIL No. 271



A–A

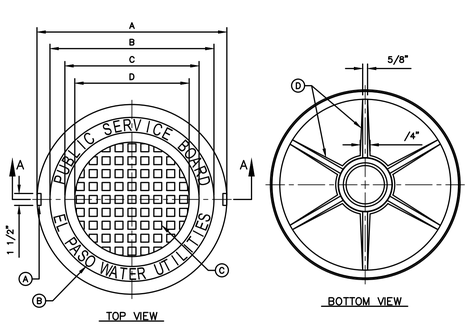
GENERAL NOTES:

1. MATCHING SURFACES MARKED "MF" TO BE FINISHED OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.
2. CASTING TO BE SMOOTH & VOID OF AIR HOLES.
3. CASTING MUST MEET REQUIREMENTS OF AASHTO M306–07.
4. AS–CAST DIMENSIONS MAY VARY 1/16"±/ PER FOOT (AASHTO M306–07).
5. WEIGHT MAY VARY 5%± (AASHTO M306–07).

MANHOLE RING	MANHOLE– ALL TYPES	*MANHOLE TYPE A, A1, A2 & C
A	33"	25½"
B	31¾"	24⅛"
C	31½"	23⅞"
D	30"	22½"
E	39½"	32"
F	⅝"	1⅛"
WEIGHT	205 lbs.	170 lbs.

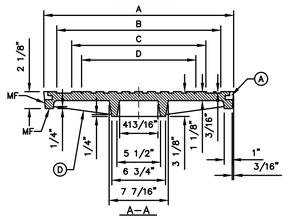
*OBSOLETE –DO NOT USE (FOR REFERENCE ONLY)

STANDARD DETAIL	DATE: 11/1992 REV: 2/21/2011	SEWER MANHOLE RING N.T.S.	el paso WATER	DETAIL No. 377

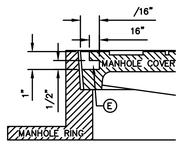


TOP VIEW

BOTTOM VIEW



A–A



LIFTING NOTCH

GENERAL NOTES:

1. MATCHING SURFACES MARKED "MF" TO BE FINISHED OF ANY IRREGULARITIES THAT WOULD PREVENT A SNUG FIT.
2. CASTING TO BE SMOOTH & VOID OF AIR HOLES.
3. CASTING MUST MEET REQUIREMENTS OF AASHTO M306–07.
4. AS–CAST DIMENSIONS MAY VARY 1/16"±/ PER FOOT (AASHTO M306–07).
5. WEIGHT MAY VARY 5%± (AASHTO M306–07).

CONSTRUCTION KEY NOTES:

A. LIFTING NOTCH.

B. 3/16" RAISED LETTERING.

C. 1" SQUARES (3/16" TALL) WITH 5/8" SPACE BETWEEN.

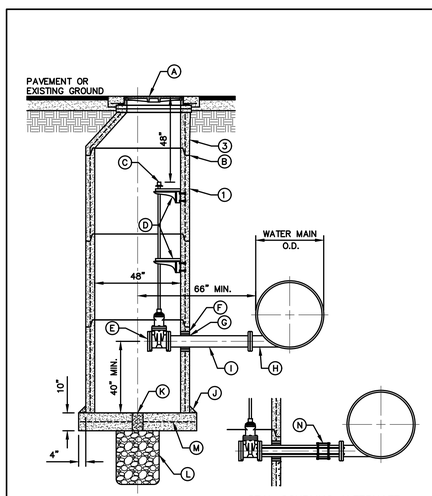
D. REINFORCING RIBS.

E. SLOT.

MANHOLE COVER	MANHOLE– ALL TYPES	*MANHOLE TYPE A, A1, A2 & C
A	31⅜"	23¾"
B	28⅛"	20⅝"
C	24⅜"	16⅞"
D	21⅛"	14⅜"
WEIGHT	200 lbs.	165 lbs.

*OBSOLETE –DO NOT USE (FOR REFERENCE ONLY)

STANDARD DETAIL	DATE: 11/1992 REV: 2/21/2011	SEWER MANHOLE COVER N.T.S.	el paso WATER	DETAIL No. 378



SECTION

SEAL COUPLING ALTERNATE

GENERAL NOTES:

1. PRE–CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM C–478 AND SHALL MEET HS–20 LOADING. PROVIDE REINFORCEMENT WITHIN 3" ⌀ OPENINGS OR KNOCKOUTS. OPENINGS (UP TO 8") MADE IN FIELD SHALL BE CORE DRILLED.
2. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.
3. ECCENTRIC CONE SECTION REINFORCEMENT IN ACCORDANCE WITH ASTM C–478.

CONSTRUCTION KEY NOTES:

A. MANHOLE RING AND COVER (SEE DETAILS 377 & 378). SET FRAME AND COVER FLUSH WITH ROADWAY SURFACE OR FINISHED GR. (SEE DETAIL 185).

B. ALL JOINTS TO BE TONGUE, GROOVE AND SEALED WITH RAM–NEK OR APPROVED EQUAL.

C. 1¼" DIAMETER SOLID STEEL EXTENSION STEM WITH SQUARE SOCKET ON BOTTOM TO FIT 2" SQUARE VALVE NUT AND 2" SQUARE OPERATOR NUT ON TOP.

D. ADJUSTABLE EXTENSION STEM GUIDE (AS PER DETAIL 261–3) @ 6' MAX. INTERVALS.

E. 6" FLANGED GATE VALVE (NORMALLY CLOSED) WITH BLIND FLANGE.

F. NON–SHRINK GROUT.

G. 1" SPONGE RUBBER.

H. 6" BOTTOM TANGENT OUTLET (SCCP OR STEEL PIPE). USE BOTTOM OUTLET FOR DIP.

I. PROVIDE SPOOL PIECE WITH BOLTED FLANGES BOTH ENDS.

J. 4"x4" GROUT ALL AROUND.

K. 6" DIAMETER DRAIN HOLE FILLED WITH GRAVEL.

L. 24" DIAMETER BY 2'–6" DEEP GRAVEL SUMP.

M. #5 @ 12" O.C.E.W.

N. IF SEAL COUPLING IS USED, MUST INSTALL ¾" STAINLESS STEEL HARNESS RODS WELDED OR BOLTED TO BOTH END FLANGES FOR PROPER RESTRAINT. COAT RODS WITH NON–CORROSIVE INHIBITIVE PAINT. WRAP ENTIRE COUPLING & ROD ASSEMBLY WITH POLYETHYLENE WRAP.

STANDARD DETAIL	DATE: 5/1994 REV: 3/1/2011	BLOW–OFF VALVE ASSEMBLY N.T.S.	el paso WATER	DETAIL No. 262

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REV.	DATE	BY	DESCRIPTION

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DESIGNED S.T.
DRAWN A.B.
CHECKED B.J.K.
DATE 09/30/2021

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594–5500

CONSULTANT
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9601 McAllister Freeway #307, San Antonio TX 78216 (210) 314-3553
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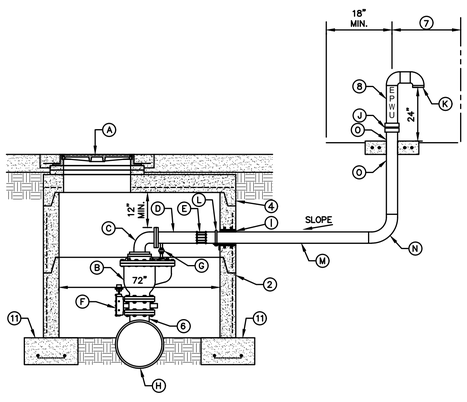
NE ASR ENHANCED ARROYO PHASE I

TYPICAL WATER DETAILS (SHEET 3 OF 3)

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JOB NO. 20–110
SHEET 3 OF 4
SHEET NO. C13.2

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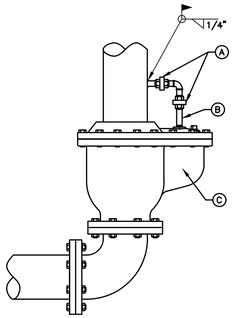
GENERAL NOTES:

1. INSTALLATION SHALL GENERALLY BE FOR A MAIN-LINE 20" AND LARGER (6" COMBINATION AIR VALVE SHOWN). INSTALLATION OF OTHER SIZED VALVES IS SIMILAR.
2. PRE-CAST MANHOLE SECTIONS SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM C-478 AND SHALL MEET HS-20 LOADING. PROVIDE MANUFACTURER'S WITHIN 1" OF OPENINGS OR KNOCKOUTS. OPENINGS (UP TO 8") MADE IN FIELD SHALL BE CORE DRILLED.
3. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.
4. ECCENTRIC/CONCENTRIC LID (ECCENTRIC SHOWN), 8" THICK (SEE DETAIL 379-1).
5. VALVE AND PIPE SIZES AS SPECIFIED.
6. WHERE TOP OUTLET FITTING IS NOT PROVIDED BY MANUFACTURER, PROVIDE TAPPING SLEEVE (DRY TAP MAIN LINE) WITH VERTICAL FLANGE TO SIZE OF AIR VALVE.
7. WHEN INSTALLATION IS WITHIN TXDOT R.O.W., VENT PIPE SHALL BE LOCATED 6' FROM TXDOT R.O.W. VENT PIPE SHALL NOT BE PLACED IN SIDEWALK AREA.
8. AIR VENT PIPING (SIZE AS REQUIRED PER COMBINATION AIR VALVE) TO BE SCHEDULE 40 WELDED STEEL WITH FORGED STEEL WELD FITTINGS. BURIED VENT PIPING SHALL HAVE 3 COATS OF EPOXY POLYAMIDE COATING. ABOVE GROUND PIPING TO BE PRIMED AND PAINTED BLUE (PURPLE FOR RECLAIMED) WITH A SEMI-GLOSS ENAMEL AND LABELED "DRAIN" WITH 3-INCH HIGH WHITE LETTERS.
9. AIR VENT PIPING SHALL BE LOCATED CLEAR OF PAVED ROADWAY.
10. PRE-CAST CONCRETE MANHOLE SHALL NOT REST ON PIPE.
11. 12"X24" FOOTING WITH NO.5 REBAR AT 12" ON CENTER EACH WAY IS REQUIRED.

CONSTRUCTION KEY NOTES:

A. MANHOLE RING AND COVER (SEE DETAILS 377 & 378). SET FRAME AND COVER FLUSH WITH ROADWAY SURFACE OR FINISHED GRADE (SEE DETAIL 100).
B. COMBINATION AIR VALVE, SIZE AS SPECIFIED.
C. 6" FLANGED 90° BEND.
D. 6" FLANGED SPOOL.
E. 6" DRESSER COUPLING (ROMAC 501 OR APPROVED EQUAL).
F. 6" FLANGED BUTTERFLY VALVE WITH VERTICAL OPERATING NUT.
G. AIR RELEASE PIPING, SEE DET 263-6.
H. MAINLINE, SIZE AS SPECIFIED.
I. PIPE WALL SLEEVE (LINK SEAL OR EQUAL).
J. BREAK-A-WAY COUPLING, SEE DET 263-5.
K. INSECT SCREEN.
L. ANCHOR PIPING TO VALVE VAULT WITH 3"x3"x¼" ANGLE & ⅜"ø STRAP.
M. 6" PLAIN END BY PLAIN END SCHEDULE 40 STEEL PIPE (GALVANIZED NOT ALLOWED).
N. 6" STEEL 90° BEND WELDED.
O. 6" PLAIN END BY THREADED MALE SCHEDULE 40 STEEL PIPE (GALVANIZED NOT ALLOWED).

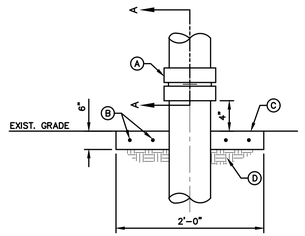
COMBINATION AIR RELEASE VALVE FOR LINES 20" AND LARGER BENEATH PAVING INSTALLATION	N.T.S.	DETAIL No. 263-4



CONSTRUCTION KEY NOTES:

A. UNION SIZED FOR OUTLET PIPING (WHERE APPLICABLE).
B. STEEL AIR RELEASE OUTLET PIPING ROUTED INTO LARGER STEEL VACUUM PIPING.
C. SINGLE BODY COMBINATION AIR RELEASE AIR VACUUM VALVE.

STANDARD DETAIL	DATE: 8/21/2006 REV:	AIR RELEASE PIPING	N.T.S.	el paso WATER	DETAIL No. 263-6



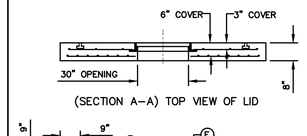
T = WALL THICKNESS

SECTION A-A

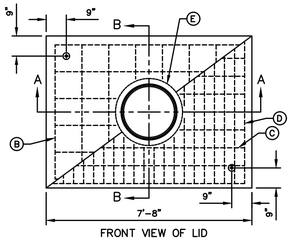
CONSTRUCTION KEY NOTES:

A. SCHEDULE 40 THREADED STEEL COUPLING.
B. 2 - No. 4 REBAR CONTINUOUS, EACH WAY.
C. MINIMUM 3500psi CONCRETE 2'x2' SQUARE COLLAR.
D. 12" SUBGRADE @ 95% PER ASTM D-1557.

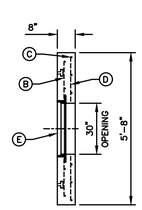
STANDARD DETAIL	DATE: 8/21/2006 REV:	BREAK-A-WAY COUPLING	N.T.S.	el paso WATER	DETAIL No. 263-5



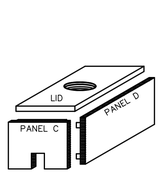
(SECTION A-A) TOP VIEW OF LID



FRONT VIEW OF LID



(SECTION B-B) SIDE VIEW



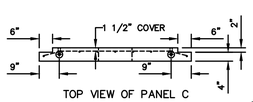
ASSEMBLY

GENERAL NOTES:

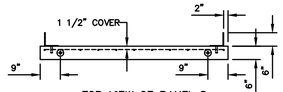
1. WATER CEMENT RATIO 0.5 OR LESS BY WEIGHT OR NOT MORE THAN 5.5 GALLONS PER SACK.
2. REINFORCING SHALL COMPLY WITH ASTM A615 GRADE 60 STEEL FY=60000 PSI.
3. BAR BENDING AND PLACEMENT TO COMPLY WITH LATEST ACI STANDARDS.
4. LIFTERS FOR HANDLING SHALL BE INSTALLED PER MANUFACTURER'S REQUIREMENTS AND RATED TO HANDLE THE WEIGHT.
5. METER BOX SHALL BE MODULAR; CONCRETE TO HAVE A MINIMUM 28 DAYS COMPRESSIVE STRENGTH OF 4000 PSI.

CONSTRUCTION KEY NOTES:

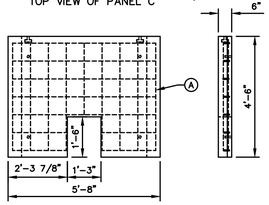
A. NO. 4 REBAR AT 8" ON CENTER, BOTH WAYS.
B. NO. 4 REBAR AT 12" ON CENTER, BOTH WAYS (TOP LAYER).
C. NO. 4 REBAR AT 8" ON CENTER, LONG SPAN (BOTTOM LAYER).
D. NO. 5 REBAR AT 4 1/2" ON CENTER, SHORT SPAN (BOTTOM LAYER).
E. MANHOLE RING (SEE DETAIL 377), INTEGRALLY CAST & CENTERED ON LID. SET LID SO COVER (SEE DETAIL 378) IS FLUSH WITH TOP SURFACE OF LID.



TOP VIEW OF PANEL C

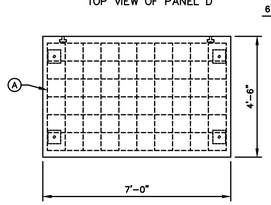


TOP VIEW OF PANEL D

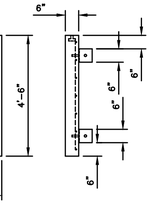


FRONT VIEW OF PANEL C

SIDE VIEW

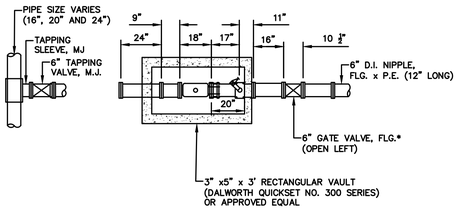


FRONT VIEW OF PANEL D

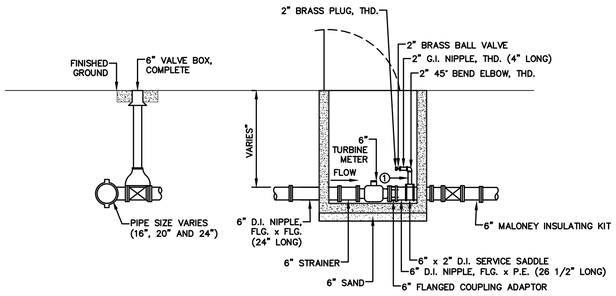


SIDE VIEW

STANDARD DETAIL	DATE: 7/26/2006 REV: 7/20/2009	METER BOX TYPE "F" FOR 3" AND LARGER SERVICE INSTALLATION (H2O LOADING)	N.T.S.	el paso WATER	DETAIL No. 295-2



PLAN VIEW

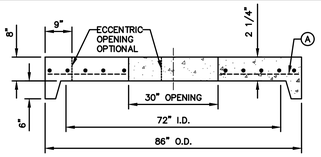


SECTION A-A

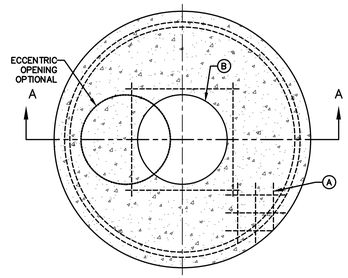
① - 2" G.I. NIPPLE, THD. (8" LONG)
• - RESILIENT SEAT

3' x 5' x 3' RECTANGULAR CONCRETE VAULT (TRAFFIC BEARING LOCATION)

1 / C13.3 6" TURBINE METER INSTALLATION N.T.S.



SECTION A-A



MANHOLE LID FOR TYPE "B1"

GENERAL NOTES:

1. FLAT TOP MANHOLE LID SHALL BE OF REINFORCED CONCRETE CONFORMING TO ASTM C-478. CEMENT SHALL BE TYPE I-II, PER ASTM C-150, AND MUST CONTAIN A MINIMUM OF 4% FLY ASH OF THE TOTAL LID WEIGHT.
2. CONCRETE SHALL BE MIN. 28 DAY COMPRESSIVE STRENGTH 4000psi.
3. MANUFACTURER TO PROVIDE LIFTERS OF ADEQUATE SIZE AS NEEDED.
4. REINFORCING SHALL MEET A.S.T.M. C478-87 AND TRAFFIC LOADING (HS-20).
5. RING & COVER OR SPECIAL LIDS TO MEET REQUIREMENTS, MAY BE CAST IN PLACE

CONSTRUCTION KEY NOTES:

A. #5 REBAR 6" O.C./E.W.
B. 30" OPENING, SIZE TO ACCOMMODATE MANHOLE RING (SEE DETAIL 377). OPTIONAL PLACEMENT OF OPENING MAY BE CONCENTRIC (BOLD) OR ECCENTRIC (DASHED).

STANDARD DETAIL	DATE: 11/1992 REV: 2/21/2011	MANHOLE ECCENTRIC/CONCENTRIC CONCRETE LID FOR TYPE "B1" MANHOLES	N.T.S.	el paso WATER	DETAIL No. 379-1

90% SUBMITTAL --- FOR ENGINEERING REVIEW ONLY NOT TO BE USED FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION

WARNING ! BEFORE YOU DIG
CALL
1-800-DIG-TESS
1-800-344-8377
FOR FIELD LOCATING EXISTING UTILITIES

ENGINEER'S SEAL

THESE PLANS WERE RELEASED UNDER THE AUTHORITY OF SAUL TREJO, P.E. #107801 TO BE ISSUED AS PRELIMINARY SUBMITTAL TO EPW FOR PRELIMINARY REVIEW. IT IS NOT TO BE USED FOR CONSTRUCTION OR FINAL PERMIT ISSUANCE.

DESIGNED S.T.
DRAWN A.B.
CHECKED B.J.K.
DATE 09/30/2021

UTILITY OWNER

el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

CONSULTANT

PLANNING•ENGINEERING•PROJECT MANAGEMENT
MCi Moreno Cardenas Inc.
EL PASO • SAN ANTONIO
2505 E. Missouri Ave. El Paso, TX 79903 (915) 532-2091
9601 McAllister Freeway #307, San Antonio TX 78216 (210) 314-3553
Texas Board of Professional Engineers Registration No. F-000554

NE ASR ENHANCED ARROYO PHASE I

TYPICAL WATER DETAILS (SHEET 3 OF 3)

THESE CONTRACT DOCUMENTS HAVE BEEN PREPARED SPECIFICALLY AND EXCLUSIVELY FOR THE DESIGN OF "NE ASR ENHANCED ARROYO PHASE I"

MORENO CARDENAS INC. IS NOT RESPONSIBLE FOR THEIR USE ON ANY OTHER PROJECT OR APPLICATION.

JOB NO. 20-110
SHEET 4 OF 4
SHEET NO. C13.3

Filename:F:\20110\DWG\15_20110 - C13.0-C13.2_DWG_WATERLINE DETAILS.DWG
Plot Date:12/6/2021 2:47:06 PM By:Arturo Barragan

SITE DESCRIPTION

PROJECT NAME AND LIMITS: NE ASR ENHANCED ARROYO PHASE I

THE PROJECT IS LOCATED APPROXIMATELY 1.15 MILES NORTH OF THE INTERSECTION OF McCOMBS STREET AND THE PATRIOT FREEWAY, BETWEEN McCOMBS STREET AND MARTIN LUTHER KING BLVD. THE PROPERTY IS CURRENTLY OWNED AND MAINTAINED BY EPWATER.

PROJECT DESCRIPTION:

THE PROPOSED PROJECT CONSISTS OF WIDENING THE EXISTING ARROYO, ROUTING THE PIPING THAT WILL CONNECT TO THE EXISTING RECLAIM PIPE, AND LANDSCAPING AMENITIES TO PROVIDE AN AESTHETIC APPEARANCE TO THE OVERALL SITE. THE ENHANCED ARROYO DESIGN CONSISTS OF MULTIPLE INFILTRATION BASINS SEPARATED BY CONCRETE WEIRS AND A DEDICATED HIKE AND BIKE TRAIL LOCATED ON THE SOUTH SIDE OF THE ENHANCED ARROYO. THE ENTRANCE TO THE PROPOSED PARKING AREA WILL BE LOCATED ON McCOMBS STREET.

EXISTING CONDITIONS:

THE PROJECT SITE IS PREDOMINANTLY FLAT IN ELEVATION WITH DENSE NATIVE VEGETATION. THERE ARE ALSO ELECTRICAL POWER POLES STRETCHING EAST AND WEST AND TWO ABANDONED UNKNOWN TANKS.

MAJOR SOIL DISTURBING ACTIVITIES:

MAJOR SOIL DISTURBING ACTIVITIES WILL CONSIST OF EARTH EXCAVATION WITHIN THE ARROYO AREA AND ADJACENT TO McCOMBS STREET.

TOTAL PROJECT AREA: ±23 ACRES

TOTAL AREA TO BE DISTURBED: ±23 ACRES

WEIGHTED RUNOFF COEFFICIENT
(AFTER CONSTRUCTION): 0.33

EXISTING CONDITION OF SOIL AND VEGETATIVE
COVER AND % OF EXISTING VEGETATIVE COVER:

THE GEOTECHNICAL REPORT REVEALED THAT THE PROJECT SITE CONSISTS OF FINE-GRAINED CLAYEY SANDS, FINE-GRAINED POORLY GRADED SANDS, AND WELL-GRADED GRAVEL. THERE IS ALSO A LAYER OF CALICHE WITHIN THE PROJECT SITE WITH A DEPTH OF 6 TO 11.5 FEET BELOW THE GROUND SURFACE. EXCAVATING BELOW THIS CALICHE LAYER WOULD IMPROVE THE INFILTRATION RATES FOR EACH BASIN.

NAME OF RECEIVING WATERS:

THE ASR WATERSHED DRAINAGE AREA IS LOCATED APPROXIMATELY 5,555 LF NORTH OF I-54 ON McCOMBS STREET, JUST WEST OF PAINTED DUNES GOLF COURSE. IT IS BOUND BY McCOMBS STREET ON THE EAST SIDE, APPROXIMATELY 1,670 LF TO THE WEST OF MARTIN LUTHER KING JR. BLVD., APPROXIMATELY 900 LF TO THE NORTH, AND APPROXIMATELY 300 LF TO THE SOUTH. STORMWATER RUNOFF FLOWS FROM WEST TO EAST. THERE IS ONE CULVERT THAT CROSSES UNDER MARTIN LUTHER KING JR. BOULEVARD. THE STORMWATER RUNOFF GENERATED IS MAINLY DUE TO SHEET FLOW.

EROSION AND SEDIMENT CONTROL

SOIL STABILIZATION PRACTICES

- ____ TEMPORARY SEEDING
- ____ PERMANENT PLANTING, SODDING, OR SEEDING
- ____ MULCHING
- ____ SOIL RETENTION BLANKET
- X BUFFER ZONES
- X PRESERVATION OF NATURAL RESOURCES

OTHER:

STRUCTURAL PRACTICES:

- X SILT FENCES
- ____ HAY BALES
- ____ ROCK BERMS
- ____ DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- ____ DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- ____ DIVERSION DIKE AND SWALE COMBINATION
- ____ PIPE SLOPE DRAINS
- ____ CONCRETE FLUMES
- X ROCK BEDDING AT CONSTRUCTION EXIT (TEMPORARY)
- ____ TIMBER MATTING AT CONSTRUCTION EXIT
- X CHANNEL LINERS
- ____ SEDIMENT TRAPS
- ____ SEDIMENT BASINS
- ____ STORM INLET SEDIMENT TRAP
- ____ STONE OUTLET STRUCTURES
- ____ CURBS AND GUTTERS
- ____ STORM DRAINS
- ____ VELOCITY CONTROL DEVICES
- ____ VEGETATED SWALES & NATURAL DEPRESSIONS

OTHER:

NARRATIVE – SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

1. INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS (e.g. SILT FENCE AND/OR STABILIZED CONSTRUCTION ENTRANCE).
2. CLEARING, DEMOLITION AND EXCAVATION OF ARROYO AREA;
3. SUBGRADE PREPARATION, CHANNEL LINING;
4. NEW CONCRETE WEIR STRUCTURES;
5. WHEN ALL CONSTRUCTION ACTIVITY RELATED IN DEVELOPMENT OF THE SITE IS COMPLETE, REMOVE TEMPORARY CONTROLS IN 1. ABOVE

BEGIN DATE: MAY-2022 (APPROXIMATE)

END DATE: MAY-2023 (APPROXIMMATE)

BEST MANAGEMENT PRACTICES CONTROLS

I. WASTE MATERIALS:

ALL WASTE MATERIALS, INCLUDING CONSTRUCTION DEBRIS, SHALL BE COLLECTED AND STORED IN A SECURELY LIDDED METAL DUMPSTER. NO CONSTRUCTION WASTE MATERIAL SHALL BE BURIED ON SITE. THE TRANSIT DUMPSTER SHALL COMPLY WITH ORDINANCE 18.52.010 (ENCLOSURE AND REMOVAL OF WASTE MATERIALS DURING CONSTRUCTION). THE DUMPSTER SHALL BE EMPTIED AS NECESSARY OR AS REQUIRED BY ORDINANCE 9.04 (SOLID WASTE MANAGEMENT) AND THE TRASH SHALL BE HAULED TO A LICENSED LANDFILL.

II. HAZARDOUS WASTE:

AT A MINIMUM, ANY PRODUCTS IN THE FOLLOWING CATEGORIES SHALL BE CONSIDERED HAZARDOUS: PAINT, ACIDS FOR CLEANING MASONRY SURFACES, CLEANING SOLVENTS, ASPHALT PRODUCTS, CHEMICAL ADDITIVES FOR SPILL STABILIZATION, CURING COMPOUNDS AND ADDITIVES. IN THE EVENT OF A SPILL WHICH MAY BE HAZARDOUS, THE CONTRACTOR SHALL TAKE IMMEDIATE ACTION AND CONTACT THE FIRE DEPT. AND TNRCC.

III. SANITARY WASTE:

ALL SANITARY WASTE SHALL BE COLLECTED FROM THE CONSTRUCTION PORTABLE UNITS AS NECESSARY OR AS REQUIRED, CHAPTER 18.08 (BUILDING CODE), BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR. ALL WASTE MATERIAL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

IV. SPILL PREVENTION:

THE FOLLOWING PRACTICES SHALL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL EXPOSURES OF MATERIALS TO STORM WATER RUNOFF.

V. GOOD HOUSEKEEPING:

A. STORE ONLY ENOUGH PRODUCTS REQUIRED TO DO THE JOB
B. NEATLY STORE MATERIALS ON-SITE IN AN ORDERLY MANNER
C. KEEP PRODUCTS IN THEIR ORIGINAL CONTAINER
D. DO NOT MIX SUBSTANCES WITH ONE ANOTHER, UNLESS OTHERWISE RECOMMENDED BY THE MANUFACTURER
E. USE ENTIRE CONTENTS OF A PRODUCT BEFORE DISPOSING THE CONTAINER
F. FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL

VI. HAZARDOUS PRODUCTS:

PRACTICES USED TO REDUCE RISKS:

A. KEEP PRODUCTS IN THEIR ORIGINAL CONTAINER IF AT ALL POSSIBLE
B. RETAIN ORIGINAL LABELS, PRODUCT INFORMATION AND MATERIAL SAFETY DATA SHEETS (MSDS)
C. DISPOSE SURPLUS PRODUCT IN ACCORDANCE WITH MANUFACTURER'S OR LOCAL & STATE RECOMMENDED METHODS

VII. PETROLEUM PRODUCTS:

ALL ON-SITE VEHICLES SHALL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTIVE MAINTENANCE TO REDUCE THE CHANCE OF LEAKAGE. PETROLEUM PRODUCTS SHALL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT SUBSTANCES USED ON-SITE SHALL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATION.

VIII. SPILL CONTROL PRACTICES:

A. MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP SHALL BE CLEARLY POSTED AND SITE PERSONNEL SHALL BE MADE AWARE OF THE PROCEDURES:
B. MATERIALS AND EQUIPMENT NECESSARY FOR CLEANUP SHALL BE KEPT IN THE MATERIAL STORAGE AREA ON-SITE:
C. ALL SPILLS SHALL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY
D. SPILL AREA SHALL BE WELL VENTILATED AND APPROPRIATE CLOTHING WILL BE WORN:
E. ANY SPILL SHALL BE REPORTED TO THE APPROPRIATE GOVERNMENTAL AGENCY
F. MEASURES SHALL BE TAKEN TO PREVENT A SPILL FROM REOCCURRING

IX. MAINTENANCE AND INSPECTION PROCEDURES:

ALL POLLUTION PREVENTION MEASURES SHALL BE INSPECTED AT LEAST ONCE A MONTH OR WITHIN 24-HOURS PRIOR TO ANTICIPATED STORM EVENT AND FOLLOWING A STORM EVENT OF 0.5 INCHES OR MORE. INSPECTION IN FINAL STABILIZED AREAS OR DURING ARID PERIODS WILL BE CONDUCTED MONTHLY, BEST MANAGEMENT PRACTICES AND POLLUTION CONTROL PROCEDURES SHALL BE INSPECTED FOR ADEQUACY.

X. REMARKS:

DISPOSAL AREAS, STOCKPILES, AND HAUL ROADS SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE AND CONTROL THE AMOUNT OF SEDIMENT THAT MAY ENTER RECEIVING WATERS. DISPOSAL AREAS SHALL NOT BE LOCATED IN ANY WETLAND, WATERBODY OR STREAMBED. CONSTRUCTION STAGING AREAS AND VEHICLE MAINTENANCE AREAS SHALL BE CONSTRUCTED BY THE CONTRACTOR IN A MANNER TO MINIMIZE THE RUNOFF OF POLLUTANTS. ALL WATERWAYS SHALL BE CLEANED AS SOON AS PRACTICABLE OF TEMPORARY EMBANKMENT, TEMPORARY BRIDGES, MATTING, FALSEWORK, PILING DEBRIS OR OTHER OBSTRUCTIONS PLACED DURING CONSTRUCTION OPERATIONS THAT ARE NOT A PART OF THE FINISHED WORK.

XI. OFFSITE VEHICLE TRACKING:

IN ADDITION TO THE STABILIZED CONSTRUCTION ENTRANCES, THE FOLLOWING MEASURES SHALL BE OBSERVED DURING CONSTRUCTION:

- HAUL ROADS SHALL BE DAMPENED FOR DUST CONTROL
- LOADED HAUL TRUCKS SHALL BE COVERED WITH TARPAULIN
- EXCESS DIRT ON ROAD SHALL BE REMOVED IMMEDIATELY
- STABILIZED CONSTRUCTION ENTRANCE
- OTHER:

95% SUBMITTAL -- FOR ENGINEERING REVIEW ONLY NOT TO BE USED FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION

WARNING ! BEFORE YOU DIG
CALL
1-800-DIG-TESS
1-800-344-8377
FOR FIELD LOCATING EXISTING UTILITIES

ENGINEER'S SEAL

THESE PLANS WERE RELEASED UNDER THE AUTHORITY OF MARCOS MEDINA, PE #93830 TO BE ISSUED AS A **95% SUBMITTAL** TO EL PASO WATER FOR REVIEW. IT IS NOT TO BE USED FOR CONSTRUCTION OR FINAL PERMIT ISSUANCE.

DESIGNED	F.S.
DRAWN	E.G./E.C.
CHECKED	M.M./B.K.
DATE	09/30/2021

UTILITY OWNER

el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

CONSULTANT

PLANNING ENGINEERING PROJECT MANAGEMENT
MCi Moreno Cardenas Inc.
EL PASO • SAN ANTONIO
2505 E. Missouri Ave. El Paso, TX 79903 (915) 532-2091
9601 McAllister Freeway #207, San Antonio TX 78216 (210) 314-3553
Texas Board of Professional Engineers Registration No. F-000554

NE ASR ENHANCED ARROYO PHASE I

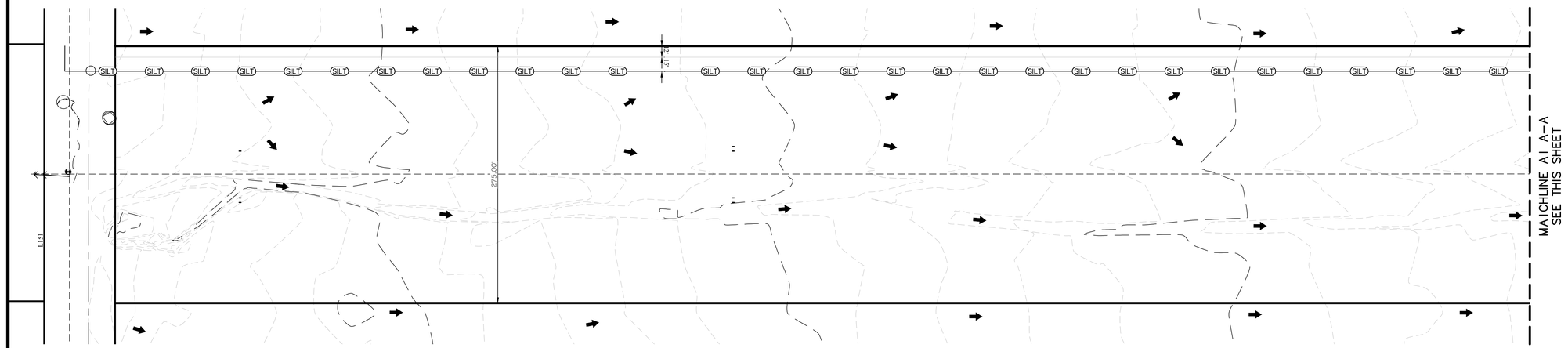
SWPPP NOTES

THESE CONTRACT DOCUMENTS HAVE BEEN PREPARED SPECIFICALLY AND EXCLUSIVELY FOR THE DESIGN OF "NE ASR ENHANCED ARROYO PHASE I"

MORENO CARDENAS INC. IS NOT RESPONSIBLE FOR THEIR USE ON ANY OTHER PROJECT OR APPLICATION.

JOB NO.	20-110
SEQUENCE NO.	1 OF 4
SHEET NO.	C14.0

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FLOOD ZONE "A1"

AREAS OF 100–YEAR FLOOD; BASE FLOOD ELEVATIONS AND FLOOD HAZARD FACTORS DETERMINED.

FIRM – FLOOD INSURANCE RATE MAP CITY OF EL PASO, EL PASO COUNTY, TX.

THIS PROJECT IS LOCATED WITHIN ZONE "A1" AS DESIGNATED IN PANEL NO. 480214–008 C AND 480214–009 D, DATED JUNE 15, 1988 OF THE FLOOD INSURANCE RATE MAPS IN THE AREAS OF CITY OF EL PASO, EL PASO COUNTY, TEXAS.

LEGEND

- SILT — TEMPORARY SEDIMENT CONTROL FENCE
- ECL — TEMPORARY EROSION CONTROL LOG
- FLOW DIRECTION
- STABILIZED CONSTRUCTION ENTRANCE/ EXIT
- CONCRETE TRUCK WASH OUT
- NOTICE OF INTENT
- PORTABLE TOILETS
- STAGING AREA

STAGING AREA

CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AN AREA TO BE USED FOR STAGING.

NOTES

1. STABILIZED CONSTRUCTION EXITS TO BE PLACED AT ACCESS POINTS COORDINATED WITH AND APPROVED BY THE STREET DEPARTMENT.
2. SW3P SIGN SHALL BE LOCATED WITHIN ON–SITE OFFICE.
3. CONTRACTOR TO POST T.C.E.Q. CONSTRUCTION SITE NOTICE ON THE JOB SITE.
4. SEDIMENT CONTROL FENCE TO BE LOCATED DOWNSTREAM ROW LINE OR AT PROPOSED GRADING LIMITS OR AS PER DIRECTION OF THE ENGINEER.
5. LOCATION OF CONSTRUCTION EXITS ARE PRELIMINARY AND ARE TO BE LOCATED AS PER DIRECTION OF THE ENGINEER.
6. EXISTING INLETS TO BE PROTECTED WITH SILT FENCE DURING CONSTRUCTION UNTIL REMOVAL.

0 60
SCALE: 1"=60'

95% SUBMITTAL -- FOR ENGINEERING REVIEW ONLY NOT TO BE USED FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION

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1–800–DIG–TESS
1–800–344–8377
FOR FIELD LOCATING EXISTING UTILITIES

ENGINEER'S SEAL

THESE PLANS WERE RELEASED UNDER THE AUTHORITY OF MARCOS MEDINA, PE #93830 TO BE ISSUED AS A **95% SUBMITTAL** TO EL PASO WATER FOR REVIEW. IT IS NOT TO BE USED FOR CONSTRUCTION OR FINAL PERMIT ISSUANCE.

DESIGNED	F.S.
DRAWN	E.G./E.C.
CHECKED	M.M./B.K.
DATE	09/30/2021

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594–5500

CONSULTANT
PLANNING ENGINEERING PROJECT MANAGEMENT
MCi Moreno Cardenas Inc.
EL PASO • SAN ANTONIO
2505 E. Missouri Ave. El Paso, TX 79903 (915) 532-2091
9601 McAllister Freeway #207, San Antonio TX 78216 (210) 314-3553
Texas Board of Professional Engineers Registration No. F-000554

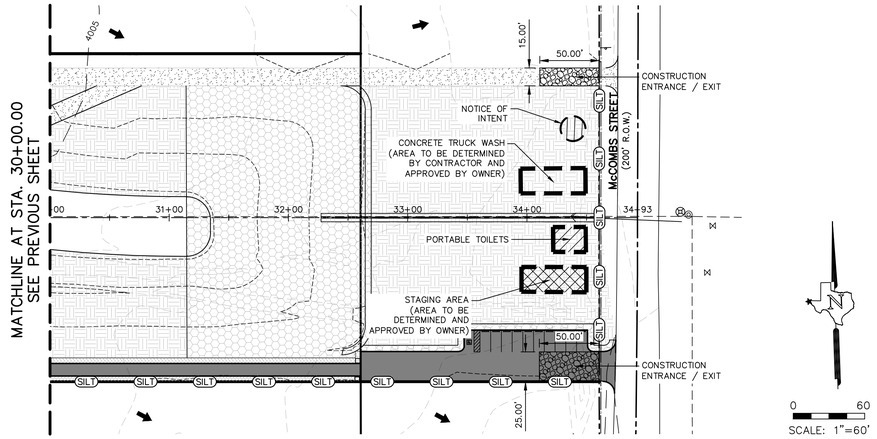
NE ASR ENHANCED ARROYO PHASE I

STORMWATER POLLUTION PREVENTION PLAN

THESE CONTRACT DOCUMENTS HAVE BEEN PREPARED SPECIFICALLY AND EXCLUSIVELY FOR THE DESIGN OF "NE ASR ENHANCED ARROYO PHASE I" MORENO CARDENAS INC. IS NOT RESPONSIBLE FOR THEIR USE ON ANY OTHER PROJECT OR APPLICATION.

JOB NO. 20–110
SEQUENCE NO. 2 OF 4
SHEET NO. C14.1

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FLOOD ZONE "A1"

AREAS OF 100–YEAR FLOOD; BASE FLOOD ELEVATIONS AND FLOOD HAZARD FACTORS DETERMINED.

FIRM – FLOOD INSURANCE RATE MAP CITY OF EL PASO, EL PASO COUNTY, TX.

THIS PROJECT IS LOCATED WITHIN ZONE "A1" AS DESIGNATED IN PANEL NO. 480214–008 C AND 480214–009 D, DATED JUNE 15, 1988 OF THE FLOOD INSURANCE RATE MAPS IN THE AREAS OF CITY OF EL PASO, EL PASO COUNTY, TEXAS.

LEGEND

- SILT — TEMPORARY SEDIMENT CONTROL FENCE
- ECL — TEMPORARY EROSION CONTROL LOG
- FLOW DIRECTION
- STABILIZED CONSTRUCTION ENTRANCE/ EXIT
- CONCRETE TRUCK WASH OUT
- NOTICE OF INTENT
- PORTABLE TOILETS
- STAGING AREA

STAGING AREA

CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AN AREA TO BE USED FOR STAGING.

NOTES

1. STABILIZED CONSTRUCTION EXITS TO BE PLACED AT ACCESS POINTS COORDINATED WITH AND APPROVED BY THE STREET DEPARTMENT.
2. SW3P SIGN SHALL BE LOCATED WITHIN ON–SITE OFFICE.
3. CONTRACTOR TO POST T.C.E.Q. CONSTRUCTION SITE NOTICE ON THE JOB SITE.
4. SEDIMENT CONTROL FENCE TO BE LOCATED DOWNSTREAM ROW LINE OR AT PROPOSED GRADING LIMITS OR AS PER DIRECTION OF THE ENGINEER.
5. LOCATION OF CONSTRUCTION EXITS ARE PRELIMINARY AND ARE TO BE LOCATED AS PER DIRECTION OF THE ENGINEER.
6. EXISTING INLETS TO BE PROTECTED WITH SILT FENCE DURING CONSTRUCTION UNTIL REMOVAL.

95% SUBMITTAL -- FOR ENGINEERING REVIEW ONLY NOT TO BE USED FOR CONSTRUCTION

REV.	DATE	BY	DESCRIPTION

WARNING ! BEFORE YOU DIG
CALL
1–800–DIG–TESS
1–800–344–8377
FOR FIELD LOCATING EXISTING UTILITIES

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1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
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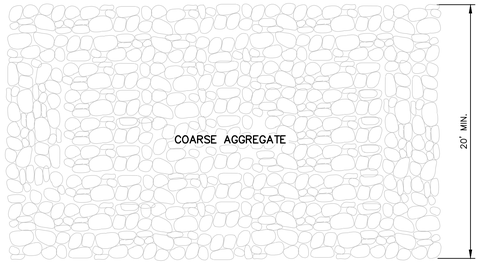
NE ASR ENHANCED ARROYO PHASE I

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JOB NO.	20–110
SEQUENCE NO.	3 OF 4
SHEET NO.	C14.2

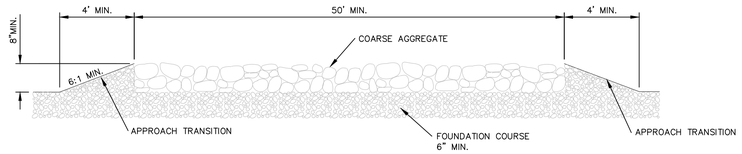
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PLAN

GENERAL NOTES:

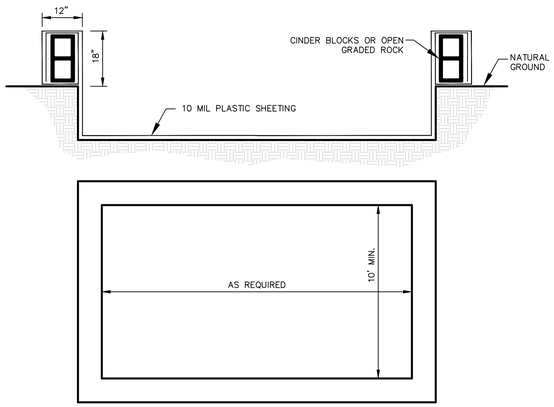
1. THE LENGTH OF THE TYPE 1 CONSTRUCTION EXIT SHALL BE AS INDICATED ON THE PLANS, BUT NOT LESS THAN 50'.
2. THE COARSE AGGREGATE SHOULD BE OPEN GRADED WITH A SIZE OF 4" TO 8".
3. THE APPROACH TRANSITIONS SHOULD BE NO STEEPER THAN 6:1 AND CONSTRUCTED AS DIRECTED BY THE ENGINEER.
4. THE CONSTRUCTION EXIT FOUNDATION COURSE SHALL BE FLEXIBLE BASE, BITUMINOUS CONCRETE, PORTLAND CEMENT CONCRETE OR OTHER MATERIAL AS APPROVED BY THE ENGINEER.
5. THE CONSTRUCTION EXIT SHALL BE GRADED TO ALLOW DRAINAGE TO A SEDIMENT TRAPPING DEVICE. 6.THE GUIDELINES SHOWN HEREON ARE SUGGESTIONS ONLY AND MAY BE MODIFIED BY THE ENGINEER.



PROFILE

1 / C14.3 CONSTRUCTION EXIT (TYPE 1)

SCALE NOT NEEDED

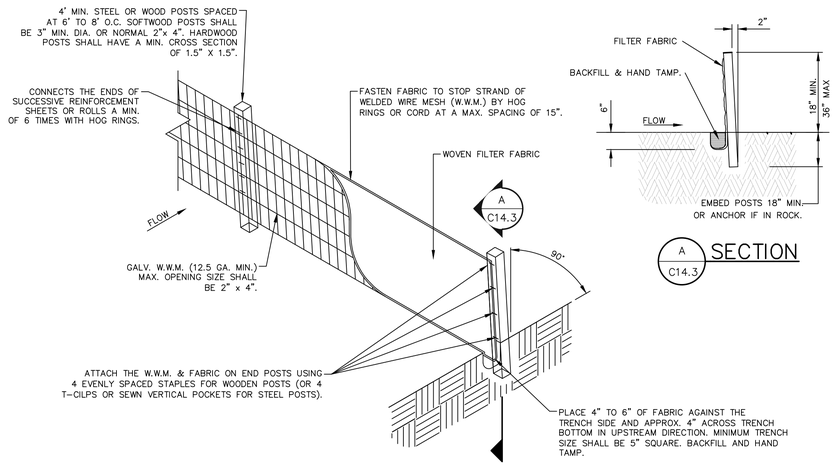


GENERAL NOTES

1. THE EXCAVATION FOR THE CONCRETE TRUCK WASHOUT SHALL BE A MINIMUM OF 10' WIDE AND OF SUFFICIENT LENGTH AND DEPTH TO ACCOMMODATE 7 GALLONS OF WASHOUT WATER AND CONCRETE PER TRUCK PER DAY AND/OR 50 GALLONS OF WASHOUT WATER AND CONCRETE PER PUMP TRUCK PER DAY.
2. IN THE EVENT THAT THE SELF-INSTALLED CONCRETE TRUCK WASHOUT IS CONSTRUCTED ABOVE GROUND, IT SHALL BE 10' WIDE AND 10' LONG WITH THE SAME REQUIREMENTS FOR CONTAINMENT AS DESCRIBED IN ITEM 1.
3. THE CONTAINMENT ARE SHALL BE LINED WITH 10 MIL PLASTIC SHEETING, WITHOUT HOLES OR TEARS. WHERE THERE ARE SEAMS, THESE SHALL BE SECURED ACCORDING TO MANUFACTURER'S DIRECTIONS.
4. THE PLASTIC SHEETING SHALL BE OF SUFFICIENT SIZE SO THAT IT WILL OVERLAP THE TOP OF THE CONTAINMENT AREA AND BE WRAPPED AROUND THE CINDER BLOCKS OR OPEN GRADED ROCK AT LEAST 2 TIMES.
5. THE CINDER BLOCKS SHALL BE PLACED ABUTTING EACH OTHER TO FORM A CONTINUOUS BERM AROUND THE PERIMETER OF THE CONTAINMENT AREA.
6. THE BERM CONSISTING OF CINDER BLOCKS OR OPEN GRADED ROCK SHALL BE NO LESS THAN 18" HIGH AND NO LESS THAT 12" WIDE.
7. THE CONTAINMENT AREA SHALL NOT EXCEED 50% OF CAPACITY AT ANY ONE TIME.
8. SOLIDS SHALL BE REMOVED FROM THE CONTAINMENT AREA AND DISPOSED OF PROPERLY AND ANY DAMAGE TO THE PLASTIC SHEETING SHALL BE REPAIRED OR SHEETING REPLACED BEFORE NEXT USE.

2 / C14.3 CONCRETE TRUCK WASHOUT

SCALE: NTS



A / C14.3 SECTION

3 / C14.3 TEMPORARY SEDIMENT CONTROL FENCE

ISOMETRIC VIEW

95% SUBMITTAL -- FOR ENGINEERING REVIEW ONLY NOT TO BE USED FOR CONSTRUCTION

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1-800-344-8377
FOR FIELD LOCATING EXISTING UTILITIES

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DESIGNED F.S.
DRAWN E.G./E.C.
CHECKED M.M./B.K.
DATE 09/30/2021

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

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MCi Moreno Cardenas Inc.
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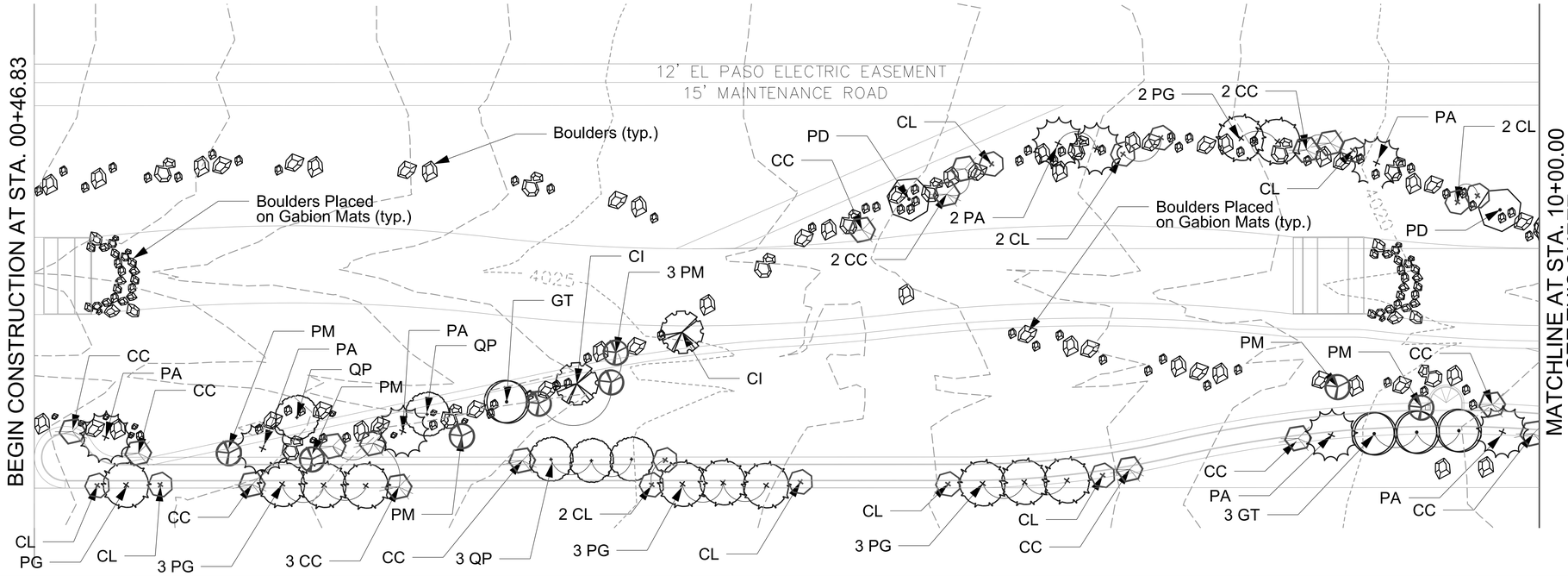
NE ASR ENHANCED ARROYO PHASE I

SWPPP DETAILS

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JOB NO. **20-110**
SEQUENCE NO. **4** OF **4**
SHEET NO. **C14.3**

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LEGEND

EDGE ASPHALT TRAIL

EDGE EXIST ROAD OR CONCRETE PAVING

PROP, SHADE OR ORNAMENTAL TREE SEE PLANT QUANTITY TABLE

PROPOSED BOULDERS

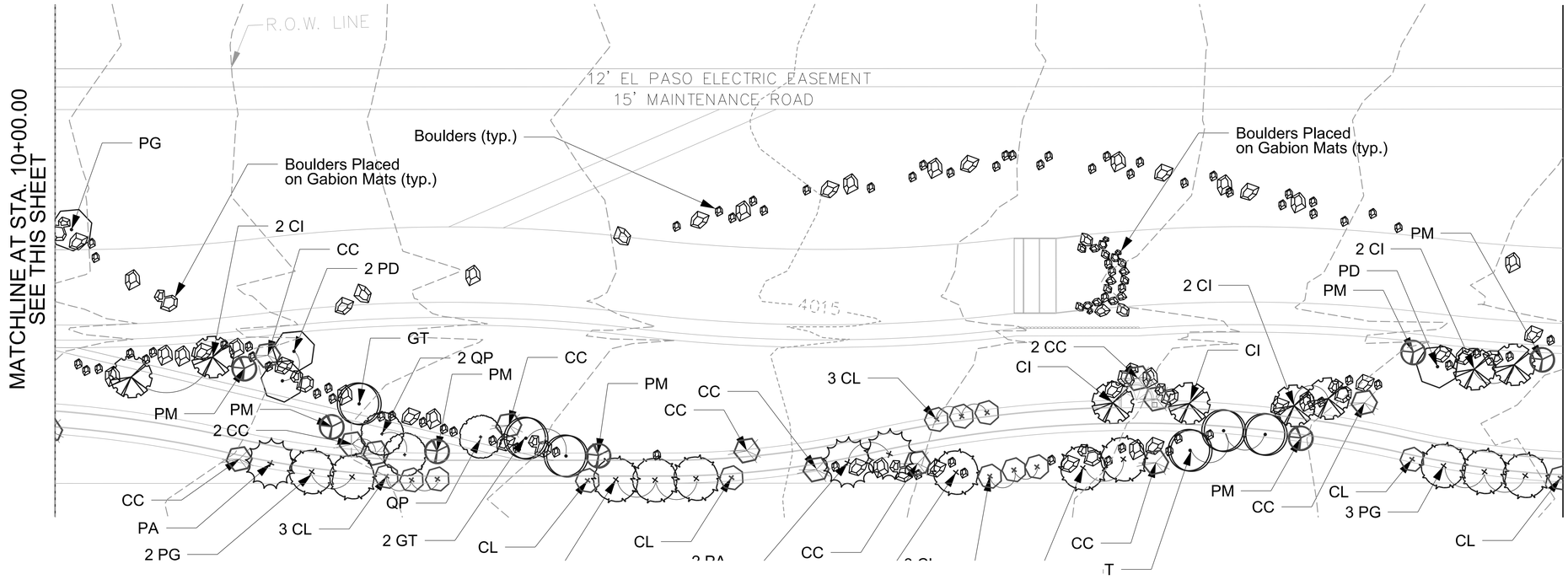
NOTES:

1. COORDNATE BOULDER PLACEMENT ON TOP OF GABION MATS WITH CIVIL PLANS.

2. SEE SHEETS L3.1 THROUGH L3.5 FOR LANDSCAPE DETAILS.

0 40 80

1" = 40'-0"



LANDSCAPE QUANTITY TABLE

SYMBOL	ABBREV.	QTY	COMMON NAME
	CC	28	MEXICAN RED BUD
	CI	10	PECAN
	CL	25	DESERT WILLOW
	PG	23	HONEY MESQUITE
	PD	5	COTTONWOOD
	GT	10	HONEY LOCUST
	PA	11	ALEPPO PINE
	PM	15	MEXICAN PLUM
	QP	8	MEXICAN WHITE OAK
		338	BOULDERS
		2	TRASH RECEPTACLES (SEE DETAILS)

0 40 80

1" = 40'-0"

REV.	DATE	BY	DESCRIPTION

WARNING ! BEFORE YOU DIG
CALL
1-800-DIG-TESS
1-800-344-8377
FOR FIELD LOCATING EXISTING UTILITIES

Meridian Green Works, LLC
974 Perry Lane
Thorndale, Texas 76577
512.838.6858

REGISTERED LANDSCAPE ARCHITECT WAYNE COOPER 1286 STATE OF TEXAS
1-9-2022

DESIGNED HWC
DRAWN
CHECKED
DATE 1/4/2022

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

CONSULTANT
PLANNING ENGINEERING PROJECT MANAGEMENT
Moreno Cardenas Inc.
EL PASO · SAN ANTONIO
2505 E. Missouri Ave. El Paso, TX 79903 (915) 532-2091
9601 McAllister Freeway #207, San Antonio TX 78216 (210) 314-3553
Texas Board of Professional Engineers Registration No. F-000554

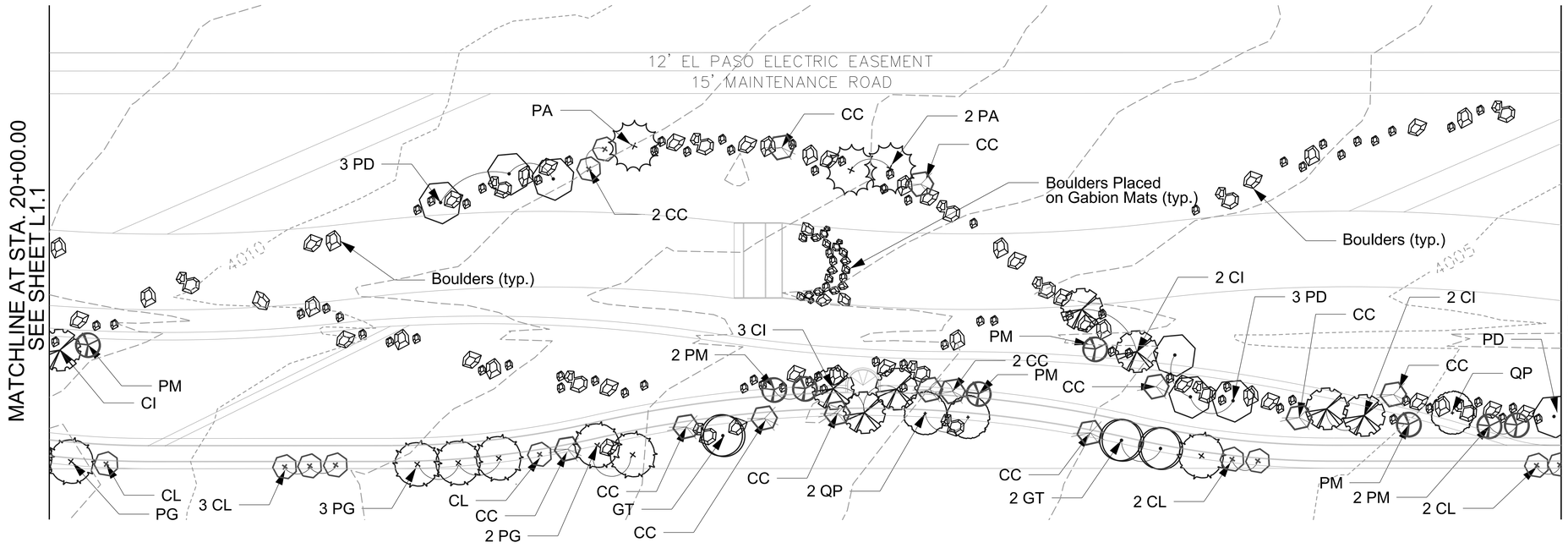
NE ASR ENHANCED ARROYO PHASE I

LANDSCAPE PLAN

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MERIDIAN GREEN WORKS, LLC IS NOT RESPONSIBLE FOR THEIR USE ON ANY OTHER PROJECT OR APPLICATION.

JOB NO. 20-110
SEQUENCE NO. 1 OF 2
SHEET NO. L1.1

F:\20110\XREF\For W. Cooper\20-110 TLR ttblk 24x36 for Wayne.dwg Time:Nov17,2020-04:15pm Login:edgar



LEGEND

EDGE ASPHALT TRAIL

EDGE EXIST ROAD OR CONCRETE PAVING

PROP. SHADE OR ORNAMENTAL TREE
SEE PLANT QUANTITY TABLE

PROPOSED BOULDERS

NOTES:

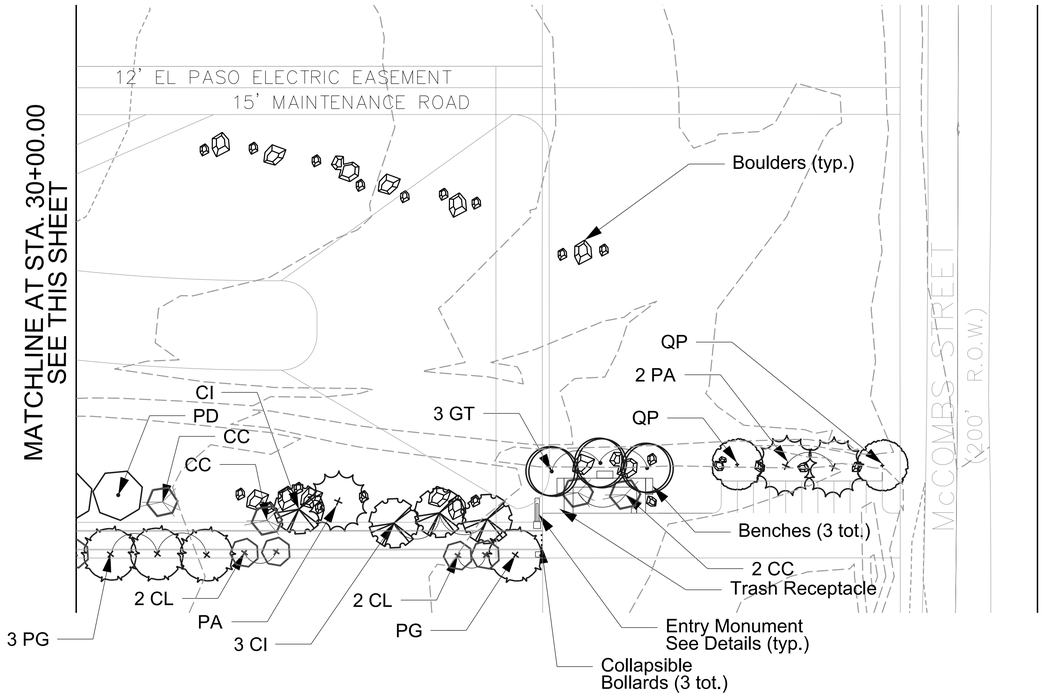
1. COORDNATE BOULDER PLACEMENT ON TOP OF GABION MATS WITH CIVIL PLANS.

2. SEE SHEETS L3.1 THROUGH L3.5 FOR LANDSCAPE DETAILS.

3. COLLAPSIBLE BOLLARDS TO BE ANCHORED TO CONCRETE PAVING. COORDINATE LOCATIONS WITH CIVIL PLANS FOR PARKING LOT AND TRAIL.

0 40 80

1" = 40'-0"



END PROJECT AT STA. 34+00.00

0 40 80

1" = 40'-0"

LANDSCAPE QUANTITY TABLE

SYMBOL	ABBREV.	QTY	COMMON NAME
	CC	16	MEXICAN RED BUD
	CI	11	PECAN
	CL	14	DESERT WILLOW
	PG	10	HONEY MESQUITE
	PD	8	COTTONWOOD
	GT	6	HONEY LOCUST
	PA	6	ALEPPO PINE
	PM	7	MEXICAN PLUM
	QP	5	MEXICAN WHITE OAK
		186	BOULDERS
		3	BENCHES
		2	TRASH RECEPTACLES (SEE DETAILS)
		3	COLLAPSIBLE BOLLARDS
		1	ENTRY MONUMENT

REV.	DATE	BY	DESCRIPTION

WARNING !
BEFORE YOU DIG
CALL
1-800-DIG-TESS
1-800-344-8377
FOR FIELD LOCATING EXISTING UTILITIES

Meridian Green Works, LLC
974 Perry Lane
Thorndale, Texas 76577
512.838.6858

REGISTERED LANDSCAPE ARCHITECT
"WAYNE COOPER"
1286
STATE OF TEXAS
1-4-2022

DESIGNED HWC
DRAWN
CHECKED
DATE 1/4/2022

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

CONSULTANT
PLANNING ENGINEERING PROJECT MANAGEMENT
MCi Moreno Cardenas Inc.
EL PASO • SAN ANTONIO
2505 E. Missouri Ave. El Paso, TX 79903 (915) 532-2091
9601 McAllister Freeway #207, San Antonio TX 78216 (210) 314-3553
Texas Board of Professional Engineers Registration No. F-000554

NE ASR ENHANCED ARROYO PHASE I

LANDSCAPE PLAN

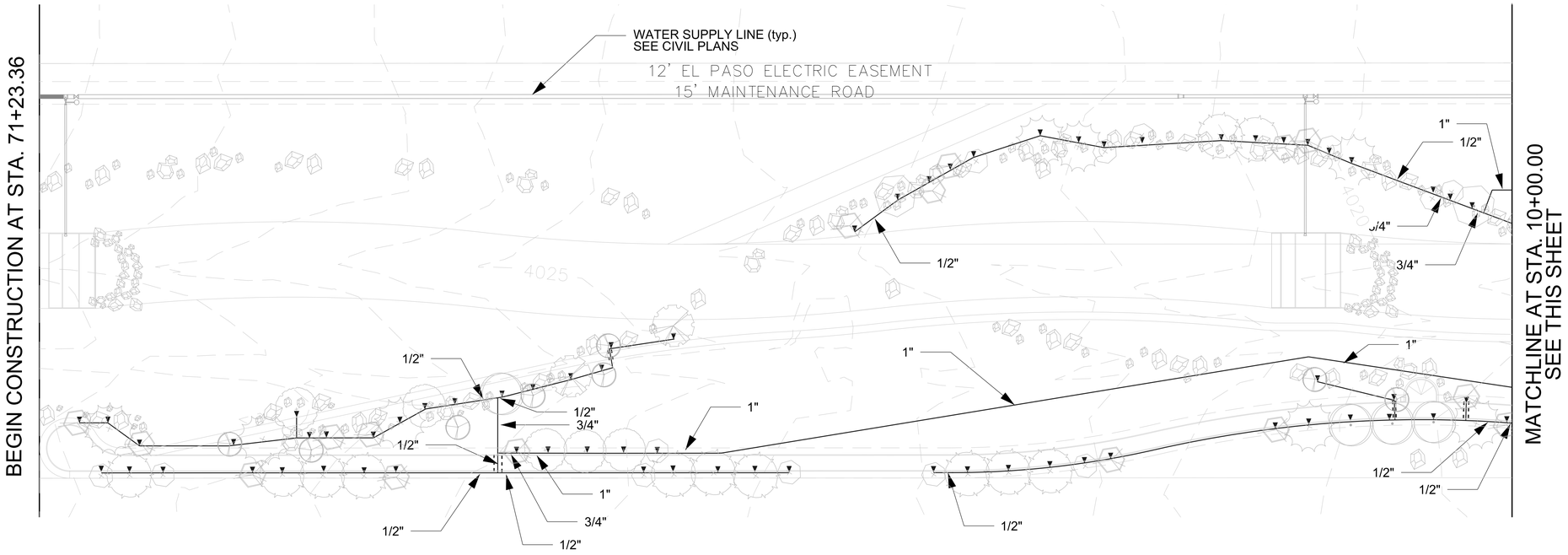
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JOB NO. 20-110

SEQUENCE NO. 2 OF 2

SHEET NO. L1.2

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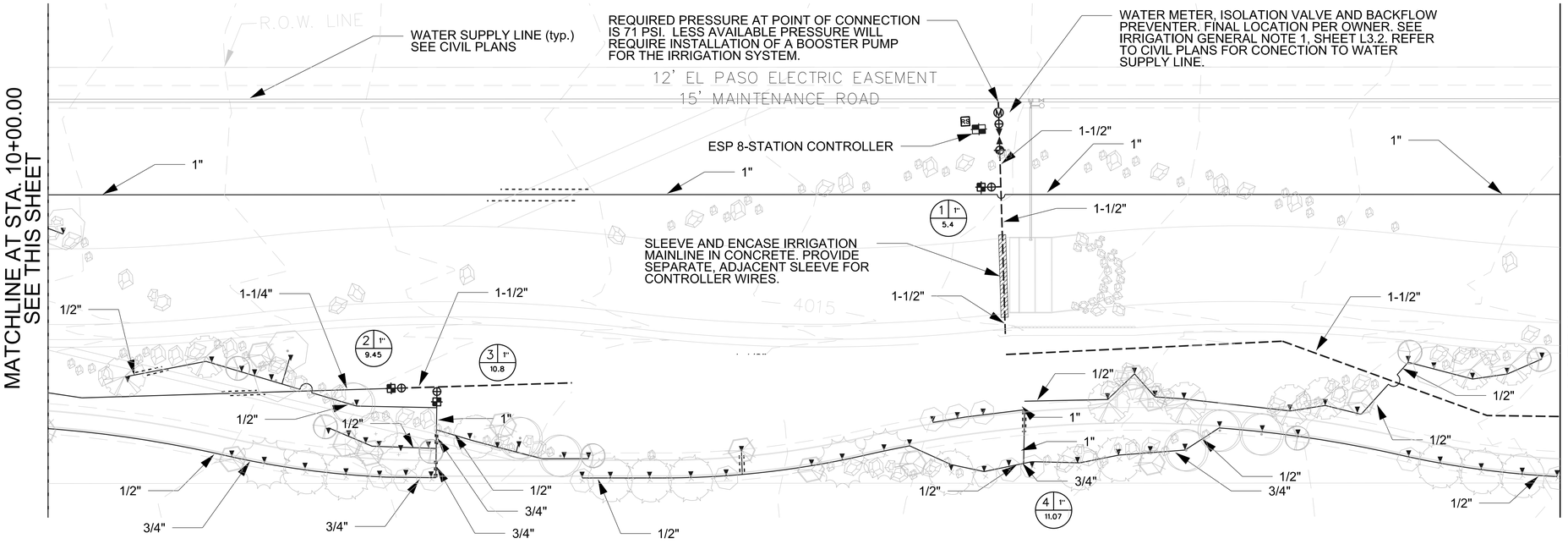


LEGEND

- EXISTING WATER LINE
- EXISTING SEWER LINE
- IRRIGATION WATER METER
- ISOLATION VALVE. MATCH MAINLINE SIZE. SEE DETAILS FOR ADDITIONAL INFORMATION.
- 1-1/2" FEBCO MODEL 825Y REDUCED PRESSURE ZONE ASSEMBLY BACKFLOW PREVENTION DEVICE.
- RAIN BIRD PEB MASTER VALVE, IN HEAVY DUTY PLASTIC BOX WITH LOCKING LID. MATCH MAINLINE SIZE.
- RAINBIRD XCZ-100-PRB-COM CONTROL ZONE KIT WITH PRESSURE REGULATING BASKET FILTER.
- RAIN BIRD ESP 8-STATION CONTROLLER IN STAINLESS STEEL PEDESTAL CABINET.
- RAINBIRD RSD-BEx RAIN SENSOR.
- RAINBIRD XERI-BIRD 8 MULTI-OUTLET EMISSION DEVICE RAINBIRD XB-20PC DRIP EMITTERS - 6 PER TREE
- SCH 40 PVC MAIN LINE PIPE. SIZE AS INDICATED ON PLANS.
- SDR 21, CLASS 200 PVC LATERAL LINE. SIZE AS INDICATED ON PLANS. SEE IRRIGATION NOTES.
- PVC SCHEDULE 40 SLEEVE, 2" LARGER THAN PIPE SIZE.

STATION NO. — VALVE SIZE
GALLONS PER MINUTE

0 40 80
1" = 40'-0"



NOTES:

1. SEE IRRIGATION DETAILS FOR SPECIFIC INFORMATION ABOUT ISOLATION VALVES, BACKFLOW PREVENTION, ETC.
2. METER LOCATION IS PROPOSED. SEE CIVIL PLANS FOR FINAL LOCATION OF IRRIGATION WATER METER.
3. BACKFLOW PREVENTION TO BE APPROVED BY OWNER PRIOR TO INSTALLATION. AT OWNER'S REQUEST, A SUBSTITUTE BACKFLOW PREVENTION DEVICE MAY BE USED IN LIEU OF THE REDUCED PRESSURE ZONE DEVICE SHOWN ON THE PLANS.

0 40 80
1" = 40'-0"

REV.	DATE	BY	DESCRIPTION

WARNING ! BEFORE YOU DIG
CALL
1-800-DIG-TESS
1-800-344-8377
FOR FIELD LOCATING EXISTING UTILITIES

Meridian Green Works, LLC
974 Perry Lane
Thorndale, Texas 76577
512.838.6858

STATE OF TEXAS — 12326 — Harold Wayne Cooper, IV — LICENSED IRRIGATOR
1-4-2022

DESIGNED HWC
DRAWN
CHECKED
DATE 1/4/2022

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

CONSULTANT
PLANNING ENGINEERING PROJECT MANAGEMENT
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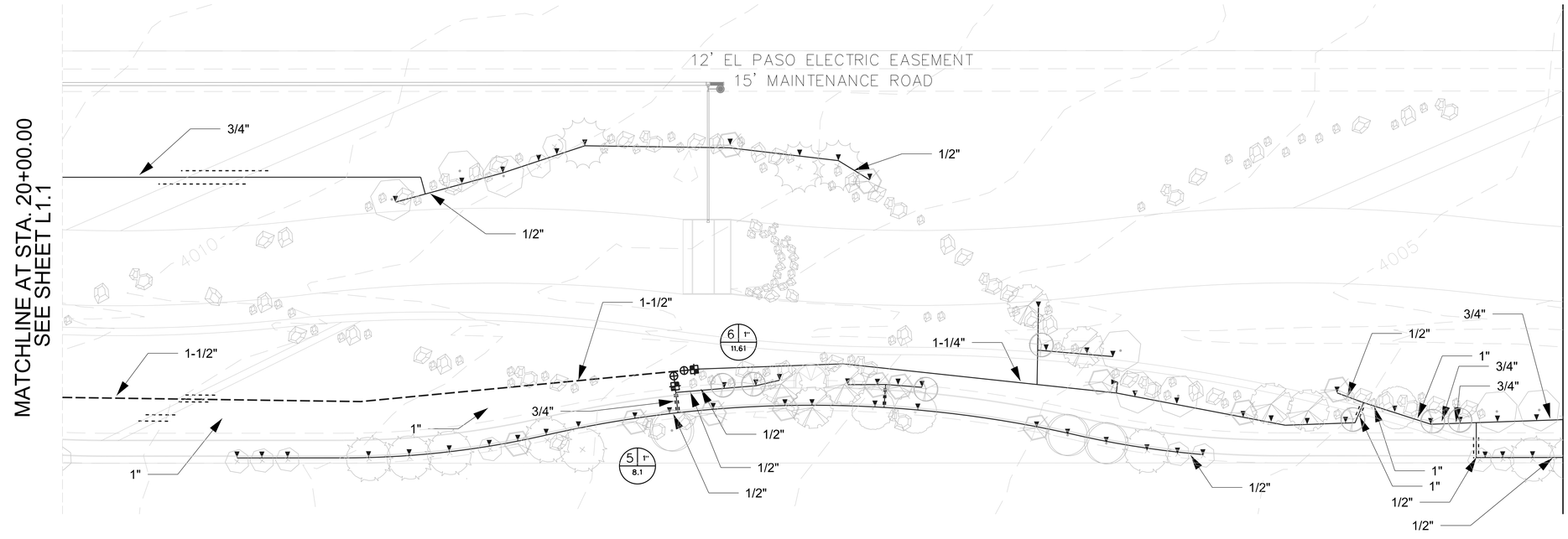
NE ASR ENHANCED ARROYO PHASE I

IRRIGATION PLAN

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JOB NO. 20-110
SEQUENCE NO. 1 OF 2
SHEET NO. L2.1

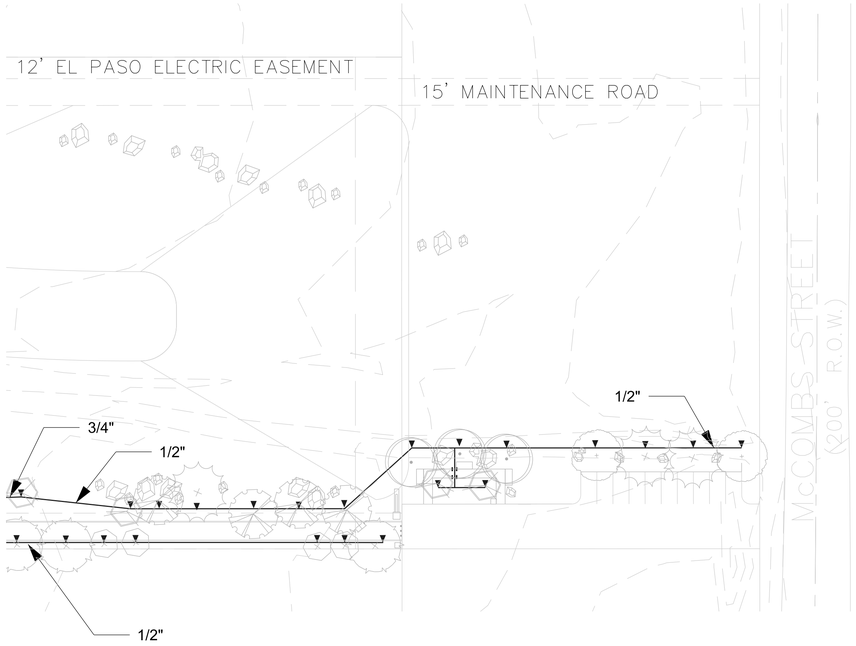
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LEGEND

- EXISTING WATER LINE
- EXISTING SEWER LINE
- IRRIGATION WATER METER
- ISOLATION VALVE. MATCH MAINLINE SIZE. SEE DETAILS FOR ADDITIONAL INFORMATION.
- 1-1/2" FEBCO MODEL 825Y REDUCED PRESSURE ZONE ASSEMBLY BACKFLOW PREVENTION DEVICE.
- RAIN BIRD PEB MASTER VALVE, IN HEAVY DUTY PLASTIC BOX WITH LOCKING LID. MATCH MAINLINE SIZE.
- RAINBIRD XCZ-100-PRB-COM CONTROL ZONE KIT WITH PRESSURE REGULATING BASKET FILTER.
- RAINBIRD TBOS-BT BATTERY POWERED CONTROLLER. SEE PLANS FOR NUMBER OF STATIONS PER CONTROLLER.
- RAINBIRD RSD-BEx RAIN SENSOR.
- RAINBIRD XERI-BIRD 8 MULTI-OUTLET EMISSION DEVICE RAINBIRD XB-20PC DRIP EMITTERS - 8 PER TREE
- SCH 40 PVC MAIN LINE PIPE, SIZE AS INDICATED ON PLANS.
- SDR 21, CLASS 200 PVC LATERAL LINE. SIZE AS INDICATED ON PLANS. SEE IRRIGATION NOTES.
- PVC SCHEDULE 40 SLEEVE, 2" LARGER THAN PIPE SIZE.

STATION NO. — VALVE SIZE
X | 1½"
18.0
GALLONS PER MINUTE



END PROJECT AT STA. 34+00.00

NOTES:

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0 40 80
1" = 40'-0"

REV.	DATE	BY	DESCRIPTION

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1-800-344-8377
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974 Perry Lane
Thorndale, Texas 76577
512.838.6858

STATE OF TEXAS
Harold Wayne Cooper, Jr.
12326
LICENSED IRRIGATOR
1-2-2022

DESIGNED HWC
DRAWN
CHECKED
DATE 1/4/2022

UTILITY OWNER
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EL PASO, TEXAS 79925
(915) 594-5500

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Texas Board of Professional Engineers Registration No. F-000554

NE ASR ENHANCED ARROYO PHASE I

IRRIGATION PLAN

THESE CONTRACT DOCUMENTS HAVE BEEN PREPARED SPECIFICALLY AND EXCLUSIVELY FOR THE DESIGN OF
"NE ASR ENHANCED ARROYO PHASE I"
MERIDIAN GREEN WORKS, LLC IS NOT RESPONSIBLE FOR THEIR USE ON ANY OTHER PROJECT OR APPLICATION.

JOB NO. 20-110
SEQUENCE NO. 2 OF 2
SHEET NO. L2.2

F:\20110\XREF\For W. Cooper\20-110 TLR titblk 24x36 for Wayne.dwg Time:Nov17,2020-04:15pm Login:edgpr

LANDSCAPE PLANTING NOTES:

1). CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ANY EXISTING UNDERGROUND UTILITIES OR OBSTACLES. CONTRACTOR SHALL MAKE GOOD ALL DAMAGE RESULTING FROM THEIR OPERATIONS, AT NO COST TO THE OWNER.

2). CONTRACTOR SHALL IMMEDIATELY NOTIFY OWNER UPON ENCOUNTERING UNKNOWN OBSTRUCTIONS, GRADE DIFFERENCES, OR CONDITIONS NOT INDICATED ON DRAWINGS. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR NECESSARY REVISIONS DUE TO FAILURE TO GIVE SUCH NOTIFICATION.

3). CONTRACTOR TO RECEIVE THE SITE AS CURRENT CONDITIONS EXIST.

4). FINAL LOCATIONS OF ALL PLANT MATERIAL SHALL BE SUBJECT TO THE APPROVAL OF THE OWNER.

5). CONTRACTOR SHALL NOTIFY OWNER 48 HOURS IN ADVANCE OF COMMENCEMENT OF WORK, TO COORDINATE PROJECT INSPECTION SCHEDULES.

6). ALL PLANT MATERIALS SHALL BE TRIANGULAR SPACED, OR AS INDICATED ON THE DRAWINGS.

7). SEE PLANT LIST ON FOR TYPE, SIZE, AND VARIETY OF PLANT MATERIAL. QUANTITIES SHOWN FOR CONVENIENCE ONLY. VERIFY QUANTITIES ON PLAN SHEETS. CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF PLANT MATERIAL QANTITIES.

8). IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PREVENT PLANTS FROM FALLING OR BEING BLOWN OVER AND TO STRAIGHTEN OR REPLANT ALL PLANTS WHICH ARE DAMAGED DUE TO WIND. PLANTS BLOWN OVER BY HIGH WINDS SHALL NOT BE A CAUSE FOR ADDITIONAL EXPENSE TO THE OWNER, BUT SHALL BE THE FINANCIAL RESPONSIBILITY OF CONTRACTOR.

9). TOPSOIL MATERIAL FOR PLANTING,SHALL BE FREE FROM HARD CLODS, STIFF CLAY, HARD PAN, STONES LARGER THAN 1" IN DIAMETER, NOXIOUS WEEDS AND PLANTS, SOD, PARTIALLY DISINTEGRATED DEBRIS, INSECTS OR ANY OTHER UNDESIRABLE MATERIAL, PLANTS OR SEEDS THAT WOULD BE TOXIC OR HARMFUL TO GROWTH.

10). IN THE EVENT OF VARIATION BETWEEN QUANTITIES SHOWN ON THE PLANT LIST AND THE PLANS, THE PLANS SHALL CONTROL. IMPROPER PLANT COUNT MADE BY THE LANDSCAPE CONTRACTOR SHALL BE NO CAUSE FOR ADDITIONAL COSTS TO THE OWNER.

11). THE CONTRACTOR SHALL MEET BOTH THE CONTAINER SIZE AND CALIPER SIZE, AS WELL AS HEIGHT AND SPREAD SPECIFICATIONS SPECIFIED. ALL PLANT MATERIALS PROVIDED WILL BE IN COMPLIANCE WITH THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1), PUBLISHED BY THE AMERICAN NURSERY AND LANDSCAPE ASSOCIATION (LATEST EDITION) AND THE STANDARDIZED PLANT NAMES, PUBLISHED BY THE AMERICAN JOINT COMMITTEE ON HORTICULTURAL NOMMENCLATURE (LATEST EDITION).

12). EXCAVATE TWO TIMES GREATER THAN THE ROOT BALL DIAMETER OF TREES AND SHRUBS. SCARIFY BOTTOM OF PLANTING PIT BEFORE PLACING PLANT. PLACEMENT OF PLANT SHALL BE PERPENDICULAR TO GROUND.

13). CONTRACTOR WILL NOT PLANT MATERIAL SHOWN ON PLANS WHEN IT IS EVIDENT THAT FIELD CONDITIONS HAVE CHANGED SINCE PLANS WERE DRAWN. ANY CHANGES ARE TO BE BROUGHT TO THE ATTENTION OF THE OWNER BEFORE ANY PLANTING IS DONE IN THE AREA.

14). PLANT MATERIALS MAY BE AVAILABLE FROM THE FOLLOWING WHOLESALE NURSERIES:
a. Production Growers, 4950 Love Road, El Paso, TX 79922, (915) 584-0581, prodgrow@aol.com
b. Guzman's Garden Center, 540 N. Telshor, Las Cruces NM; (575) 521-0496, guzmansgreenhouse.com
c. Sierra Vista Wholesale Growers, 120 S. Vinton Rd., La Union, NM 88021, (575) 589-3924, wholesale@sierravistagrowersnm.com
d. Sunland Nursery Company, 620 Richardson Rd, Mesilla Park, NM 88047, (575) 524-4500, sunlandnursery.com
e. Arid Zone Trees, 750 E Germann Rd, Mesa, AZ 85212, (480) 987-9094, aridzonetrees.com
f. Monrovia Nurseries, 817 E. Monrovia Place, Azusa, CA 91702, (800) 999-9321, monrovia.com

CONTRACTOR TO PROVIDE PLANT AVAILABLITY WITHIN 30 DAYS OF COMMENCING WORK. PLANT SUBSTITUTIONS MAY BE PERMITTED WITH APPROVAL. REQUEST SUBSTITUTION IN WRITING GIVING REASONS FOR SUCH SUBSTITUTIONS.

15). TREAT ALL PLANTING AREAS (ALL AREAS WITHIN THE DRIP LINES OF TREES SHOWN ON THE PLANS) WITH AN APPLICATION OF PRE-EMERGENT HERBICIDE. FOLLOW MANUFACTURER'S INSTRUCTIONS FOR APPLICATION.

16). REMOVE ALL WIRE, STRING, WIRE BASKETS, BURLAP, CONTAINERS, ETC., FROM THE ROOTBALL OF PLANTS BEFORE BACKFILLING THE PLANTING HOLE.

17). WARRANTY FOR THE PLANTING MATERIAL SHALL BE ONE YEAR FROM THE DATE OF ACCEPTANCE.

18). THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL IRRIGATION SYSTEM AND LANDSCAPED/UN-LANDSCAPED MEDIAN MAINTENANCE AREAS(S) WITHIN PROJECT LIMITS. ANY WORK IN LANDSCAPED MEDIANS AND /OR DOUBLE FRONT PARKWAYS REQUIRES COORDINATION WITH CID AND STREETS AND MAINTENANCE DEPARTMENT. THESE AREAS WILL BE REMOVED FROM CITY'S MAINTENANCE SCHEDULE BEGINNING WITH ISSUANCE OF NTP ISSUANCE UNTIL THE TIME OF FINAL ACCEPTANCE OF THE PROJECT SITE. DURING CONSTRUCTION, WITHIN THE PROJECT LIMITS, THE CONTRACTOR WILL BE RESPONSIBLE FOR THE BI-WEEKLY MAINTENANCE OF THE MEDIANS WHICH INCLUDES BUT IS NOT LIMITED TO PICKING UP TRASH AND DEBRIS, ALL REPAIRS OF IRRIGATION SYSTEM LEAKS, VERIFICATION OF IRRIGATION SYSTEM WORKING PROPERLY TO PROVIDE ADEQUATE WATERING OF PLANTS, TREES, AND SHRUBS, PRUNING (TO INCLUDE 2 INCH SUCKERS), REPLACING VEGETATION, SHRUBSAND / OR TREES AND ADDRESSING ALL VISUAL OBSTRUCTIONS. STREET AND MAINTENANCE ALSO REQUIRES THAT ONCE CONSTRUCTION IS COMPLETED CONTRACTOR SHALL RESTORE THE MEDIAN AREA WITHIN THE PROJECT CONSTRUCTION LIMITS TO THE ORIGINAL CONDITION OR BETTER AND CONTRACTOR SHALL LEAVE ALL LANDSCAPING IN A MANICURED FASHION. STREETS AND MAINTENANCE DEPARTMENT WILL ADVISE PROJECT MANAGER OF ANY DEFICIENCIES AND CONTRACTOR SHALL ADDRESS ISSUES WITHIN 2 WEEKS.

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1-800-344-8377
FOR FIELD LOCATING EXISTING UTILITIES

Meridian Green Works, LLC
974 Perry Lane
Thorndale, Texas 76577
512.838.6858

REGISTERED LANDSCAPE ARCHITECT WAYNE COOPER 1298 STATE OF TEXAS
1-4-2022

DESIGNED	HWC
DRAWN	
CHECKED	
DATE	1/4/2022

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

CONSULTANT
PLANNING ENGINEERING PROJECT MANAGEMENT
MCi Moreno Cardenas Inc.
EL PASO · SAN ANTONIO
2505 E. Missouri Ave. El Paso, TX 79903 (915) 532-2091
9601 McAllister Freeway #207, San Antonio TX 78216 (210) 314-3553
Texas Board of Professional Engineers Registration No. F-000554

NE ASR ENHANCED ARROYO PHASE I

LANDSCAPE PLANTING NOTES

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JOB NO.	20-110
SEQUENCE NO.	1 OF 8
SHEET NO.	L3.1

IRRIGATION PLAN GENERAL NOTES:

1. IRRIGATION SYSTEM DESIGN IS DIAGRAMMATIC. PIPE, VALVE AND IRRIGATION SYSTEM COMPONENT LOCATIONS MAY BE SHOWN IN PAVED AREAS FOR DESIGN CLARIFICATION. ALL SYSTEM COMPONENTS WILL BE IN TURF OR LANDSCAPED AREAS WHERE POSSIBLE. CONTRACTOR TO ADJUST LOCATION OF ALL COMPONENTS TO COMPENSATE FOR FINAL SITE CONDITIONS AND PROVIDE OPTIMAL WATER COVERAGE. AVOID DAMAGE TO EXISTING OR PROPOSED IMPROVEMENTS ON PROJECT SITE. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSTALLING A COMPLETE IRRIGATION SYSTEM. ALL FITTINGS AND NECESSARY EQUIPMENT REQUIRED TO MAKE THE IRRIGATION SYSTEM OPERATE PROPERLY AND COMPLY WITH ALL STATE AND LOCAL CODES ARE INCIDENTAL TO THESE PLANS AND ARE THE RESPONSIBILITY OF THE CONTRACTOR.

2. CONTRACTOR SHALL TEST AVAILABE PRESSURE AND SUBMIT RESULTS TO OWNER'S REPRESENTATIVE FOR REVIEW AND APPROVAL PRIOR TO COMMENCING WORK. IN NO CASE SHALL CONTRACTOR COMMENCE WITH CONSTRUCTION IF MEASURED PRESSURE AT POINT OF CONNECTION IS LESS THAN REQUIRED SYSTEM PRESSURE. FAILURE TO CONTACT THE OWNER'S REPRESENTATIVE SHOULD A DISCREPENCY OCCUR, WILL RESULT IN THE CONTRACTOR MAKING NECESSARY CHANGES TO THE IRRIGATION SYSTEM TO THE SATISFACTION OF THE LANDSCAPE ARCHITECT WITHOUT ADDITIONAL COST TO THE OWNER.

3. THE CONTRACTOR SHALL LOCCATE AND VERIFY EACH WATER TAP THE IRRIGATION SYSTEM WILL CONNECT TO. ALL EQUIPMENT AND INSTALLATION METHODS SHALL COMPLY WITH CITY OF EL PASO STANDARDS AND SPECIFICATIONS.

4. ALL LATERAL PIPING IS 1/2" DIAMETER CLASS 200 PVC PIPE UNLESS SHOWN OTHERWISE ON PLANS.

5. IRRIGATION CONTRACTOR TO COORDINATE PLACEMENT OF ALL REQUIRED SLEEVES UNDER PAVING. SLEEVES FOR MAIN LINE TO BE SCH 40 PVC PIPE, TWO (2) TIMES THE SIZE OF THE MAIN LINE, OR TWO (2) TIMES THE SUM OF MULTIPLE LINES IN THE SLEEVE. SLEEVES SHALL EXTEND 24-INCHES BEYOND THE EDGE OF THE PAVING SURFACE AND WILL BE WRAPPED WITH 4 MIL PLASTIC THAT HAS BEEN TAPED IN PLACE. SLEEVES WILL TERMINATE IN A VALVE BOX AT EACH END. THE CONTRACTOR WILL BE HELD LIABLE FOR GAINING ACCESS UNDER ALL PAVEMENTS.

6. TRENCHES FOR MAIN LINE TO BE A MINIMUM DEPTH OF 18" BELOW FINISHED GRADE. TRENCHES FOR LATERAL LINES TO BE A MINIMUM DEPTH OF 12" BELOW GRADE.

7. IRRIGATION CONTRACTOR TO INSTALL AN AUTOMATIC DRAIN VALVE AT THE LOWEST POINT OF EACH IRRIGATION ZONE.

8. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH APPLICABLE LOCAL CODES AND REQUIREMENTS.

9. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ANY EXISTING UNDERGROUND UTILITIES OR OBSTACLES. CONTRACTOR SHALL REPAIR ALL DAMAGE RESULTING FROM HIS OPERATIONS, AT NO COST TO THE OWNER.

10. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO PLANT MATERIAL DUE TO SYSTEM FAILURE OR INFERIOR WORKMANSHIP DURING THE INSTALLATION OF PLANTS AND MAINTENANCE PERIOD.

11. EACH CONTROLLER WILL HAVE AN INDEPENDENT COMMON WIRE LOOPED BETWEEN VALVES IT CONTROLS. REMOTE CONTROL WIRES WILL BE LOCATED IN A SEPARATE TRENCH 5-FEET FROM THE MANLINE ON THE NORTH OR WEST SIDE SIDE OF THE MAINLINE. ALL VALVE WIRES WILL BE LABELLED AT THE VALVE AND CONTROLLER WITH CORRESPONDING, WATER AND WEATHERPROOF LABELS. THE LABELLING SYSTEM WILL BE SEQUENTIAL.

12. THE IRRIGATION CONTRACTOR SHALL BE RESPONSIBLE FOR THE FINAL ELECTRICAL CONNECTION FOR CONTROLLERS. THIS SHALL INCLUDE ALLNECESSARY FUSE BOXES OR OTHER ELECTRICAL REQUIREMENTS.

13. ALL FITTINGS, VALVES, CONNECTIONS AND NECESSARY EQUIPMENT REQUIRED TO MAKE THIS IRRIGATION SYSTEM OPERATE PROPERLY AND TO COMPLY WITH LOCAL AND STATE CODES ARE INCIDENTAL TO THESE PLANS AND ARE THE RESPONSIBILITY OF THE CONTACTOR.

14. THE CONTRACTORS SHALL LOCATE AND VERIFY EACH WATER TAP TO WHICH THE IRRIGATION SYSTEM WILL CONNECT. ALL EQUIPMENT AND INSTALLATION METHODS SHALL COMPLY WITH APPLICABLE STANDARDS AND CODE REQUIREMENTS.

15. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGE OR INTERRUPTION IN SERVICE CAUSED BY HIS EXCAVATIONS AND/OR WORK.

16. ALL SPRINKLER HEADS SHALL BE ON STAINLESS STEEL RISERS WITH CHECK VALVE.

17. A COPY OF THE BACKFLOW TEST REPORT SHALL BE SUBMITTED TO THE OWNER FOR APPROVAL.

18. IRRIGATION SYSTEM OPERATION MANUALS AND CONTROLLERS SHALL BE PROVIDED TO THE OWNER PRIOR TO THE FINAL PUNCH LIST WALK THROUGH.

19. A COPY OF THE FINAL AS-BUILT PLANS SHALL BE SUBMITTED TO THE OWNER PRIOR TO FINAL INSPECTION / WALKTHROUGH; ADDITIONAL COMMENTS MAY BE GENERATED UPON REVIEW AND FOLLOW UP INSPECTION(S) FROM AS-BUILT DRAWINGS.

WATERING SCHEDULE

STATION	TOTAL GPM'S	PRECIP. RATE	RUN TIME FOR 1.2"	RUN TIME 3 DAYS/WEEK
1	5.4	.39	3 HR. 05 MIN.	62 MIN.
2	9.45	.39	3 HR. 05 MIN.	62 MIN.
3	10.8	.39	3 HR. 05 MIN.	62 MIN.
4	11.07	.39	3 HR. 05 MIN.	62 MIN.
5	8.1	.39	3 HR. 05 MIN.	62 MIN.
6	11.61	.39	3 HR. 05 MIN.	62 MIN.
	OVERALL TOTAL GPM'S		TOTAL RUN TIME FOR 1.2"	TOTAL RUN TIME 3 DAYS/WEEK
	56.43		18 HR. 30 MIN.	6 HR. 12 MIN.

CRITICAL ANALYSIS – STATION 6

WATER SOURCE INFORMATION: TBD

DESIGN ANALYSIS: CRITICAL STATION FLOW	11.61 GPM
PRESSURE REQ'D AT LAST HEAD	15.0 PSI
LOSS THROUGH SYSTEM PIPE	12.33 PSI
LOSS THROUGH FITTINGS	2.00 PSI
ELEVATION CHANGE LOSS	(3.02 PSI)
PRESSURE REQ'D AT STATION VALVE OUTLET:	26.31 PSI
RESIDUAL PRESSURE AT STATION VALVE:	13.69 PSI
PRESSURE REQ'D AT STATION VALVE INLET:	50.00 PSI
MAINLINE LOSSES	3.08 PSI
FITTINGS LOSSES	2.50 PSI
BACKFLOW LOSSES	12.00 PSI
MASTER VALVE LOSSES	2.00 PSI
ELEVATION CHANGE LOSS	.65 PSI
WATER METER LOSSES	.55 PSI
PRESSURE REQ'D AT WATER METER:	70.78 PSI

REV.	DATE	BY	DESCRIPTION

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1-800-344-8377
FOR FIELD LOCATING EXISTING UTILITIES

Meridian Green Works, LLC
974 Perry Lane
Thorndale, Texas 76577
512.838.6858

STATE OF TEXAS
Harold Wayne Cooper, Jr.
12326
LICENSED IRRIGATOR
1-2-2022

DESIGNED HWC
DRAWN
CHECKED
DATE 1/4/2022

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

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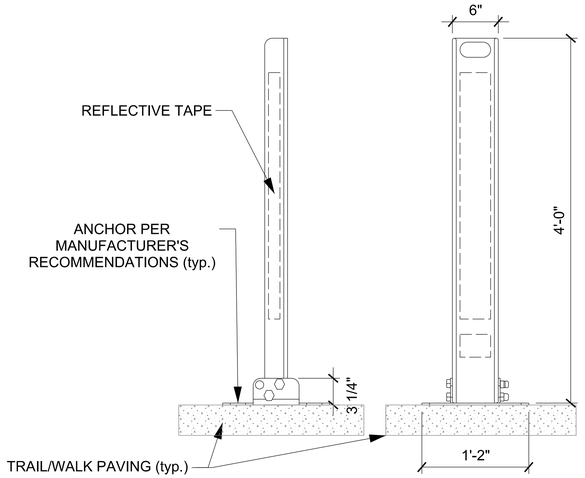
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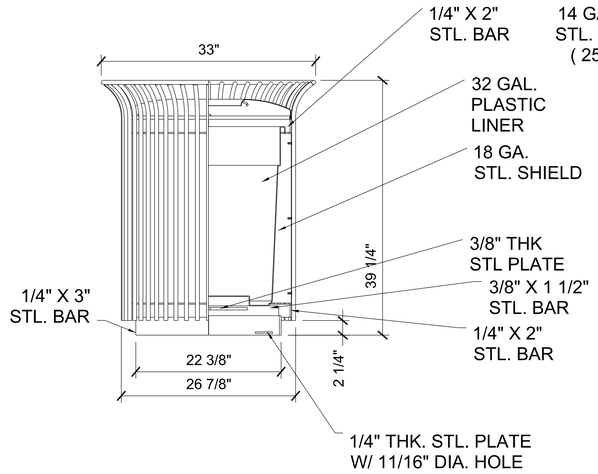
JOB NO. 20-110
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SHEET NO. L3.2

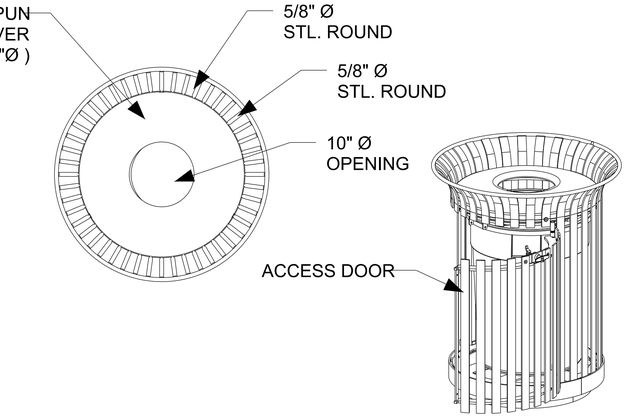
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Collapsible Bollard 3

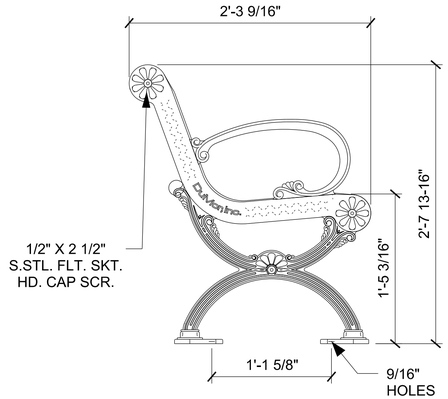
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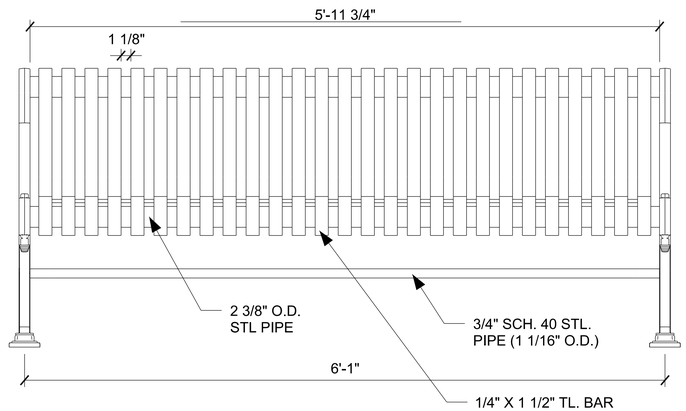




Trash Receptacle 2

Scale: NTS





NOTE:
INSTALL BENCHES PER
MANUFACTURER STANDARDS
AND RECOMMENDATIONS
(SEE SPECIFCATIONS)

Typical Park Bench Details 1

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Meridian Green Works, LLC
974 Perry Lane
Thorndale, Texas 76577
512.838.6858

REGISTERED LANDSCAPE ARCHITECT
HAROLD WAYNE COOPER
1286
STATE OF TEXAS
1-4-2022

DESIGNED	HWC
DRAWN	
CHECKED	
DATE	1/4/2022

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

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NE ASR ENHANCED ARROYO PHASE I

LANDSCAPE AMENITY DETAILS

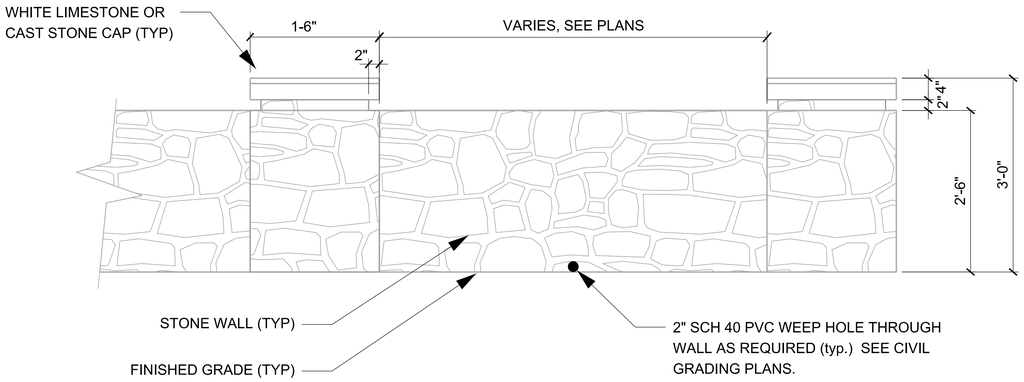
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SHEET NO.	L3.3

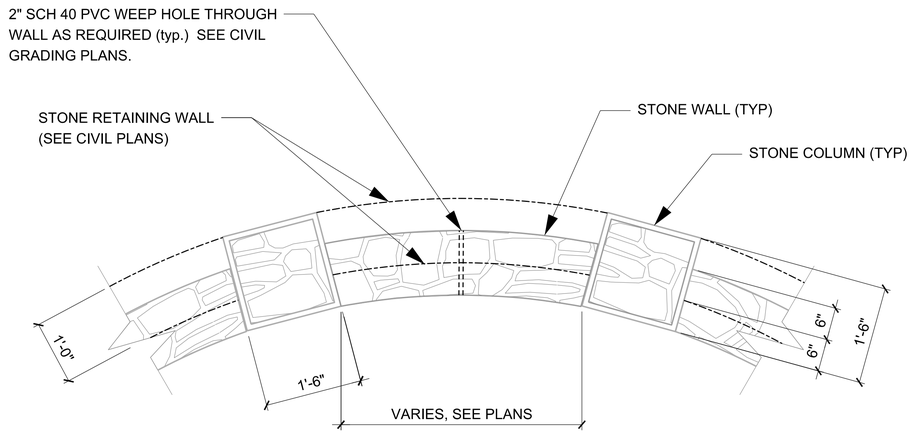
OVERLOOK WALL NOTES:

1. REFER TO TRAILHEAD / ENTRY MONUMENT DETAILS AND NOTES FOR APPLICABLE INFORMATION ON CONSTRUCTION OF THE OVERLOOK WALLS.
2. MORTAR TO HAVE MIN. 1,800 PSI COMP STRENGTH @ 28 DAYS.
3. OVERLOOK WALL STONES TO BE BONDED TO RETAINING WALL STONES AND CONCRETE FOUNDATION DURING CONSTRUCTION OF THE RETAINING WALLS AROUND THE OVERLOOKS.
4. OVERLOOK WALL MATERIALS SHALL BE APPROVED BY THE OWNER PRIOR TO CONSTRUCTION.
5. ALL FOUR (4) SIDES OF THE OVERLOOK COLUMNS ARE IDENTICAL.

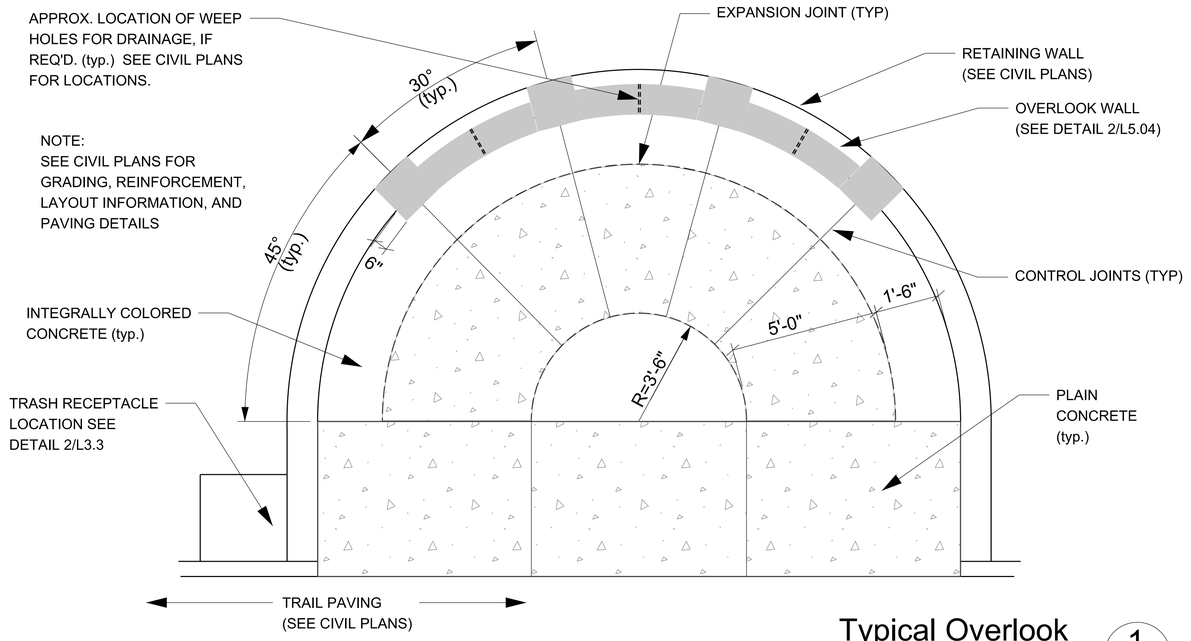
Overlook Wall Notes 4
Scale: NTS



Overlook Wall Elevation 2
Scale: NTS



Typical Overlook Wall Plan View 3
Scale: NTS



Typical Overlook 1
Scale: NTS

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TRAILHEAD STONE WALL GENERAL NOTES:

1. CONCRETE IN FOUNDATIONS TO HAVE 3,000 psi COMPRESSIVE STRENGTH AT 28 DAYS. CONCRETE CORE FILL TO HAVE 1,000 psi COMPRESSIVE STRENGTH AT 28 DAYS.

2. MORTAR TO HAVE MIN. 1,800 PSI COMP STRENGTH @ 28 DAYS, WITH NO MORE THAN FIFTEEN (15) POUNDS OF ASTM C207, TYPE S, HYDRATED LIME PER CUBIC FOOT OF MORTAR WHEN MIXED BY VOLUME.

3. REINFORCING STEEL TO COMPLY WITH ASTM A615, GRADE 60.

4. ROCK SHALL BE MT. FRANKLIN LIMESTONE, QUARRIED, IRREGULAR IN SIZE AND SECURED FROM QUARRIES FR WORKING AND FITTING ON THE JOB BY USE OF ORDINARY TOOLS. OWNER TO APPROVE STONE COLORS PRIOR TO USE IN WALL CONSTRUCTION.

5. SITE PREPARATION: REMOVE VEGETATION, DEBRIS, TUNSATISFACTORY MATERIALS, OBSTRUCTIONS AND DELETERIOUS MATERIALS FROM GROUND SURFACE PPRIOR TO PLACEMENT OF BACKFILL MATERIAL. THE EXPOSED SUBGRADE SHOULD BE SCARIFIED JUST PRIOR TO BACKFILL PLACEMENT TO A DEPTH OF SIX (6) INCHES AND RECOMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DENSITY AS DETERMINED BY ASTM D-1557 COMPACTION TEST. THE MOISTURE CONTENT OF THE SUBGRADE SHALL BE MAINTAINED SLIGHTLY ABOVE THE OPTIMUM UNTIL PERMANENTLY COVERED.

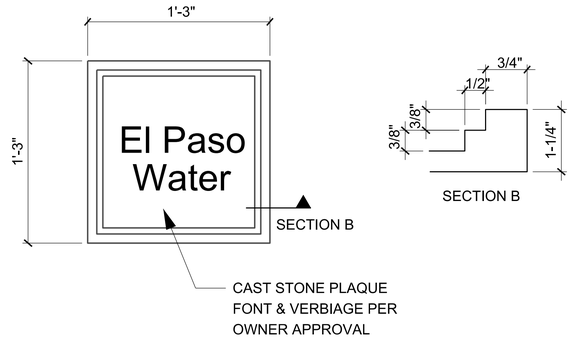
6. ALL FOOTINGS SHALL BE FORMED WHENEVER THE CONCRETE CANNOT BE PLACED AGAINST SOLID EARTH EXCAVATION. ALL FOOTINGS SHALL BE EXCAVATED NEATLY AND, PRIOR TO PLACEMENT OF REINFORCEMENT AND CONCRETE, THE SUBGRAD SHALL BE COMPACTED TO AT LEAST 95% OF THE MAXIMUM DENSITY AS DETERMINED BY ASTM D- 1557 COMPACTION TEST.

7. ROCK WALL SHALL BE ERECTED BY MASONS SKILLED IN THE CONTRUCTION OF NATIVE STONE WALLS. WALL SURFACES INDICATED AS VERTICAL SHALL BE LAID PLUMB AND TRUE TO LINE, AND THOSE WITH SLOPPED FACES SHALL HAVE CONSTANT SLOPES FROM TOP OF FOOTING TO THE TOP OF WALL. ROCK SHALL BE LAID UP WITH FACES FLUSH, AND THE SPACE BETWEEN THE FACES FILLED WITH CORE FILL CONCRETE OR MORTAR AND ROCK EXCEPT WHERE ROCK EXTENDS FROM ONE FACE TO THE OPPOSITE FACE. ROCKS ON EXPOSED VIEW SURFACES SHALL BE SELECTED FOR CLOSE FIT WITHOUT SPECIAL CUTTING.

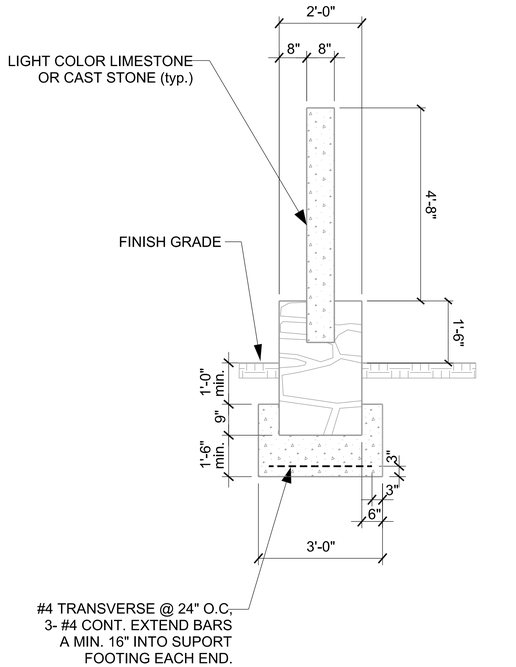
   THE FIRST COURSE OF ROCKSSHALL BE BONDED TO THE FOUNDATION CONCRETE BY USING ROCKS THAT ARE TWELVE (12) INCHES OR LARGER IN DIMENSION PLACED IN THE PLASTIC CONCRETE OF THE FOUNDATION TO OBTAIN A MINIMUM OF SIX (6) INCHES PROJECTION TO BOND WITH THE ROCK CONSTRUCTION ABOVE.

8. BACKFILL MATERIAL USED SHALL BE PLACED IN EIGHT (8) INCH LOOSE LIFTS AND COMPACTED TO AT LEAST 95% MAXIMUM DENSITY AS DETERMINED BY ASTM D-1557 COMPACTION TEST.

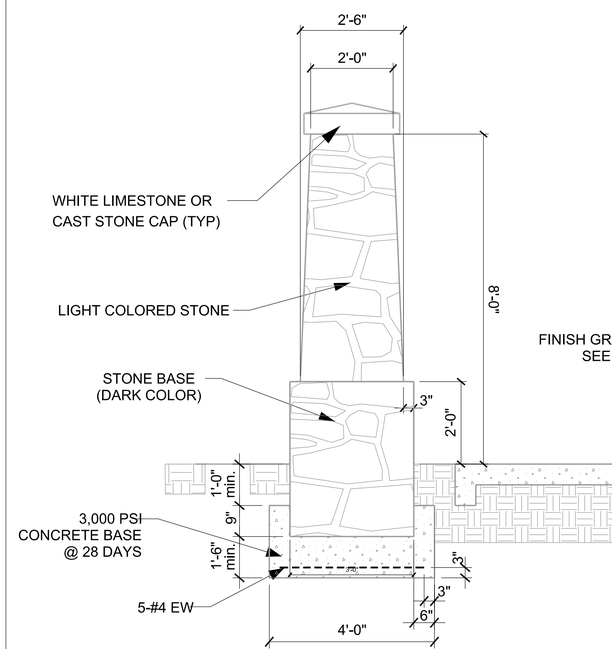
Trailhead / Entry Monument General Notes 1
Scale: NTS

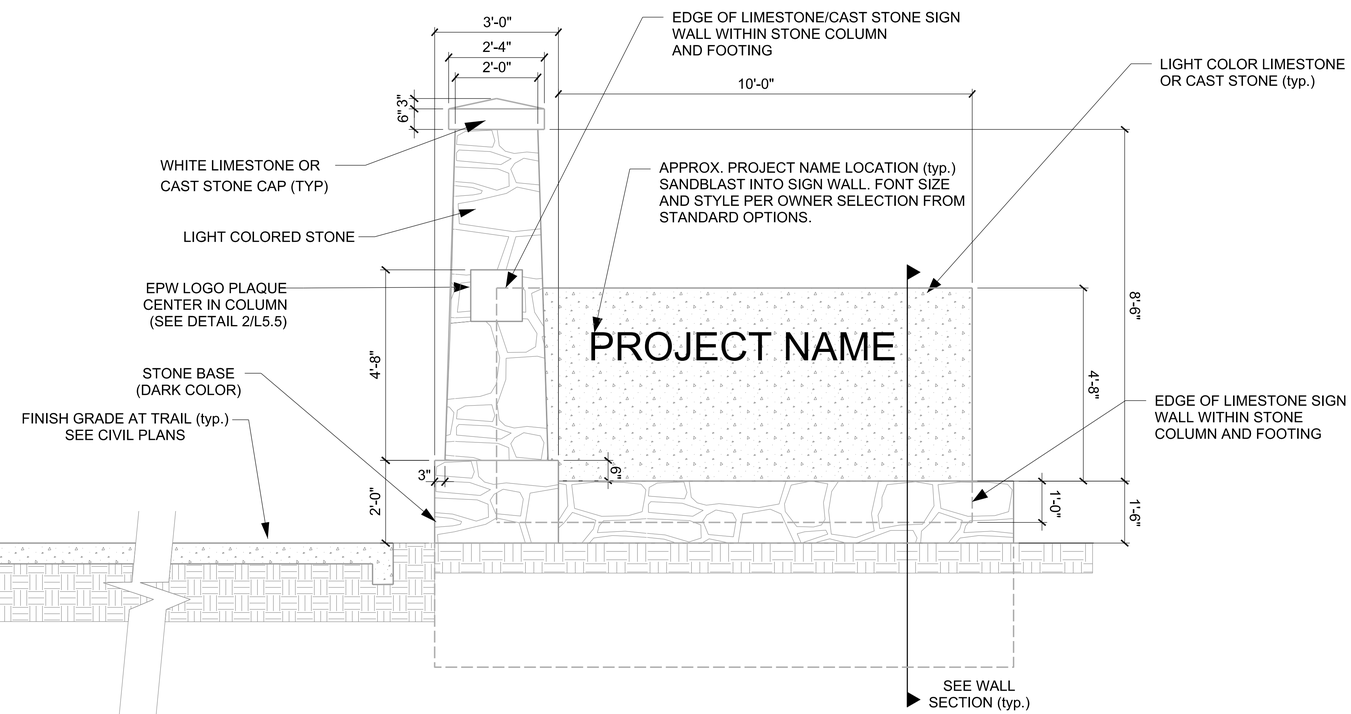


Logo Plaque 2
Scale: NTS



Wall Section 3
Scale: NTS





Trailhead / Entry Monument Elevation 1
Scale: NTS

REV.	DATE	BY	DESCRIPTION

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Meridian Green Works, LLC
974 Perry Lane
Thorndale, Texas 76577
512.838.6858

REGISTERED LANDSCAPE ARCHITECT
HAROLD WAYNE FOSTER JR.
1286
STATE OF TEXAS
1-9-2022

DESIGNED	HWC
DRAWN	
CHECKED	
DATE	1/4/2022

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

CONSULTANT
PLANNING ENGINEERING PROJECT MANAGEMENT
MCi Moreno Cardenas Inc.
EL PASO · SAN ANTONIO
2505 E. Missouri Ave. El Paso, TX 79903 (915) 532-2091
9601 McAllister Freeway #207, San Antonio TX 78216 (210) 314-3553
Texas Board of Professional Engineers Registration No. F-000554

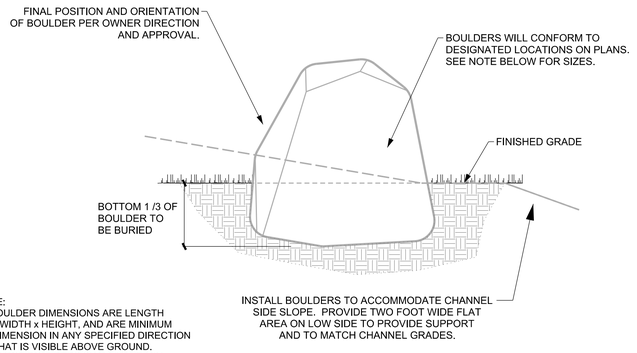
NE ASR ENHANCED ARROYO PHASE I

LANDSCAPE AMENITY DETAILS

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JOB NO.	20-110
SEQUENCE NO.	5 OF 8
SHEET NO.	L3.5

F:\20110\XREF\For W. Cooper\20-110 TLR titblk 24x36 for Wayne.dwg Time:Nov 17,2020 - 04:15pm Login:edgar



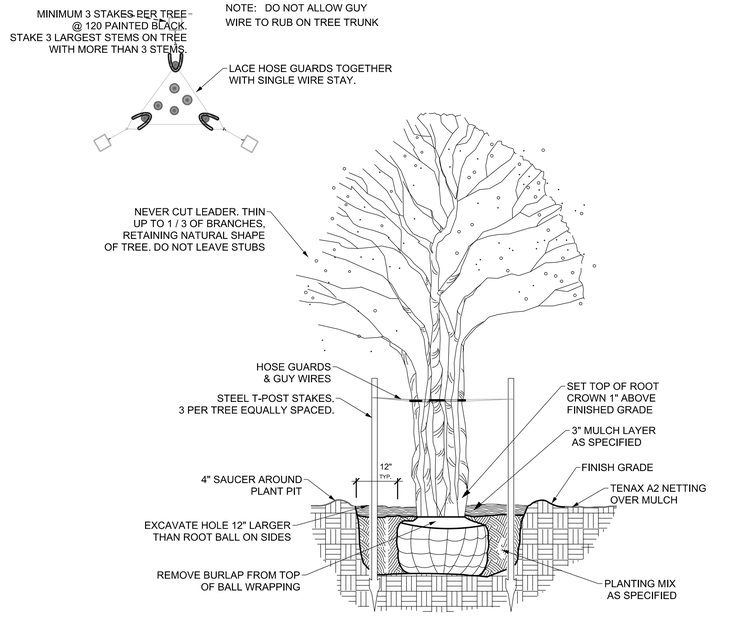
NOTE:
1. BOULDER DIMENSIONS ARE LENGTH x WIDTH x HEIGHT, AND ARE MINIMUM DIMENSION IN ANY SPECIFIED DIRECTION THAT IS VISIBLE ABOVE GROUND.
2. LARGE BOULDERS SHALL HAVE MIN. SIZE OF 3.5' x 3.5' x 3.5'.
3. MEDIUM BOULDERS SHALL HAVE MIN. SIZE OF 2.5' x 2.5' x 2.5'
4. SMALL BOULDERS SHALL HAVE MIN. SIZE OF 1.5" x 1.5" x 1.5'
5. 45% OF BOULDERS WILL BE "LARGE".
6. 35% OF BPULDERS WILL BE "MEDIUM".
7. 20% OF BOULDERS WILL BE "SMALL".
8. SMALL BOULDERS WILL NOT BE LOCATED WITHIN THE DRAINAGE CHANNEL.

Boulder Detail 4
Scale: NTS

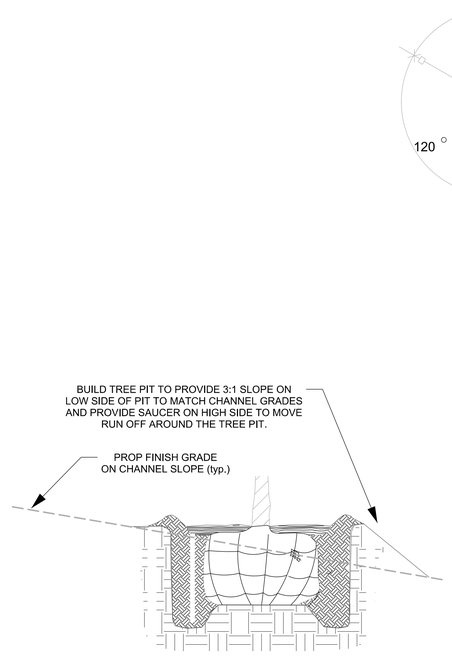
LANDSCAPE SUMMARY TABLE

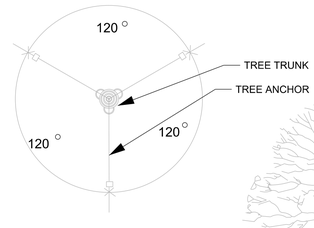
Qty.	Sym.	Common Name	Scientific Name	Size	Type	Height	Spacing	Remarks
22	CI	Pecan	Carya illionensis	2"	Cont.	12' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
44	CC	Redbud	Cercis canadensis	1-1/2"	Cont.	8' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
40	CL	Desert Willow	Chilopsis linearis	1-1/2"	Cont.	8' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
16	GT	Shademaster Honey Locust	Gleditsia triacanthos inermis 'Shademaster'	2"	Cont.	12' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
17	PA	Aleppo Pine	Pinus halepensis	2"	Cont.	12' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
33	PG	Honey Mesquite	Prosopis glandulosa	2"	Cont.	12' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
13	PD	Cottonwood	Populus deltoides	2"	Cont.	12' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
23	PM	Mexican Plum	Prunus mexicana	1-1/2"	Cont.	8' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
13	QP	Mexican White Oak	Quercus polymorpha	2"	Cont.	12' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
524		Boulders					As Shown	Sizes per detail.

LANDSCAPE SUMMARY 3
SCALE: NTS



Multi-Trunk Tree Planting and Staking Detail 2
SCALE: NTS





NOTES:
* SEE SPECIFICATIONS DESCRIPTIONS OF HARDWARE.

* TEMPORARY TREE WELL, TREE ANCHORS AND GUY WIRES TO BE REMOVED UPON APPROVAL AT COMPLETION OF ONE YEAR WARRANTY PERIOD.

* TREE CALIPER MEASURED ABOVE TOP OF ROOTBALL. 6" FOR TREES LESS THAN 4" CALIPER; 12" FOR TREES 4" CALIPER AND GREATER.

* APPROXIMATELY ONE THIRD OF THE BRANCH STRUCTURE SHALL BE SELECTIVELY REMOVED BY THINNING. THE NATURAL CHARACTER AND GENERAL SHAPE OF THE TREE SHALL BE PRESERVED.

Single Trunk Tree Planting & Staking Detail 1
SCALE: NTS

F:\20110\VREF\For W. Cooper\20-110 TLR ttlblk 24x36 for Wayne.dwg Time:Nov17,2020-04:15pm Login:edgar

REV.	DATE	BY	DESCRIPTION

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974 Perry Lane
Thorndale, Texas 76577
512.838.6858

REGISTERED LANDSCAPE ARCHITECT "WAYNE COOPER" STATE OF TEXAS 1295
1-9-2022

DESIGNED HWC
DRAWN
CHECKED
DATE 1/4/2022

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

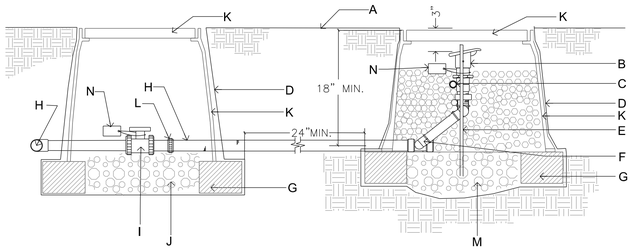
CONSULTANT
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9601 McAllister Freeway #207, San Antonio TX 78216 (210) 314-3553
Texas Board of Professional Engineers Registration No. F-000554

NE ASR ENHANCED ARROYO PHASE I

LANDSCAPE PLANTING DETAILS

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JOB NO. 20-110
SEQUENCE NO. 3 OF 8
SHEET NO. L3.6



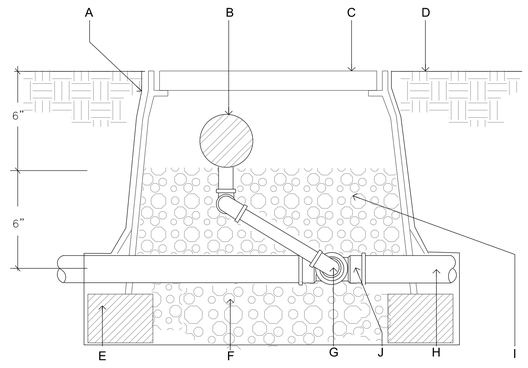
A. FINISH GRADE.
B. 1" BUCKNER QUICK COUPLER VALVE, DOUBLE SLOT, PURPLE TOP–MODEL QB5NPI0 WITH LASCO SNAP–LOK W/MALE BRASS STABILIZER ELBOW.
C. MIN. 12" SECTION 1" DIA. PVC, SECTION SHOULD EXTEND BEYOND BOTH REBAR SECTION, STABILIZE IN GRAVEL.
D. PROVIDE DEWITT PRO 5 WEED CLOTH ALONG SIDES AND BASE OF VALVE BOX. TAPE TO ALL INLET AND OUTLET PIPE AND VALVE BOX WITH HEAVY DUTY 3M PLASTIC TAPE.
E. 1/2" OR 3/8" REBAR, MIN. 30" LENGTH, ONE ON EITHER SIDE OF QUICK COUPLER FOR STABILITY.
F. LASCO SWING JOINT (PRE–ASSEMBLED).
G. 8" X 8" X 16" SOLID CMU BLOCK
H. IRRIGATION MAINLINE
I. ISOLATION BALL VALVE, SEE IRRIGATION LEGEND.
J. 6" DEPTH OF 3/8" WASHED PEA GRAVEL
K. CARSON PRODUCTS INC. 1419–18 BODY (ABS) VALVE BOX AND EXTENSION(S) W/BOLT DOWN COVER (COVER COLOR TO BE PURPLE).
L. PROVIDE PVC UNION FOR PIPE SIZES LESS THAN THREE INCHES IN DIAMETER OR PROVIDE. FLANGES FOR PIPE SIZES THREE INCHES IN DIAMETER OR LARGER.
M. 3/8" WASHED PEA GRAVEL FILLED TO QUICK COUPLER FOR STABILITY.
N. WEATHER PROOF TAG THAT READS. "NON–PORTABLE WATER, NOT SAFE FOR DRINKING." FLANGES FOR PIPE SIZES THREE INCHES IN DIAMETER OR LARGER.

NOTE: INSTALL AN 8" X 8" X 16" SOLID CMU BLOCK AT EACH CORNER OF THE VALVE BOX. INSTALL 3/8" PEA GRAVEL BELOW THE 1419–18 VALVE BOX WITH BOLT DOWN COVER. EXTEND PEA GRAVEL UP TO COLLAR OF QUICK COUPLER VALVE. INSTALL A TEE, FLANGE & BALL VALVE OFF OF THE MAIN LINE IMMEDIATELY UPSTREAM OF THE QUICK COUPLER VALVE.

QUICK COUPLER VALVE

SCALE: NTS

6



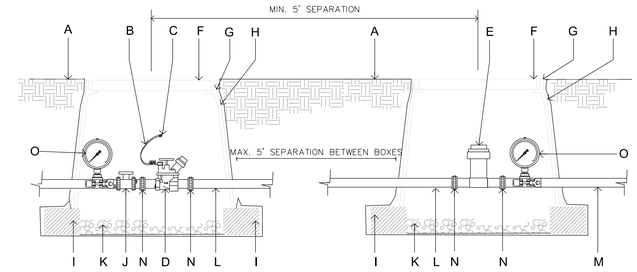
A. PROVIDE DEWITT PRO 5 WEED CLOTH ALONG SIDES AND BASE OF VALVE BOX INSTALLATION. TAPE TO ALL INLET AND OUTLET PIPE AND VALVE BOX WITH HEAVY DUTY PLASTIC 3M TAPE.
B. AIR RELEASE VALVE.
C. CARSON PRODUCTS, INC. 1419–18 (ABS) VALVE BOX WITH BOLT DOWN COVER, EXTENSIONS AS NECESSARY. COLOR TO MATCH FINISHED
D. FINISH GRADE.
E. 8"X8"X16" SOLID CMU BLOCK @ EACH CORNER.
F. 1 CUBIC FOOT 3/8" WASHED PEA GRAVEL.
G. LASCO–PREASSEMBLED SWING JOINT.
H. IRRIGATION MAINLINE/LATERAL MAINLINE.
I. 6" DEPTH OF 3/8" PEA GRAVEL.
J. PVC TEE FITTING.

NOTE: PVC PIPE TO BE CLEAR OF VALVE BOX AND SOLID CMU BLOCK.

AIR RELEASE VALVE

SCALE: NTS

4



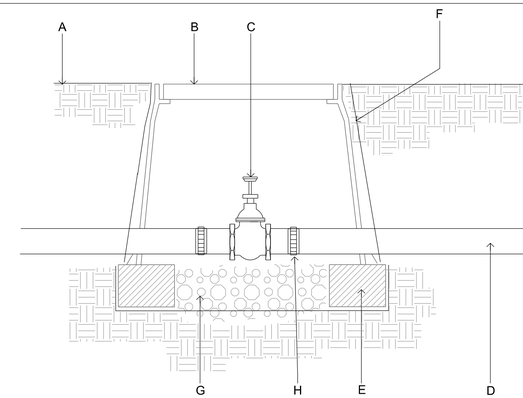
A. FINISH GRADE.
B. 24" WIRE LOOP.
C. DRY SPLICE CONNECTOR OR EQUAL.
D. AUTOMATIC VALVE INCLUDED IN CONTROL ZONE KIT. SEE IRRIGATION LEGEND.
E. BASKET FILTER STRAINER INCLUDED IN CONTROL ZONE KIT SHALL BE INSTALLED TO PROVIDE ACCESSFOR MAINTENANCE AND REPLACEMENT. SEE IRRIGATION LEGEND.
F. LOCKING VALVE BOX COVER FLAT LID WITH BOLT.
g. CARSON PRODUCTS INC. 1419–18 BODY (ABS) VALVE BOX W/BOLT DOWN COVER (COVER COLOR TO MATCH FINISH MATERIAL AND EXTENSION AS NECESSARY.
H. PROVIDE DEWITT PRO 5 WEED CLOTH ALONG SIDES AND BASE OF VALVE BOX AND BLOCKS TAPE TO ALL INLET & OUTLET PIPE WITH 3M HEAVY DUTY PLASTIC TAPE.
I. 8"X8"X16" CMU SOLID CONCRETE BLOCK @ EACH CORNER..
J. ISOLATION BALL VALVE, INCLUDED IN CONTROL ZONE KIT.
K. 4" LAYER OF 3/8" WASHED PEA GRAVEL.
L. PVC PIPE SIZED PER PLAN WITH WELD ON THREADED FITTINGS ON EACH END.
M. LATERAL LINE
N. PROVIDE PVC UNION FOR PIPE SIZES LESS THAN THREE INCHES IN DIAMETER OR PROVIDE. FLANGES FOR PIPE SIZES THREE INCHES IN DIAMETER OR LARGER.
O. HORIZONTAL HYGIENIC PRESSURE GAUGE.

NOTE: PROVIDE 1 PRESSURE GAUGE ON MAIN LINE UPSTREAM OF BALL VALVE AND ANOTHER DOWNSTREAM OF KIT'S PRESSURE REGULATOR. PROVIDE 5' SEPARATION BETWEEN BOXES. IF SPACE IS NOT AVAILABLE, PROVIDE A MIN. 5' SEPARATION AT CENTER LINES OF BOXES. SET GAGES HORIZONTAL TO BRE READABLE.

DRIP VALVE/BASKET FILTER KIT

SCALE: NTS

2



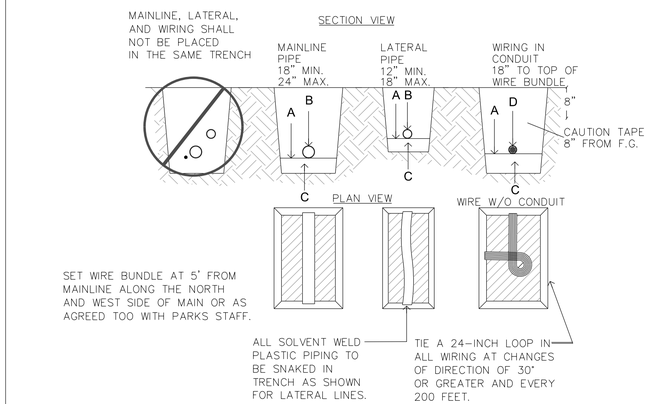
A. FINISH GRADE.
B. ABS PLASTIC VALVE BOX WITH BOLT DOWN FLAT LID COVER TO MATCH COLOR OF FINISH MATERIAL AND 8" EXTENSIONS AS NECESSARY.
C. BRASS ISOLATION VALVE– SEE IRRIGATION LEGEND.
D. IRRIGATION MAINLINE.
E. 8"X 8"X16" SOLID CMU SOLID BLOCK @ EACH CORNER.
F. PROVIDE DEWITT PRO 5 WEED CLOTH ALONG SIDES AND BASE OF VALVE BOX INSTALLATION. TAPE TO ALL INLET AND OUTLET PIPE AND VALVE BOX WITH HEAVY DUTY PLASTIC 3M TAPE.
G. 4" DEPTH, 3/8" WASHED PEA GRAVEL.
H. FLANGE (3" AND ABOVE) AND UNION (BELOW 3" PIPE SIZE)

NOTE: PVC PIPE TO BE CLEAR OF VALVE BOX AND SOLID CMU BLOCK.

ISOLATION VALVE

SCALE: NTS

5

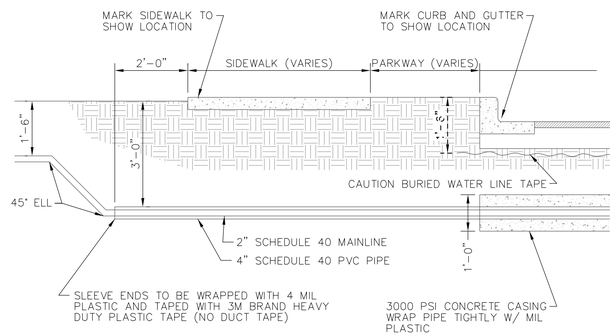


NOTES:
A. BOTTOM OF EXCAVATED TRENCH WHERE NONE ROCKY SOILS ARE EXPOSED (ENCOUNTERED).
B. IRRIGATION SYSTEM PIPING.
C. MINIMUM 4" DEEP BEDDING SANDY SOILS MATERIAL WHERE ROCKY SOILS ARE EXPOSED.
D. IRRIGATION SYSTEM VALVE WIRING.
E. BACKFILL SOILS MATERIAL MAY BE NATIVE SOILS IF IT IS FREE OF CALICHE OR STONES LARGER THANK 1" IN SIZE AND ORGANIC MATTER OR WASTE DEBRIS. SOILS COMPACTION IN TURF AREAS TO BE 80% TO 85% DENSITY BY ASTM D–1557 STANDARD AND AT 95% DENSITY UNDER PAVED OR HARDSCAPE SURFACES.

PIPE/WIRE IN TRENCH

SCALE: NTS

3



NOTE: SLEEVE TO BE KEPT CLEAN AND FREE OF SOIL AND DEBRIS

SLEEVE DETAIL

SCALE: NTS

1

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512.838.6858

STATE OF TEXAS
Herold Wayne Cooper, III
12326
LICENSED IRRIGATOR
1-2-2022

DESIGNED	HWC
DRAWN	
CHECKED	
DATE	1/4/2022

UTILITY OWNER
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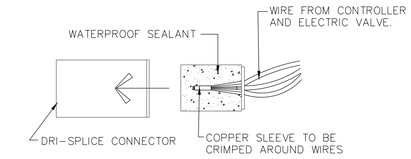
NE ASR ENHANCED ARROYO PHASE I

IRRIGATION DETAILS

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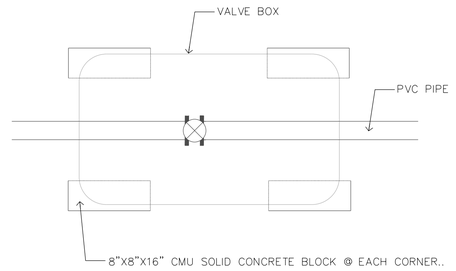


THREE STEP OPERATION DRI-SPLICE
CONNECTOR ONLY.
FILL WITH SEALANT SUFFICIENT TO
SEAP WHEN ASSEMBLED.

WIRE CONNECTORS

SCALE: NTS

6

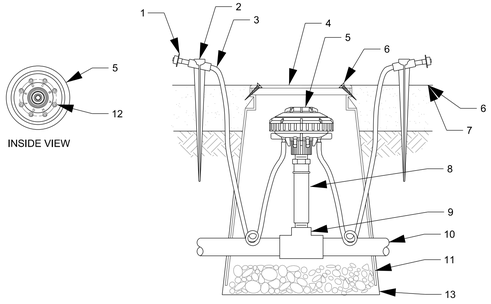


NOTE: BLOCKS TO SIT ON WEED CLOTH ON UNDISTURBED SOIL. DISTURBED SOILS SHALL BE COMPACTED WITH TAMPER PRIOR TO SETTING WEED CLOTH & BLOCKS. VALVE BOX AND EXTENSIONS TO SIT ON BLOCKS. VALVE BOX AND EXTENSIONS TO HAVE A MINIMUM 2" CLEARANCE TO THE TOP OF PVC PIPE.

BRICK PLACEMENT AT VALVE BOX

SCALE: NTS

3



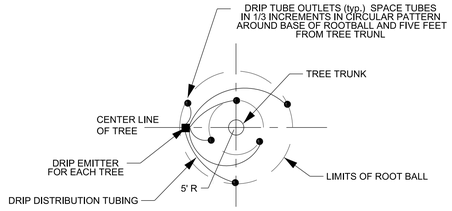
1. DIFFUSER BUG CAP: RAIN BIRD DBC-025 (1 OF 2 SHOWN, 8 POSSIBLE)
2. UNIVERSAL 1/4" TUBING STAKE: RAIN BIRD TS-025 (1 OF 2 SHOWN, 8 POSSIBLE)
3. 1/4" DISTRIBUTION TUBING: RAIN BIRD XQ TUBING (LENGTH AS REQUIRED) (1 OF 2 SHOWN, 8 POSSIBLE)
4. SUBTERRANEAN EMITTER BOX: CARSON 910 SERIES (GREEN IN TURF AREAS AND TAN IN ROCK LANDSCAPE AREAS)
5. MULTI-8-OUTLET EMISSIONDEVICE: RAIN BIRD XERI-BIRD XBD-80.
6. INSTALL 2 #8, 2" LONG SELF TAPING BRASS SCREWS.
7. FINISH GRADE.
8. PVC SCH 80 THREADED NIPPLE LENGTH AS NEEDED.
9. PVC SCH 40 TEE OR ELL.
10. PVC LATERAL PIPE.
11. 3" MINIMUM DEPTH OF 3/4" WASHED PEA GRAVEL.
12. SINGLE-OUTLET EMITTER: RAIN BIRD XERI-BUG EMITTER.
13. WEED BARRIER TAPED TO EMITTER BOX AND PIPE PENETRATION. TAPE TO BE 3M BRAND HEAVY DUTY PLASTIC TAPE.

NOTES:
1. COIL ADDITIONAL 9" OF TUBING IN EMITTER BOX TO FACILITATE MAINTENANCE.
2. RAIN BIRD XERI-BUG BARB X BARB EMITTERS ARE AVAILABLE IN THE FOLLOWING MODELS:
XB-05PC 0.5 GPHXB-10PC 1.0 GPHXB-20PC 2.0 GPH

MULTI-8 OUTLET EMITTER

SCALE: NTS

7



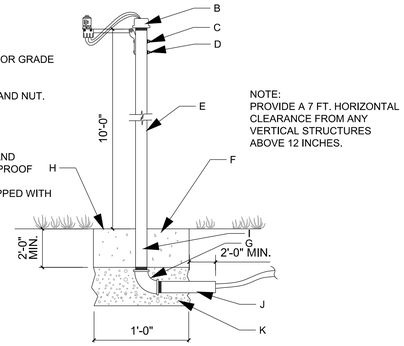
NOTE:
PLACE PVC RISER, EMITTER AND BOX ON THE WEST SIDE OF THE TREE'S TRUNK, FIVE FEET FROM THE BASE OF THE TRUNK

DRIP EMITTER PATTERN FOR TREES

SCALE: NTS

5

NOTES:
A. RAIN BIRD RSD-BEx RAIN SENSOR. SET TO 1/8"
B. 2 1/2" PIPE CAP WITH HOLE FOR WIRES AND SEAL WITH EXTERIOR GRADE SILICONE SEALANT.
C. DRILL TWO 3/16" HOLES IN PIPE FOT SENSOR BRACKET.
D. (2) NO. 8-32 MACHINE SCREWS WITH WASHER, LOCK WASHER AND NUT.
E. 2 1/2" SCH 40 GALVANIZED PIPE-10 FT. HT. A.G.
F. 12"X12" CONCRETE BASE. MIN. 24" DEEP.
G. PIPE ELBOW
H. FINISH GRADE
I. PIPE TO BE SEALED AFTER CABLE IS RUN, USE 4 MIL. PLASTIC AND TAPED NIPPLE AND THE CABLE WITH HIGH GRADE 3M WEATHER PROOF PLASTIC TAPE.
J. NIPPLE. GALVANIZED PIPE IN CONCRETE FOOTING TO BE WRAPPED WITH WEATHER PROOF TAPE TO PROTECT FROM CORROSION.
K. 6" THICK, 3/8" DIAMETER WASHED PEA GRAVEL.



NOTE:
PROVIDE A 7 FT. HORIZONTAL CLEARANCE FROM ANY VERTICAL STRUCTURES ABOVE 12 INCHES.

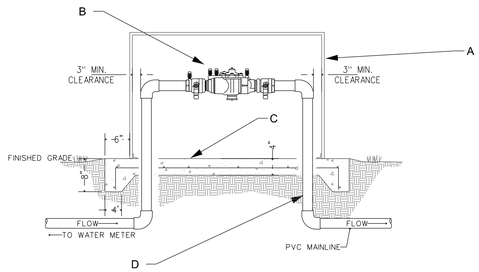
RAIN SENSOR

SCALE: NTS

2

NOTE:
ALL ASSEMBLIES SHOULD BE ACCESSIBLE FOR PERIODIC TESTING AND MAINTENANCE AS ESTABLISHED BY LOCAL CODES. SUGGESTED 16" MINIMUM CLEARANCE FROM TESTCOCK SIDE OF ASSEMBLY AND 12" MINIMUM CLEARANCE FROM VALVE BODY.

A. STAINLESS STEEL INSULATED HOT BOX EMCLOSURE R-VALUE R-25 (SEE IRRIGATION LEGEND) ASSE 1060-CLASS i
B. REDUCED PRESSURE ASSEMBLY BACKFLOW PREVENTER (SEE PARTS LIST)
C. 4000 PSI CONCRETE PAD. 4" DEPTH, SLOPED 1% TO DRAIN.
D. PIPE SHALL BE SLEEVED THROUGH CONC. PAD WITH SCH 40 PVC SEAL PIPE.

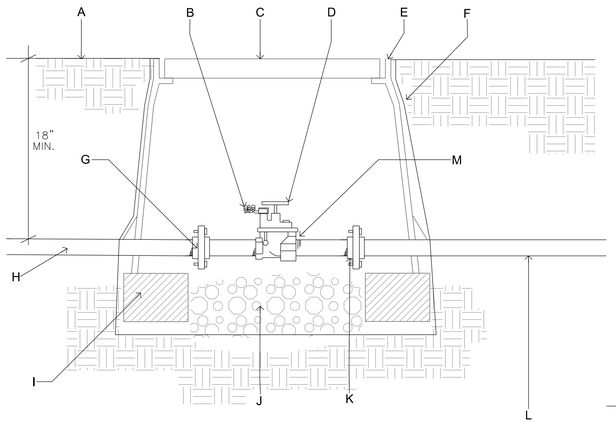


NOTE:
INSTALL BACKFLOW PREVENTER DEVICE AS REQUIRED BY LOCAL CODES AND HEALTH DEPARTMENT. VERIFY LOCAL REQUIREMENTS PRIOR TO INSTALLATION.

REDUCED PRESSURE BACKFLOW PREVENTER

SCALE: NTS

4



NOTE: PVC PIPE TO BE CLEAR OF VALVE BOX AND SOLID CMU BLOCK.

A. FINISH GRADE.
B. WIRE EXPANSION COIL. EXTEND WIRE 12" ABOVE VALVE BOX FOR SERVICE.
C. CARSON BOLT DOWN (ABS) FLAT COVER BOX, COLOR TO MATCH FINISH MATERIAL.
D. ELECTRIC MASTER VALVE.
E. CARSON PRODUCTS INC, 1419-18 (ABS) VALVE BOX WITH 8" EXTENSIONS AS NECESSARY.
F. DEWITT PRO 5 WEED CLOTH ALONG SIDES AND BASE OF VALVE BOX INSTALLATION. TAPE TO ALL INLET AND OUTLET PIPE AND VALVE BOX WITH HEAVY DUTY PLASTIC 3M TAPE.
G. FLANGE (3" AND ABOVE) AND UNION (BELOW 3" PIPE SIZE).
H. WATER FLOW MAINLINE.
I. 8"X8"X16" SOLID CMU BLOCK @ EACH CORNER.
J. 4" DEPTH, 3/8" DIAMETER WASHED PEA GRAVEL.
K. PVC MAINLINE FLANGES (3" AND ABOVE) OR UNION (BELOW 3" PIPE SIZE).
L. MAINLINE.
M. THREADED FITTING SCH. 40 PVC.

IRRIGATION MASTER VALVE

SCALE: NTS

1

REV.	DATE	BY	DESCRIPTION

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512.838.6858

STATE OF TEXAS
Herold Wayne Cooper, Jr.
12326
LICENSED IRRIGATOR
1-4-2022

DESIGNED	HWC
DRAWN	
CHECKED	
DATE	1/4/2022

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

CONSULTANT
PLANNING ENGINEERING PROJECT MANAGEMENT
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9601 McAllister Freeway #207, San Antonio TX 78216 (210) 314-3553
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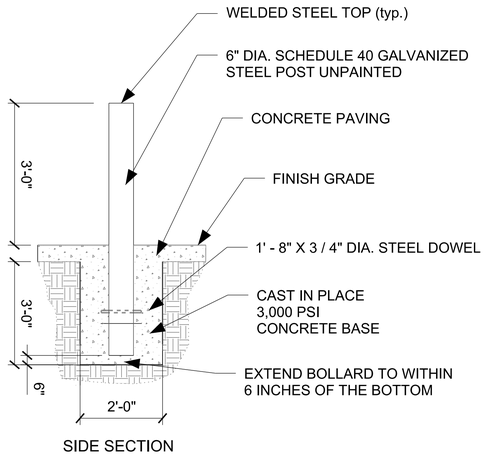
NE ASR ENHANCED ARROYO PHASE I

IRRIGATION DETAILS

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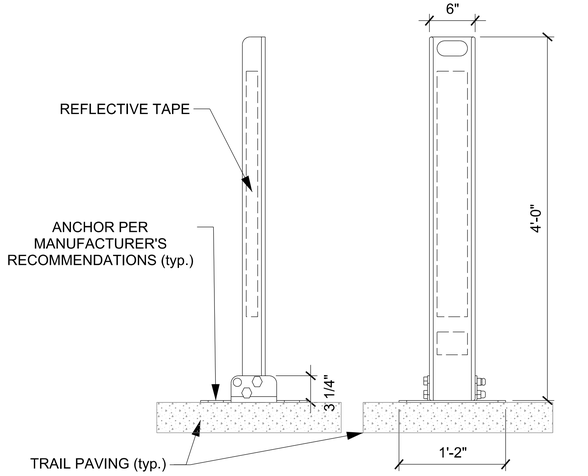
JOB NO.	20-110
SEQUENCE NO.	5 OF 8
SHEET NO.	L3.8

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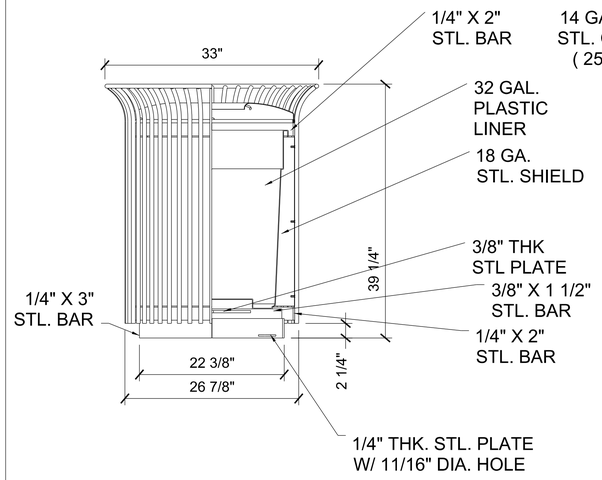
Fixed Bollard 4

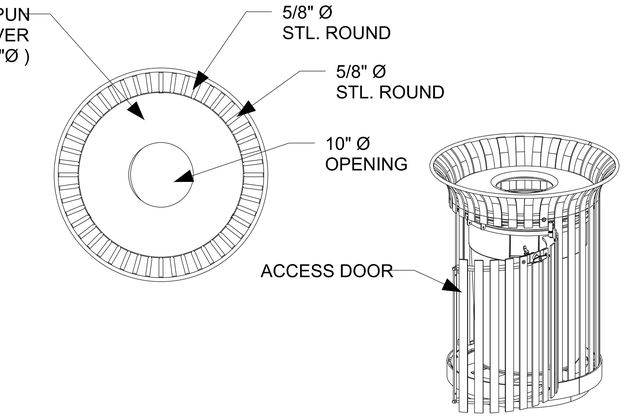
Scale: NTS



Collapsible Bollard 3

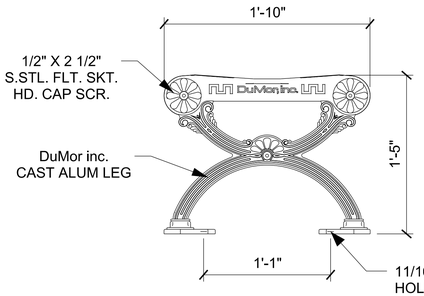
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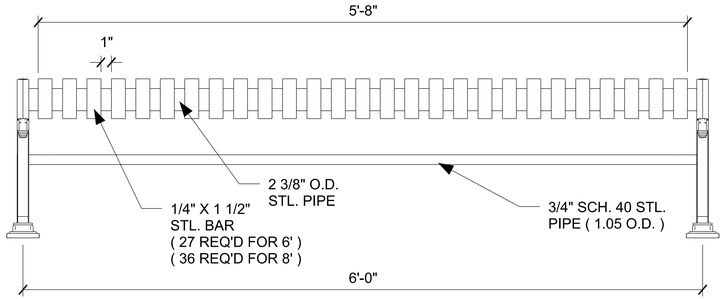




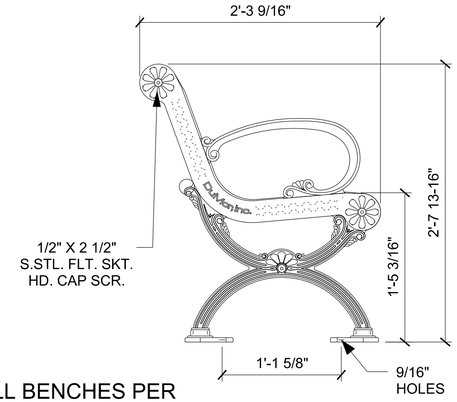
Trash Receptacle 2

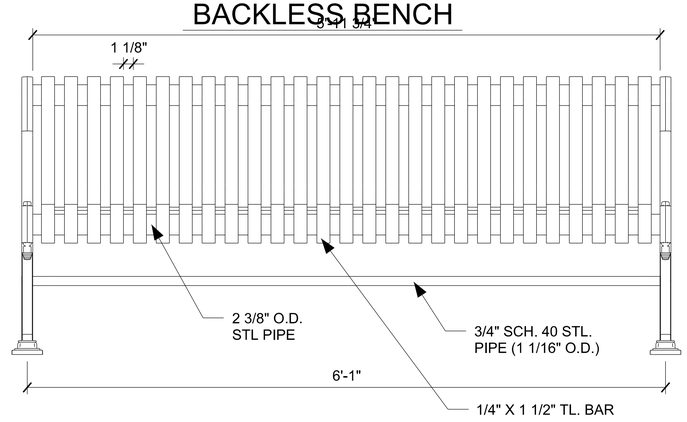
Scale: NTS





BACKLESS BENCH





Typical Park Bench Details 1

Scale: NTS

NOTE:
INSTALL BENCHES PER MANUFACTURER STANDARDS AND RECOMMENDATIONS (SEE SPECIFCATIONS)

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REV.	DATE	BY	DESCRIPTION

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H. WAYNE COOPER JR. 1286
NAME L.A. NO.
DATE 11-20-2020

DESIGNED F.S.
DRAWN E.G./E.C.
CHECKED M.M./B.K.
DATE XX/XX/2020

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el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
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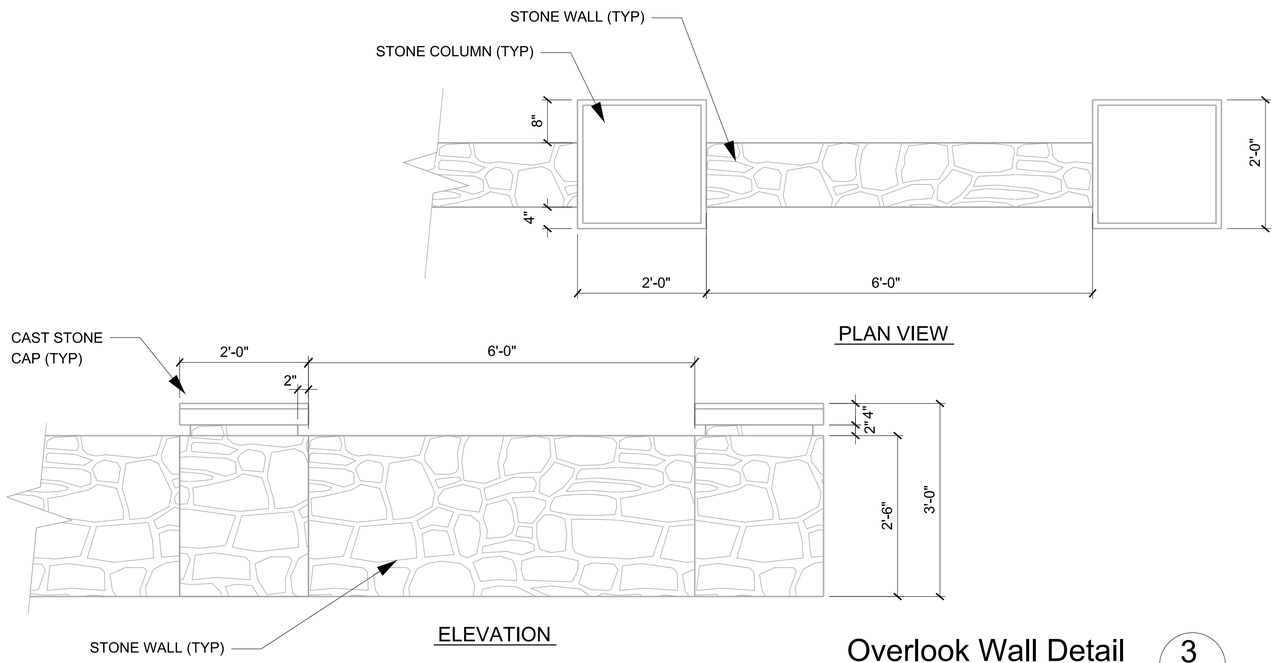
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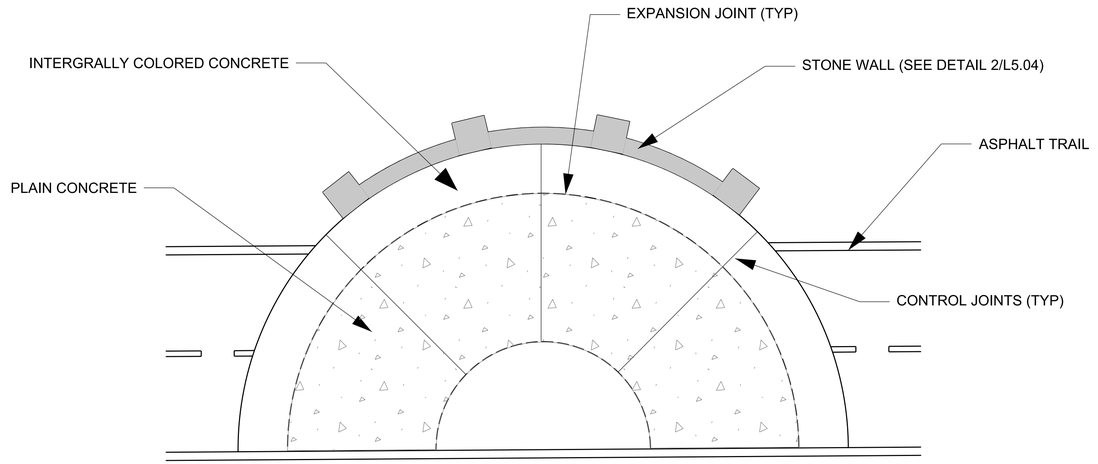
JOB NO. 20-110
SEQUENCE NO. OF
SHEET NO. L3.1

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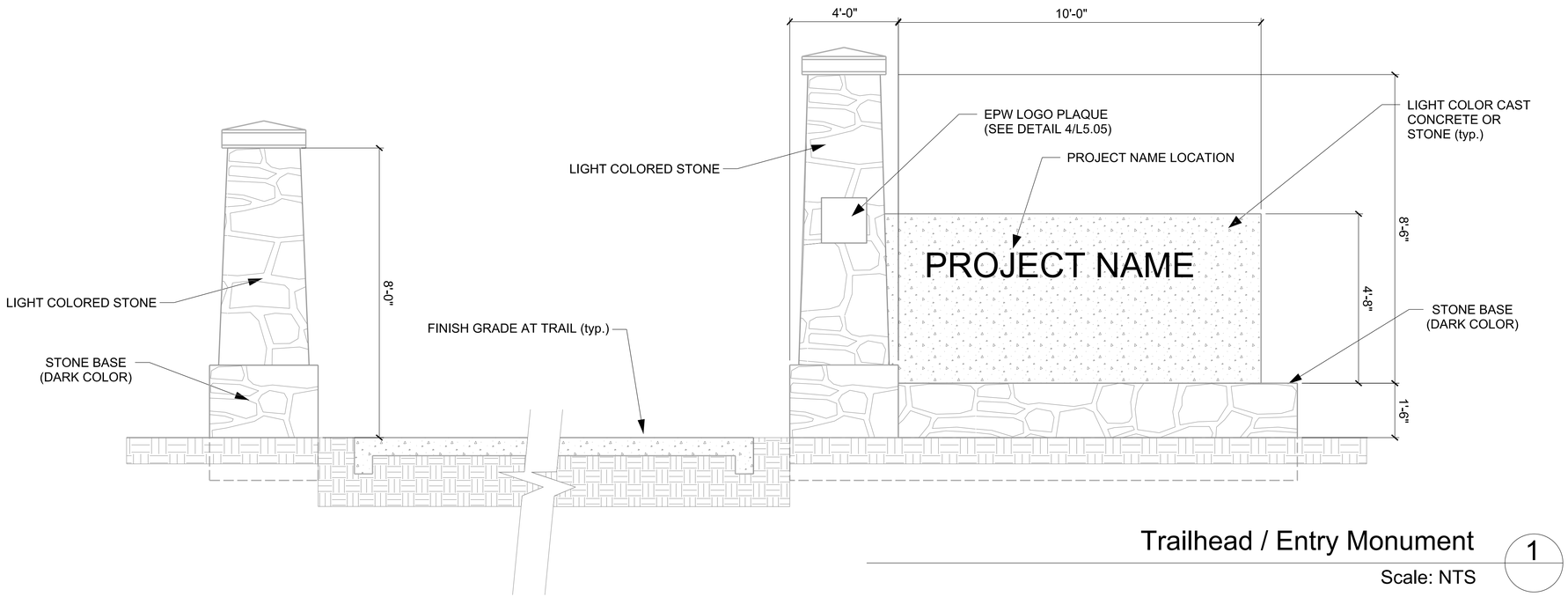
Overlook Wall Detail 3

Scale: NTS



Typical Overlook 2

NTS



Trailhead / Entry Monument 1

Scale: NTS

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DATE 11-20-2020

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DRAWN E.G./E.C.
CHECKED M.M./B.K.
DATE XX/XX/2020

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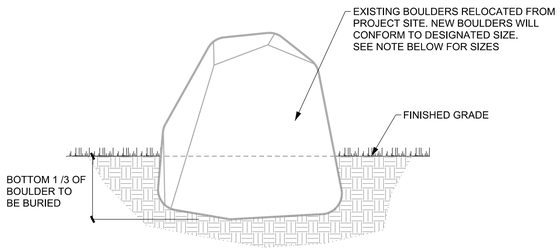
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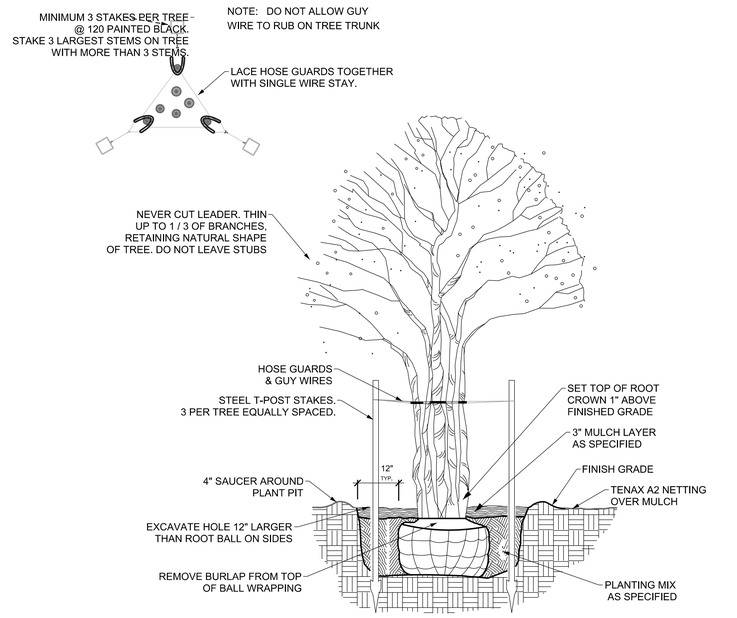
NOTE:
1. BOULDER DIMENSIONS ARE LENGTH x WIDTH x HEIGHT, AND ARE MINIMUM DIMENSION IN ANY SPECIFIED DIRECTION
2. LARGE BOULDERS SHALL HAVE MIN. SIZE OF 3' x 3' x 3.5'
3. MEDIUM BOULDERS SHALL HAVE MIN. SIZE OF 2' x 2' x 2.5'
4. SMALL BOULDERS SHALL HAVE MIN. SIZE OF 1' x 1" x 1.5'

Boulder Detail 4
Scale: NTS

LANDSCAPE SUMMARY TABLE

Qty.	Sym.	Common Name	Scientific Name	Size	Type	Height	Spacing	Remarks
21	CI	Pecan	Carya illionensis	2"	Cont.	12' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
44	CC	Redbud	Cercis canadensis	1-1/2"	Cont.	8' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
39	CL	Desert Willow	Chilopsis linearis	1-1/2"	Cont.	8' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
16	GT	Shademaster Honey Locust	Gleditsia triacanthos inermis 'Shademaster'	2"	Cont.	12' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
17	PA	Aleppo Pine	Pinus halepensis	2"	Cont.	12' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
33	PG	Honey Mesquite	Prosopis glandulosa	2"	Cont.	12' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
13	PD	Cottonwood	Populus deltoides	2"	Cont.	12' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
21	PM	Mexican Plum	Prunus mexicana	1-1/2"	Cont.	8' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
12	QP	Mexican White Oak	Quercus polymorpha	2"	Cont.	12' min.	As Shown	Full, Healthy, Well-Formed, Nursery Grown
524		Boulders						

LANDSCAPE SUMMARY 3
SCALE: NTS



Multi-Trunk Tree Planting and Staking Detail 2
SCALE: NTS

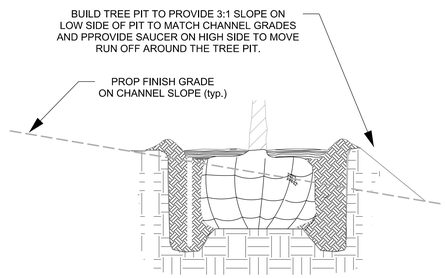


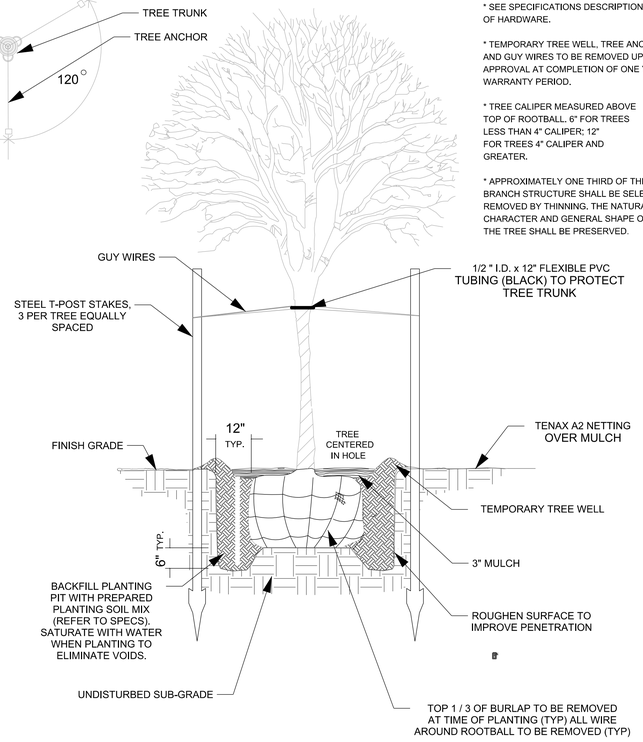
NOTES:
* SEE SPECIFICATIONS DESCRIPTIONS OF HARDWARE.

* TEMPORARY TREE WELL, TREE ANCHORS AND GUY WIRES TO BE REMOVED UPON APPROVAL AT COMPLETION OF ONE YEAR WARRANTY PERIOD.

* TREE CALIPER MEASURED ABOVE TOP OF ROOTBALL. 6" FOR TREES LESS THAN 4" CALIPER; 12" FOR TREES 4" CALIPER AND GREATER.

* APPROXIMATELY ONE THIRD OF THE BRANCH STRUCTURE SHALL BE SELECTIVELY REMOVED BY THINNING, THE NATURAL CHARACTER AND GENERAL SHAPE OF THE TREE SHALL BE PRESERVED.





Single Trunk Tree Planting & Staking Detail 1
SCALE: NTS

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NAME L.A. NO.
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DESIGNED	DRAWN	CHECKED	DATE
F.S.	E.G./E.C.	M.M./B.K.	XX/XX/2020

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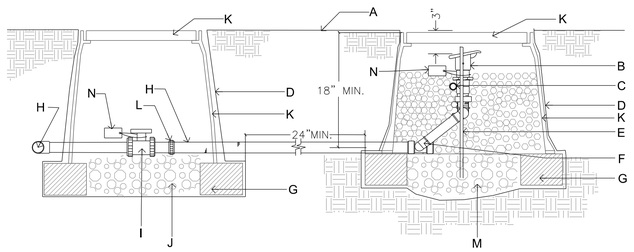
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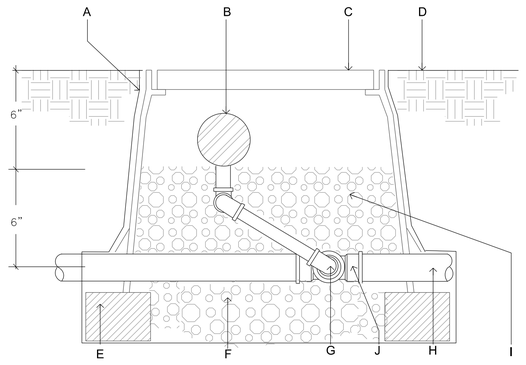
A. FINISH GRADE.
B. 1" BUCKNER QUICK COUPLER VALVE, DOUBLE SLOT, PURPLE TOP–MODEL QB5NP10 WITH LASCO SNAP–LOK W/MALE BRASS STABILIZER ELBOW.
C. MIN. 12" SECTION 1" DIA. PVC, SECTION SHOULD EXTEND BEYOND BOTH REBAR SECTION, STABILIZE IN GRAVEL.
D. PROVIDE DEWITT PRO 5 WEED CLOTH ALONG SIDES AND BASE OF VALVE BOX. TAPE TO ALL INLET AND OUTLET PIPE AND VALVE BOX WITH HEAVY DUTY 3M PLASTIC TAPE.
E. 1/2" OR 3/8" REBAR, MIN. 30" LENGTH, ONE ON EITHER SIDE OF QUICK COUPLER FOR STABILITY.
F. LASCO SWING JOINT (PRE–ASSEMBLED).
G. 8" X 8" X 16" SOLID CMU BLOCK
H. IRRIGATION MAINLINE
I. ISOLATION BALL VALVE, SEE IRRIGATION LEGEND.
J. 6" DEPTH OF 3/8" WASHED PEA GRAVEL.
K. CARSON PRODUCTS INC. 1419–18 BODY (ABS) VALVE BOX AND EXTENSION(S) W/BOLT DOWN COVER (COVER COLOR TO BE PURPLE).
L. PROVIDE PVC UNION FOR PIPE SIZES LESS THAN THREE INCHES IN DIAMETER OR PROVIDE. FLANGES FOR PIPE SIZES THREE INCHES IN DIAMETER OR LARGER.
M. 3/8" WASHED PEA GRAVEL FILLED TO QUICK COUPLER FOR STABILITY.
N. WEATHER PROOF TAG THAT READS. "NON–PORTABLE WATER, NOT SAFE FOR DRINKING." FLANGES FOR PIPE SIZES THREE INCHES IN DIAMETER OR LARGER.

NOTE: INSTALL AN 8" X 8" X 16" SOLID CMU BLOCK AT EACH CORNER OF THE VALVE BOX. INSTALL 3/8" PEA GRAVEL BELOW THE 1419–18 VALVE BOX WITH BOLT DOWN COVER. EXTEND PEA GRAVEL UP TO COLLAR OF QUICK COUPLER VALVE. INSTALL A TEE, FLANGE & BALL VALVE OFF OF THE MAIN LINE IMMEDIATELY UPSTREAM OF THE QUICK COUPLER VALVE.

QUICK COUPLER VALVE

SCALE: NTS

6



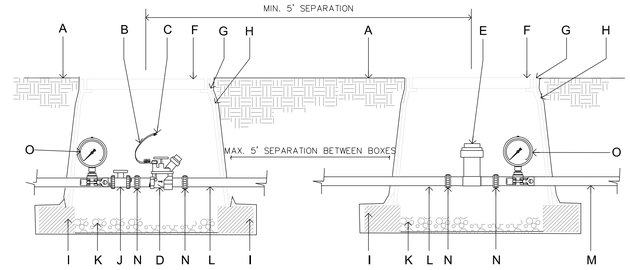
A. PROVIDE DEWITT PRO 5 WEED CLOTH ALONG SIDES AND BASE OF VALVE BOX INSTALLATION. TAPE TO ALL INLET AND OUTLET PIPE AND VALVE BOX WITH HEAVY DUTY PLASTIC 3M TAPE.
B. AIR RELEASE VALVE.
C. CARSON PRODUCTS, INC. 1419–18 (ABS) VALVE BOX WITH BOLT DOWN COVER, EXTENSIONS AS NECESSARY. COLOR TO MATCH FINISHED
D. FINISH GRADE.
E. 8"X8"X16" SOLID CMU BLOCK @ EACH CORNER.
F. 1 CUBIC FOOT 3/8" WASHED PEA GRAVEL.
G. LASCO–PREASSEMBLED SWING JOINT.
H. IRRIGATION MAINLINE/LATERAL MAINLINE.
I. 6" DEPTH OF 3/8" PEA GRAVEL.
J. PVC TEE FITTING.

NOTE: PVC PIPE TO BE CLEAR OF VALVE BOX AND SOLID CMU BLOCK.

AIR RELEASE VALVE

SCALE: NTS

4



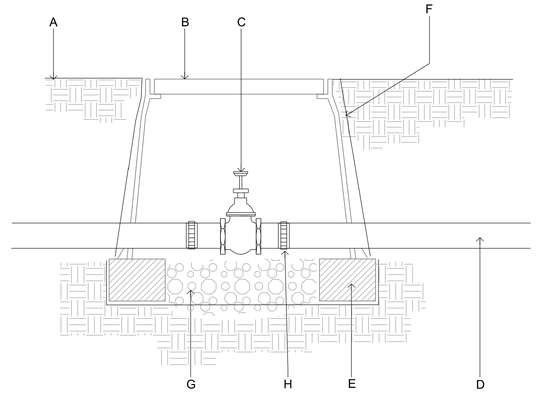
A. FINISH GRADE.
B. 24" WIRE LOOP.
C. DRY SPLICE CONNECTOR OR EQUAL.
D. AUTOMATIC VALVE INCLUDED IN CONTROL ZONE KIT. SEE IRRIGATION LEGEND.
E. BASKET FILTER STRAINER INCLUDED IN CONTROL ZONE KIT SHALL BE INSTALLED TO PROVIDE ACCESSFOR MAINTENANCE AND REPLACEMENT. SEE IRRIGATION LEGEND.
F. LOCKING VALVE BOX COVER FLAT LID WITH BOLT.
g. CARSON PRODUCTS INC. 1419–18 BODY (ABS) VALVE BOX W/BOLT DOWN COVER (COVER COLOR TO MATCH FINISH MATERIAL AND EXTENSION AS NECESSARY.
H. PROVIDE DEWITT PRO 5 WEED CLOTH ALONG SIDES AND BASE OF VALVE BOX AND BLOCKS TAPE TO ALL INLET & OUTLET PIPE WITH 3M HEAVY DUTY PLASTIC TAPE.
I. 8"X8"X16" CMU SOLID CONCRETE BLOCK @ EACH CORNER..
J. ISOLATION BALL VALVE, INCLUDED IN CONTROL ZONE KIT.
K. 4" LAYER OF 3/8" WASHED PEA GRAVEL.
L. PVC PIPE SIZED PER PLAN WITH WELD ON THREADED FITTINGS ON EACH END.
M. LATERAL LINE
N. PROVIDE PVC UNION FOR PIPE SIZES LESS THAN THREE INCHES IN DIAMETER OR PROVIDE. FLANGES FOR PIPE SIZES THREE INCHES IN DIAMETER OR LARGER.
O. HORIZONTAL HYGIENIC PRESSURE GAUGE

NOTE: PROVIDE 1 PRESSURE GAUGE ON MAIN LINE UPSTREAM OF BALL VALVE AND ANOTHER DOWNSTREAM OF KIT'S PRESSURE REGULATOR. PROVIDE 5' SEPARATION BETWEEN BOXES. IF SPACE IS NOT AVAILABLE, PROVIDE A MIN. 5' SEPARATION AT CENTER LINES OF BOXES. SET GAGES HORIZONTAL TO BRE READABLE.

DRIP VALVE/BASKET FILTER KIT

SCALE: NTS

2



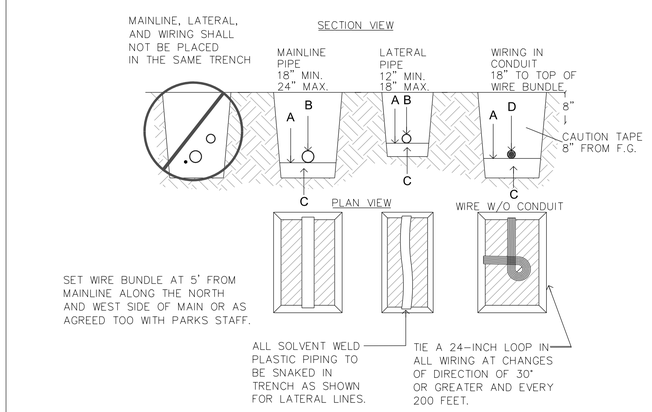
A. FINISH GRADE.
B. CARSON PRODUCTS INC, 1419–18(ABS) VALVE BOX WITH BOLT DOWN FLAT LID COVER TO MATCH COLOR OF FINISH MATERIAL AND 8" EXTENSIONS AS NECESSARY.
C. BRASS ISOLATION VALVE– SEE IRRIGATION LEGEND.
D. IRRIGATION MAINLINE.
E. 8"X 8"X16" SOLID CMU SOLID BLOCK @ EACH CORNER.
F. PROVIDE DEWITT PRO 5 WEED CLOTH ALONG SIDES AND BASE OF VALVE BOX INSTALLATION. TAPE TO ALL INLET AND OUTLET PIPE AND VALVE BOX WITH HEAVY DUTY PLASTIC 3M TAPE.
G. 4" DEPTH, 3/8" WASHED PEA GRAVEL.
H. FLANGE (3" AND ABOVE) AND UNION (BELOW 3" PIPE SIZE)

NOTE: PVC PIPE TO BE CLEAR OF VALVE BOX AND SOLID CMU BLOCK.

ISOLATION VALVE

SCALE: NTS

5

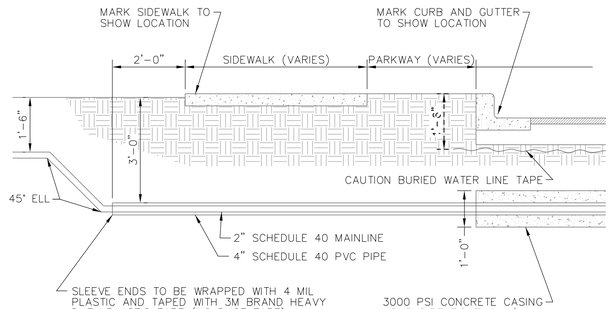


NOTES:
A. BOTTOM OF EXCAVATED TRENCH WHERE NONE ROCKY SOILS ARE EXPOSED (ENCOUNTERED).
B. IRRIGATION SYSTEM PIPING.
C. MINIMUM 4" DEEP BEDDING SANDY SOILS MATERIAL WHERE ROCKY SOILS ARE EXPOSED.
D. IRRIGATION SYSTEM VALVE WIRING.
E. BACKFILL SOILS MATERIAL MAY BE NATIVE SOILS IF IT IS FREE OF CALICHE OR STONES LARGER THANK 1" IN SIZE AND ORGANIC MATTER OR WASTE DEBRIS. SOILS COMPACTION IN TURF AREAS TO BE 80% TO 85% DENSITY BY ASTM D–1557 STANDARD AND AT 95% DENSITY UNDER PAVED OR HARDSCAPE SURFACES.

PIPE/WIRE IN TRENCH

SCALE: NTS

3



NOTE: SLEEVE TO BE KEPT CLEAN AND FREE OF SOIL AND DEBRIS

SLEEVE DETAIL

SCALE: NTS

1

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H. WAYNE COOPER JR. 1286
NAME LIC. NO.
DATE 11-20-2020

DESIGNED F.S.
DRAWN E.G./E.C.
CHECKED M.M./B.K.
DATE XX/XX/2020

UTILITY OWNER
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1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594–5500

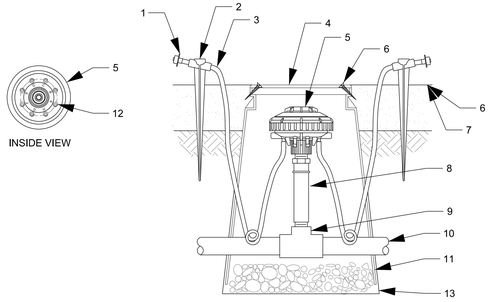
CONSULTANT
PLANNING ENGINEERING PROJECT MANAGEMENT
MCi Moreno Cardenas Inc.
EL PASO • SAN ANTONIO
2505 E. Missouri Ave. El Paso, TX 79903 (915) 532-2091
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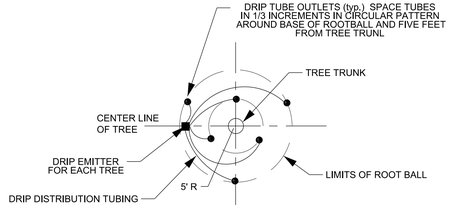
1. DIFFUSER BUG CAP: RAIN BIRD DBC-025 (1 OF 2 SHOWN, 8 POSSIBLE)
2. UNIVERSAL 1/4" TUBING STAKE: RAIN BIRD TS-025 (1 OF 2 SHOWN, 8 POSSIBLE)
3. 1/4" DISTRIBUTION TUBING: RAIN BIRD XQ TUBING (LENGTH AS REQUIRED) (1 OF 2 SHOWN, 8 POSSIBLE)
4. SUBTERRANEAN EMITTER BOX: CARSON 910 SERIES (GREEN IN TURF AREAS AND TAN IN ROCK LANDSCAPE AREAS)
5. MULTI-8-OUTLET EMISSIONDEVICE: RAIN BIRD XERI-BIRD XBD-80.
6. INSTALL 2 #8, 2" LONG SELF TAPING BRASS SCREWS.
7. FINISH GRADE.
8. PVC SCH 80 THREADED NIPPLE LENGTH AS NEEDED.
9. PVC SCH 40 TEE OR ELL.
10. PVC LATERAL PIPE.
11. 3" MINIMUM DEPTH OF 3/4" WASHED PEA GRAVEL.
12. SINGLE-OUTLET EMITTER: RAIN BIRD XERI-BUG EMITTER.
13. WEED BARRIER TAPED TO EMITTER BOX AND PIPE PENETRATION. TAPE TO BE 3M BRAND HEAVY DUTY PLASTIC TAPE.

NOTES:
1. COIL ADDITIONAL 9" OF TUBING IN EMITTER BOX TO FACILITATE MAINTENANCE.
2. RAIN BIRD XERI-BUG BARB X BARB EMITTERS ARE AVAILABLE IN THE FOLLOWING MODELS: XB-05PC 0.5 GPHXB-10PC 1.0 GPHXB-20PC 2.0 GPH

MULTI-8 OUTLET EMITTER

SCALE: NTS

7



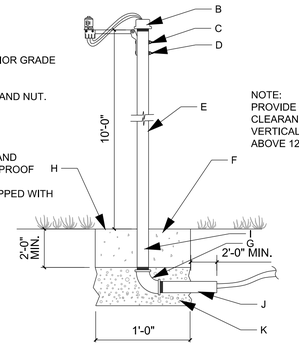
NOTE:
PLACE PVC RISER, EMITTER AND BOX ON THE WEST SIDE OF THE TREE'S TRUNK, FIVE FEET FROM THE BASE OF THE TRUNK

DRIP EMITTER PATTERN FOR TREES

SCALE: NTS

5

NOTES:
A. RAIN BIRD RSD-BEx RAIN SENSOR. SET TO 1/8"
B. 2 1/2" PIPE CAP WITH HOLE FOR WIRES AND SEAL WITH EXTERIOR GRADE SILICONE SEALANT.
C. DRILL TWO 3/16" HOLES IN PIPE FOT SENSOR BRACKET.
D. (2) NO. 8-32 MACHINE SCREWS WITH WASHER, LOCK WASHER AND NUT.
E. 2 1/2" SCH 40 GALVANIZED PIPE-10 FT. HT. A.G.
F. 12"X12" CONCRETE BASE. MIN. 24" DEEP.
G. PIPE ELBOW
H. FINISH GRADE
I. PIPE TO BE SEALED AFTER CABLE IS RUN, USE 4 MIL. PLASTIC AND TAPED NIPPLE AND THE CABLE WITH HIGH GRADE 3M WEATHER PROOF PLASTIC TAPE.
J. NIPPLE. GALVANIZED PIPE IN CONCRETE FOOTING TO BE WRAPPED WITH WEATHER PROOF TAPE TO PROTECT FROM CORROSION.
K. 6" THICK, 3/8" DIAMETER WASHED PEA GRAVEL.



NOTE:
PROVIDE A 7 FT. HORIZONTAL CLEARANCE FROM ANY VERTICAL STRUCTURES ABOVE 12 INCHES.

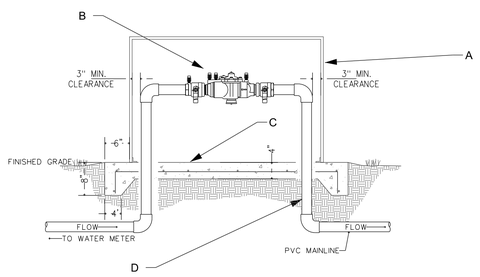
RAIN SENSOR

SCALE: NTS

2

NOTE:
ALL ASSEMBLIES SHOULD BE ACCESSIBLE FOR PERIODIC TESTING AND MAINTENANCE AS ESTABLISHED BY LOCAL CODES. SUGGESTED 16" MINIMUM CLEARANCE FROM TESTCOCK SIDE OF ASSEMBLY AND 12" MINIMUM CLEARANCE FROM VALVE BODY.

A. STAINLESS STEEL INSULATED HOT BOX EMCLOSURE R-VALUE R-25 (SEE IRRIGATION LEGEND)
ASSE 1060-CLASS i
B. REDUCED PRESSURE ASSEMBLY BACKFLOW PREVENTER (SEE PARTS LIST)
C. 4000 PSI CONCRETE PAD. 4" DEPTH, SLOPED 1% TO DRAIN.
D. PIPE SHALL BE SLEEVED THROUGH CONC. PAD WITH SCH 40 PVC SEAL PIPE.

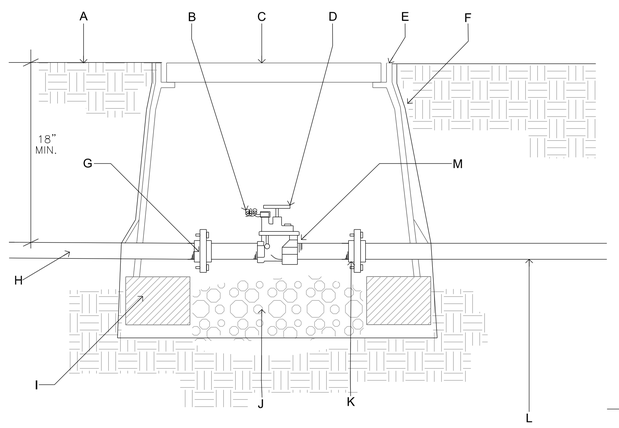


NOTE:
INSTALL BACKFLOW PREVENTER DEVICE AS REQUIRED BY LOCAL CODES AND HEALTH DEPARTMENT. VERIFY LOCAL REQUIREMENTS PRIOR TO INSTALLATION.

REDUCED PRESSURE BACKFLOW PREVENTER

SCALE: NTS

4



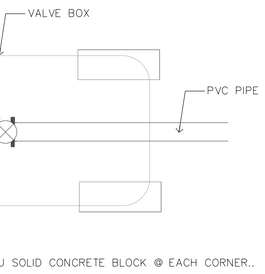
NOTE: PVC PIPE TO BE CLEAR OF VALVE BOX AND SOLID CMU BLOCK.

A. FINISH GRADE.
B. WIRE EXPANSION COIL. EXTEND WIRE 12" ABOVE VALVE BOX FOR SERVICE.
C. CARSON BOLT DOWN (ABS) FLAT COVER BOX, COLOR TO MATCH FINISH MATERIAL.
D. ELECTRIC MASTER VALVE.
E. CARSON PRODUCTS INC, 1419-18 (ABS) VALVE BOX WITH 8" EXTENSIONS AS NECESSARY.
F. DEWITT PRO 5 WEED CLOTH ALONG SIDES AND BASE OF VALVE BOX INSTALLATION. TAPE TO ALL INLET AND OUTLET PIPE AND VALVE BOX WITH HEAVY DUTY PLASTIC 3M TAPE.
G. FLANGE (3" AND ABOVE) AND UNION (BELOW 3" PIPE SIZE).
H. WATER FLOW MAINLINE.
I. 8"X8"X16" SOLID CMU BLOCK @ EACH CORNER.
J. 4" DEPTH, 3/8" DIAMETER WASHED PEA GRAVEL.
K. PVC MAINLINE FLANGES (3" AND ABOVE) OR UNION (BELOW 3" PIPE SIZE).
L. MAINLINE.
M. THREADED FITTING SCH. 40 PVC.

IRRIGATION MASTER VALVE

SCALE: NTS

1

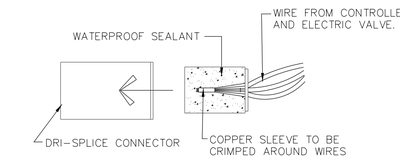


NOTE: BLOCKS TO SIT ON WEED CLOTH ON UNDISTURBED SOIL. DISTURBED SOILS SHALL BE COMPACTED WITH TAMPER PRIOR TO SETTING WEED CLOTH & BLOCKS. VALVE BOX AND EXTENSIONS TO SIT ON BLOCKS. VALVE BOX AND EXTENSIONS TO HAVE A MINIMUM 2" CLEARANCE TO THE TOP OF PVC PIPE.

BRICK PLACEMENT AT VALVE BOX

SCALE: NTS

3



THREE STEP OPERATION DRI-SPLICE CONNECTOR ONLY.
FILL WITH SEALANT SUFFICIENT TO SEAP WHEN ASSEMBLED.

WIRE CONNECTORS

SCALE: NTS

6

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H. WAYNE COOPER JR. 128G
NAME L.A. NO.
DATE 11-20-2020

DESIGNED	DRAWN	CHECKED	DATE
F.S.	E.G./E.C.	M.M./B.K.	XX/XX/2020

UTILITY OWNER
el paso WATER
1154 HAWKINS BLVD.
EL PASO, TEXAS 79925
(915) 594-5500

CONSULTANT
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SHEET NO. L3.5

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APPENDIX C:
SUPPORTING DOCUMENTS

Geotechnical Engineering Study

Northeast ASR
El Paso, El Paso County, Texas
LOI File NO. 18-031

Prepared for:
EPWATER
1154 Hawkins Boulevard
El Paso, Texas 79925

Prepared by:
LOI ENGINEERS
2101 E. Missouri Avenue, Suite B
El Paso, Texas 79903

May 4, 2018

ENGINEERS

File No. LOI18-031
May 4, 2018

Mr. Scott R. Reinert, P.E.
EPWater
1154 Hawkins Blvd.
El Paso, Texas 79925

Re: Geotechnical Engineering Report
Northeast ASR
El Paso, El Paso County, Texas

Dear Mr. Reinert:

We thank you for the opportunity to present the enclosed geotechnical engineering report for the above referenced project. This engineering report was prepared in accordance with the scope of services as presented in our proposal No. LOIP17-383, dated December 15, 2018 (revised December 21, 2017), and authorized on January 2018 with notice to proceed on February 19, 2018. The information we are presenting herein describes the procedures utilized for field and laboratory investigation, along with the results of our study.

It was a pleasure to work with you on this phase of your project, and we look forward to assist you further during the subsequent construction activities. If you have any questions regarding the information we present herein, please call us.

Respectfully submitted,
LOI ENGINEERS

5/4/18

STATE OF TEXAS
SERGIO FLORES
124736
LICENSED
PROFESSIONAL ENGINEER

Sergio Flores, P.E.
Project Professional

Bernardino Olague, P.E., PMP
Principal Engineer

Copies: Above (2) and via E-mail
(1) Mr. Brian Klaes, P.E.
File (1)

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3.4 Soil Resistivity 3
3.5 Corrosivity 4
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APPENDIX A

Boring Location Map A-1
Boring Logs ..... A-2 – A-29
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APPENDIX B

Soil Terminology B-1
Soil Symbols B-2

1.0 INTRODUCTION

We have completed the geotechnical engineering study for the proposed Northeast ASR, which will be located west of and north of the Painted Dunes Desert Golf Course in northeast El Paso, Texas. We were authorized to conduct this study by Mr. Scott R. Reinert, P.E. representing EPWater (Client) on January 24, 2018, and authorized to proceed on February 19, 2018.

2.0 PROJECT DESCRIPTION AND OBJECTIVE

The project consists of the acquisition of subsurface soil data for use in the Northeast Aquifer Storage Recovery. The Northeast ASR will be west of and north of the Painted Dunes Desert Golf Course in northeast El Paso, El Paso County, Texas.

We conducted our study in general accordance with the "Recommended Practice for the Design of Foundations" manual published by the American Society of Civil Engineers.

3.0 FIELD AND LABORATORY INVESTIGATION

3.1 Field Exploration

In our field exploration phase, we drilled seventeen (17) soil borings to depths ranging from 20 feet to 50 feet below ground surface at representative locations along the proposed Northeast Aquifer Storage Recovery (ASR) project alignment. We drilled and sampled the soil borings in general accordance with ASTM D-6151 and D-1586 procedures with a truck-mounted CME-75 drill rig. We located the borings in the field using property corners and street references included in the project plans provided by Client.

The soil boring locations are shown in the Boring Plan included in the Appendix A of this report in Sheet A-1. We also prepared a log of each soil boring to delineate the soil strata studied at the site. The soil boring logs (B-1 through B-17) are included in the Appendix A

of this report as Sheets A-2 through A-29. A key to the soil terminology used in the logs is included in the Appendix B of this report as Sheets B-1 and B-2.

We conducted Standard Penetration Tests (SPT) at each representative soil strata in the soil borings to determine the relative density or consistency of the resident soils. The SPT is a widely recognized procedure that provides a numerical value of the soil strata being tested, indicating the number of blows that it takes for a standard 140-pound weight hammer with a standard 30-inch free fall drop to penetrate 12 inches into the soil. The SPT values for the soil strata in the soil borings are included in the soil boring logs.

As part of our field exploration, we collected representative soil samples from the soil borings at regular depth intervals using a standard 2-inch diameter split spoon sampler. We identified and labeled the samples according to boring number and depth, visually classified them according to ASTM D-2488, and placed them in moisture-proof containers for transportation to the laboratory for further evaluation and testing.

Unless we receive prompt notification from Client, we will store the samples collected from the field investigation in our laboratory for a period of 90 days from the date of this report, after which time we will discard the samples.

3.2 Geotechnical Laboratory Testing

In the laboratory, we determined the moisture content, particle size analysis, percent passing the No. 200 sieve, and Atterberg Limits of selected samples. We conducted these tests to determine the physical and engineering properties of representative soils at the site. These tests also allowed us to properly classify the resident soils in accordance with the Unified Soil Classification System (USCS). The results of our tests are included in the soil boring logs, adjacent to the depth at which the sample was recovered.

Type of Test	Number of Tests
Moisture Content (ASTM D-2216)	86
Grain Size Distribution Analysis (ASTM D-422)	20
Percent Passing No. 200 Sieve (ASTM D-6913)	58
Atterberg Limits (ASTM D-4318)	39
Crumb Test (ASTM D-6572)	12
Pinhole Test (ASTM D-4647)	12

3.3 Infiltration Tests

As part of our scope, LOI provided support to JSAI, a water-resource and environmental consultant, in the performance of seven (7) infiltration tests at soil boring locations B-4, B-6, B-7, B-8, B-10, B-12 and B-13. The test locations are plotted in Appendix A-1. The hollow-stem augers were left in the soil boring during the tests to keep the soil boring open to the boring termination depth. Reporting of the results of the infiltration tests are beyond our scope, but rather will be provided by JSAI.



Figure 1: JSAI performing infiltration test after soil sampling

3.4 Soil Resistivity

The results of in-situ soil resistivity testing are presented in the Appendix A-75. These results were obtained following the method provided in our scope of services. We used an AEMC Model 4500 Digital Ground Resistance Tester to perform these tests. The results indicate mild to highly corrosive characteristics

The readings were taken in a west-to-east direction (100 feet) near boring location B-7. The line we followed in our tests is indicated on Sheet A-1.

3.5 Corrosivity

During our field exploration, we collected twelve (12) representative soil samples from the soil borings at depths ranging from ground surface to 6½ feet. We identified and labeled the samples according to sampling point and depth, visually classified them according to ASTM D-2488, and placed them in moisture-proof containers for transportation to the laboratory for further evaluation and testing. The results indicate mild to highly corrosive characteristics. The complete results of the corrosivity testing are presented in the Appendix as Sheets A-37 and A-38.

3.6 Dispersivity

During our field exploration, we collected twelve (12) representative soil samples from the soil borings at depths ranging from ground surface to 6½ feet. We tested the samples for dispersivity using the crumb (ASTM D 6572) and pinhole tests (ASTM D 4647) to determine the dispersivity of the soil. The results indicate predominantly non-dispersive soils with some intermediate dispersive soils.

4.0 GENERAL SITE CONDITIONS

4.1 Site Geology

The project site is located mainly on the Hueco Bolson. According to the Soil Conservation Service of El Paso County, the soils in this area correspond to the Turney-Berino association, which is described as nearly level and gently sloping soils that have a clay loam subsoil and are moderately deep over soft caliche.

4.2 Site Topography and Site Conditions

The project site is divided into two sectors: west and east of McCombs Street. The west sector site is relatively level, and slopes gently downward in a westerly direction. The east sector site features an undulating topography, as it partially lies on an existing golf course.

The west sector site has overhead powerlines running north to south and east to west. An overhead power line parallels the boring locations B-1 to B-8.

4.3 Site Vegetation

At the time of our field phase, the west sector site exhibited dense native vegetation consisting of weeds, brittlebush, creosote, shrubs, mesquite plants and trees, and perennial grasses. The east sector site exhibited perennial grasses with occasional brittlebush and mesquite plants.



Figure 2: Typical west sector site conditions, mesquite plants, found during drilling operations

4.4 Soil Stratigraphy

For purposes of this study, we have divided the project area into five (5) areas: each area has been represented by individual cross sections, Cross Section A-A' to Cross Section E-E'. The locations of the project areas are indicated in Appendix A-1.

Cross Section A-A'

The soils we encountered in the borings in Cross Section A-A' can be divided into three generalized soil strata as follows:

Stratum A, consisting of lean clays, occasionally intermixed with fine grained sands was encountered from ground surface elevation, and extended to depths ranging from 7½ feet to 10 feet below ground surface (bgs) in Borings B-2, B-3, B-13 and B-14. These soils were encountered at a firm to hard consistency, with SPT values results ranging from 5 to more than 50 blows per foot of penetration. These soils were encountered at a dry to moist condition, with tested moisture content values ranging from 2 to 11 percent, and percent finer than the No. 200 sieve test results ranging from 52 to 54 percent. These soils exhibited a maximum liquid limit of 40 which yielded a plasticity index of 24. Soils in this stratum can be classified as CL in accordance with the USCS.

Stratum B, consisting of fine grained clayey sands, occasionally underlying the Stratum A soils, and extended to a depth of 20 feet bgs in Borings B-2, B-13 and B-14. These soils were encountered at a dense to very dense relative density, with SPT values results ranging from 32 to more than 50 blows per foot of penetration. These soils were encountered at a dry to moist condition, with tested moisture content values ranging from 4 to 7 percent, and percent finer than the No. 200 sieve test results ranging from 44 to 45 percent. These soils exhibited a maximum liquid limit of 48 which yielded a plasticity index of 30. Soils in this stratum can be classified as SC in accordance with the USCS.

Stratum C, consisting of fine grained poorly graded sands, occasionally intermixed with various amounts of silt, was encountered underlying Stratum B soils, and extended to depths ranging from to 21½ feet to boring termination depth of 51½ feet below ground surface (bgs) in Borings B-2, B-3, B-13 and B-14. These soils were encountered at a medium dense to very dense relative density, with SPT values results ranging from 29 to more than 50 blows per foot of penetration. These soils were encountered at a dry condition, with tested moisture content values ranging from 1 to 3 percent, and percent finer than the

No. 200 sieve test results ranging from 3.4 to 7.3 percent. Soils in this stratum can be classified as SW, SP or SP-SM in accordance with the USCS.

Cross Section B-B'

The soils we encountered in the borings in Cross Section B-B' can be grouped into one generalized soil stratum as follows:

Stratum A, consisting of fine grained clayey sands, was encountered from ground surface elevation, and extended to depths ranging from 7½ feet to 15 feet bgs in Borings B-4, B-5, B-6, B-15, B-16 and B-17. These soils were encountered at a very loose to very dense relative density, with SPT values results ranging from 4 to more than 50 blows per foot of penetration. These soils were encountered at a dry to moist condition, with tested moisture content values ranging from 5 to 9 percent, and percent finer than the No. 200 sieve test results ranging from 34 to 49 percent. These soils exhibited a maximum tested liquid limit of 37 which yielded a plasticity index of 22. Soils in this stratum can be classified as SC in accordance with the USCS.

Stratum B, consisting of fine grained poorly graded sands, occasionally intermixed with various amounts of silt, was encountered underlying the Stratum A soils, and extended to depths ranging from 21½ feet to the boring termination depth of 31½ feet below ground surface bgs in Borings B-5, B-6, B-15, B-16 and B-17. These soils were encountered at a medium dense to very dense relative density, with SPT values results ranging from 15 to more than 50 blows per foot of penetration. These soils were encountered at a dry condition, with tested moisture content values ranging from 1 to 3 percent, and percent finer than the No. 200 sieve test results ranging from 3.7 to 12.3 percent. Soils in this stratum can be classified as SM, SP or SP-SM in accordance with the USCS.

Stratum C, consisting of poorly graded and well graded gravels, occasionally intermixed with multi-grained sand, was encountered underlying Stratum A and B soils, and extended to depths ranging from to 21½ feet to boring 25 feet below ground surface bgs in Borings B-4, B-6 and B-15. These soils were encountered at a medium dense to very

dense relative density, with SPT values results ranging from 21 to more than 50 blows per foot of penetration. These soils were encountered at a dry condition, with one tested moisture content value of 1 percent, and percent finer than the No. 200 sieve test results ranging from 2.8 to 3.6 percent. Soils in this stratum can be classified as GW or GP in accordance with the USCS.

Cross Section C-C'

The soils we encountered in the borings in Cross Section C-C' can be divided into three generalized soil stratum as follows:

Stratum A, consisting of sandy lean clays, occasionally intermixed with sand was encountered from ground surface elevation, and extended to a depth of 10 feet bgs in Boring B-11. These soils were encountered at a stiff to hard consistency, with SPT values results ranging from 15 to more than 50 blows per foot of penetration. These soils were encountered at a dry to moist condition, with a tested moisture content value of 9 percent, and percent finer than the No. 200 sieve test results ranging from 65 to 68 percent. These soils exhibited a maximum tested liquid limit of 41, which yielded a plasticity index of 24. Soils in this stratum can be classified as CL in accordance with the USCS.

Stratum B, consisting of fine grained clayey sands, encountered from ground surface elevation, and extended to depths ranging from 10 feet to 15 feet bgs in Borings B-1 and B-7. These soils were encountered at a medium dense to dense relative density, with SPT values results ranging from 11 to 36 blows per foot of penetration. These soils were encountered at a dry condition, with tested moisture content values ranging from 3 to 5 percent, and percent finer than the No. 200 sieve test results ranging from 23 to 38 percent. These soils exhibited a maximum liquid limit of 51 which yielded a plasticity index of 28. Soils in this stratum can be classified as SC in accordance with the USCS.

Stratum C, consisting of fine to medium grained poorly graded sands, occasionally intermixed with various amounts of silt, was encountered underlying the Stratum A and B

soils, and extended to depths ranging from 41½ feet to the boring termination depth of 51½ feet bgs in Borings B-1, B-7 and B-11. These soils were encountered at a medium dense to very dense relative density, with SPT values results ranging from 18 to more than 50 blows per foot of penetration. These soils were encountered at a dry condition, with tested moisture content values ranging from less than 1 to 4 percent, and percent finer than the No. 200 sieve test results ranging from 4.2 to 8.5 percent. Soils in this stratum can be classified as SP or SP-SM in accordance with the USCS.

Cross Section D-D'

The soils we encountered in the borings in Cross Section D-D' can be divided into two generalized soil strata as follows:

Stratum A, consisting of fine grained clayey sands, intermixed with lean clay pockets encountered from ground surface elevation, and extended to depths ranging from 7½ feet to 20 feet bgs in Borings B-8, B-9 and B-10. These soils were encountered at a medium dense to very dense relative density, with SPT values results ranging from 10 to more than 50 blows per foot of penetration. These soils were encountered at a dry to moist condition, with tested moisture content values ranging from 4 to 7 percent, and percent finer than the No. 200 sieve test result of 46 percent. These soils exhibited a maximum liquid limit of 33 which yielded a plasticity index of 18. Soils in this stratum can be classified as SC in accordance with the USCS.

Stratum B, consisting of fine grained poorly graded sands, occasionally intermixed with silt, gravel and fat clay pockets was encountered underlying Stratum A soils, and extended to depths ranging from 35 to boring termination depth of 41½ feet bgs in Borings B-8, B-9 and B-10. These soils were encountered at a medium dense to very dense relative density, with SPT values results ranging from 14 to more than 50 blows per foot of penetration. These soils were encountered at a dry to moist condition, with tested moisture content values ranging from less than 1 to 10 percent, and percent finer than the No. 200 sieve test results ranging from 2.9 to 10.6 percent. Soils in this stratum can be classified as SP, SW or SP-SM in accordance with the USCS.

4.5 Groundwater

Groundwater was not present in the borings drilled during the time of our field exploration. According to the Texas Water Development Board Groundwater Database, the groundwater table at the site may range between 250 feet to about 400 feet below ground surface.

5.0 ENGINEERING EVALUATION

5.1 Vertical Movements

We calculated the Potential Vertical Rise (PVR) of a theoretically dry soil mass, in accordance with Texas Department of Transportation (TxDOT) method Tex 124-E. The calculated PVR value is 1 inch under dry moisture conditions for soils and conditions encountered in samples obtained from the soil borings.

6.0 ADDITIONAL CONSIDERATIONS

6.1 Limitations

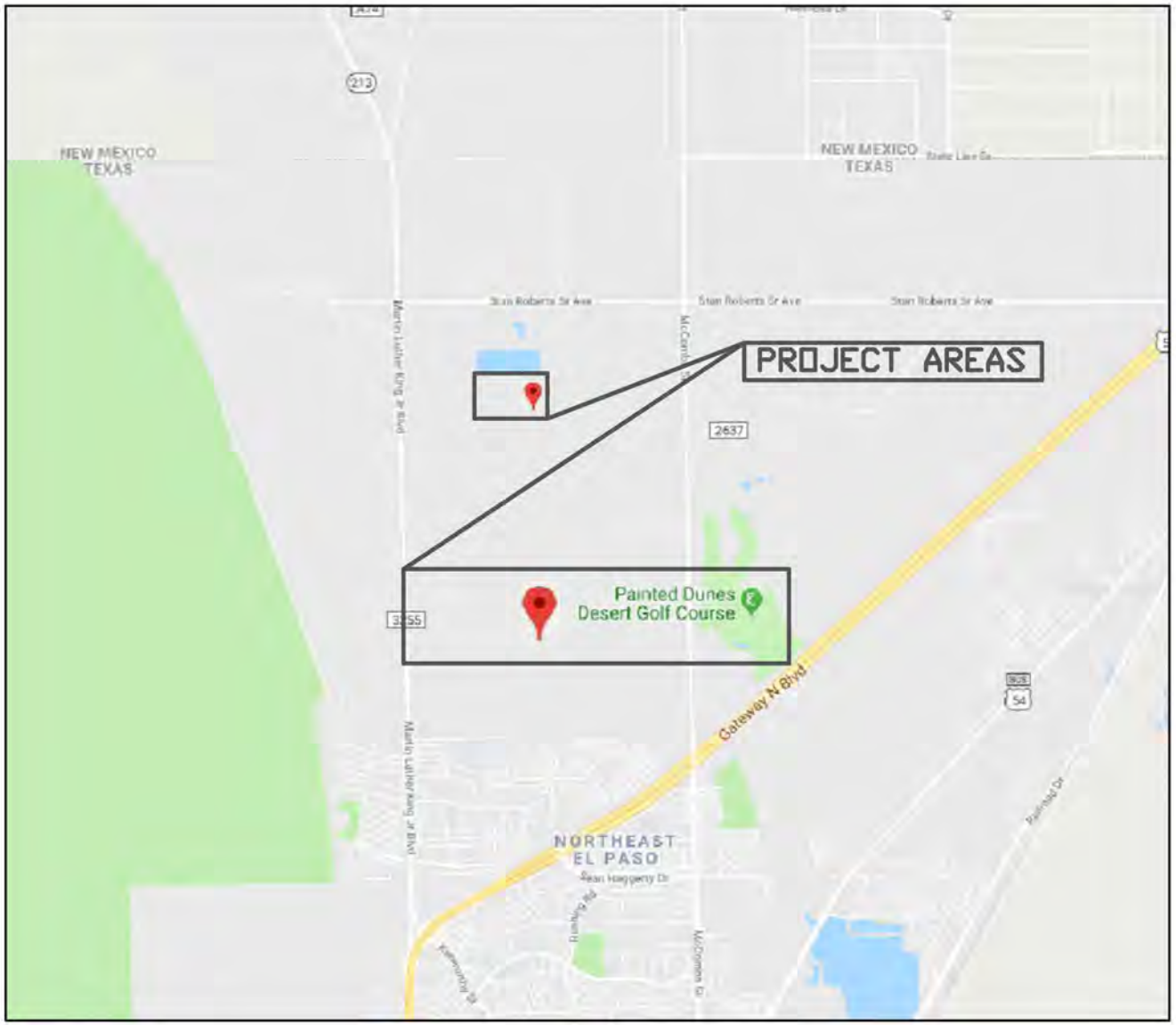
We have performed our professional services and have obtained the data presented in this report in accordance with generally accepted geotechnical engineering principles and practices. The information in this report is based on the data obtained from seventeen (17) representative test borings and laboratory testing conducted on representative samples, and on our knowledge of the project conditions at the time of our subsurface soil study.

The data in this report reflects subsurface soil conditions only at the specific sampling location, time of sampling, and to the depths indicated in our report. This report is not intended to identify or address any potential environmental concerns associated with the project site.

We recommend that Client notify LOI ENGINEERS of any changes to the project conditions considered in this report, so that we may provide pertinent modifications to our recommendations if deemed necessary. Additionally, once construction commences, we should be notified of any unusual site conditions that appear to vary from those reported herein, so that we may conduct further investigations and prepare supplemental recommendations if deemed necessary.

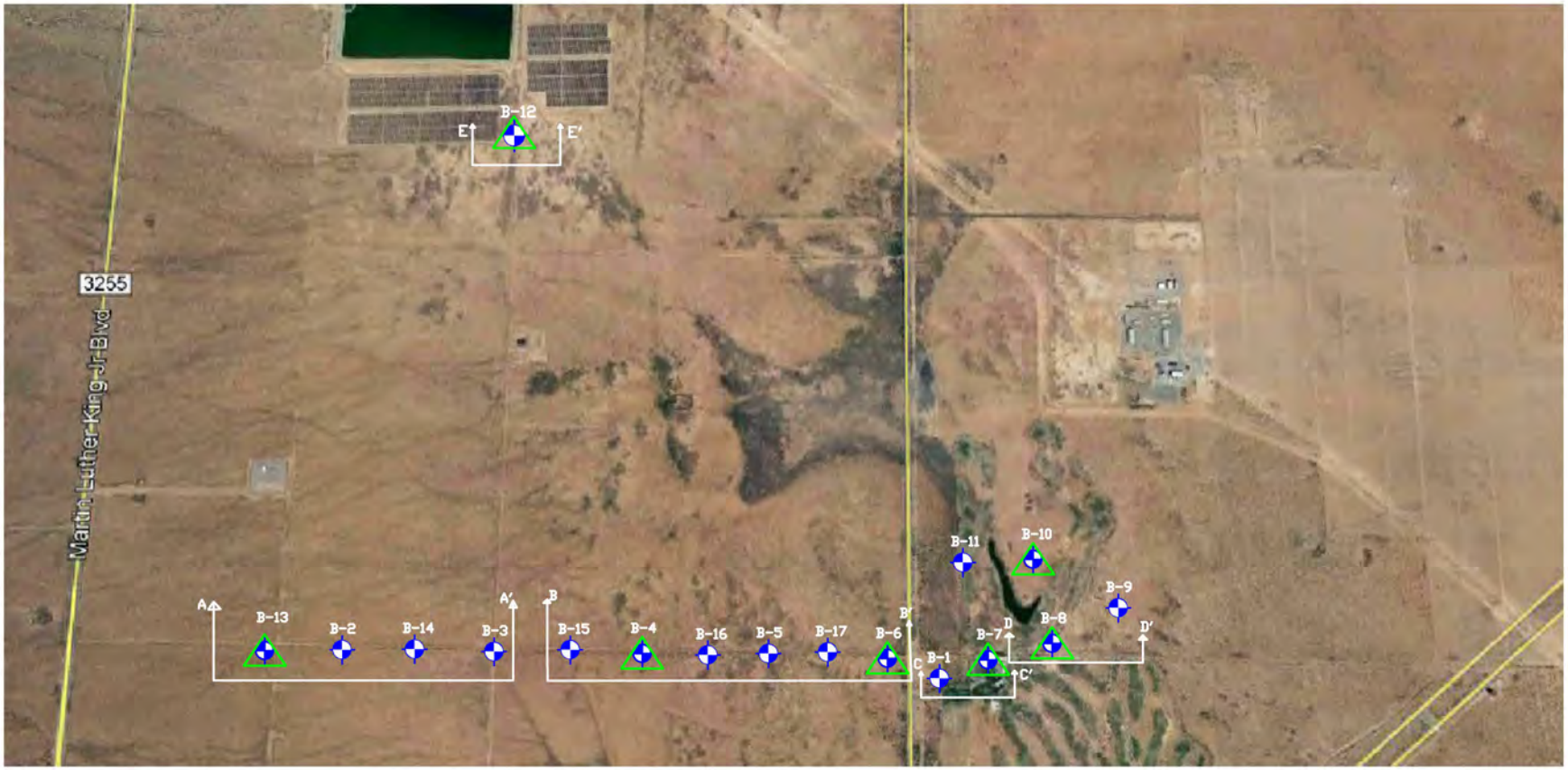
We conducted this investigation for the purpose of defining the subsurface soil conditions for the Northeast ASR project. Use of this information for projects other than the one described herein will not be adequate.

APPENDIX A



LEGEND	GEOTECHNICAL CONSULTANT	PROJECT CONSULTANT	DRAWING TITLE: GENERAL LOCATION MAP
APPROXIMATE PROJECT LOCATION	LOI ENGINEERS 915-781-1532 2101 E. MISSOURI AVE SUITE B EL PASO, TEXAS 79903	EP WATER 1154 HAWKINS BLVD. EL PASO, TEXAS 79925	PROJECT NAME: NORTHEAST ASR PROJECT EL PASO, TEXAS

DRAWN BY	REVIEWED BY	APPROVED BY	SCALE
M.M.	S.F.	B.O.	N.T.S
PROJECT No.	**FILE NAME**	**DATE**	**SHEET No.**
LOI18-031	SITE PLAN	03/06/18	A-1.1



LEGEND	GEOTECHNICAL CONSULTANT	PROJECT CONSULTANT	DRAWING TITLE: BORING LOCATION PLAN
B-1 APPROXIMATE BORING LOCATION AND NUMBER B-1 INFILTRATION TEST LOCATION AND NUMBER	LOI ENGINEERS 915-781-1532 2101 E. MISSOURI AVE SUITE B EL PASO, TEXAS 79903	EP WATER 1154 HAWKINS BLVD. EL PASO, TEXAS 79925	PROJECT NAME: NORTHEAST ASR PROJECT EL PASO, TEXAS

DRAWN BY	REVIEWED BY	APPROVED BY	SCALE
M.M.	S.F.	B.O.	N.T.S
PROJECT No.	**FILE NAME**	**DATE**	**SHEET No.**
LOI18-031	SITE PLAN	03/06/18	A-1.2



LEGEND	GEOTECHNICAL CONSULTANT	PROJECT CONSULTANT	DRAWING TITLE: BORING LOCATION PLAN
B-1 APPROXIMATE BORING LOCATION AND NUMBER ELECTRICAL RESISTIVITY TEST	LOI ENGINEERS 915-781-1532 2101 E. MISSOURI AVE SUITE B EL PASO, TEXAS 79903	EP WATER 1154 HAWKINS BLVD. EL PASO, TEXAS 79925	PROJECT NAME: NORTHEAST ASR PROJECT EL PASO, TEXAS

DRAWN BY	REVIEWED BY	APPROVED BY	SCALE
M.M.	S.F.	B.O.	N.T.S
PROJECT No.	**FILE NAME**	**DATE**	**SHEET No.**
LOI18-031	SITE PLAN	03/06/18	A-1.3

LOG OF TEST BORING No. B-1

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/17/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4004 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value CURVE (10 30 50)
0			SAND, fine grained, clayey, medium dense, light brown, moist							19	
			- reddish-brown with traces of gravel at 2.5 feet		5	38	31	13	18	21	
5			- dense at 5 feet	SC						32	
					5	35	51	23	28	33	
10			SAND, medium grained, poorly graded, dense, dry, with traces of gravel		2	4.6				33	
15			- medium dense and light gray at 15 feet							18	
20			- very dense at 20 feet							50+	50+
25					1	4.2				50+	50+
				SP							
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-2**

LOG OF TEST BORING No. B-1

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/17/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4004 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value: CURVE (10 30 50)
			SAND, medium grained, poorly graded, very dense, light gray, dry							50+	50+
35										50+	50+
40					2					50+	50+
45			SAND, medium grained, poorly graded with silt, very dense, gray, dry	SP-SM						50+	50+
50					0	8.5				50+	50+
			Termination depth at 51.5 feet								
55											
60											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-3**

LOG OF TEST BORING No. B-2

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/19/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4079 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value CURVE (10 30 50)
0			CLAY, sandy lean, brown, firm, dry		2					5	
			- stiff with gravel at 2.5 feet	CL						13	
5			- very stiff, light brown at 5 feet		11	53	40	16	24	20	
			SAND, fine grained, clayey, very dense, dry							50+	50+
10			- very stiff at 10 feet	SC	7					35	
15			- reddish-brown at 15 feet		6					32	
20			SAND, medium grained, poorly graded, brown, very dense, dry	SP	3	4.9	NV	NV	NP	50+	50+
			Termination depth at 21.5 feet								
25											
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-4**

LOG OF TEST BORING No. B-3

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/22/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4055 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value CURVE (10 30 50)
0			CLAY, sandy lean, brown firm, dry		5					8	
			- very stiff at 2.5 feet							40	
5				CL	7	54	33	13	20	30	
			- hard at 7.5 feet							50+	50+
10			SAND, fine grained, clayey, brown, very dense, dry to moist		7	44	48	18	30	50+	50+
15			- dense at 15 feet	SC						41	
20			SAND, medium grained, poorly graded with silt and gravel, dense, brown, dry		2	5.6	NV	NV	NP	41	
25										30	
				SP-SM							
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-5**

LOG OF TEST BORING No. B-3

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/22/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4055 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value: CURVE (10 30 50)
			SAND, medium grained, poorly graded with silt and gravel, dense, brown, dry							45	
35					2	7.3	NV	NV	NP	41	
			Termination depth at 36.5 feet								
40											
45											
50											
55											
60											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-6**

LOG OF TEST BORING No. B-4

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/19/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4034 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value: CURVE (10 30 50)
0			SAND, fine grained, clayey, brown, medium dense, dry to moist	SC	8	45	29	14	15	12	
			- very dense, white, with caliche at 2.5 feet		6	49				50+	50+
5			- dense at 5 feet							48	
			- medium dense at 7.5 feet		7					17	
10										22	
15			GRAVEL, medium grained, well graded, brown, medium dense, dry with sand		1	2.9	NV	NV	NP	24	
20					1					21	
			Termination depth at 21.5 feet								
25											
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-7**

LOG OF TEST BORING No. B-5

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/19/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4021 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value CURVE (10 30 50)
0			SAND, medium grained, poorly graded, brown, medium dense, dry to moist	SP	7					14	
			- dense at 2.5 feet							34	
5			SAND, fine grained, clayey, brown, very dense, dry	SC	5	44				50+	50+
			- medium dense, white, with caliche and gravel at 7.5 feet							16	
10			- dense with silt at 10 feet		6					41	
15			SAND, medium grained, poorly graded, brown, dense, dry	SP	3	4.6				42	
20			SAND, fine grained, silty, brown, dense, dry	SM	2	12.3				43	
25			SAND, medium grained, poorly graded, brown, very dense, dry	SP	2	4.9				50+	50+
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-8**

LOG OF TEST BORING No. B-5

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/19/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4021 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value: CURVE (10 30 50)
										50+	50+
			Termination depth at 31.5 feet								
35											
40											
45											
50											
55											
60											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-9**

LOG OF TEST BORING No. B-6

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/21/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4010 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value: CURVE (10 30 50)
0			SAND, fine grained, clayey, brown, very loose, dry to moist	SC	7					4	
			- medium dense, reddish- brown at 2.5 feet		5	45	37	15	22	17	
5			- gray at 5 feet							12	
			SAND, medium grained, poorly graded, brown, medium dense, dry	SP	1	3.7	NV	NV	NP	21	
10			- dense, with silt seams at 10 feet							39	
15			Gravel, medium grained, poorly graded, dense, brown, dry	GW	1	3.6	NV	NV	NP	44	
20			- very dense at 20 feet							50+	50+
25			SAND, medium grained, poorly graded, very dense, white, with silt	SP-SM	1	5.4	NV	NV	NP	50+	50+
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-10**

LOG OF TEST BORING No. B-6

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/21/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4010 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value: CURVE (10 30 50)
										50+	50+
			Termination depth at 31.5 feet								
35											
40											
45											
50											
55											
60											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-11**

LOG OF TEST BORING No. B-7

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/23/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4002 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value: CURVE (10 30 50)
0			SAND, fine grained, medium dense, reddish-gray, dry	SC						11	
			- tan with caliche at 2.5 feet							22	
5			- dense at 5 feet							36	
			- reddish-brown with silt at 7.5 feet		3	23				13	
10			- dense at 10 feet							36	
15			SAND, medium grained, poorly graded, very dense with silt and trace of gravel	SP-SM	1	7				50+	50+
20			- light gray at 20 feet							50+	50+
25			- with gravel at 25 feet							50+	50+
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-12**

LOG OF TEST BORING No. B-7

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/23/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4002 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value: CURVE (10 30 50)
			SAND, fine grained, poorly graded very dense, light gray, moist	SP	1	4.1				50+	50+
35					1					50+	50+
40										50+	50+
			Termination depth at 41.5 feet								
45											
50											
55											
60											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-13**

LOG OF TEST BORING No. B-8

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/23/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4007 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value: CURVE (10 30 50)
0			SAND, fine grained, clayey, brown, dense, dry to moist		5					33	
			- medium dense with caliche at 2.5 feet	SC	6	46	33	15	18	21	
5										10	
			SAND, medium grained, poorly graded with silt, brown, medium dense, dry		3	5.6	NV	NV	NP	15	
10			- light gray at 10 feet	SP-SM						26	
15			SAND, medium grained, poorly graded, brown, dense, dry		2	2.9	NV	NV	NP	46	
20			- very dense and light gray at 20 feet							50+	50+
25				SP						50+	50+
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-14**

LOG OF TEST BORING No. B-8

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/23/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4007 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value CURVE (10 30 50)
			SAND, medium grained, poorly graded, brown, dense							34	
35			CLAY, sandy fat, brown, very stiff, moist	CH	11	50	66	25	41	49	
40			- hard, with silt and gravel at 40 feet		4					50+	50+
			Termination depth at 41.5 feet								
45											
50											
55											
60											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-15**

LOG OF TEST BORING No. B-9

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/23/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4008 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value CURVE (10 30 50)
0			SAND, fine grained, medium dense, dry, light brown, with clay		7					10	
			- dense at 2.5 feet							33	
5			- medium dense at 5 feet		7					24	
										15	
10				SC						21	
15			- very dense at 15 feet							50+	50+
20			SAND, medium grained, well graded, brown, dense, dry with traces of gravel		1	4	NV	NV	NP	43	
25										46	
				SW							
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-16**

LOG OF TEST BORING No. B-9

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/23/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4008 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value CURVE (10 30 50)
			SAND, medium grained, poorly graded, brown, very dense, dry							50+	50+
35			CLAY, fat with sand, brown, very stiff, moist	CH	14	85	53	20	33	45	
			SAND, fine grained, clayey, brown, dense, dry		6	49	24	14	10		
40			- reddish-brown, very dense, with silt at 40 feet	SC						50+	50+
45					5					50+	50+
50			SAND, medium grained, poorly graded with silt, brown, very dense, dry	SP-SM	2	10.6	NV	NV	NP	50+	50+
			Termination depth at 51.5 feet								
55											
60											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-17**

LOG OF TEST BORING No. B-10

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/23/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4009 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value CURVE (10 30 50)
0			CLAY, lean, brown, very stiff, dry	CL						22	
			SAND, fine grained, tan, medium dense, dry	SC	4					24	
5										25	
			GRAVEL, well graded, dense, tan, dry	GW	1	7.6	NV	NV	NP	37	
10										36	
15			SAND, medium grained, poorly graded, medium dense, reddish-tan, dry	SP	0	3	NV	NV	NP	21	
20			- dense at 20 feet							33	
25			- medium dense at 25 feet							14	
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-18**

LOG OF TEST BORING No. B-10

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/23/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4009 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content, %	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value: CURVE (10 30 50)
			SAND, fine grained, clayey, brown, very dense, moist							50+	50+
35					2					50+	50+
					10						
40										50+	50+
			Termination depth at 41.5 feet								
45											
50											
55											
60											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-19**

LOG OF TEST BORING No. B-11

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/26/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4008 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value CURVE (10 30 50)
0			CLAY, sandy lean, stiff, brown, dry							15	
			- very stiff at 2.5 feet		9	65	39	18	21	26	
5				CL	9	68	41	17	24	30	
			- tan, hard, with caliche at 7.5 feet							50+	50+
10			SAND, medium grained, poorly graded with silt, medium dense and reddish-brown, dry with traces of gravel		0	5.4	NV	NV	NP	23	
15			- dense and light gray at 15 feet							49	
20			- very dense at 20 feet							50+	50+
25			- gray at 25 feet	SP-SM						50+	50+
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-20**

LOG OF TEST BORING No. B-11

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/26/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4008 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value: CURVE (10 30 50)
			SAND, medium grained, poorly graded with silt, very dense, gray, dry							50+	50+
35										50+	50+
40					4					50+	50+
			Termination depth at 41.5 feet								
45											
50											
55											
60											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-21**

LOG OF TEST BORING No. B-12

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/22/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4052 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value: CURVE (10 30 50)
0			CLAY, sandy lean, brown, very stiff, dry to moist	CL	9	64				18	
										27	
5										47	
			SAND, fine grained, clayey, brown, very dense, dry to moist	SC	6	49				50+	50+
10			- dense at 10 feet							43	
15			SAND, medium grained, poorly graded, brown, medium dense, dry, with traces of gravel	SP	1	3.7	NV	NV	NP	27	
20			- dense at 20 feet							37	
25			SAND, medium grained, poorly graded with silt, brown, dense, dry with gravel	SP-SM	1	5.7	NV	NV	NP	44	
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-22**

LOG OF TEST BORING No. B-12

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/22/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4052 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value: CURVE (10 30 50)
			SAND, medium grained, poorly graded with silt, brown, dense, dry with gravel							40	
			Termination depth at 31.5 feet								
35											
40											
45											
50											
55											
60											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-23**

LOG OF TEST BORING No. B-13

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/27/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4093 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value CURVE (10 30 50)
0			CLAY, sandy lean, reddish-brown, firm, moist							5	
			- very stiff at 2.5 feet	CL	7	54	28	17	11	18	
5			- firm and tan at 5 feet							8	
			SAND, fine grained, clayey, very dense, reddish-brown, dry	SC	4	45				50+	50+
10										50+	50+
15										50+	50+
20			CLAY, sandy lean, hard, light brown, moist	CL	6	53	41	16	25	50+	50+
25			- very stiff and tan at 25 feet							38	
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-24**

LOG OF TEST BORING No. B-13

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/27/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4093 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value: CURVE (10 30 50)
			SAND, medium grained, poorly graded, gray, very dense, dry,							50+	50+
35			- dense at 35 feet							44	
40				SP						44	
45			- light gray at 45 feet		1	3.4				46	
50			SAND, medium graded, poorly graded, very dense, light gray, dry	SC	7	37	50	20	30	50+	50+
			Termination depth at 51.5 feet								
55											
60											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-25**

LOG OF TEST BORING No. B-14

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/22/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4066 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value: CURVE (10 30 50)
0			SAND, fine grained, silty, brown, medium dense, dry	SM	3					10	
										13	
5			CLAY, sandy lean, brown, very stiff, dry to moist	CL	10	52				31	
										33	
10			SAND, medium grained, poorly graded with silt, brown, medium dense, dry with traces of gravel	SP-SM	4					16	
15			SAND, medium grained, well graded with silt, medium dense, with traces of gravel	SW-SM	2	6.2	NV	NV	NP	29	
20			- dense and light gray at 20 feet		1					31	
			Termination depth at 21.5 feet								
25											
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-26**

LOG OF TEST BORING No. B-15

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/22/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4045 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value CURVE (10 30 50)
0			SAND, fine grained, clayey, brown, loose, dry to moist		7	38				7	
			- dense at 2.5 feet							43	
5			- reddish-brown at 5 feet	SC	6					49	
			- medium dense and gray at 7.5 feet							25	
10			SAND, medium grained, poorly graded with silt, brown, medium dense, dry		2					22	
15			- gray at 15 feet	SP-SM						22	
20			GRAVEL, poorly graded, sandy, medium dense, dry	GP	1	2.8	NV	NV	NP	26	
			Termination depth at 21.5 feet								
25											
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-27**

LOG OF TEST BORING No. B-16

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/21/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4027 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value: CURVE (10 30 50)
0			SAND, fine grained, clayey, brown, loose, dry to moist	SC	9	34				5	
										6	
5			- medium dense and gray at 5 feet		5	36				13	
			SAND, medium grained, poorly graded with silt, brown, medium dense, dry with traces of gravel	SP-SM	1	6.3	NV	NV	NP	18	
10										15	
15			- dense at 15 feet							47	
20			SAND, medium grained, poorly graded, brown, dense, dry with traces of gravel	SP	1	4.3	NV	NV	NP	45	
			Termination depth at 21.5 feet								
25											
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-28**

LOG OF TEST BORING No. B-17

Project name: Northeast ASR
File No.: LOI18-031
Date drilled: 02/21/2018
Boring Location: See Sheet A-1
Elevation (ft.): 4014 North: N/A West: N/A

Elevation and Depth (Ft.)	Samples	Soil symbols	Soil Description	USCS symbol	Moisture content,%	Minus #200 sieve, %	Liquid limit	Plastic limit	Plasticity index	SPT N-Value: Blows per foot (N)	SPT N-Value CURVE (10 30 50)
0			SAND, fine grained, clayey, brown, loose, moist	SC	7					7	
			- dense with caliche at 2.5 feet							30	
5					6					38	
										37	
10			SAND, medium grained, poorly graded with silt, brown, dense, dry	SP-SM	2	6.0	NV	NV	NP	30	
15			- medium dense at 15 feet							28	
20			- very dense at 20 feet		1					50+	50+
			Termination depth at 21.5 feet								
25											
30											

Groundwater Table Data

Depth	Date	Time
N/A	N/A	N/A

Sample Type
- Auger cutting
- 2" O.D. split spoon
- 3" O.D. split tube
- Thin-walled Shelby tube

Rig type: CME-75
Boring type: HSA
Drilled by: SC
Logger: KR
Sheet No.: **A-29**

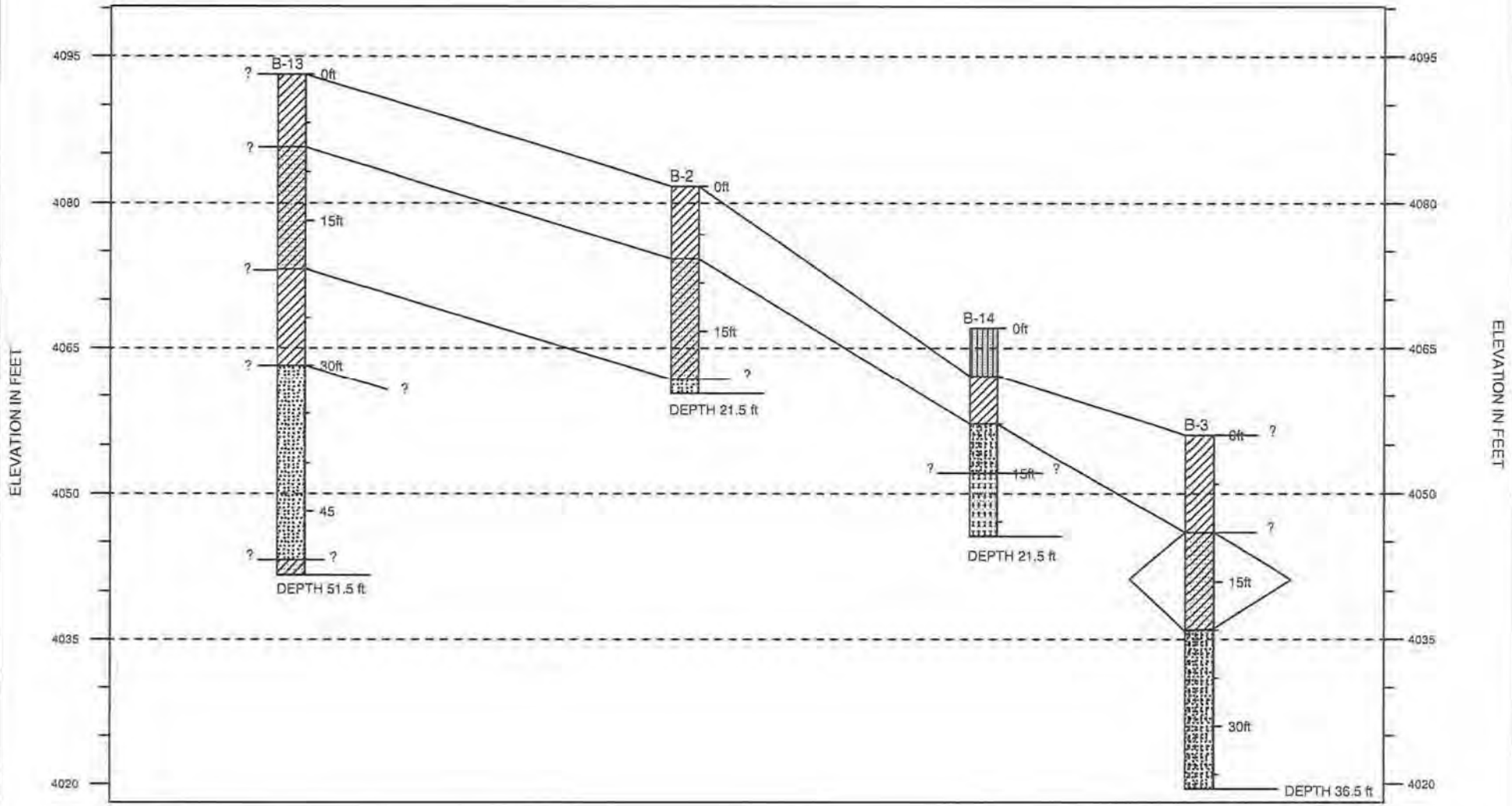
SUMMARY OF RESULTS

Project: Northeast ASR
LOI Proj # LOI18-031
Date: 02/28/18 By: AR/PNA

Boring No.	Depth (ft.)	% Moisture Content	% Material passing # 4	% Material passing # 40	% Material minus # 200	LL	PL	PI	Soil Classification
1	2 ½ - 4	5			38	31	13	18	SC; Clayey sand
1	7 ½ - 9	13			88	51	23	28	CH; Fat clay with sand
1	7 ½ - 9	5			35				SC; Clayey sand
1	10 - 11 ½	2	84	37	4.6				SP; Poorly graded sand with gravel
1	25 - 26 ½	1			4.2				SP; Poorly graded sand
1	40 - 41 ½	2							
1	50 - 51 ½	0			8.5				SP-SM; Poorly graded sand with silt
2	0 - 1 ½	2							
2	5 - 6 ½	11			53	40	16	24	CL; Sandy lean clay
2	10 - 11 ½	7							
2	15 - 16 ½	6							
2	20 - 21 ½	3			4.9	NV	NV	NP	SP; Poorly graded sand
3	0 - 1 ½	5							
3	5 - 6 ½	7			54	33	13	20	CL; Sandy lean clay
3	10 - 11 ½	7			44	48	18	30	SC; Clayey sand
3	20 - 21 ½	2	77	38	5.6	NV	NV	NP	SP-SM; Poorly graded sand with silt and gravel
3	35 - 36 ½	2	67	27	7.3	NV	NV	NP	SP-SM; Poorly graded sand with silt and gravel
4	0 - 1 ½	8			45	29	14	15	SC; Clayey sand
4	2 ½ - 4	6	99	67	49				SC; Clayey sand
4	7 ½ - 9	7							
4	15 - 16 ½	1	48	16	2.9	NV	NV	NP	GW; Well graded gravel with sand
4	20 - 21 ½	1							
5	0 - 1 ½	7							
5	5 - 6 ½	5			44				SC; Clayey sand
5	10 - 11 ½	6							
5	15 - 16 ½	3			4.6	NV	NV	NP	SP; Poorly graded sand
5	20 - 21 ½	2			12.3				SM; Silty sand
5	25 - 26 ½	2	83	27	4.9	NV	NV	NP	SP; Poorly graded sand with gravel
6	0 - 1 ½	7							
6	2 ½ - 4	5			45	37	15	22	SC; Clayey sand
6	7 ½ - 9	1	91	29	3.7	NV	NV	NP	SP; Poorly graded sand
6	15 - 16 ½	1	53	18	3.6	NV	NV	NP	GW; Well-graded gravel with sand
6	25 - 26 ½	1			5.4	NV	NV	NP	SP-SM; Poorly graded sand with silt
7	7 ½ - 9	3			23.5				SC; Clayey sand
7	15 - 16 ½	1	71	23	7.0				SP-SM; Poorly graded sand with silt and gravel
7	30 - 31 ½	1			4.1				SP; Poorly graded sand
7	35 - 36 ½	1							
8	0 - 1 ½	5							
8	2 ½ - 4	6			46	33	15	18	SC; Clayey sand
8	7 ½ - 9	3			5.6	NV	NV	NP	SP-SM; Poorly graded sand with silt
8	15 - 16 ½	2			2.9	NV	NV	NP	SP; Poorly graded sand
8	35 - 36 ½	11			50	66	25	41	CH; Sandy fat clay
8	40 - 41 ½	4							
9	0 - 1 ½	7							
9	5 - 6 ½	7							

Boring No.	Depth (ft.)	% Moisture Content	% Material passing # 4	% Material passing # 40	% Material minus # 200	LL	PL	PI	Soil Classification
9	20 - 21 ½	1	79	24	4.0	NV	NV	NP	SW; Well-graded sand with gravel
9	35 - 36 ½ (13")	14			85	53	20	33	CH; Fat clay with sand
9	35 - 36 ½ (13"-21")	6			49	24	14	10	SC; Clayey sand
9	45 - 46 ½	5							
9	50 - 51 ½	2			10.6	NV	NV	NP	SP-SM; Poorly graded sand with silt
10	2 ½ - 4	4							
10	7 ½ - 9	1	49	24	7.6	NV	NV	NP	GW-GM; Well-graded gravel with silt and sand
10	15 - 16 ½	0			3.0	NV	NV	NP	SP; Poorly graded sand
10	35 - 36 ½ TOP	2							
10	35 - 36 ½ BOTTOM	10							
11	2 ½ - 4	9			65	39	18	21	CL; Sandy lean clay
11	5 - 6 ½	9			68	41	17	24	CL; Sandy lean clay
11	15 - 16 ½	0	74	38	5.4	NV	NV	NP	SP; Poorly graded sand with silt and gravel
11	40 - 41 ½	4							
12	0 - 1 ½	9			64				CL; Sandy lean clay
12	7 ½ - 9	6			49				SC; Clayey sand
12	15 - 16 ½	1	60	17	3.7	NV	NV	NP	SP; Poorly graded sand with gravel
12	25 - 26 ½	1	55	19	5.7	NV	NV	NP	SP-SM; Poorly graded sand with silt and gravel
13	2 ½ - 4	7			54	28	17	11	SC; Clayey sand
13	7 ½ - 9 TOP	4	94	74	45				SC; Clayey sand
13	7 ½ - 9 BOTTOM	3	98	68	46				SC; Clayey sand
13	20 - 21 ½	6			53	41	16	25	CL; Sandy lean clay
13	45 - 46 ½	1			3.4				SP; Poorly graded sand
13	50 - 51 ½	7			37	50	20	30	SC; Clayey sand
14	0 - 1 ½	3							
14	5 - 6 ½	10			52				CL; Sandy lean clay
14	10 - 11 ½	4							
14	15 - 16 ½	2	71	17	6.2	NV	NV	NP	SW-SM; Well-graded sand with silt and gravel
14	20 - 21 ½	1							
15	0 - 1 ½	7			38				SC; Clayey sand
15	5 - 6 ½	6							
15	10 - 11 ½	2							
15	20 - 21 ½	1	51	14	2.8	NV	NV	NP	GP; Poorly graded gravel with sand
16	0 - 1 ½	9			34				SC; Clayey sand
16	5 - 6 ½	5			36				SC; Clayey sand
16	7 ½ - 9	1	80	34	6.3	NV	NV	NP	SP-SM; Poorly graded sand with silt and gravel
16	20 - 21 ½	1	64	18	4.3	NV	NV	NP	SP; Poorly graded sand with gravel
17	0 - 1 ½	7							
17	5 - 6 ½	6							
17	10 - 11 ½	2			6.0	NV	NV	NP	SP-SM; Poorly graded sand with silt
17	20 - 21 ½	1							

CROSS SECTION FOR: A-A'

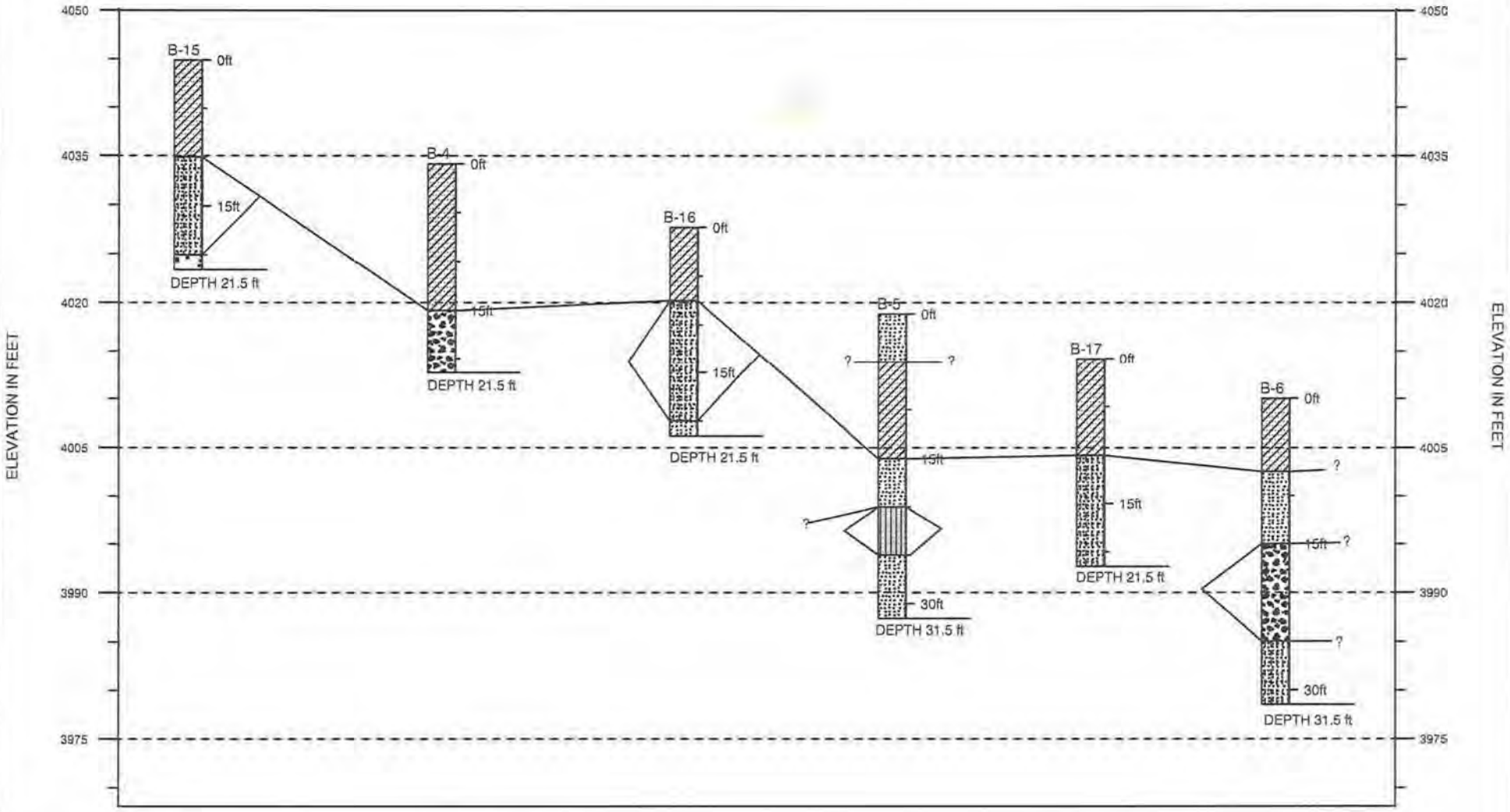


Strata symbols

- Low plasticity clay
- Clayey sand
- Poorly graded sand
- Well graded sand with silt
- Poorly graded sand with silt
- Silty sand

LOI ENGINEERS GENERALIZED SOIL PROFILE		
HORIZONTAL SCALE: NTS VERTICAL SCALE: 1"=15'	DRAWN BY/APPROVED BY: MM/BO	DATE DRAWN 3/13/2018
Northeast ASR		
PROJECT NO. LOI18-031		SHEET A-32

CROSS SECTION FOR: B-B'

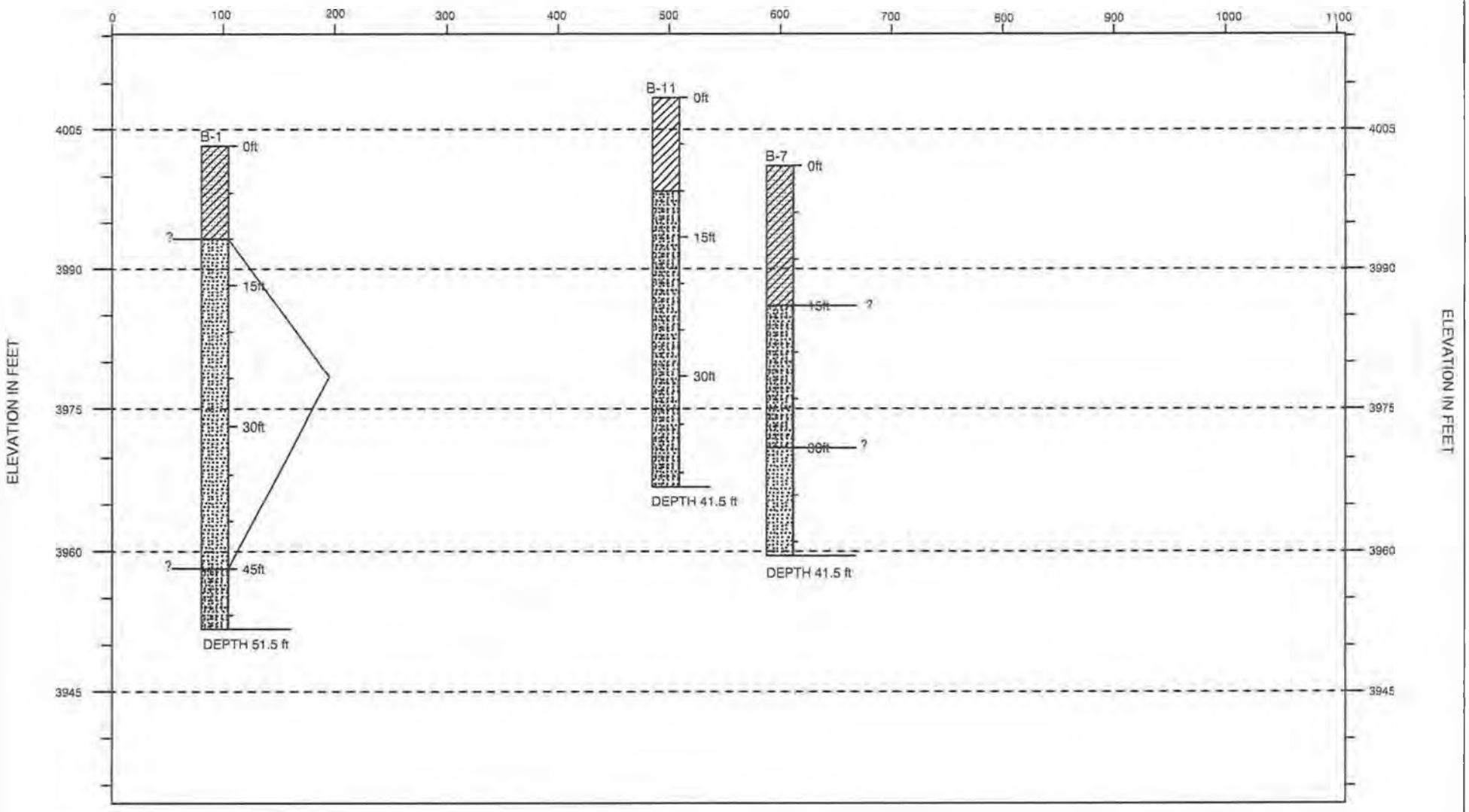


Strata symbols

- Clayey sand
- Well graded gravel
- Poorly graded sand
- Poorly graded gravel
- Silty sand
- Poorly graded sand with silt

LOI ENGINEERS GENERALIZED SOIL PROFILE		
HORIZONTAL SCALE: NTS VERTICAL SCALE: 1"=15'	DRAWN BY/APPROVED BY: MM/BO	DATE DRAWN 3/13/2018
Northeast ASR		
PROJECT NO. LOI18-031		SHEET A-33

CROSS SECTION FOR: C-C'



Strata symbols

- Clayey sand
- Poorly graded sand
- Poorly graded sand with silt
- Low plasticity clay

LOI ENGINEERS

GENERALIZED SOIL PROFILE

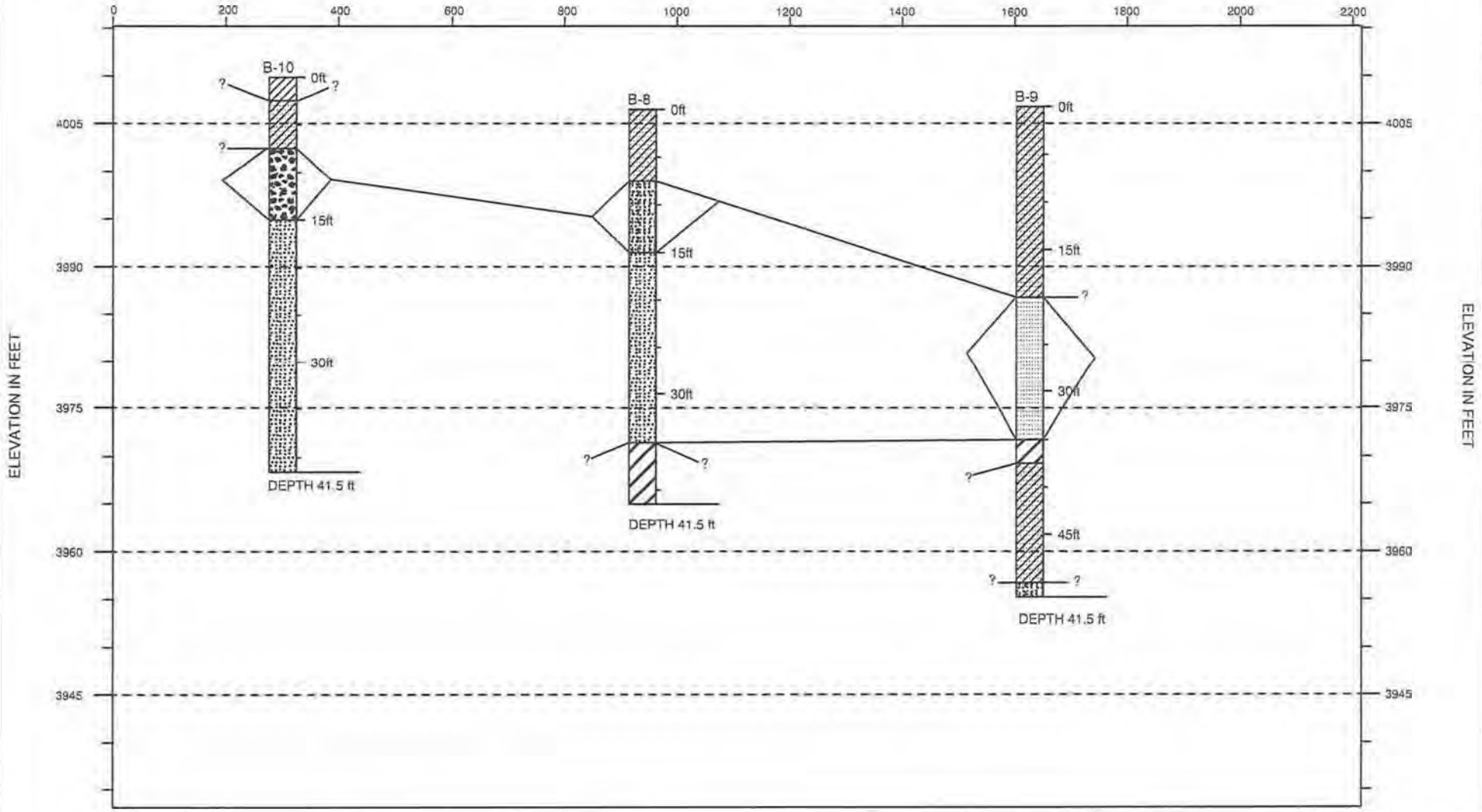
HORIZONTAL SCALE 1"=100'	DRAWN BY/APPROVED BY: MM/BO	DATE DRAWN
VERTICAL SCALE 1"=15'		3/13/2018

Northeast ASR

PROJECT NO. LOI18-031

SHEET A-34

CROSS SECTION FOR: D-D'



Strata symbols

- Clayey sand
- Poorly graded sand with silt
- Poorly graded sand
- Low plasticity clay
- Well graded gravel
- Well graded sand
- High plasticity clay

LOI ENGINEERS

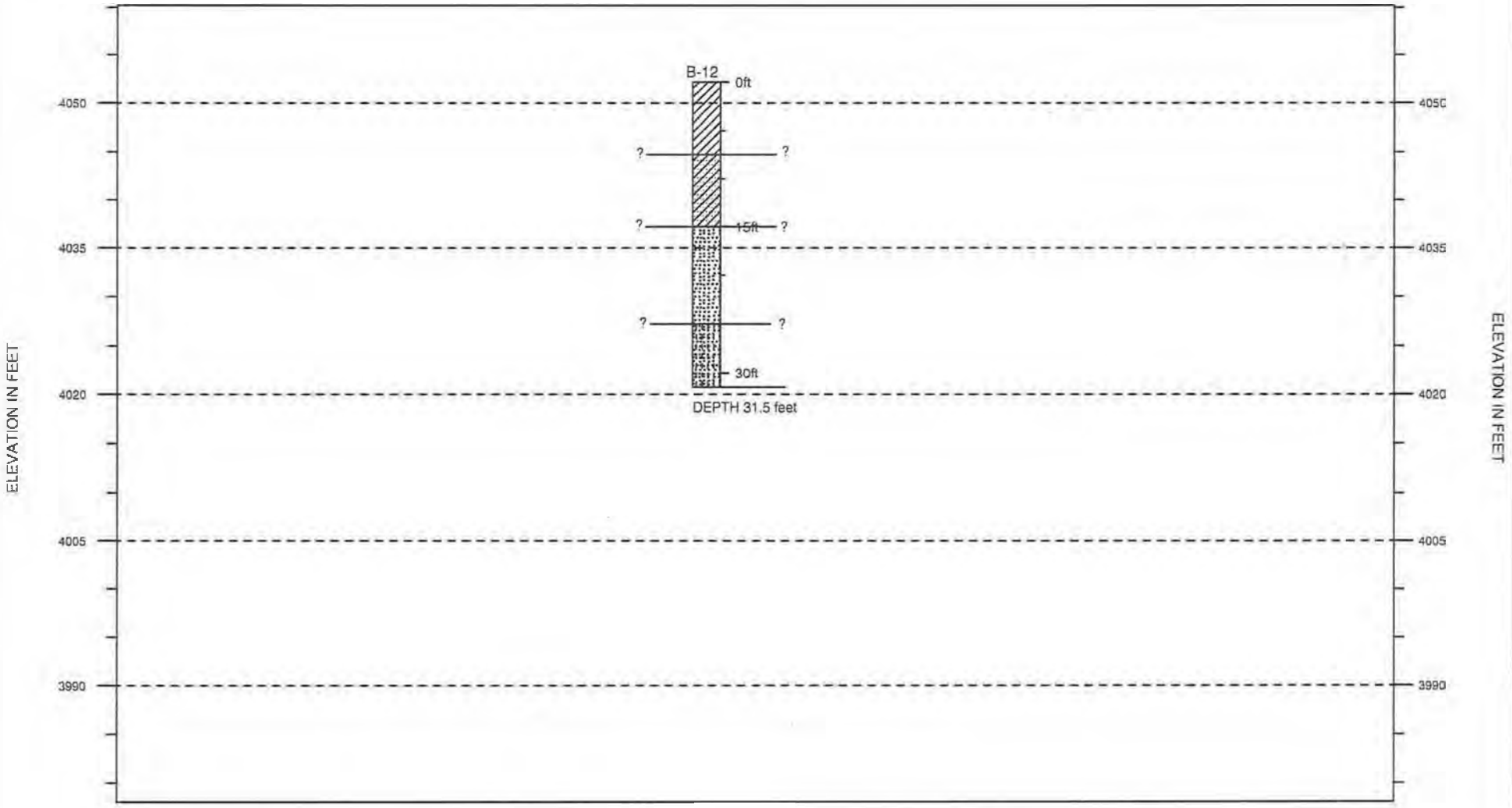
GENERALIZED SOIL PROFILE

HORIZONTAL SCALE 1"=200'	DRAWN BY/APPROVED BY: MM/BO	DATE DRAWN
VERTICAL SCALE 1"=15'		3/13/2018

Northeast ASR

Project NO. LOI18-031 | SHEET A-35

CROSS SECTION FOR: E-E'



Strata symbols

- Low plasticity clay
- Clayey sand
- Poorly graded sand
- Poorly graded sand with silt

LOI ENGINEERS

GENERALIZED SOIL PROFILE

HORIZONTAL SCALE:	NTS	DRAWN BY/APPROVED BY: MM/BO	DATE DRAWN
VERTICAL SCALE:	1"=15'		3/16/2018

Northeast ASR

PROJECT NO. LOI18-031

SHEET A-36

Certificate of Analysis Summary 577770

LOI Engineers, El Paso, TX

Project Name: Northeast ASR-18-031

Project Id:
Contact: Sergio Flores
Project Location: El Paso, TX

Date Received in Lab: Wed Feb-28-18 02:18 pm
Report Date: 07-MAR-18
Project Manager: Holly Taylor

Analysis Requested													
	Lab Id:	577770-001		577770-002		577770-003		577770-004		577770-005		577770-006	
	Field Id:	B-1		B-3		B-5		B-7		B-9		B-10	
	Depth:												
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Feb-27-18 10:00		Feb-23-18 11:00		Feb-23-18 15:00		Feb-24-18 12:00		Feb-23-18 14:00		Feb-26-18 09:00	
Inorganic Anions by SW 9056 SUB: TX104704215-18-24	***Extracted:***	Mar-05-18 14:33		Mar-05-18 14:33		Mar-05-18 14:33		Mar-05-18 14:33		Mar-05-18 14:33		Mar-05-18 14:33	
	Analyzed:	Mar-05-18 19:10		Mar-06-18 07:52		Mar-06-18 08:05		Mar-06-18 08:19		Mar-06-18 08:33		Mar-06-18 09:13	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		61.0	10.0	23.9	10.0	43.5	10.0	<10.0	10.0	140	10.0	14.3	10.0
Sulfate		<10.0	10.0	196	10.0	220	10.0	20.4	10.0	282	10.0	47.7	10.0
Soil pH by EPA 9045C SUB: TX104704215-18-24	***Extracted:***												
	Analyzed:	Mar-02-18 08:30		Mar-02-18 08:30		Mar-02-18 08:30		Mar-02-18 08:30		Mar-02-18 08:30		Mar-02-18 08:30	
	Units/RL:	SU	RL	SU	RL	SU	RL	SU	RL	SU	RL	SU	RL
pH		8.23		8.26		7.96		8.42		8.19		8.20	

This analytical report, and the entire data package it represents, has been made for your exclusive and confidential use.
The interpretations and results expressed throughout this analytical report represent the best judgment of XENCO Laboratories.
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Our liability is limited to the amount invoiced for this work order unless otherwise agreed to in writing.

Holly Taylor
Project Manager

Final 1.000

Certificate of Analysis Summary 577770

LOI Engineers, El Paso, TX

Project Name: Northeast ASR-18-031

Project Id:
Contact: Sergio Flores
Project Location: El Paso, TX

Date Received in Lab: Wed Feb-28-18 02:18 pm
Report Date: 07-MAR-18
Project Manager: Holly Taylor

Analysis Requested													
	Lab Id:	577770-007		577770-008		577770-009		577770-010		577770-011		577770-012	
	Field Id:	B-11		B-12		B-14		B-15		B-16		B-17	
	Depth:												
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Feb-26-18 13:00		Feb-22-18 09:00		Feb-22-18 11:00		Feb-22-18 23:00		Feb-21-18 09:00		Feb-21-18 11:00	
Inorganic Anions by SW 9056 SUB: TX104704215-18-24	***Extracted:***	Mar-05-18 14:33		Mar-05-18 14:33		Mar-05-18 14:33		Mar-05-18 14:33		Mar-05-18 14:33		Mar-05-18 14:33	
	Analyzed:	Mar-06-18 09:27		Mar-06-18 09:40		Mar-06-18 09:54		Mar-06-18 10:07		Mar-06-18 10:21		Mar-06-18 10:34	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		20.9	10.0	63.6	10.0	109	10.0	14.9	10.0	44.0	10.0	163	10.0
Sulfate		15.8	10.0	30.4	10.0	<10.0	10.0	46.5	10.0	92.1	10.0	359	10.0
Soil pH by EPA 9045C SUB: TX104704215-18-24	***Extracted:***												
	Analyzed:	Mar-02-18 08:30		Mar-02-18 08:30		Mar-02-18 08:30		Mar-02-18 08:30		Mar-02-18 08:30		Mar-02-18 08:30	
	Units/RL:	SU	RL	SU	RL	SU	RL	SU	RL	SU	RL	SU	RL
pH		8.20		8.24		8.29		8.60		8.45		8.39	

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Our liability is limited to the amount invoiced for this work order unless otherwise agreed to in writing.

Holly Taylor
Project Manager

Final 1.000

REPORT FOR DETERMINING DISPERSIVE CHARACTERISTICS OF CLAYEY SOILS BY THE CRUMB TEST

ASTM D-6572, C-2216, D-698

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample Date: 03/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 2 from 2.5' to 4' depth.

Technician: SC

Soil Classification: SC; Clayey sand

Sample Number: BH-2 (2.5' - 4')

Crumb Test Data

Method Used: "B" (remolded)

Preparation: Distilled Water Only

As Received Water Content: 5.4 %

Final Water Content: 21.1 %

Elapsed time of test: 6 h + 45 min

Crumb Test Data Results

		Specification
Dispersion Grade:	1	N/A
Dispersion Classification:	Non-dispersive	N/A

LOI ENGINEERS
Texas Firm Registration No. F-14023

REPORT OF IDENTIFICATION AND CLASSIFICATION OF DISPERSIVE CLAYEY SOILS BY THE PINHOLE TEST

ASTM D-4647, ASTM D-2487, ASTM C-136, ASTM D-4318, ASTM D-698, D-2216

Project Name: Northeast ASR **Project Number:** LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925 **Sample date:** 3/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 2 from 2.5' to 4' depth. **Sampler:** SC

Soil Classification: SC; Clayey sand
Sample Number: BH-2 (2.5' - 4')

Pinhole test

Method Used: "A"

Speci. Preparation: Remolded

% of Compaction: N/A

MaxDryUnitWeight: N/A pcf

Optimum Water Content: N/A

Used Water Content: 21.1%

As Received Water Content: 5.4%

		Specified
Dispersive Classification:	ND1	N/A
	Non-dispersive	

* Does not meet specifications

LOI ENGINEERS
Texas Firm Registration No. F-14023

Sheet No. A-40

PINHOLE TEST WORKSHEET (ASTM D4647)

Project Name: Northeast ASR
Project Number: LOI18-031
Client: El Paso Water Utilities-Public Service Board1154 Hawkins Blvd, El Paso, TX 79925
Sample Date: 3/15/18
Sample Location: Subgrade Material; Sampled in the Boring Hole # 2 from 2.5' to 4' depth.

Soil Description: SC; Clayey sand
In-Situ Conditions: SC; Clayey sand
Sample Number: BH-2 (2.5' - 4')
Test Performed By: AR

Method used "A" **Type of Specimen:** Remolded **% Compaction:** N/A

Start Time	Head (in)	Flow		Flow Rate (ml/s)	Turbidity from Side						Completely Clear from top	Notes
		ml	sec		Very Dark	Dark	Moderately Dark	Slightly Dark	Barely Visible	Completely Clear		
13:01	2	30	60	0.50						✓	✓	Start Test
13:02	2	22	60	0.37						✓	✓	
13:03	2	22	60	0.37						✓	✓	
13:04	2	24	60	0.40						✓	✓	Rate after 10 min. 0.4 ml/s
13:05	2	26	60	0.43						✓	✓	Raised head to 7" because the color is Completely Clear and the flow did not exced 0.8 ml/s.
13:13	7	47	60	0.78						✓	✓	
13:14	7	40	60	0.67						✓	✓	
13:15	7	38	60	0.63						✓	✓	
13:16	7	36	60	0.60						✓	✓	Rate after 5 min. 0.7 ml/s
13:17	7	40	60	0.67						✓	✓	Raised head to 15" because the color is Completely Clear and the flow is less than between 0.8 to 1.4 ml/s.
13:21	15	70	60	1.17						✓	✓	
13:22	15	65	60	1.08						✓	✓	
13:23	15	65	60	1.08						✓	✓	
13:24	15	65	60	1.08						✓	✓	Rate after 5 min. 1.1 ml/s
13:25	15	65	60	1.08						✓	✓	Head was raised to 40" because the color is Completely Clear, the flow did not exced 1.8 ml/s.
13:27	40	130	60	2.17						✓	✓	
13:28	40	122	60	2.03						✓	✓	
13:29	40	124	60	2.07						✓	✓	End Test
13:30	40	124	60	2.07						✓	✓	Test stopped. The color is Completely Clear and the flow rate does not increased than 3.0 ml/s. Hole = 1.0 mm
13:31	40	124	60	2.07						✓	✓	
												Classification: ND1

Sheet No. A-41

REPORT FOR DETERMINING DISPERSIVE CHARACTERISTICS OF CLAYEY SOILS BY THE CRUMB TEST

ASTM D-6572, C-2216, D-698

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample Date: 03/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 3 from 0' to 1.5' depth.

Technician: SC

Soil Classification: CL; Sandy lean clay

Sample Number: BH-3 (0' - 1.5')

Crumb Test Data

Method Used: "B" (remolded)

Preparation: Distilled Water Only

As Received Water Content: 5.4 %

Final Water Content: 5.9 %

Elapsed time of test: 6 h + 45 min

Crumb Test Data Results

		Specification
Dispersion Grade:	1	N/A
Dispersion Classification:	Non-dispersive	N/A

LOI ENGINEERS
Texas Firm Registration No. F-14023

REPORT OF IDENTIFICATION AND CLASSIFICATION OF DISPERSIVE CLAYEY SOILS BY THE PINHOLE TEST

ASTM D-4647, ASTM D-2487, ASTM C-136, ASTM D-4318, ASTM D-698, D-2216

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample date: 3/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 3 from 0' to 1.5' depth.

Sampler: SC

Soil Classification: CL; Sandy lean clay

Sample Number: BH-3 (0' - 1.5')

Pinhole test

Method Used: "A"

Speci. Preparation: Remolded

% of Compaction: N/A

MaxDryUnitWeight: N/A pcf

Optimum Water Content: N/A

Used Water Content: 5.9%

As Received Water Content: 5.4%

		Specified
Dispersive Classification:	ND1	N/A
	Non-dispersive	

LOI ENGINEERS
Texas Firm Registration No. F-14023

Sheet No. A-43

PINHOLE TEST WORKSHEET (ASTM D4647)

Project Name: Northeast ASR
Project Number: LOI18-031
Client: El Paso Water Utilities-Public Service Board1154 Hawkins Blvd, El Paso, TX 79925
Sample Date: 3/15/18
Sample Location: Subgrade Material; Sampled in the Boring Hole # 3 from 0' to 1.5' depth.

Soil Description: CL; Sandy lean clay
In-Situ Conditions: CL; Sandy lean clay
Sample Number: BH-3 (0' - 1.5')
Test Performed By: AR

Method used "A" **Type of Specimen:** Remolded **% Compaction:** N/A

Start Time	Head (in)	Flow		Flow Rate (ml/s)	Turbidity from Side						Completely Clear from top	Notes
		ml	sec		Very Dark	Dark	Moderately Dark	Slightly Dark	Barely Visible	Completely Clear		
14:01	2	33	60	0.55						✓	✓	Start Test
14:02	2	34	60	0.57						✓	✓	
14:03	2	36	60	0.60						✓	✓	
14:04	2	38	60	0.63						✓	✓	Rate after 10 min. 0.6 ml/s
14:05	2	34	60	0.57						✓	✓	Raised head to 7" because the color is Completely Clear and the flow did not exced 0.8 ml/s.
14:13	7	50	60	0.83						✓	✓	
14:14	7	46	60	0.77						✓	✓	
14:15	7	43	60	0.72						✓	✓	
14:16	7	48	60	0.80						✓	✓	Rate after 5 min. 0.78 ml/s
14:17	7	46	60	0.77						✓	✓	Raised head to 15" because the color is Completely Clear and the flow is less than between 0.8 to 1.4 ml/s.
14:21	15	68	60	1.13						✓	✓	
14:22	15	62	60	1.03						✓	✓	
14:23	15	65	60	1.08						✓	✓	
14:24	15	64	60	1.07						✓	✓	Rate after 5 min. 1.1 ml/s
14:25	15	63	60	1.05						✓	✓	Head was raised to 40" because the color is Completely Clear, the flow did not exced 1.8 ml/s.
14:27	40	140	60	2.33						✓	✓	
14:28	40	132	60	2.20						✓	✓	
14:29	40	130	60	2.17						✓	✓	End Test
14:30	40	130	60	2.17						✓	✓	Test stopped. The color is Completely Clear and the flow rate does not increased than 3.0 ml/s. Hole = 1.0 mm
14:31	40	134	60	2.23						✓	✓	
												Classification: ND1

Sheet No. A-44

REPORT FOR DETERMINING DISPERSIVE CHARACTERISTICS OF CLAYEY SOILS BY THE CRUMB TEST

ASTM D-6572, C-2216, D-698

Project Name: Northeast ASR **Project Number:** LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925 **Sample Date:** 03/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 4 from 0' to 1.5' depth. **Technician:** SC

Soil Classification: SC; Clayey sand
Sample Number: BH-4 (0' - 1.5')

Crumb Test Data

Method Used: "B" (remolded)

Preparation: Distilled Water Only

As Received Water Content: 8.4 %

Final Water Content: 11.2 %

Elapsed time of test: 6 h + 45 min

Crumb Test Data Results

		Specification
Dispersion Grade:	1	N/A
Dispersion Classification:	Non-dispersive	N/A

LOI ENGINEERS
Texas Firm Registration No. F-14023

Sheet No. A-45

REPORT OF IDENTIFICATION AND CLASSIFICATION OF DISPERSIVE CLAYEY SOILS BY THE PINHOLE TEST

ASTM D-4647, ASTM D-2487, ASTM C-136, ASTM D-4318, ASTM D-698, D-2216

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample date: 3/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 4 from 0' to 1.5' depth.

Sampler: SC

Soil Classification: SC; Clayey sand

Sample Number: BH-4 (0' - 1.5')

Pinhole test

Method Used: "A"

Speci. Preparation: Remolded

% of Compaction: N/A

MaxDryUnitWeight: N/A pcf

Optimum Water Content: N/A

Used Water Content: 11.2%

As Received Water Content: 8.4%

		Specified
Dispersive Classification:	ND1	N/A
	Non-dispersive	

LOI ENGINEERS
Texas Firm Registration No. F-14023

Sheet No. A-46

PINHOLE TEST WORKSHEET (ASTM D4647)

Project Name: Northeast ASR
Project Number: LOI18-031
Client: El Paso Water Utilities-Public Service Board1154 Hawkins Blvd, El Paso, TX 79925
Sample Date: 3/15/18
Sample Location: Subgrade Material; Sampled in the Boring Hole # 4 from 0' to 1.5' depth.

Soil Description: SC; Clayey sand
In-Situ Conditions: SC; Clayey sand
Sample Number: BH-4 (0' - 1.5')
Test Performed By: AR

Method used "A" **Type of Specimen:** Remolded **% Compaction:** N/A

Start Time	Head (in)	Flow		Flow Rate (ml/s)	Turbidity from Side						Completely Clear from top	Notes
		ml	sec		Very Dark	Dark	Moderately Dark	Slightly Dark	Barely Visible	Completely Clear		
8:01	2	20	60	0.33						✓	✓	Start Test
8:02	2	18	60	0.30						✓	✓	
8:03	2	17	60	0.28						✓	✓	
8:04	2	18	60	0.30						✓	✓	Rate after 10 min. 0.3 ml/s
8:05	2	15	60	0.25						✓	✓	Raised head to 7" because the color is Completely Clear and the flow did not exced 0.8 ml/s.
8:13	7	35	60	0.58						✓	✓	
8:14	7	27	60	0.45						✓	✓	
8:15	7	28	60	0.47						✓	✓	
8:16	7	24	60	0.40						✓	✓	Rate after 5 min. 0.5 ml/s
8:17	7	28	60	0.47						✓	✓	Raised head to 15" because the color is Completely Clear and the flow is less than the specified: between 0.8 to 1.4 ml/s.
8:21	15	68	60	1.13						✓	✓	
8:22	15	61	60	1.02						✓	✓	
8:23	15	57	60	0.95						✓	✓	
8:24	15	55	60	0.92						✓	✓	Rate after 5 min. 1.0 ml/s
8:25	15	55	60	0.92						✓	✓	Head was raised to 40" because the color is Completely Clear, the flow did not exced 1.8 ml/s.
8:27	40	120	60	2.00						✓	✓	
8:28	40	105	60	1.75						✓	✓	
8:29	40	103	60	1.72						✓	✓	End Test
8:30	40	103	60	1.72						✓	✓	Test stopped. The color is Completely Clear and the flow rate was below than 3.0 ml/s. Hole = 1.0 mm
8:31	40	103	60	1.72						✓	✓	
												Classification: ND1

Sheet No. A-47

REPORT FOR DETERMINING DISPERSIVE CHARACTERISTICS OF CLAYEY SOILS BY THE CRUMB TEST

ASTM D-6572, C-2216, D-698

Project Name: Northeast ASR **Project Number:** LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925 **Sample Date:** 03/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 5 from 0' to 1.5' depth. **Technician:** SC

Soil Classification: SC; Clayey sand
Sample Number: BH-5 (0' - 1.5')

Crumb Test Data

Method Used: "B" (remolded)

Preparation: Distilled Water Only

As Received Water Content: 7.4 %

Final Water Content: 9.2 %

Elapsed time of test: 6 h + 45 min

Crumb Test Data Results

		Specification
Dispersion Grade:	1	N/A
Dispersion Classification:	Non-dispersive	0

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REPORT OF IDENTIFICATION AND CLASSIFICATION OF DISPERSIVE CLAYEY SOILS BY THE PINHOLE TEST

ASTM D-4647, ASTM D-2487, ASTM C-136, ASTM D-4318, ASTM D-698, D-2216

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample date: 3/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 5 from 0' to 1.5' depth.

Sampler: SC

Soil Classification: SC; Clayey sand

Sample Number: BH-5 (0' - 1.5')

Pinhole test

Method Used: "A"

Speci. Preparation: Remolded

% of Compaction: N/A

MaxDryUnitWeight: N/A pcf

Optimum Water Content: N/A

Used Water Content: 9.2%

As Received Water Content: 7.4%

		Specified
Dispersive Classification:	ND1	N/A
	Nondispersive	

* Does not meet specifications

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Sheet No. A-49

PINHOLE TEST WORKSHEET (ASTM D4647)

Project Name: Northeast ASR
Project Number: LOI18-031
Client: El Paso Water Utilities-Public Service Board1154 Hawkins Blvd, El Paso, TX 79925
Sample Date: 3/15/18
Sample Location: Subgrade Material; Sampled in the Boring Hole # 5 from 0' to 1.5' depth.

Soil Description: SC; Clayey sand
In-Situ Conditions: SC; Clayey sand
Sample Number: BH-5 (0' - 1.5')
Test Performed By: AR

Method used "A" **Type of Specimen:** Remolded **% Compaction:** N/A

Start Time	Head (in)	Flow		Flow Rate (ml/s)	Turbidity from Side						Completely Clear from top	Notes
		ml	sec		Very Dark	Dark	Moderately Dark	Slightly Dark	Barely Visible	Completely Clear		
13:01	2	30	60	0.50						✓	✓	Start Test
13:02	2	22	60	0.37						✓	✓	
13:03	2	22	60	0.37						✓	✓	
13:04	2	24	60	0.40						✓	✓	Rate after 10 min. 0.4 ml/s
13:05	2	26	60	0.43						✓	✓	Raised head to 7" because the color is Completely Clear and the flow did not exced 0.8 ml/s.
13:13	7	47	60	0.78						✓	✓	
13:14	7	40	60	0.67						✓	✓	
13:15	7	38	60	0.63						✓	✓	
13:16	7	36	60	0.60						✓	✓	Rate after 5 min. 0.7 ml/s
13:17	7	40	60	0.67						✓	✓	Raised head to 15" because the color is Completely Clear and the flow is less than between 0.8 to 1.4 ml/s.
13:21	15	70	60	1.17						✓	✓	
13:22	15	65	60	1.08						✓	✓	
13:23	15	65	60	1.08						✓	✓	
13:24	15	65	60	1.08						✓	✓	Rate after 5 min. 1.1 ml/s
13:25	15	65	60	1.08						✓	✓	Head was raised to 40" because the color is Completely Clear, the flow did not exced 1.8 ml/s.
13:27	40	130	60	2.17						✓	✓	
13:28	40	122	60	2.03						✓	✓	
13:29	40	124	60	2.07						✓	✓	End Test
13:30	40	124	60	2.07						✓	✓	Test stopped. The color is Completely Clear and the flow rate does not increased than 3.0 ml/s. Hole = 1.0 mm
13:31	40	124	60	2.07						✓	✓	
												Classification: ND1

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REPORT FOR DETERMINING DISPERSIVE CHARACTERISTICS OF CLAYEY SOILS BY THE CRUMB TEST

ASTM D-6572, C-2216, D-698

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample Date: 03/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 6 from 2.5' to 4' depth.

Technician: SC

Soil Classification: SC; Clayey sand

Sample Number: BH-6 (2.5' - 4')

Crumb Test Data

Method Used: "B" (remolded)

Preparation: Distilled Water Only

As Received Water Content: 4.6 %

Final Water Content: 12.3 %

Elapsed time of test: 6 h + 45 min

Crumb Test Data Results

		Specification
Dispersion Grade:	2	N/A
Dispersion Classification:	Intermediate	N/A

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REPORT OF IDENTIFICATION AND CLASSIFICATION OF DISPERSIVE CLAYEY SOILS BY THE PINHOLE TEST

ASTM D-4647, ASTM D-2487, ASTM C-136, ASTM D-4318, ASTM D-698, D-2216

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample date: 3/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 6 from 2.5' to 4' depth.

Sampler: SC

Soil Classification: SC; Clayey sand

Sample Number: BH-6 (2.5' - 4')

Pinhole test

Method Used: "A"

Speci. Preparation: Remolded

% of Compaction: N/A

MaxDryUnitWeight: N/A pcf

Optimum Water Content: N/A

Used Water Content: 12.3%

As Received Water Content: 4.6%

		Specified
Dispersive Classification:	ND1	N/A
	Non-dispersive	

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PINHOLE TEST WORKSHEET (ASTM D4647)

Project Name: Northeast ASR
Project Number: LOI18-031
Client: El Paso Water Utilities-Public Service Board1154 Hawkins Blvd, El Paso, TX 79925
Sample Date: 3/15/18
Sample Location: Subgrade Material; Sampled in the Boring Hole # 6 from 2.5' to 4' depth.

Soil Description: SC; Clayey sand
In-Situ Conditions: SC; Clayey sand
Sample Number: BH-6 (2.5' - 4')
Test Performed By: AR

Method used "A" **Type of Specimen:** Remolded **% Compaction:** N/A

Start Time	Head (in)	Flow		Flow Rate (ml/s)	Turbidity from Side						Completely Clear from top	Notes
		ml	sec		Very Dark	Dark	Moderately Dark	Slightly Dark	Barely Visible	Completely Clear		
13:01	2	38	60	0.63						✓	✓	Start Test
13:02	2	28	60	0.47						✓	✓	
13:03	2	27	60	0.45						✓	✓	
13:04	2	27	60	0.45						✓	✓	Rate after 10 min. 0.5 ml/s
13:05	2	26	60	0.43						✓	✓	Raised head to 7" because the color is Completely Clear and the flow did not exced 0.8 ml/s.
13:13	7	51	60	0.85						✓	✓	
13:14	7	42	60	0.70						✓	✓	
13:15	7	43	60	0.72						✓	✓	
13:16	7	44	60	0.73						✓	✓	Rate after 5 min. 0.73 ml/s
13:17	7	40	60	0.67						✓	✓	Raised head to 15" because the color is Completely Clear and the flow is less than between 0.8 to 1.4 ml/s.
13:21	15	75	60	1.25						✓	✓	
13:22	15	65	60	1.08						✓	✓	
13:23	15	70	60	1.17						✓	✓	
13:24	15	71	60	1.18						✓	✓	Rate after 5 min. 1.2 ml/s
13:25	15	71	60	1.18						✓	✓	Head was raised to 40" because the color is Completely Clear, the flow did not exced 1.8 ml/s.
13:27	40	143	60	2.38						✓	✓	
13:28	40	133	60	2.22						✓	✓	
13:29	40	136	60	2.27						✓	✓	End Test
13:30	40	135	60	2.25						✓	✓	Test stopped. The color is Completely Clear and the flow rate does not increased than 3.0 ml/s. Hole = 1.0 mm
13:31	40	138	60	2.30						✓	✓	
												Classification: ND1

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REPORT FOR DETERMINING DISPERSIVE CHARACTERISTICS OF CLAYEY SOILS BY THE CRUMB TEST

ASTM D-6572, C-2216, D-698

Project Name: Northeast ASR **Project Number:** LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925 **Sample Date:** 03/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 8 from 2.5' to 4' depth. **Technician:** SC

Soil Classification: SC; Clayey sand
Sample Number: BH-8 (2.5' - 4')

Crumb Test Data

Method Used: "B" (remolded)

Preparation: Distilled Water Only

As Received Water Content: 5.7 %

Final Water Content: 10.1 %

Elapsed time of test: 6 h + 45 min

Crumb Test Data Results

		Specification
Dispersion Grade:	2	N/A
Dispersion Classification:	Intermediate	N/A

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REPORT OF IDENTIFICATION AND CLASSIFICATION OF DISPERSIVE CLAYEY SOILS BY THE PINHOLE TEST

ASTM D-4647, ASTM D-2487, ASTM C-136, ASTM D-4318, ASTM D-698, D-2216

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample date: 3/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 8 from 2.5' to 4' depth.

Sampler: SC

Soil Classification: SC; Clayey sand

Sample Number: BH-8 (2.5' - 4')

Pinhole test

Method Used: "A"

Speci. Preparation: Remolded

% of Compaction: N/A

MaxDryUnitWeight: N/A pcf

Optimum Water Content: N/A

Used Water Content: 10.1%

As Received Water Content: 5.7%

		Specified
Dispersive Classification:	ND1	N/A
	Non-dispersive	

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Sheet No. A-55

PINHOLE TEST WORKSHEET (ASTM D4647)

Project Name: Northeast ASR
Project Number: LOI18-031
Client: El Paso Water Utilities-Public Service Board1154 Hawkins Blvd, El Paso, TX 79925
Sample Date: 3/15/18
Sample Location: Subgrade Material; Sampled in the Boring Hole # 8 from 2.5' to 4' depth.

Soil Description: SC; Clayey sand
In-Situ Conditions: SC; Clayey sand
Sample Number: BH-8 (2.5' - 4')
Test Performed By: AR

Method used "A" **Type of Specimen:** Remolded **% Compaction:** N/A

Start Time	Head (in)	Flow		Flow Rate (ml/s)	Turbidity from Side						Completely Clear from top	Notes
		ml	sec		Very Dark	Dark	Moderately Dark	Slightly Dark	Barely Visible	Completely Clear		
13:01	2	30	60	0.50						✓	✓	Start Test
13:02	2	22	60	0.37						✓	✓	
13:03	2	22	60	0.37						✓	✓	
13:04	2	24	60	0.40						✓	✓	Rate after 10 min. 0.4 ml/s
13:05	2	26	60	0.43						✓	✓	Raised head to 7" because the color is Completely Clear and the flow did not exced 0.8 ml/s.
13:13	7	47	60	0.78						✓	✓	
13:14	7	40	60	0.67						✓	✓	
13:15	7	38	60	0.63						✓	✓	
13:16	7	36	60	0.60						✓	✓	Rate after 5 min. 0.7 ml/s
13:17	7	40	60	0.67						✓	✓	Raised head to 15" because the color is Completely Clear and the flow is less than between 0.8 to 1.4 ml/s.
13:21	15	70	60	1.17						✓	✓	
13:22	15	65	60	1.08						✓	✓	
13:23	15	65	60	1.08						✓	✓	
13:24	15	65	60	1.08						✓	✓	Rate after 5 min. 1.1 ml/s
13:25	15	65	60	1.08						✓	✓	Head was raised to 40" because the color is Completely Clear, the flow did not exced 1.8 ml/s.
13:27	40	130	60	2.17						✓	✓	
13:28	40	122	60	2.03						✓	✓	
13:29	40	124	60	2.07						✓	✓	End Test
13:30	40	124	60	2.07						✓	✓	Test stopped. The color is Completely Clear and the flow rate does not increased than 3.0 ml/s. Hole = 1.0 mm
13:31	40	124	60	2.07						✓	✓	
												Classification: ND1

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REPORT FOR DETERMINING DISPERSIVE CHARACTERISTICS OF CLAYEY SOILS BY THE CRUMB TEST

ASTM D-6572, C-2216, D-698

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample Date: 03/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 9 from 0' to 1.5' depth.

Technician: SC

Soil Classification: SC; Clayey sand

Sample Number: BH-9 (0' - 1.5')

Crumb Test Data

Method Used: "B" (remolded)

Preparation: Distilled Water Only

As Received Water Content: 7.3 %

Final Water Content: 11.5 %

Elapsed time of test: 6 h + 45 min

Crumb Test Data Results

		Specification
Dispersion Grade:	1	N/A
Dispersion Classification:	Non-dispersive	N/A

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REPORT OF IDENTIFICATION AND CLASSIFICATION OF DISPERSIVE CLAYEY SOILS BY THE PINHOLE TEST

ASTM D-4647, ASTM D-2487, ASTM C-136, ASTM D-4318, ASTM D-698, D-2216

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample date: 3/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 9 from 0' to 1.5' depth.

Sampler: SC

Soil Classification: SC; Clayey sand

Sample Number: BH-9 (0' - 1.5')

Pinhole test

Method Used: "A"

Speci. Preparation: Remolded

% of Compaction: N/A

MaxDryUnitWeight: N/A pcf

Optimum Water Content: N/A

Used Water Content: 11.5%

As Received Water Content: 7.3%

		Specified
Dispersive Classification:	ND1	N/A
	Non-dispersive	

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PINHOLE TEST WORKSHEET (ASTM D4647)

Project Name: Northeast ASR
Project Number: LOI18-031
Client: El Paso Water Utilities-Public Service Board1154 Hawkins Blvd, El Paso, TX 79925
Sample Date: 3/15/18
Sample Location: Subgrade Material; Sampled in the Boring Hole # 9 from 0' to 1.5' depth.

Soil Description: SC; Clayey sand
In-Situ Conditions: SC; Clayey sand
Sample Number: BH-9 (0' - 1.5')
Test Performed By: AR

Method used "A" **Type of Specimen:** Remolded **% Compaction:** N/A

Start Time	Head (in)	Flow		Flow Rate (ml/s)	Turbidity from Side						Completely Clear from top	Notes
		ml	sec		Very Dark	Dark	Moderately Dark	Slightly Dark	Barely Visible	Completely Clear		
9:10	2	36	60	0.60						✓	✓	Start Test
9:11	2	32	60	0.53						✓	✓	
9:12	2	30	60	0.50						✓	✓	
9:13	2	30	60	0.50						✓	✓	Rate after 10 min. 0.5 ml/s
9:14	2	31	60	0.52						✓	✓	Raised head to 7" because the color is Completely Clear and the flow did not exced 0.8 ml/s.
9:20	7	51	60	0.85						✓	✓	
9:21	7	46	60	0.77						✓	✓	
9:22	7	44	60	0.73						✓	✓	
9:23	7	44	60	0.73						✓	✓	Rate after 5 min. 0.76 ml/s
9:24	7	44	60	0.73						✓	✓	Raised head to 15" because the color is Completely Clear and the flow is less than the specified: between 0.8 to 1.4 ml/s.
9:31	15	68	60	1.13						✓	✓	
9:32	15	71	60	1.18						✓	✓	
9:33	15	75	60	1.25						✓	✓	
9:34	15	72	60	1.20						✓	✓	Rate after 5 min. 1.2 ml/s
9:35	15	72	60	1.20						✓	✓	Head was raised to 40" because the color is Completely Clear, the flow did not exced 1.8 ml/s.
9:47	40	140	60	2.33						✓	✓	
9:48	40	133	60	2.22						✓	✓	
9:49	40	135	60	2.25						✓	✓	End Test
9:50	40	132	60	2.20						✓	✓	Test stopped. The color is Completely Clear and the flow rate was below than 3.0 ml/s. Hole = 1.0 mm
9:51	40	131	60	2.18						✓	✓	
												Classification: ND1

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REPORT FOR DETERMINING DISPERSIVE CHARACTERISTICS OF CLAYEY SOILS BY THE CRUMB TEST

ASTM D-6572, C-2216, D-698

Project Name: Northeast ASR **Project Number:** LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925 **Sample Date:** 03/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 12 from 0' to 1.5' depth. **Technician:** SC

Soil Classification: CL; Sandy lean clay
Sample Number: BH-12 (0' - 1.5')

Crumb Test Data

Method Used: "B" (remolded)

Preparation: Distilled Water Only

As Received Water Content: 8.7 %

Final Water Content: 14.3 %

Elapsed time of test: 6 h + 45 min

Crumb Test Data Results

		Specification
Dispersion Grade:	1	N/A
Dispersion Classification:	Non-dispersive	N/A

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REPORT OF IDENTIFICATION AND CLASSIFICATION OF DISPERSIVE CLAYEY SOILS BY THE PINHOLE TEST

ASTM D-4647, ASTM D-2487, ASTM C-136, ASTM D-4318, ASTM D-698, D-2216

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample date: 3/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 12 from 0' to 1.5' depth.

Sampler: SC

Soil Classification: CL; Sandy lean clay

Sample Number: BH-12 (0' - 1.5')

Pinhole test

Method Used: "A"

Speci. Preparation: Remolded

% of Compaction: N/A

MaxDryUnitWeight: N/A pcf

Optimum Water Content: N/A

Used Water Content: 14.3%

As Received Water Content: 8.7%

		Specified
Dispersive Classification:	ND1	N/A
	Non-dispersive	

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Sheet No. A-61

PINHOLE TEST WORKSHEET (ASTM D4647)

Project Name: Northeast ASR
Project Number: LOI18-031
Client: El Paso Water Utilities-Public Service Board1154 Hawkins Blvd. El Paso, TX 79925
Sample Date: 3/15/18
Sample Location: Subgrade Material; Sampled in the Boring Hole # 12 from 0' to 1.5' depth.

Soil Description: CL; Sandy lean clay
In-Situ Conditions: CL; Sandy lean clay
Sample Number: BH-12 (0' - 1.5')
Test Performed By: AR

Method used "A" **Type of Specimen:** Remolded **% Compaction:** N/A

Start Time	Head (in)	Flow		Flow Rate (ml/s)	Turbidity from Side						Completely Clear from top	Notes
		ml	sec		Very Dark	Dark	Moderately Dark	Slightly Dark	Barely Visible	Completely Clear		
8:01	2	23	60	0.38						✓	✓	Start Test
8:02	2	19	60	0.32						✓	✓	
8:03	2	17	60	0.28						✓	✓	
8:04	2	19	60	0.32						✓	✓	Rate after 10 min. 0.3 ml/s
8:05	2	18	60	0.30						✓	✓	Raised head to 7" because the color is Completely Clear and the flow did not exced 0.8 ml/s.
8:13	7	34	60	0.57						✓	✓	
8:14	7	30	60	0.50						✓	✓	
8:15	7	29	60	0.48						✓	✓	
8:16	7	28	60	0.47						✓	✓	Rate after 5 min. 0.5 ml/s
8:17	7	28	60	0.47						✓	✓	Raised head to 15" because the color is Completely Clear and the flow is less than the specified: between 0.8 to 1.4 ml/s.
8:21	15	58	60	0.97						✓	✓	
8:22	15	52	60	0.87						✓	✓	
8:23	15	53	60	0.88						✓	✓	
8:24	15	52	60	0.87						✓	✓	Rate after 5 min. 0.9 ml/s
8:25	15	52	60	0.87						✓	✓	Head was raised to 40" because the color is Completely Clear, the flow did not exced 1.8 ml/s.
8:27	40	105	60	1.75						✓	✓	
8:28	40	103	60	1.72						✓	✓	
8:29	40	103	60	1.72						✓	✓	End Test
8:30	40	103	60	1.72						✓	✓	Test stopped. The color is Completely Clear and the flow rate was below than 3.0 ml/s. Hole = 1.0 mm
8:31	40	103	60	1.72						✓	✓	
												Classification: ND1

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REPORT FOR DETERMINING DISPERSIVE CHARACTERISTICS OF CLAYEY SOILS BY THE CRUMB TEST

ASTM D-6572, C-2216, D-698

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample Date: 03/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 14 from 5' to 6.5' depth.

Technician: SC

Soil Classification: CL; Sandy lean clay

Sample Number: BH-14 (5' - 6.5')

Crumb Test Data

Method Used: "B" (remolded)

Preparation: Distilled Water Only

As Received Water Content: 6.8 %

Final Water Content: 14.4 %

Elapsed time of test: 6 h + 45 min

Crumb Test Data Results

		Specification
Dispersion Grade:	2	N/A
Dispersion Classification:	Intermediate	N/A

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REPORT OF IDENTIFICATION AND CLASSIFICATION OF DISPERSIVE CLAYEY SOILS BY THE PINHOLE TEST

ASTM D-4647, ASTM D-2487, ASTM C-136, ASTM D-4318, ASTM D-698, D-2216

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample date: 3/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 14 from 5' to 6.5' depth.

Sampler: SC

Soil Classification: CL; Sandy lean clay

Sample Number: BH-14 (5' - 6.5')

Pinhole test

Method Used: "A"

Speci. Preparation: Remolded

% of Compaction: N/A

MaxDryUnitWeight: N/A pcf

Optimum Water Content: N/A

Used Water Content: 14.4%

As Received Water Content: 6.8%

		Specified
Dispersive Classification:	ND2	N/A
	Non-dispersive	

LOI ENGINEERS
Texas Firm Registration No. F-14023

Sheet No. A-64

PINHOLE TEST WORKSHEET (ASTM D4647)

Project Name: Northeast ASR
Project Number: LOI18-031
Client: El Paso Water Utilities-Public Service Board1154 Hawkins Blvd, El Paso, TX 79925
Sample Date: 3/15/18
Sample Location: Subgrade Material; Sampled in the Boring Hole # 14 from 5' to 6.5' depth.

Soil Description: CL; Sandy lean clay
In-Situ Conditions: CL; Sandy lean clay
Sample Number: BH-14 (5' - 6.5')
Test Performed By: AR

Method used "A" **Type of Specimen:** Remolded **% Compaction:** N/A

Start Time	Head (in)	Flow		Flow Rate (ml/s)	Turbidity from Side						Completely Clear from top	Notes
		ml	sec		Very Dark	Dark	Moderately Dark	Slightly Dark	Barely Visible	Completely Clear		
10:20	2	27	60	0.45						✓	✓	Start Test
10:21	2	25	60	0.42						✓	✓	
10:22	2	25	60	0.42						✓	✓	
10:23	2	25	60	0.42						✓	✓	Rate after 10 min. 0.4 ml/s
10:24	2	25	60	0.42						✓	✓	Raised head to 7" because the color is Completely Clear and the flow did not exced 0.8 ml/s.
10:33	7	45	60	0.75						✓	✓	
10:34	7	36	60	0.60						✓	✓	
10:35	7	37	60	0.62						✓	✓	
10:36	7	35	60	0.58						✓	✓	Rate after 5 min. 0.63 ml/s
10:37	7	35	60	0.58						✓	✓	Raised head to 15" because the color is Completely Clear and the flow is less than between 0.8 to 1.4 ml/s.
10:42	15	58	60	0.97						✓	✓	
10:43	15	60	60	1.00						✓	✓	
10:44	15	60	60	1.00						✓	✓	
10:45	15	60	60	1.00						✓	✓	Rate after 5 min. 1.0 ml/s
10:46	15	60	60	1.00						✓	✓	Head was raised to 40" because the color is Completely Clear, the flow did not exced 1.8 ml/s.
10:52	40	100	60	1.67					✓	✓		
10:53	40	120	60	2.00					✓	✓		
10:54	40	150	60	2.50					✓	✓		End Test
10:55	40	230	60	3.83					✓	✓		Test stopped. The color increase to Barely Visible from the Side, but was Completely Clear from the Top. The flow rate increased and exceded 3.0 ml/s. Hole < 1.5 mm
10:56	40	220	60	3.67					✓	✓		
												Classification: ND2

Sheet No. A-65

REPORT FOR DETERMINING DISPERSIVE CHARACTERISTICS OF CLAYEY SOILS BY THE CRUMB TEST

ASTM D-6572, C-2216, D-698

Project Name: Northeast ASR **Project Number:** LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925 **Sample Date:** 03/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 15 from 0' to 1.5' depth. **Technician:** SC

Soil Classification: SC; Clayey sand
Sample Number: BH-15 (0' - 1.5')

Crumb Test Data

Method Used: "B" (remolded)

Preparation: Distilled Water Only

As Received Water Content: 7.1 %

Final Water Content: 12.8 %

Elapsed time of test: 6 h + 45 min

Crumb Test Data Results

		Specification
Dispersion Grade:	1	N/A
Dispersion Classification:	Non-dispersive	N/A

LOI ENGINEERS
Texas Firm Registration No. F-14023

Sheet No. A-66

REPORT OF IDENTIFICATION AND CLASSIFICATION OF DISPERSIVE CLAYEY SOILS BY THE PINHOLE TEST

ASTM D-4647, ASTM D-2487, ASTM C-136, ASTM D-4318, ASTM D-698, D-2216

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample date: 3/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 15 from 0' to 1.5' depth.

Sampler: SC

Soil Classification: SC; Clayey sand

Sample Number: BH-15 (0' - 1.5')

Pinhole test

Method Used: "A"

Speci. Preparation: Remolded

% of Compaction: N/A

MaxDryUnitWeight: N/A pcf

Optimum Water Content: N/A

Used Water Content: 12.8%

As Received Water Content: 7.1%

		Specified
Dispersive Classification:	ND1	N/A
	Non-dispersive	

LOI ENGINEERS
Texas Firm Registration No. F-14023

Sheet No. A-67

PINHOLE TEST WORKSHEET (ASTM D4647)

Project Name: Northeast ASR
Project Number: LOI18-031
Client: El Paso Water Utilities-Public Service Board1154 Hawkins Blvd, El Paso, TX 79925
Sample Date: 3/15/18
Sample Location: Subgrade Material; Sampled in the Boring Hole # 15 from 0' to 1.5' depth.

Soil Description: SC; Clayey sand
In-Situ Conditions: SC; Clayey sand
Sample Number: BH-15 (0' - 1.5')
Test Performed By: AR

Method used "A" **Type of Specimen:** Remolded **% Compaction:** N/A

Start Time	Head (in)	Flow		Flow Rate (ml/s)	Turbidity from Side						Completely Clear from top	Notes
		ml	sec		Very Dark	Dark	Moderately Dark	Slightly Dark	Barely Visible	Completely Clear		
8:01	2	22	60	0.37						✓	✓	Start Test
8:02	2	18	60	0.30						✓	✓	
8:03	2	19	60	0.32						✓	✓	
8:04	2	18	60	0.30						✓	✓	Rate after 10 min. 0.3 ml/s
8:05	2	18	60	0.30						✓	✓	Raised head to 7" because the color is Completely Clear and the flow did not exced 0.8 ml/s.
8:13	7	30	60	0.50						✓	✓	
8:14	7	29	60	0.48						✓	✓	
8:15	7	28	60	0.47						✓	✓	
8:16	7	27	60	0.45						✓	✓	Rate after 5 min. 0.5 ml/s
8:17	7	26	60	0.43						✓	✓	Raised head to 15" because the color is Completely Clear and the flow is less than the specified: between 0.8 to 1.4 ml/s.
8:21	15	63	60	1.05						✓	✓	
8:22	15	57	60	0.95						✓	✓	
8:23	15	55	60	0.92						✓	✓	
8:24	15	53	60	0.88						✓	✓	Rate after 5 min. 0.9 ml/s
8:25	15	51	60	0.85						✓	✓	Head was raised to 40" because the color is Completely Clear, the flow did not exced 1.8 ml/s.
8:27	40	110	60	1.83						✓	✓	
8:28	40	100	60	1.67						✓	✓	
8:29	40	100	60	1.67						✓	✓	End Test
8:30	40	105	60	1.75						✓	✓	Test stopped. The color is Completely Clear and the flow rate was below than 3.0 ml/s. Hole = 1.0 mm
8:31	40	104	60	1.73						✓	✓	
												Classification: ND1

Sheet No. A-68

REPORT FOR DETERMINING DISPERSIVE CHARACTERISTICS OF CLAYEY SOILS BY THE CRUMB TEST

ASTM D-6572, C-2216, D-698

Project Name: Northeast ASR **Project Number:** LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925 **Sample Date:** 03/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 16 from 0' to 1.5' depth. **Technician:** SC

Soil Classification: SC; Clayey sand
Sample Number: BH-16 (0' - 1.5')

Crumb Test Data

Method Used: "B" (remolded)

Preparation: Distilled Water Only

As Received Water Content: 9.0 %

Final Water Content: 11.6 %

Elapsed time of test: 6 h + 45 min

Crumb Test Data Results

		Specification
Dispersion Grade:	2	N/A
Dispersion Classification:	Intermediate	N/A

LOI ENGINEERS
Texas Firm Registration No. F-14023

Sheet No. A-69

REPORT OF IDENTIFICATION AND CLASSIFICATION OF DISPERSIVE CLAYEY SOILS BY THE PINHOLE TEST

ASTM D-4647, ASTM D-2487, ASTM C-136, ASTM D-4318, ASTM D-698, D-2216

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample date: 3/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 16 from 0' to 1.5' depth.

Sampler: SC

Soil Classification: SC; Clayey sand

Sample Number: BH-16 (0' - 1.5')

Pinhole test

Method Used: "A"

Speci. Preparation: Remolded

% of Compaction: N/A

MaxDryUnitWeight: N/A pcf

Optimum Water Content: N/A

Used Water Content: 11.6%

As Received Water Content: 9.0%

		Specified
Dispersive Classification:	ND1	N/A
	Non-dispersive	

LOI ENGINEERS
Texas Firm Registration No. F-14023

Sheet No. A-70

PINHOLE TEST WORKSHEET (ASTM D4647)

Project Name: Northeast ASR
Project Number: LOI18-031
Client: El Paso Water Utilities-Public Service Board1154 Hawkins Blvd, El Paso, TX 79925
Sample Date: 3/15/18
Sample Location: Subgrade Material; Sampled in the Boring Hole # 16 from 0' to 1.5' depth.

Soil Description: SC; Clayey sand
In-Situ Conditions: SC; Clayey sand
Sample Number: BH-16 (0' - 1.5')
Test Performed By: AR

Method used "A" **Type of Specimen:** Remolded **% Compaction:** N/A

Start Time	Head (in)	Flow		Flow Rate (ml/s)	Turbidity from Side						Completely Clear from top	Notes
		ml	sec		Very Dark	Dark	Moderately Dark	Slightly Dark	Barely Visible	Completely Clear		
13:01	2	30	60	0.50						✓	✓	Start Test
13:02	2	27	60	0.45						✓	✓	
13:03	2	29	60	0.48						✓	✓	
13:04	2	27	60	0.45						✓	✓	Rate after 10 min. 0.46 ml/s
13:05	2	25	60	0.42						✓	✓	Raised head to 7" because the color is Completely Clear and the flow did not exced 0.8 ml/s.
13:13	7	51	60	0.85						✓	✓	
13:14	7	44	60	0.73						✓	✓	
13:15	7	41	60	0.68						✓	✓	
13:16	7	46	60	0.77						✓	✓	Rate after 5 min. 0.75 ml/s
13:17	7	44	60	0.73						✓	✓	Raised head to 15" because the color is Completely Clear and the flow is less than between 0.8 to 1.4 ml/s.
13:21	15	81	60	1.35						✓	✓	
13:22	15	71	60	1.18						✓	✓	
13:23	15	73	60	1.22						✓	✓	
13:24	15	74	60	1.23						✓	✓	Rate after 5 min. 1.25 ml/s
13:25	15	75	60	1.25						✓	✓	Head was raised to 40" because the color is Completely Clear, the flow did not exced 1.8 ml/s.
13:27	40	144	60	2.40						✓	✓	
13:28	40	130	60	2.17						✓	✓	
13:29	40	132	60	2.20						✓	✓	End Test
13:30	40	130	60	2.17						✓	✓	Test stopped. The color is Completely Clear and the flow rate does not increased than 3.0 ml/s. Hole = 1.0 mm
13:31	40	132	60	2.20						✓	✓	
												Classification: ND1

Sheet No. A-71

REPORT FOR DETERMINING DISPERSIVE CHARACTERISTICS OF CLAYEY SOILS BY THE CRUMB TEST

ASTM D-6572, C-2216, D-698

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample Date: 03/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 17 from 0' to 1.5' depth.

Technician: SC

Soil Classification: SC; Clayey sand

Sample Number: BH-17 (0' - 1.5')

Crumb Test Data

Method Used: "B" (remolded)

Preparation: Distilled Water Only

As Received Water Content: 6.8 %

Final Water Content: 9.5 %

Elapsed time of test: 6 h + 45 min

Crumb Test Data Results

		Specification
Dispersion Grade:	1	N/A
Dispersion Classification:	Non-dispersive	N/A

LOI ENGINEERS
Texas Firm Registration No. F-14023

Sheet No. A-72

REPORT OF IDENTIFICATION AND CLASSIFICATION OF DISPERSIVE CLAYEY SOILS BY THE PINHOLE TEST

ASTM D-4647, ASTM D-2487, ASTM C-136, ASTM D-4318, ASTM D-698, D-2216

Project Name: Northeast ASR

Project Number: LOI18-031

Client: El Paso Water Utilities-Public Service Board
1154 Hawkins Blvd, El Paso, TX 79925

Sample date: 3/15/18

Sample Location: Subgrade Material; Sampled in the Boring Hole # 17 from 0' to 1.5' depth.

Sampler: SC

Soil Classification: SC; Clayey sand

Sample Number: BH-17 (0' - 1.5')

Pinhole test

Method Used: "A"

Speci. Preparation: Remolded

% of Compaction: N/A

MaxDryUnitWeight: N/A pcf

Optimum Water Content: N/A

Used Water Content: 9.5%

As Received Water Content: 6.8%

		Specified
Dispersive Classification:	ND1	N/A
	Non-dispersive	

LOI ENGINEERS
Texas Firm Registration No. F-14023

Sheet No. A-73

PINHOLE TEST WORKSHEET (ASTM D4647)

Project Name: Northeast ASR
Project Number: LOI18-031
Client: El Paso Water Utilities-Public Service Board1154 Hawkins Blvd, El Paso, TX 79925
Sample Date: 3/15/18
Sample Location: Subgrade Material; Sampled in the Boring Hole # 17 from 0' to 1.5' depth.

Soil Description: SC; Clayey sand
In-Situ Conditions: SC; Clayey sand
Sample Number: BH-17 (0' - 1.5')
Test Performed By: AR

Method used "A" **Type of Specimen:** Remolded **% Compaction:** N/A

Start Time	Head (in)	Flow		Flow Rate (ml/s)	Turbidity from Side						Completely Clear from top	Notes
		ml	sec		Very Dark	Dark	Moderately Dark	Slightly Dark	Barely Visible	Completely Clear		
8:01	2	31	60	0.52						✓	✓	Start Test
8:02	2	26	60	0.43						✓	✓	
8:03	2	24	60	0.40						✓	✓	
8:04	2	24	60	0.40						✓	✓	Rate after 10 min. 0.43 ml/s
8:05	2	25	60	0.42						✓	✓	Raised head to 7" because the color is Completely Clear and the flow did not exced 0.8 ml/s.
8:13	7	49	60	0.82						✓	✓	
8:14	7	41	60	0.68						✓	✓	
8:15	7	42	60	0.70						✓	✓	
8:16	7	41	60	0.68						✓	✓	Rate after 5 min. 0.71 ml/s
8:17	7	40	60	0.67						✓	✓	Raised head to 15" because the color is Completely Clear and the flow is less than the specified: between 0.8 to 1.4 ml/s.
8:21	15	68	60	1.13						✓	✓	
8:22	15	61	60	1.02						✓	✓	
8:23	15	64	60	1.07						✓	✓	
8:24	15	65	60	1.08						✓	✓	Rate after 5 min. 1.1 ml/s
8:25	15	65	60	1.08						✓	✓	Head was raised to 40" because the color is Completely Clear, the flow did not exced 1.8 ml/s.
8:27	40	141	60	2.35						✓	✓	
8:28	40	135	60	2.25						✓	✓	
8:29	40	133	60	2.22						✓	✓	End Test
8:30	40	133	60	2.22						✓	✓	Test stopped. The color is Completely Clear and the flow rate was below than 3.0 ml/s. Hole = 1.0 mm
8:31	40	133	60	2.22						✓	✓	
												Classification: ND1

Sheet No. A-74

SOIL ELECTRICAL RESISTIVITY SURVEY REPORT

Project Name: Northeast ASR
Project Number: LOI18-031
Sample Location: B-7
Sample Date: 4/18/2018

Pin Spacing "A" (Feet)	Line W-E		
	Resistance (Ohms)	Resistivity (Ohm-ft)	Resistivity (Ohm-cm)
5	0.150	4.71	143.63
10	0.580	36.44	1,110.77
20	0.030	3.77	114.91
40	0.460	115.61	3,523.81
50	0.120	37.70	1,149.07
100	ERROR	ERROR	ERROR

Notes:
Description of site condition:
Weather - No recorded precipitation within the last 5 days
Soil Condition - Surface soils were dry at the time of testing.
Temperature - Average temperature was approximately 80-Deg F
Date Collected: April 18, 2018
Instrument Used: AEMC Model 4500
Instrument Calibration Date: February 10, 2018

APPENDIX B

SOIL TERMINOLOGY

COARSE GRAINED SOILS: More than 50 percent retained on No. 200 sieve. Includes fine, medium, or coarse grained (depending on grain size) gravel and sand, and silty and/or clayey gravel and sand. Density is described according to relative density measured in the laboratory, or sampler resistance in the field as follows:

Penetration Resistance* (Blows per Foot)	Descriptive Term	Relative Density** (Percent)
0 – 4	Very Loose	0 - 15
5 - 9	Loose	15 – 35
10 - 29	Medium Dense	35 – 65
30 - 49	Dense	65 - 85
More than 50	Very Dense	85 - 100

* From Standard Penetration Test with 140-pound hammer, 30 inch drop.
** From relative density tests on undisturbed sand sample.

FINE GRAINED SOILS: More than 50 percent passing through the No. 200 sieve. Includes organic and inorganic silt and clay, gravelly and/or sandy silt and clay, silty clay, and clayey silt. Consistency is described according to shear strength, from unconfined compression tests in the laboratory, penetrometer tests in the field or laboratory, or sampler resistance in the field as follows:

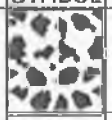
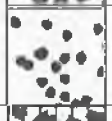
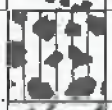
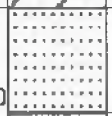
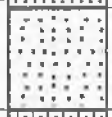
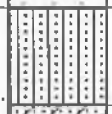
Compressive Strength* (Tons per Square Foot)	Descriptive Term	Penetration Resistance** (Blows per Foot)
Less than 0.25	Very Soft	Less than 2
0.25 - 0.50	Soft	2 - 4
0.50 - 1.00	Firm	5 - 8
1.00 - 2.00	Stiff	9 - 15
2.00 - 4.00	Very Stiff	16 - 50
4.00 and higher	Hard	50 and higher

* From unconfined compression strength test.
** From Standard Penetration Test with 140-pound hammer, 30 inch drop.

Slickensided: With inclined planes of weakness of slick and glassy appearance.
Fissured: With shrinkage cracks that are frequently filled with fine sand.
Laminated: With thin layers of varying colors and texture.
Interbedded: With alternate layers of different soil types.
Calcareous: With noticeable quantities of calcium carbonate.
Sensitive: Applies to cohesive soils that are subject to loss of strength when remolded.
Well graded: With wide range in grain sizes and good distribution of intermediate particle sizes.
Poorly graded: With one predominant grain size, or a poor distribution with intermediate sizes missing.

SOIL SYMBOLS

Identification of the major soil divisions used to distinguish the change of a different stratum. For their combinations and a more detailed description, see UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487-00)

MAJOR SOIL DIVISIONS			SOIL SYMBOL	USCS SYMBOL	TYPICAL NAME
Coarse-Grained Soils (< 50% pass No. 200 sieve)	GRAVELS (<50% pass No. 4 sieve)	Clean Gravels (< 5% pass No. 200 sieve)		**GW**	Well-Graded Gravels
				**GP**	Poorly-Graded Gravels
		Gravels with fines (> 12% pass No. 200 sieve)		**GM**	Silty Gravels
				**GC**	Clayey Gravels
	SANDS (> 50% pass No. 4 sieve)	Clean Sands (< 5% pass No. 200 sieve)		**SW**	Well-Graded Sands
				**SP**	Poorly-Graded Sands
		Sands with fines (> 12% pass No. 200 sieve)		**SM**	Silty Sands
				**SC**	Clayey Sands
Fine-Grained Soils (> 50% pass No. 200 sieve)	SILTS	Silts of Low Plasticity (*LL < 50)		**ML**	Inorganic Silts (slightly plastic)
		Silts of High Plasticity (*LL > 50)		**MH**	Inorganic Silts (elastic)
	CLAYS	Clays of Low Plasticity (*LL < 50)		**CL**	Inorganic Clays (lean clays)
		Clays of High Plasticity (*LL > 50)		**CH**	Inorganic Clays (Fat clays)

*Liquid Limit of the soil
NV: No value obtained; NP: Non-plastic

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, ALBUQUERQUE DISTRICT
200 E. GRIGGS AVENUE
LAS CRUCES, NEW MEXICO
88001

December 2, 2020

Regulatory Division

SUBJECT: No Permit Required – Action Number (No.) SPA-2020-00260, Northeast Aquifer Storage and Recharge Enhanced Arroyo Project located in El Paso County, Texas

Scott Reinert
El Paso Water
1154 Hawkins Blvd.
El Paso, Texas 79925

Dear Mr. Reinert:

This letter responds to your request for a determination of Department of the Army (DA) permit requirements for the proposed Northeast Aquifer Storage and Recharge Enhanced Arroyo Project located at approximately latitude 31.957123 North, longitude -106.422488 West, in El Paso County, Texas. On October 26, 2020, Moreno Cardenas, Inc., on behalf of El Paso Water, requested that the U.S. Army Corps of Engineers (Corps) complete an approved jurisdictional determination (AJD) for the proposed project. We have assigned Action No. SPA-2020-00260 to this request. Please reference this number in all future correspondence concerning this action.

Based on the information provided and obtained by the Corps, we have determined that a Department of the Army permit is not required since the project would not result in the discharge of dredged/fill material into waters of the United States (WOTUS). This decision is based on the requested AJD, which determined that there are WOTUS on the proposed project site (attached). The basis for the AJD is that the review area contains only an ephemeral stream channel, which is excluded for regulation under the Navigable Waters Protection Rule (i.e. Exclusion (b)(3) Ephemeral feature - including an ephemeral stream, swale, gully, rill, or pool). A copy of this JD is also available at http://www.spa.usace.army.mil/reg/JD. This AJD is valid for five years unless new information warrants revision of the determination before the expiration date.

The delineation included herein has been conducted to identify the location and extent of the aquatic resource boundaries and/or the jurisdictional status of aquatic resources for purposes of the Clean Water Act for the particular site identified in this request. This delineation and/or jurisdictional determination may not be valid for the Wetland Conservation Provisions of the Food Security Act of 1985, as amended. If you or your tenant are United States Department of Agriculture (USDA) program

participants, or anticipate participation in USDA programs, you should discuss the applicability of a certified wetland determination with the local USDA service center, prior to starting work.

You may accept or appeal this approved JD or provide new information in accordance with the attached Notification of Administration Appeal Options and Process and Request for Appeal (NAAOP-RFA). If you elect to appeal this AJD, you must complete Section II of the form and return it to the Army Engineer Division, South Pacific, CESPD-PDS-O, 2052B, Attn: Tom Cavanaugh, Administrative Appeal Review Officer, P.O. Box 36023, 450 Golden Gate Ave, San Francisco, CA 94102 within 60 days of the date of this notice. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety and waive all rights to appeal the AJD.

It should be noted that it is incumbent upon you to remain informed of any changes in regulations and policies as they relate to your project. If your plans change such that waters of the U.S. could be impacted by the proposed project, please contact our office for a re-evaluation of permitting requirements.

I am forwarding a copy of this letter to Mr. Troy Svede with Moreno Cardenas, Inc.

At your convenience, please complete a Customer Service Survey on-line available at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0.

Sincerely,

Chris Parrish
Chief, NM/TX Branch Chief
Regulatory Division

Enclosure(s)
1. AJD
2. AJD Appeal Form

U.S. ARMY CORPS OF ENGINEERS
REGULATORY PROGRAM
APPROVED JURISDICTIONAL DETERMINATION FORM (INTERIM)
NAVIGABLE WATERS PROTECTION RULE

I. ADMINISTRATIVE INFORMATION

Completion Date of Approved Jurisdictional Determination (AJD): 2-Dec-2020
ORM Number: SPA-2020-00260
Associated JDs: N/A or ORM numbers and identifiers
Review Area Location[1]:
State/Territory: TX City: EL Paso County/Parish/Borough: El Paso County
Center Coordinates of Review Area: Latitude 31.957123 Longitude -106.422488

II. FINDINGS

A. Summary: Check all that apply. At least one box from the following list MUST be selected. Complete the corresponding sections/tables and summarize data sources.

- ☐ The review area is comprised entirely of dry land (i.e., there are no waters or water features, including wetlands, of any kind in the entire review area). Rationale: N/A or describe rationale.
- ☐ There are "navigable waters of the United States" within Rivers and Harbors Act jurisdiction within the review area (complete table in section II.B).
- ☐ There are "waters of the United States" within Clean Water Act jurisdiction within the review area (complete appropriate tables in section II.C).
- ☒ There are waters or water features excluded from Clean Water Act jurisdiction within the review area (complete table in section II.D).

B. Rivers and Harbors Act of 1899 Section 10 (§ 10)[2]

§ 10 Name	§ 10 Size	§ 10 Criteria	Rationale for § 10 Determination
N/A	N/A	N/A	N/A

C. Clean Water Act Section 404

Territorial Seas and Traditional Navigable Waters ((a)(1) waters)[3]

(a)(1) Name	(a)(1) Size	(a)(1) Criteria	Rationale for (a)(1) Determination
N/A	N/A	N/A	N/A

Tributaries ((a)(2) waters):

(a)(2) Name	(a)(2) Size	(a)(2) Criteria	Rationale for (a)(2) Determination
N/A	N/A	N/A	N/A

Lakes and ponds, and impoundments of jurisdictional waters ((a)(3) waters):

(a)(3) Name	(a)(3) Size	(a)(3) Criteria	Rationale for (a)(3) Determination
N/A	N/A	N/A	N/A

Adjacent wetlands ((a)(4) waters):

(a)(4) Name	(a)(4) Size	(a)(4) Criteria	Rationale for (a)(4) Determination
N/A	N/A	N/A	N/A

[1] Map(s)/Figure(s) are attached to the AJD provided to the requestor.
[2] If the navigable water is not subject to the ebb and flow of the tide or included on the District's list of Rivers and Harbors Act Section 10 navigable waters list, do NOT use this document to make the determination. The District must continue to follow the procedure outlined in 33 CFR part 329.14 to make a Rivers and Harbors Act Section 10 navigability determination.
[3] A stand-alone TNW determination is completed independently of a request for an AJD. A stand-alone TNW determination is conducted for a specific segment of river or stream or other type of waterbody, such as a lake, where independent upstream or downstream limits or lake borders are established. A stand-alone TNW determination should be completed following applicable guidance and should NOT be documented on the AJD form.
[4] Some excluded waters, such as (b)(2) and (b)(4), may not be specifically identified on the AJD form unless a requestor specifically asks a Corps district to do so. Corps Districts may, in case-by-case instances, choose to identify some or all of these waters within the review area.
[5] Because of the broad nature of the (b)(1) exclusion and in an effort to collect data on specific types of waters that would be covered by the (b)(1) exclusion, four sub-categories of (b)(1) exclusions were administratively created for the purposes of the AJD Form. These four sub-categories are not new exclusions but are simply administrative distinctions and remain (b)(1) exclusions as defined by the NWPR.

D. Excluded Waters or Features

Excluded waters ((b)(1) – (b)(12))[4]:

Exclusion Name	Exclusion Size	Exclusion[5]	Rationale for Exclusion Determination
SPA-2020-00260	10400 feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool	See Section III. C below for information supporting the exclusion determination.

III. SUPPORTING INFORMATION

A. Select/enter all resources that were used to aid in this determination and attach data/maps to this document and/or references/citations in the administrative record, as appropriate.

_X_ Information submitted by, or on behalf of, the applicant/consultant: *Moreno Cardenas Inc.*
This information *is* sufficient for purposes of this AJD.
Rationale: *N/A*

_X_ Data sheets prepared by the Corps: *National Wetlands Plant List*

_X_ Photographs: *Aerial: designated project area and stream imagery. Site Photographs: image of ephemeral stream as seen at ground level; drone imagery within project area.*

_X_ Corps Site visit(s) conducted on: *August 6, 2020.*

___ Previous Jurisdictional Determinations (AJDs or PJDs): *ORM Number(s) and date(s).*

_X_ Antecedent Precipitation Tool: *provide detailed discussion in Section III.B.*

_X_ USDA NRCS Soil Survey: *Albuquerque District Regulatory Viewer.*

_X_ USFWS NWI maps: *Albuquerque District Regulatory Viewer.*

_X_ USGS topographic maps: *Albuquerque District Regulatory Viewer.*

Other data sources used to aid in this determination:

Data Source (select)	Name and/or date and other relevant information
USGS Sources	Water Watch (2020)
USDA Sources	Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin (USDA Handbook 296, issued 2006. pp 1-669)
NOAA Sources	U.S. Drought Monitor (2020)
USACE Sources	National Wetland Plant List (2018)
State/Local/Tribal Sources	Drought Monitoring report for Texas (2020)
USDA/NRCS; Digital Globe	USDA/ NRCS Plants Database (2020); Digital Globe, G-EGD/EVWHS aerial imagery (11-11-2020)
Other	GIS-ArcMap; National Geographic Society, 2013 (USA Topo Maps) (Figure 2)

B. Typical year assessment(s): The data provided by USGS and NOAA indicates that the project site resides within an arid region experiencing extreme hydrologic drought and the conditions are expected to continue. Additionally, the Antecedent Precipitation Tool (APT) indicates that this general area is drier than normal due to drought conditions. As such, the evaluation of the proposed project site for this AJD was conducted during drier than normal conditions. Therefore, additional data has been obtained and reviewed to support our jurisdictional determination.

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It is also worth noting that a recent study by Columbia University notes that the American Southwest is experiencing a historic "megadrought" not seen in centuries. In fact, for several western states, including New Mexico, the last twenty years ranks as the second-driest period in the past 1,200 years (A. Park. Williams, 2018). Based on this data, it seems reasonable that in New Mexico a typical year within the 30-year rolling period is characterized by drought conditions—even severe drought conditions.

C. **Additional comments to support AJD:** The review area for this AJD encompasses a planned project by Moreno Cardenas, Inc. on behalf of El Paso Water.

The review area is located northeast of El Paso, Texas. The unnamed single waterway identified in the review area is located within the arid Chihuahua desert. More specifically, the review area falls within MLRA 42-D; Southern Desertic Basins, Plains, and Mountains region (USDA Handbook 296, issued 2006). This region consists of a dry climate with a limited rainy season from midspring to mid-autumn. Weather patterns primarily consist of high intensity convective storm events. The average annual precipitation for this area is between 8 to 14 inches, with little winter precipitation, and snowfall is minimal to non-existent. Ground water resides more than 80 inches below the surface. Temperatures in this area range from 35 to 40° Celcius (C) (95 to 104°Farenheit [F]); and the average annual temperature is 24° C (75° F).

The single waterway identified within the review area for the proposed scope of work encompasses approximately 10,400 linear feet. The average width of the channel measures approximately 8.5 feet and has an approximate depth between 1-3 feet. It flows from west to east and has a linear alignment. It extends between Martin Luther King Jr. Boulevard on its west side and McCombs Street on its east side. Evidence of the stream channel is not present on either side of these roads. The stream channel does not have any connection to springs or other subsurface water.

Predominate soil types in the review area is indicative of both map units; Pajarito association, level (PAA) and Tourney-Berino association, undulating (TBB). The units are identified based on the area's taxonomic classification of dominant soils.

PAA includes an estimated 100 percent Pajarito or similar soils. These soils can be found in landforms identified as alluvial fans situated on a linear down-slope shape. Pajarito soil profiles Include well drained fine sandy loam soil profiles within the upper horizons measuring between 0-60 inches. The soil is characterized as having high infiltration rates and does not have the potential to pond or flood.

TBB includes an estimated 75% Turney and 20% Berino or similar soils. Soils can be found in landforms identified as basin floors situated on a linear down-slope shape. Turney soil profile includes

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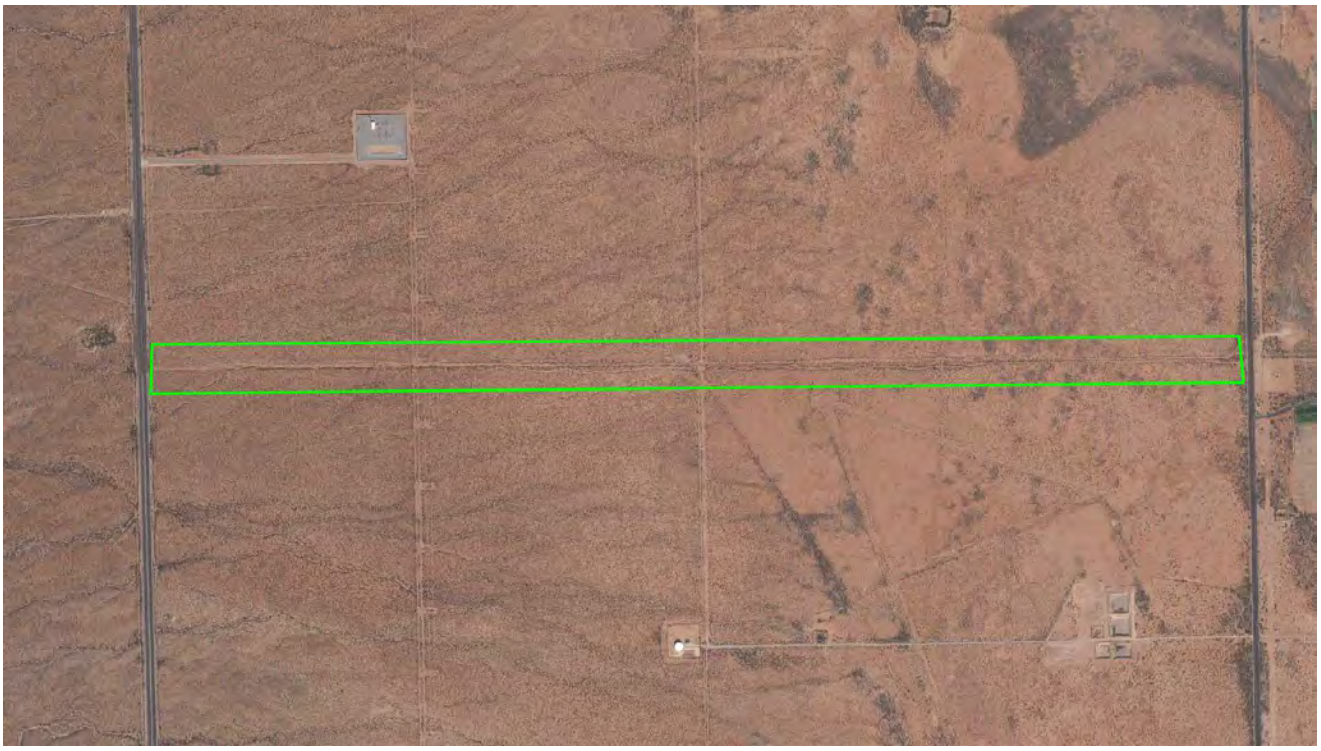
an upper horizon between 0-10 inches consisting of a well-drained fine sandy loam and a lower soil horizon between 10-80 inches consisting of a clay loam structure. The soil is characterized as having high infiltration rates and does not have the potential to pond or flood. Berino soil profiles includes an upper soil horizon between 0-8 inches consisting of well drained fine sandy loam, mid-horizon between 8-37 inches consisting of a loam/clay loam, and a lower horizon between 37-80 inches consisting of well-drained fine sandy loam. TBB soils are also characterized as having high infiltration rates and does not have the potential to pond or flood.

Regulatory Division personnel conducted a site visit of the proposed review area on August 6, 2020. Although a light rain was occurring at the time, no surface water or flow was observed in the stream channel. Additionally, the vegetation observed and listed by the applicant consists predominantly of creosote bush (*Larrea tridentate),* honey mesquite (*Prosopis Mutica),* Tarbush (*Holocarpha vairgata*), Mariola (*Parthenium incanum)*, Broomweed (*Amphiachyris)*, Prickly-pear (family: Cactaceae), and Ratany (*Krameria* L.). Herbaceous plants identified were Coyote Gourd (*Cucurbita palmata)*, Yellow Rain Lily (*N/A*), Locoweed (family: Fabaceae⁄Leguminosae), Bahia (*Bahia* Lag.), Long Flower Ipomopisis (*N/A*), Senna (family: Fabaceae⁄Leguminosae), Datura (family: Solanaceae), and Three Awn (*Aristida L.*). Grass species consisted of Needle Grama (*Bouteloua aristidoides)*. The waterway does not exhibit a riparian corridor and only upland vegetative species were observed.

In addition to the field assessment, the APT was run for the date of the site visit (see documents 2020-260 APT 2020-8-6 and 2020-260 satellite imagery 2020-9-5). The APT was also run for the date of November 11, 2020 in conjunction with reviewing aerial imagery (see document 2020-260 APT 2020-11-11 and Figure 1 provided below). The APT data coincides with the aerial imagery taken on November 11, 2020, which shows that no flows or ponding was evident in the channel.

Based on the data provided by the applicant and obtained by the Corps Regulator, the waterway within the review area has been determined to be an ephemeral stream channel. As such, and in accordance with 33 CFR 328.3 and the June 22, 2020 implementation of the Navigable Waters Protection Rule, it does not meet the definition of “Waters of the United States” and is not subject to regulation under Section 404 of the Clean Water Act.

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(Figure 1) MCI 10,400 linear foot project area; Martin Luther King Jr. Blvd. (Left/West) and McCombs St. (Right/East); Digital Globe satellite imagery; November 11, 2020

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(Figure 2) MCI 10,400 linear foot project area, GIS-ArcMap; USA Topo Maps 2013.

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Exhibit 3: Drone Photo of Existing Arroyo



Exhibit 4: Ground Photo of Distinct Flow Path

Federal Noxious Weed List

Effective as of December 10, 2010

Aquatic

Latin Name	Author(s)	Common Name(s)
Azolla pinnata	R. Brown	Mosquito fern, water velvet
Caulerpa taxifolia (Mediterranean strain)	(Vahl) C. Agardh	Killer algae
Eichhornia azurea	(Swartz) Kunth	Anchored water hyacinth, rooted
Hydrilla verticillata	(L.) Royle	Hydrilla
Hygrophila polysperma	T. Anderson	Miramar weed
Ipomoea aquatica	Forsskal	Water-spinach, swamp morning
Lagarosiphon major	(Ridley) Moss	African elodea
Limnophila sessiliflora	(Vahl) Blume	Ambulia
Melaleuca quinquenervia	(Cavanilles) S.T. Blake	Broadleaf paper bark tree
Monochoria hastata	(Linnaeus) Solms-Laubach	Arrowleaf false pickerelweed
Monochoria vaginalis	(N.L. Burm.) K. Presl	Heartshape false pickerelweed
Ottelia alismoides	(L.) Pers.	Duck lettuce
Sagittaria sagittifolia	Linnaeus	Arrowhead
Salvinia auriculata	Aublet	Giant salvinia
Salvinia biloba	Raddi	Giant salvinia
Salvinia herzogii	de la Sota	Giant salvinia
Salvinia molesta	D.S. Mitchell	Giant salvinia
Solanum tampicense	Dunal	Wetland nightshade
Sparganium erectum	Linnaeus	Exotic bur-reed

Parasitic

Latin Name	Author(s)	Common Name(s)
***Aeginetia* spp.**	Linnaeus	Varies by species
***Alectra* spp.**	Thunb.	Varies by species
***Cuscuta* spp.**	Linnaeus	Dodders
***Orobanche* spp.** (except for natives)	Linnaeus	Broomrapes
***Striga* spp.**	Lour.	Witchweeds

Terrestrial

Latin Name	Author(s)	Common Name(s)
Acacia nilotica ***= Vachellia nilotica***	(L.) Willd. ex Delile (L.) P.J.H. Hurter &	Prickly acacia (updated 3/21/2017)
Ageratina adenophora	(Sprengel) King &	Crofton weed
Ageratina riparia	(Regel) King & H. Rob.	Mistflower, spreading snakeroot
Alternanthera sessilis	(L.) R. Brown ex de	Sessile joyweed
Arctotheca calendula	(L.) Levyns	Capeweed
Asphodelus fistulosus	Linnaeus	Onionweed (corrected 3/21/2107)
Avena sterilis	Durieu	Animated oat, wild oat
Carthamus oxyacantha	M. Bieberstein	Wild safflower
Chrysopogon aciculatus	(Retzius) Trinius	Pilipiliula
Commelina benghalensis	Linnaeus	Benghal dayflower
Crupina vulgaris	Cassini	Common crupina
Digitaria scalarum	(Schweinfurth)	African couchgrass, fingergrass
Digitaria velutina	(Forsskal) Palisot de	Velvet fingergrass, annual
Drymaria arenariodes	Humboldt & Bonpland ex J.A. Schultes	Lightning weed
Emex australis ***= Rumex hypogaeus***	Steinheil T. M. Schust. & Reveal	Three-corned jack (updated 3/21/2017)
Emex spinosa ***= Rumex spinosus***	Campdera L.	Devil's thorn (updated 3/21/2017)
Euphorbia terracina	Linnaeus	False caper, Geraldton carnation
Galega officinalis	Linnaeus	Goatsrue
Heracleum	Sommier & Levier	Giant hogweed
Imperata brasiliensis	Trinius	Brazilian satintail
Imperata cylindrica	(L.) Raeuschel	Cogongrass
Inula britannica	Linnaeus	British yellowhead
Ischaemum rugosum	Salisbury	Murainograss
Leptochloa chinensis	(Linnaeus) Nees	Asian sprangletop
Lycium ferocissimum	Miers	African boxthorn
Lygodium flexuosum	(L.) Sw.	Maidenhair creeper
Lygodium microphyllum	(Cav.) R. Br.	Old world climbing fern
Melastoma	Linnaeus	Malabar melastome
Mikania cordata	(Burman f.) B. L.	Mile-a-minute
Mikania micrantha	Kunth	Bittervine
Mimosa invisa **Now: *M. diplotricha***	Martius C. Wright	Giant sensitive plant (Updated July 2016)
Mimosa pigra	Linnaeus	Catclaw mimosa
Moraea collina	Thunberg	Cape tulip
Moraea flaccida	(Sweet) Steudel	One leaf cape tulip
Moraea miniata	Andrews	Two leaf cape tulip
Moraea ochroleuca	(Salisbury) Drapiez	Apricot tulip
Moraea pallida	(Baker) Goldblatt	Yellow tulip
Nassella trichotoma	Nees) Hackel ex	Serrated tussock

Latin Name	Author(s)	Common Name(s)
Onopordum acaulon	Linnaeus	Stemless thistle
Onopordum illyricum	Linnaeus	Illyricum thistle
Opuntia aurantiaca	Lindley	Jointed prickly pear
Oryza longistaminata	A. Chevalier & Roehrich	Red rice
Oryza punctata	Kotschy ex Steudel	Red rice
Oryza rufipogon	Griffith	Red rice
Paspalum scrobiculatum	Linnaeus	Kodo-millet
Pennisetum clandestinum	Hochstetter ex Chiovenda Hochst. ex Chiov.	Kikuyugrass (updated 3/21/2017)
Pennisetum macrourum = Cenchrus caudatus	Trinius (Schrad.) Kuntze	African feathergrass (updated 3/21/2017)
Pennisetum pedicellatum = Cenchrus pedicellatus	Trinius (Trin.) Morrone	Kyasumagrass (updated 3/21/2017)
Pennisetum polystachion = Cenchrus polystachios subsp. polystachios	(Linnaeus) Schultes (L.) Morrone	Missiongrass, thin napiergrass (updated 3/21/2017)
Prosopis alpataco	R. A. Philippi	Mesquite
Prosopis argentina	Burkart	Mesquite
Prosopis articulata	S. Watson	Velvet mesquite
Prosopis burkartii	Munoz	Mesquite
Prosopis caldenia	Burkart	Calden
Prosopis calingastana	Burkart	Cusqui
Prosopis campestris	Griseback	Mesquite
Prosopis castellanosii	Burkart	Mesquite
Prosopis denudans	Bentham	Mesquite
Prosopis elata	Burkart	Mesquite
Prosopis farcta	(Banks & Solander) J.F.	Syrian mesquite
Prosopis ferox	Grisebach	Mesquite
Prosopis fiebrigii	Harms	Mesquite
Prosopis hassleri	Harms	Mesquite
Prosopis humilis	Gillies ex Hooker &	Algaroba
Prosopis kuntzei	Harms	Mesquite
Prosopis pallida	(Humboldt & Bonpland ex	Kiawe, algarroba
Prosopis palmeri	S. Watson	Mesquite
Prosopis reptans	Bentham	Tornillo
Prosopis rojasiana	Burkart	Mesquite
Prosopis ruizlealii	Burkart	Mesquite
Prosopis ruscifolia	Grisebach	Mesquite
Prosopis sericantha	Gillies ex Hooker &	Mesquite
Prosopis strombulifera	(Lamarck) Bentham	Argentine screwbean
Prosopis torquata	(Cavanilles ex Lagasca y Segura)	Mesquite

Latin Name	Author(s)	Common Name(s)
Rottboellia	(Lour.) W. Clayton	Itchgrass
Rubus fruticosis	Linnaeus	Wild blackberry
Rubus moluccanus	Linnaeus	Wild raspberry
Saccharum spontaneum	Linnaeus	Wild sugarcane
Sagittaria sagittifolia	Linnaeus	Arrowhead
Salsola vermiculata	Linnaeus	Wormleaf salsola
Senecio inaequidens	DC	South African ragwort
Senecio	Poir.	Fireweed
Setaria pumila ssp. pallidefusca	(Schumach.) B. K. Simon (Büse) B.K. Simon	Cattail grass
Solanum torvum	Swartz	Turkeyberry
Solanum viarum	Dunal	Tropical soda apple
Spermacoce alata	Aublet	Winged false buttonweed
Tridax procumbens	Linnaeus	Coat buttons
Urochloa panicoides	Beauvois	Liverseed grass

Change Log

Version	Date	Change Description	Species/Sections Affected
1.0	12/10/2010	(A) Formatting changes. (B) Added change log.	(A) Aquatic, Parasitic, and Terrestrial tables (B)

Figure: 4 TAC §19.300(a)

Common Name	**Botanical Name**
Noxious plants	
alligatorweed	*Alternanthera philoxeroides*
balloonvine	*Cardiospermum halicacabum*
Brazilian peppertree	*Schinus terebinthifolius*
broomrape	*Orobanche ramosa*
camelthorn	*Alhagi camelorum*
Chinese tallow tree	*Triadica sebifera*
Eurasian watermilfoil	*Myriophyllum spicatum*
giant duckweed	*Spirodela oligorrhiza*
giant reed	*Arundo donax*
hedge bindweed	*Calystegia sepium*
hydrilla	*Hydrilla verticillata*
itchgrass	*Rottboellia cochinchinensis*
Japanese dodder	*Cuscuta japonica*
kudzu	*Pueraria montana* var. *lobata*
lagarosiphon	*Lagarosiphon major*
paperbark	*Melaleuca quinquenervia*
purple loosestrife	*Lythrum salicaria*
rooted waterhyacinth	*Eichhornia azurea*
saltcedar	*Tamarix* spp.
salvinia	*Salvinia* spp.
serrated tussock	*Nassella trichotoma*
torpedograss	*Panicum repens*
tropical soda apple	*Solanum viarum*

water spinach	*Ipomoea aquatica*
waterhyacinth	*Eichhornia crassipes*
waterlettuce	*Pistia stratiotes*
Invasive plants	
Chinese tallow tree	*Triadica sebifera*
kudzu	*Pueraria montana* var. *lobata*
saltcedar	*Tamarix* spp.
tropical soda apple	*Solanum viarum*

Occurrence List for Quads Surrounding Request Area

Scientific Name:	Common Name:	Occurrence Number:	State Status:	Federal Status:	Eo Id:
Agave lechuguilla-dasylirion leiophyllum series	Lechuguilla-sotol Series	4			764
Agave lechuguilla-dasylirion leiophyllum series	Lechuguilla-sotol Series	5			6196
Agave lechuguilla-dasylirion leiophyllum series	Lechuguilla-sotol Series	6			2585
Agave lechuguilla-dasylirion leiophyllum series	Lechuguilla-sotol Series	10			3422
Allolepis texana	Texas false saltgrass	3			784
Bouteloua curtipendula-bouteloua eriopoda series	Sideoats Grama-black Grama Series	3			4116
Bouteloua curtipendula-bouteloua eriopoda series	Sideoats Grama-black Grama Series	17			3645
Bouteloua curtipendula-bouteloua eriopoda series	Sideoats Grama-black Grama Series	18			5131
Brickellia baccharidea	resin-leaf brickellbush	1			7203
Brickellia baccharidea	resin-leaf brickellbush	3			7183
Brickellia baccharidea	resin-leaf brickellbush	4			5835
Brickellia baccharidea	resin-leaf brickellbush	5			2177
Brickellia baccharidea	resin-leaf brickellbush	6			4404
Brickellia baccharidea	resin-leaf brickellbush	7			1474
Brickellia baccharidea	resin-leaf brickellbush	8			8140
Brickellia parvula	Mt. Davis brickellbush	1			10425

Scientific Name:	Common Name:	Occurrence Number:	State Status:	Federal Status:	Eo Id:
Brickellia parvula	Mt. Davis brickellbush	3			10160
Conepatus leuconotus	western hog-nosed skunk	81			14338
Cryptantha paysonii	Payson's hiddenflower	1			7155
Escobaria dasyacantha var. dasyacantha	dense cory cactus	7			4556
Escobaria sneedii var. sneedii	Sneed's pincushion cactus	1	E	LE	7001
Escobaria sneedii var. sneedii	Sneed's pincushion cactus	2	E	LE	1775
Escobaria sneedii var. sneedii	Sneed's pincushion cactus	3	E	LE	6550
Escobaria sneedii var. sneedii	Sneed's pincushion cactus	4	E	LE	6171
Escobaria sneedii var. sneedii	Sneed's pincushion cactus	5	E	LE	2875
Escobaria sneedii var. sneedii	Sneed's pincushion cactus	6	E	LE	6736
Escobaria sneedii var. sneedii	Sneed's pincushion cactus	7	E	LE	302
Escobaria sneedii var. sneedii	Sneed's pincushion cactus	8	E	LE	7646
Escobaria sneedii var. sneedii	Sneed's pincushion cactus	9	E	LE	8590
Escobaria sneedii var. sneedii	Sneed's pincushion cactus	10	E	LE	8648
Escobaria sneedii var. sneedii	Sneed's pincushion cactus	11	E	LE	8649
Euphorbia geyeri var. wheeleriana	Wheeler's spurge	1			7801
Euphorbia geyeri var. wheeleriana	Wheeler's spurge	3			8587

Scientific Name:	Common Name:	Occurrence Number:	State Status:	Federal Status:	Eo Id:
Fallugia paradoxa series	Apache-plume Series	2			1234
Fallugia paradoxa series	Apache-plume Series	3			7399
Fallugia paradoxa series	Apache-plume Series	4			5203
Fallugia paradoxa series	Apache-plume Series	5			953
Juniperus monosperma series	Oneseed Juniper Series	4			6553
Larrea tridentata-parthenium incanum series	Creosote-mariola Series	10			7582
Macrhybopsis aestivalis	speckled chub	47	T		13579
Opuntia arenaria	sand prickly-pear	1			442
Opuntia arenaria	sand prickly-pear	4			6698
Opuntia arenaria	sand prickly-pear	5			6088
Opuntia arenaria	sand prickly-pear	6			1300
Opuntia arenaria	sand prickly-pear	9			7542
Opuntia arenaria	sand prickly-pear	11			5201
Peniocereus greggii var. greggii	desert night-blooming cereus	12			6446
Quercus pungens-cercocarpus montanus series	Scrub Oak-mountain Mahogany Series	1			6879
Quercus pungens-cercocarpus montanus series	Scrub Oak-mountain Mahogany Series	2			5966
Quercus pungens-cercocarpus montanus series	Scrub Oak-mountain Mahogany Series	3			2349

Scientific Name:	Common Name:	Occurrence Number:	State Status:	Federal Status:	Eo Id:
Quercus pungens-cercocarpus montanus series	Scrub Oak-mountain Mahogany Series	5			1629
Rhinichthys cataractae	longnose dace	10			14014
Salvia summa	great sage	9			2912
Salvia summa	great sage	12			6058
Salvia summa	great sage	13			143
Silene plankii	Plank's catchfly	3			5585
Spilogale gracilis	western spotted skunk	36			14262
Spilogale gracilis	western spotted skunk	38			14263
Vulpes macrotis	kit fox	14			1778

Element Occurrence Record

Scientific Name: Agave lechuguilla-dasylirion leiophyllum series **Occurrence #:** 6 **Eo Id:** 2585

Common Name: Lechuguilla-sotol Series **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G4 **State Rank:** S4 **Federal Status:**

Location Information:

Directions

LOWER LIMESTONE SLOPES, SOUTH SIDE OF HITT CANYON AREA, FRANKLIN MOUNTAINS SP

Survey Information:

First Observation: **Survey Date:** 1990-05-22 **Last Observation:** 1990

Eo Type: **Eo Rank:** B **Eo Rank Date:** 1990-05-22

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: DESCRIPTION AND PLANT LIST IN DLI REPORT, SITE 17

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Texas Parks and Wildlife Department. 1990. Franklin Mountains State Park, El Paso County, Texas summary of representative plant communities. 81 pp. August 1990.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

Element Occurrence Record

Scientific Name: Bouteloua curtipendula-bouteloua eriopoda series
Occurrence #: 3 **Eo Id:** 4116
Common Name: Sideoats Grama-black Grama Series
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G4 **State Rank:** S3
Federal Status:

Location Information:

Directions

EAST SIDE OF FRANKLIN MOUNTAINS STATE PARK, 3 MILES DUE NORTHWEST OF EL PASO

Survey Information:

First Observation:
Survey Date:
Last Observation:
Eo Type:
Eo Rank: B
Eo Rank Date:
Observed Area: 4,500.00

Comments:

General Description: SUCCULENT DESERT (LECHUGUILLA, SOTOL, YUCCA) SPECIES INTERMIXED WITH GRAMA GRASSLAND; GOOD QUALITY

Comments:

Protection Comments:

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

RISKIND, DAVID, PH.D. TEXAS PARKS AND WILDLIFE DEPARTMENT 4200 SMITH SCHOOL ROAD AUSTIN, TEXAS 78744 PH-512/479-4897 (WORK)

Specimen:

Element Occurrence Record

Scientific Name: Bouteloua curtipendula-bouteloua eriopoda series
Occurrence #: 17 **Eo Id:** 3645
Common Name: Sideoats Grama-black Grama Series
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G4 **State Rank:** S3
Federal Status:

Location Information:

Directions

IGNEOUS AND CALCAREOUS SEDIMENTARY LOWER SLOPES, BOTH SIDES OF UPPER FUSSELMAN CANYON, SOUTH OF LOOP 375, FRANKLIN MOUNTAINS SP

Survey Information:

First Observation:
Survey Date: 1989-10-31
Last Observation: 1989-11-01
Eo Type:
Eo Rank: B
Eo Rank Date: 1989-10-31
Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: DESCRIPTION AND PLANT LIST IN DLI REPORT, SITE 12

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Texas Parks and Wildlife Department. 1990. Franklin Mountains State Park, El Paso County, Texas summary of representative plant communities. 81 pp. August 1990.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

Element Occurrence Record

Scientific Name: Brickellia baccharidea
Occurrence #: 2
Eo Id: 1018
Common Name: resin-leaf brickellbush
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G3
State Rank: S1
Federal Status:

Location Information:

Directions

FRANKLIN MOUNTAINS, 1.1 MILE WEST OF THE JUNCTION OF GATEWAY SOUTH AND TRANS-MOUNTAIN ROAD, AND 1.2 MILE WEST OF THE JUNCTION OF WAR AND TRANS-MOUNTAIN ROAD

Survey Information:

First Observation: 1977-11-20
Survey Date:
Last Observation: 1978-11-12
Eo Type:
Eo Rank:
Eo Rank Date:
Observed Area:

Comments:

General Description: SOUTH EXPOSURE AMONG RHYOLITE BOULDERS AND GRANITE ROCKS

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: IN FLOWER AND FRUIT

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

WORTHINGTON, R.D. (3810). 1978. SPECIMEN # NONE SR.

Specimen:

Sul Ross State University Herbarium. 1977. R.D. Worthington (s.n.), Specimen # none SR. 20 November 1977.

Sul Ross State University Herbarium. 1978. R.D. Worthington #3731, 3732, Specimen # none SR. 14 October 1978.

Sul Ross State University Herbarium. 1978. R.D. Worthington #3810, Specimen # none SR. 12 November 1978.

WORTHINGTON, R. D. (3810). 1978. SPECIMEN # NONE SR. (S78WORSRTXUS)

[S77WORSRTXUS]

Element Occurrence Record

Scientific Name: Escobaria dasyacantha var. dasyacantha **Occurrence #:** 7 **Eo Id:** 4556

Common Name: dense cory cactus **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G3T3 **State Rank:** S3 **Federal Status:**

Location Information:

Directions

FRANKLIN MOUNTAINS

Survey Information:

First Observation: **Survey Date:** **Last Observation:** 1921-05-28

Eo Type: **Eo Rank:** H **Eo Rank Date:** 2006-12-07

Observed Area:

Comments:

General Description:

Comments: J.N. ROSE AND W.R. FITCH #17856; MRS. S.L. PATTISON S.N., 28 MAY 1921; CHARLES WRIGHT S.N. (SEVERAL COLLECTIONS)

Protection Comments:

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Benson, Lyman. 1969. Flora of Texas: Cactaceae. Volume 2, Part II, pp. 221-317, plates 1-14. C. L. Lundell and collaborators, editors. Texas Research Foundation, Renner, TX. 97 pp.

BENSON, L. 1969. CACTACEAE. IN LUNDELL, C. L. ET. AL. FLORA OF TEXAS, VOL. II. TEXAS RESEARCH FOUNDATION, RENNER.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

Element Occurrence Record

Scientific Name: Escobaria sneedii var. sneedii **Occurrence #:** 1 **Eo Id:** 7001

Common Name: Sneed's pincushion cactus **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:** E

Global Rank: G2G3QT2Q **State Rank:** S2 **Federal Status:** LE

Location Information:

Directions

O'HARA CANYON, FRANKLIN MOUNTAINS

Survey Information:

First Observation: 1921 **Survey Date:** **Last Observation:** 1977

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments:

Protection Comments: LISTED ENDANGERED BY THE USF& WS

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

HEIL, K. D. 1984. USF& WS RECOVERY PLAN FOR CORYPHANTHA SNEEDII.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

Sul Ross State University Herbarium, Alpine. 1977. C. Champie (s.n.), Specimen # none SRSC.

Element Occurrence Record

Scientific Name: Escobaria sneedii var. sneedii
Occurrence #: 2 **Eo Id:** 1775
Common Name: Sneed's pincushion cactus
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status: E
Global Rank: G2G3QT2Q **State Rank:** S2
Federal Status: LE

Location Information:

Directions

ANTHONY'S NOSE, FRANKLIN MOUNTAINS

Survey Information:

First Observation: 1980-PRE **Survey Date:** **Last Observation:** 1980-PRE
Eo Type: **Eo Rank:** **Eo Rank Date:**
Observed Area:

Comments:

General Description:

Comments:

Protection Comments: LE

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

WORTHINGTON, R. D. 1980. REPORT ON A SURVEY FOR SNEED PINCUSHION CACTUS, CORYPHANTHA SNEEDII VAR SNEEDII ON THE DONA ANA RANGE, DONA ANA COUNTY, NEW MEXICO.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

Element Occurrence Record

Scientific Name: Escobaria sneedii var. sneedii **Occurrence #:** 3 **Eo Id:** 6550

Common Name: Sneed's pincushion cactus **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:** E

Global Rank: G2G3QT2Q **State Rank:** S2 **Federal Status:** LE

Location Information:

Directions

NORTH SLOPE, HEAD OF HITT CANYON, FRANKLIN MOUNTAINS

Survey Information:

First Observation: 1982-PRE **Survey Date:** **Last Observation:** 1982-PRE

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments:

Protection Comments: LISTED ENDANGERED BY THE USF& WS

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

WORTHINGTON, R. D. 1981. LETTER TO DR. R. KOLOGISKI CONCERNING CORYPHANTHA SNEEDII VAR SNEEDII.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

Element Occurrence Record

Scientific Name: Escobaria sneedii var. sneedii
Occurrence #: 8
Eo Id: 7646
Common Name: Sneed's pincushion cactus
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status: E
Global Rank: G2G3QT2Q
State Rank: S2
Federal Status: LE

Location Information:

Directions

EAST- TO NORTHEAST-FACING SLOPES CA. 1.2-1.3 AIR MILES NORTH-NORTHWEST OF 6927 FEET SUMMIT OF ANTHONY'S NOSE, SOUTH OF HITT CANYON, FRANKLIN MOUNTAINS SP

Survey Information:

First Observation:
Survey Date: 1990-05-22
Last Observation: 1990
Eo Type:
Eo Rank: A
Eo Rank Date: 1990-05-22
Observed Area:

Comments:

General Description: ON EXPOSURES OF EL PASO LIMESTONE (AND BLISS SANDSTONE?) ON STEEP SLOPES IN LECHUGUILLA-SOTOL AND SCRUB OAK COMMUNITIES

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: 105 PLANTS (CLUMPS) COUNTED IN CASUAL SURVEY

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Texas Parks and Wildlife Department. 1990. Franklin Mountains State Park, El Paso County, Texas summary of representative plant communities. 81 pp. August 1990.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

Element Occurrence Record

Scientific Name: Escobaria sneedii var. sneedii **Occurrence #:** 9 **Eo Id:** 8590

Common Name: Sneed's pincushion cactus **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:** E

Global Rank: G2G3QT2Q **State Rank:** S2 **Federal Status:** LE

Location Information:

Directions

FRANKLIN MOUNTAINS STATE PARK

Survey Information:

First Observation: 199? **Survey Date:** **Last Observation:** 199?

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Specimen:

Element Occurrence Record

Scientific Name: Escobaria sneedii var. sneedii
Occurrence #: 10 **Eo Id:** 8648
Common Name: Sneed's pincushion cactus
Track Status: Track all extant and selected historical EOs
Identification Confirmed:
TX Protection Status: E
Global Rank: G2G3QT2Q **State Rank:** S2
Federal Status: LE

Location Information:

Directions

Survey Information:

First Observation: **Survey Date:** **Last Observation:**
Eo Type: **Eo Rank:** **Eo Rank Date:**
Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Specimen:

Element Occurrence Record

Scientific Name: Escobaria sneedii var. sneedii **Occurrence #:** 11 **Eo Id:** 8649

Common Name: Sneed's pincushion cactus **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: **TX Protection Status:** E

Global Rank: G2G3QT2Q **State Rank:** S2 **Federal Status:** LE

Location Information:

Directions

Survey Information:

First Observation: **Survey Date:** **Last Observation:**

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Specimen:

Element Occurrence Record

Scientific Name: Fallugia paradoxa series **Occurrence #:** 2 **Eo Id:** 1234

Common Name: Apache-plume Series **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G4 **State Rank:** S4 **Federal Status:**

Location Information:

Directions

BOTTOM OF ARROYO, UPPER FUSSELMAN CANYON, SOUTH SIDE OF LOOP 375, 0.3 MILE EAST OF SMUGGLERS GAP, NORTH OF SOUTH FRANKLIN MOUNTAIN, FRANKLIN MOUNTAINS SP

Survey Information:

First Observation: **Survey Date:** 1989-10-31 **Last Observation:** 1989-11-01

Eo Type: **Eo Rank:** BC **Eo Rank Date:** 1989-10-31

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: DESCRIPTION AND PLANT LIST IN DLI REPORT, SITE 11

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Texas Parks and Wildlife Department. 1990. Franklin Mountains State Park, El Paso County, Texas summary of representative plant communities. 81 pp. August 1990.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

Element Occurrence Record

Scientific Name: Fallugia paradoxa series **Occurrence #:** 3 **Eo Id:** 7399

Common Name: Apache-plume Series **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G4 **State Rank:** S4 **Federal Status:**

Location Information:

Directions

ARROYO BOTTOM, WEST OF MUNDYS GAP, WEST TO TOM MAYS PARK, WEST SLOPE OF FRANKLIN MOUNTAINS, FRANKLIN MOUNTAINS SP

Survey Information:

First Observation: **Survey Date:** 1989-11-01 **Last Observation:** 1989-11-01

Eo Type: **Eo Rank:** B **Eo Rank Date:** 1989-11-01

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: DESCRIPTION AND PLANT LIST IN DLI REPORT, SITE 6

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Texas Parks and Wildlife Department. 1990. Franklin Mountains State Park, El Paso County, Texas summary of representative plant communities. 81 pp. August 1990.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

Element Occurrence Record

Scientific Name: Fallugia paradoxa series **Occurrence #:** 5 **Eo Id:** 953

Common Name: Apache-plume Series **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G4 **State Rank:** S4 **Federal Status:**

Location Information:

Directions

ARROYOS ON SOUTH SIDE OF HITT CANYON, FRANKLIN MOUNTAINS SP

Survey Information:

First Observation: **Survey Date:** 1990-05-22 **Last Observation:** 1990

Eo Type: **Eo Rank:** BC **Eo Rank Date:** 1990-05-22

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: DESCRIPTION AND PLANT LIST IN DLI REPORT, SITE 16

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Texas Parks and Wildlife Department. 1990. Franklin Mountains State Park, El Paso County, Texas summary of representative plant communities. 81 pp. August 1990.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

Element Occurrence Record

Scientific Name: Juniperus monosperma series **Occurrence #:** 4 **Eo Id:** 6553

Common Name: Oneseed Juniper Series **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: GNR **State Rank:** S4 **Federal Status:**

Location Information:

Directions

UPPER SLOPES, EAST SIDE OF FRANKLIN MOUNTAINS, NEAR ANTHONY'S NOSE (LAT-LONG PROVIDED BY AUTHOR)

Survey Information:

First Observation: 1973 **Survey Date:** **Last Observation:** 1974

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description: RELICT GRASSLAND/EVERGREEN SHRUBLAND

Comments: SEE ALSO CRAWFORD (1974) AN ECOLOGICAL ANALYSIS OF AN OAK-JUNIPER COMMUNITY IN THE FRANKLIN MOUNTAINS, EL PASO COUNTY, TEXAS, MS THESIS, UTEP, 90 PP.

Protection Comments:

Management Comments:

Data:

EO Data: PROVIDED IN THESIS, WHICH SEE; RUMORED TO BE DOMINATED BY FESTUCA LIGULATA, BUT NO EO FOR THIS REPORT WILL BE GENERATED UNTIL SPECIMEN (IF ANY) IS SEEN

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Applehons, Dennis J. 1973. Grassland vegetation of a relict community in the Franklin Mountains, El Paso County, Texas. M.S. Thesis, University of Texas, El Paso. 59 pp.

CRAWFORD, R.C. 1974. AN ECOLOGICAL ANALYSIS OF AN OAK-JUNIPER COMMUNITY IN THE FRANKLIN MOUNTAINS, EL PASO COUNTY, TEXAS. M.S. THESIS, UT-EL PASO. 90 PP.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

Element Occurrence Record

Scientific Name: Larrea tridentata-parthenium incanum series
Occurrence #: 11
Eo Id: 425
Common Name: Creosote-mariola Series
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G5
State Rank: S5
Federal Status:

Location Information:

Directions

GENTLE BAJADA SLOPES, SOUTH SIDE OF HITT CANYON WEST OF WATER TANK, FRANKLIN MOUNTAINS SP

Survey Information:

First Observation:
Survey Date: 1990-05-23
Last Observation: 1990
Eo Type:
Eo Rank: C
Eo Rank Date: 1990-05-23
Observed Area:

Comments:

General Description: DISTURBANCE TYPE REPLACING SIDEOATS GRAMA-BLACK GRAMA SERIES GRASSLAND IN GRAZED AREA

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: DESCRIPTION AND PLANT LIST IN DLI REPORT, SITE 15

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Texas Parks and Wildlife Department. 1990. Franklin Mountains State Park, El Paso County, Texas summary of representative plant communities. 81 pp. August 1990.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

Element Occurrence Record

Scientific Name: Peniocereus greggii var. greggii **Occurrence #:** 12 **Eo Id:** 6446

Common Name: desert night-blooming cereus **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G3G4T3 **State Rank:** S2 **Federal Status:**

Location Information:

Directions

DESERT SURROUNDING FRANKLIN MOUNTAINS

Survey Information:

First Observation: **Survey Date:** **Last Observation:** 19??

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments: SEE ALSO CHAMPIE, C. 1973. STRANGERS IN THE FRANKLINS, P.40.

Protection Comments:

Management Comments:

Data:

EO Data: RARE; FLOWERS IN APRIL

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

CHAMPIE, C. 19??. CACTI AND SUCCULENTS OF EL PASO. ABBEY GARDEN PRESS, SANTA BARBARA, CA. 100 PP.

CHAMPIE, C. 1973. STRANGERS IN THE FRANKLINS.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

Element Occurrence Record

Scientific Name: Quercus pungens-cercocarpus montanus series **Occurrence #:** 1 **Eo Id:** 6879

Common Name: Scrub Oak-mountain Mahogany Series **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G4 **State Rank:** S4 **Federal Status:**

Location Information:

Directions

NORTH- AND EAST-FACING IGNEOUS SLOPES, NEAR MUNDYS GAP, CA. 1 MILE NORTH OF NORTH FRANKLIN MOUNTAIN, FRANKLIN MOUNTAINS SP

Survey Information:

First Observation: **Survey Date:** 1989-11-01 **Last Observation:** 1989-11-01

Eo Type: **Eo Rank:** B **Eo Rank Date:** 1989-11-01

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: DESCRIPTION AND PLANT LIST IN DLI REPORT, SITE 7

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Texas Parks and Wildlife Department. 1990. Franklin Mountains State Park, El Paso County, Texas summary of representative plant communities. 81 pp. August 1990.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

Element Occurrence Record

Scientific Name: Quercus pungens-cercocarpus montanus series **Occurrence #:** 4 **Eo Id:** 5213

Common Name: Scrub Oak-mountain Mahogany Series **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G4 **State Rank:** S4 **Federal Status:**

Location Information:

Directions

EAST-FACING LIMESTONE SLOPES, ON/NEAR SUMMITS IMMEDIATELY NORTH OF MUNDYS GAP NORTH OF NORTH FRANKLIN MOUNTAIN, FRANKLIN MOUNTAINS SP

Survey Information:

First Observation: **Survey Date:** 1989-11-01 **Last Observation:** 1989-11-01

Eo Type: **Eo Rank:** B **Eo Rank Date:** 1989-11-01

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: DESCRIPTION AND PLANT LIST IN DLI REPORT, SITE 8

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Texas Parks and Wildlife Department. 1990. Franklin Mountains State Park, El Paso County, Texas summary of representative plant communities. 81 pp. August 1990.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

Element Occurrence Record

Scientific Name: Silene plankii **Occurrence #:** 1 **Eo Id:** 827

Common Name: Plank's catchfly **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G2 **State Rank:** S1 **Federal Status:**

Location Information:

Directions

0.6 AIR MILE NORTHEAST OF THE TOP OF NORTH FRANKLIN MOUNTAIN IN THE FRANKLIN MOUNTAINS

Survey Information:

First Observation: 1971-08-21 **Survey Date:** **Last Observation:** 1978-10-07

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description: NORTH FACING CLIFF, LANORIA FORMATION ROCKS

Comments: NEW MEXICO STATE UNIV. SPECIMEN (S71TODLC) NOT OBSERVED BY TXNHP

Protection Comments:

Management Comments:

Data:

EO Data: IN FLOWER

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

WORTHINGTON, R. D. 1981. USF& WS STATUS REPORT ON SILENE PLANKII.

Specimen:

NEW MEXICO STATE UNIVERSITY HERBARIUM, LAS CRUCES. 1971. DR. THOMAS K. TODSEN #?, SPECIMEN # ? NMC. 21 AUGUST 1971.

SUL ROSS STATE UNIVERSITY HERBARIUM, ALPINE. 1978. R.D. WORTHINGTON #3699, SPECIMEN # NONE SRSC. 7 OCTOBER 1978.

University of Texas at El Paso Herbarium. 1978. R.D. Worthington #3699, Specimen # 3652 UTEP. 7 October 1978.

[S71TODLCTXUS]

[S78WORSRTXUS]

Element Occurrence Record

Scientific Name: Silene plankii **Occurrence #:** 2 **Eo Id:** 7378

Common Name: Plank's catchfly **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G2 **State Rank:** S1 **Federal Status:**

Location Information:

Directions

0.3 AIR MILE WEST-NORTHWEST OR NORTH-NORTHWEST TO NORTHWEST OF THE TOP OF NORTH FRANKLIN MOUNTAIN

Survey Information:

First Observation: 1978 **Survey Date:** **Last Observation:** 1978-09-10

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description: NORTH FACE OF RHYOLITE CLIFF

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: IN FLOWER

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

WORTHINGTON, R. D. 1981. USF& WS STATUS REPORT ON SILENE PLANKII.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

University of Texas at Austin Herbarium. 1978. R.D. Worthington #3467, Specimen # none TEX. 10 September 1978.

University of Texas at El Paso Herbarium. 1978. R.D. Worthington #3467, Specimen # 3607 UTEP. 10 September 1978.

Element Occurrence Record

Scientific Name: Silene plankii
Occurrence #: 3
Eo Id: 5585
Common Name: Plank's catchfly
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G2
State Rank: S1
Federal Status:

Location Information:

Directions

VICINITY OF COTTONWOOD SPRING, WEST SIDE OF FRANKLIN MTS., ABOVE CANUTILLA

Survey Information:

First Observation: 1952
Survey Date:
Last Observation: 1952-10-15
Eo Type:
Eo Rank:
Eo Rank Date:
Observed Area:

Comments:

General Description: IN MATS OF SELAGINELLA ON ROCK FACE

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: IN FLOWER AND FRUIT

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

CORRELL, D. S. (15033). N.D. SPECIMEN # NONE SM.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

CORRELL, D. S. (15033). N.D. SPECIMEN # NONE SM. (S??CORSMTXUS)

SOUTHERN METHODIST UNIVERSITY HERBARIUM. 1952. D.S. CORRELL #15033, SPECIMEN # NONE SMU. 15 OCTOBER 1952.

University of Texas at Austin, Lundell Herbarium. 1952. D.S. Correll #15033, Specimen # none TEX-LL. 15 October 1952.

Element Occurrence Record

Scientific Name: Silene plankii **Occurrence #:** 4 **Eo Id:** 2353

Common Name: Plank's catchfly **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G2 **State Rank:** S1 **Federal Status:**

Location Information:

Directions

0.2 MILE NORTH OF THE TOP OF NORTH FRANKLIN MOUNTAIN, FRANKLIN MOUNTAINS

Survey Information:

First Observation: 1981 **Survey Date:** **Last Observation:** 1981-03-15

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description: RHYOLITE ROCK FACE, NORTH EXPOSURE

Comments:

Protection Comments:

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

WORTHINGTON, R. D. 1981. USF& WS STATUS REPORT ON SILENE PLANKII.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

University of Texas at El Paso Herbarium. 1981. R.D. Worthington #6879, Specimen # 15358 UTEP. 15 March 1981.

Element Occurrence Record

Scientific Name: Silene plankii **Occurrence #:** 5 **Eo Id:** 7835

Common Name: Plank's catchfly **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G2 **State Rank:** S1 **Federal Status:**

Location Information:

Directions

0.25 AIR MILES NORTH NORTHWEST TOP NORTH FRANKLIN MOUNTAINS

Survey Information:

First Observation: 1977 **Survey Date:** **Last Observation:** 1977-11-12

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description: NORTHWEST EXPOSURE ON RHYOLITE

Comments:

Protection Comments:

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

WORTHINGTON, R. D. 1981. USF& WS STATUS REPORT ON SILENE PLANKII.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

University of Texas at El Paso Herbarium. 1977. R.D. Worthington #43, Specimen # 1025 UTEP. 12 November 1977.

Element Occurrence Record

Scientific Name: Silene plankii **Occurrence #:** 6 **Eo Id:** 550

Common Name: Plank's catchfly **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G2 **State Rank:** S1 **Federal Status:**

Location Information:

Directions

0.35 [AIR] MILE SOUTH OF NORTH FRANKLIN MOUNTAIN SUMMIT, JUST WEST OF FORT BLISS BOUNDARY

Survey Information:

First Observation: ? **Survey Date:** **Last Observation:**

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

WORTHINGTON, R. D. 1981. USF& WS STATUS REPORT ON SILENE PLANKII.

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Specimen:

Element Occurrence Record

Scientific Name: Sonorella metcalfi **Occurrence #:** 1 **Eo Id:** 1120

Common Name: Franklin Mountain talus snail **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G2 **State Rank:** S1 **Federal Status:**

Location Information:

Directions

NORTH FRANKLIN MOUNTAIN, IN A NORTHWEST ARM OF FUSSELMAN CANYON, ABOVE SPRING

Survey Information:

First Observation: 1972-05-11 **Survey Date:** **Last Observation:** 1972-05-11

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: COLLECTOR ARTIE L. METCALF, 11 MAY 1972; HOLOTYPE 760816 U.S.N.M., PARATYPES 99172 DELAWARE MUSEUM OF NATURAL HISTORY, 338227 ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, 4374 UTEP

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

MILLER, WALTER B. 1976. NEW SPECIES OF SONORELLA (PULMONATA:HELMINTHOGLYPTIDAE) FROM NEW MEXICO AND TEXAS. THE NAUTILUS, VOL. 90(2), APRIL 30, 1976.

Specimen:

Academy of Natural Sciences, Philadelphia, PA. 1972. Artie L. Metcalf, Catalog # 338227 PAC. 11 May 1972.

Delaware Museum of Natural History, Wilmington. 1972. Artie L. Metcalf, Catalog # 99172 DMNH. 11 May 1972. Paratypes.

U.S. National Museum of Natural History, Smithsonian, Washington, D.C. 1972. Artie L. Metcalf, Catalog # 760816 USNMNH. 11 May 1972. Holotype.

University of Texas at El Paso. 1972. Artie L. Metcalf, Catalog # 4374 UTEP. 11 May 1972.

Element Occurrence Record

Scientific Name: Spilogale gracilis **Occurrence #:** 38 **Eo Id:** 14263

Common Name: western spotted skunk **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G5 **State Rank:** S5 **Federal Status:**

Location Information:

Directions

The specimens were located east of Tom Mays Park. Directions were created by database staff. The directions are generalized as this record consists of multiple observations.

Survey Information:

First Observation: 1974-08-12 **Survey Date:** 1986-09-01 **Last Observation:** 1986-09-01

Eo Type: **Eo Rank:** H **Eo Rank Date:** 1986-09-01

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: 12 August 1974: Skin and skeleton of one male preserved specimen; 1 September 1986: Skin and skeleton of one male preserved specimen.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Texas Parks and Wildlife Department. 1994. Franklin Mountains State Park management plan, El Paso County, Texas. 128 pp. May 1994.

Ferguson, Adam. 2014. Texas Skunk Record Database regarding five specices of skunk in Texas.

Specimen:

University of Texas El Paso Biodiversity Collections, El Paso, TX; John C. Bokich (#195), Catalog #3829, 12 August 1974, UTEP.

University of Texas El Paso Biodiversity Collections, El Paso, TX; Richard D. Worthington (#13), Catalog #8340, 1 September 1986, UTEP.

Source Feature List for Quads Surrounding Request Area

Source Feature ID:	Scientific Name:	Source Feature Descriptor:	Source Feature Locator:
37874	Trimorphodon vilkinsonii	ID Confirmed: Yes	
39176	Brickellia baccharidea	ID Confirmed: Yes	
39410	Escobaria sneedii var. sneedii	ID Confirmed: Yes	
39411	Escobaria sneedii var. sneedii	ID Confirmed: Yes	
39412	Escobaria sneedii var. sneedii	ID Confirmed: Yes	
40561	Escobaria sneedii var. sneedii	ID Confirmed: Yes	
40562	Escobaria sneedii var. sneedii	ID Confirmed: Yes	

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, TX 78758-4460
Phone: (512) 490-0057 Fax: (512) 490-0974
http://www.fws.gov/southwest/es/AustinTexas/
http://www.fws.gov/southwest/es/EndangeredSpecies/lists/

In Reply Refer To:
Project Code: 2022-0021021
Project Name: El Paso ASR

March 17, 2022

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of

this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, TX 78758-4460
(512) 490-0057

Project Summary

Project Code: 2022-0021021
Event Code: None
Project Name: El Paso ASR
Project Type: Drainage Project
Project Description: Aquifer recharge
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@31.95784245,-106.42488583271498,14z



Counties: El Paso County, Texas

Endangered Species Act Species

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. 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.

Birds

NAME	STATUS
Mexican Spotted Owl *Strix occidentalis lucida*	Threatened
There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/8196	
Northern Aplomado Falcon *Falco femoralis septentrionalis*	Endangered
Population: Wherever found, except where listed as an experimental population No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1923	
Piping Plover *Charadrius melodus*	Threatened
Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. The location of the critical habitat is not available. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/6039	
Red Knot *Calidris canutus rufa*	Threatened
There is **proposed** critical habitat for this species. The location of the critical habitat is not available. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/1864	
Southwestern Willow Flycatcher *Empidonax traillii extimus*	Endangered
There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/6749	
Yellow-billed Cuckoo *Coccyzus americanus*	Threatened
Population: Western U.S. DPS There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3911	

Insects

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

Flowering Plants

NAME	STATUS
Sneed Pincushion Cactus *Coryphantha sneedii var. sneedii*	Endangered
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4706	

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency: El Paso city
Name: Shannon Skaalure
Address: 2501 East Loop 820 North
City: Fort Worth
State: TX
Zip: 76118
Email shannon.skaalure@terracon.com
Phone: 5129171929

Last Update: 3/17/2022

EL PASO COUNTY

AMPHIBIANS

Woodhouse's toad *Anaxyrus woodhousii*

Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: SU

BIRDS

American peregrine falcon *Falco peregrinus anatum*

Year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4T4	State Rank: S2B

chestnut-collared longspur *Calcarius ornatus*

Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

Franklin's gull *Leucophaeus pipixcan*

This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2N

gray hawk *Buteo plagiatus*

Locally and irregularly along U.S.-Mexico border; mature riparian woodlands and nearby semiarid mesquite and scrub grasslands; breeding range formerly extended north to southernmost Rio Grande floodplain of Texas

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: GNR	State Rank: S2B

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EL PASO COUNTY

BIRDS

lark bunting *Calamospiza melanocorys*

Overall, it's a generalist in most short grassland settings including ones with some brushy component plus certain agricultural lands that include grain sorghum. Short grasses include sideoats and blue gramas, sand dropseed, prairie junegrass (Koeleria), buffalograss also with patches of bluestem and other mid-grass species. This bunting will frequent smaller patches of grasses or disturbed patches of grasses including rural yards. It also uses weedy fields surrounding playas. This species avoids urban areas and cotton fields.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4B

Mexican spotted owl *Strix occidentalis lucida*

Remote, shaded canyons of coniferous mountain woodlands (pine and fir); nocturnal predator of mostly small rodents and insects; day roosts in densely vegetated trees, rocky areas, or caves

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3G4T3T4	State Rank: S1B

southwestern willow flycatcher *Empidonax traillii extimus*

Thickets of willow, cottonwood, mesquite, and other species along desert streams

Federal Status: LE	State Status: E	SGCN: N
Endemic: N	Global Rank: G5T2	State Rank: S1B

western burrowing owl *Athene cunicularia hypugaea*

Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4T4	State Rank: S2

western yellow-billed cuckoo *Coccyzus americanus occidentalis*

Status applies only to western population beyond the Pecos River Drainage; breeds in riparian habitat and associated drainages; springs, developed wells, and earthen ponds supporting mesic vegetation; deciduous woodlands with cottonwoods and willows; dense understory foliage is important for nest site selection; nests in willow, mesquite, cottonwood, and hackberry; forages in similar riparian woodlands; breeding season mid-May-late Sept.

Federal Status: LT	State Status:	SGCN: Y
Endemic: N	Global Rank: G5T2T3	State Rank: S4S5B

white-faced ibis *Plegadis chihi*

Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4B

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EL PASO COUNTY

FISH

longnose dace *Rhinichthys cataractae*

Can only be found in the Big Bend portion of the Rio Grande. Occasionally taken in lakes and clear pools of rivers but prefers clear, flowing water in gravelly riffles.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2

speckled chub *Macrhybopsis aestivalis*

Found throughout the Rio Grande and lower Pecos River but occurs most frequently between the Río Conchos confluence and the Pecos River. Flowing water over coarse sand and fine gravel substrates in streams; typically found in raceways and runs.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S1S2

INSECTS

American bumblebee *Bombus pensylvanicus*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G3G4	State Rank: SNR

grande stripetail *Isoperla jewetti*

Originally described from El Paso Co., Texas from specimens collected in 1939.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G1	State Rank: S1

Samalayuca Dune grasshopper *Cibolacris samalayucae*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G2?	State Rank: S2?

MAMMALS

big brown bat *Eptesicus fuscus*

Any wooded areas or woodlands except south Texas. Riparian areas in west Texas.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

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EL PASO COUNTY

MAMMALS

big free-tailed bat *Nyctinomops macrotis*

Habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

black-tailed prairie dog *Cynomys ludovicianus*

Dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle; live in large family groups

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3

cave myotis bat *Myotis velifer*

Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4G5	State Rank: S2S3

desert pocket gopher *Geomys arenarius*

Cottonwood-willow association along the Rio Grande in El Paso and Hudspeth counties; does not tolerate clayey or gravelly soils characteristic of the other Geomys species; common along irrigation ditches in the sandy river bottom area.Lives underground, but build large and conspicuous mounds; life history not well documented, but presumed to eat mostly vegetation, be active year round, and bear more than one litter per year.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S2

eastern red bat *Lasiurus borealis*

Red bats are migratory bats that are common across Texas. They are most common in the eastern and central parts of the state, due to their requirement of forests for foliage roosting. West Texas specimens are associated with forested areas (cottonwoods). Also common along the coastline. These bats are highly mobile, seasonally migratory, and practice a type of "wandering migration". Associations with specific habitat is difficult unless specific migratory stopover sites or wintering grounds are found. Likely associated with any forested area in East, Central, and North Texas but can occur statewide.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S4

hoary bat *Lasiurus cinereus*

Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S4

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EL PASO COUNTY

MAMMALS

kit fox *Vulpes macrotis*

Open desert grassland; avoids rugged, rocky terrain and wooded areas.

Federal Status:	State Status:	SGCN: Removed from Y
Endemic: N	Global Rank: G4	State Rank: S1S2

long-legged myotis bat *Myotis volans*

Found in pine-oak woodland to grassland ecotone, higher elevations of Trans-Pecos.High, open woods and mountainous terrain; nursery colonies (which may contain several hundred individuals) form in summer in buildings, crevices, and hollow trees; apparently does not use caves as day roosts, but may use such sites at night; single offspring born June-July.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4G5	State Rank: S1S2

long-tailed weasel *Mustela frenata*

Includes brushlands, fence rows, upland woods and bottomland hardwoods, forest edges & rocky desert scrub. Usually live close to water.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

mountain lion *Puma concolor*

Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains & riparian zones.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2S3

muskrat *Ondatra zibethicus*

Found in fresh or brackish marshes, lakes, ponds, swamps, and other bodies of slow-moving water. Most abundant in areas with cattail. Dens in bank burrow or conical house of vegetation in shallow vegetated water. It is primarily found in the Rio Grande near El Paso and in SE Texas in the Houston area.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

pronghorn *Antilocapra americana*

Prefers hilly and plateau areas of open grassland, desert-grassland, and desert-scrub, where it frequents south-facing slopes and other sheltered areas.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

rock mouse *Peromyscus nasutus*

Rocky areas and talus slopes above 6000 feet. General vegetation associations include madrone, oak, maple, juniper, pinyon and ponderosa pine.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4

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EL PASO COUNTY

MAMMALS

Townsend's big-eared bat *Corynorhinus townsendii*

In Texas, habitat ranges from desert scrub to pinyon-juniper woodland, consistently in areas with canyons or cliffs (Schmidly 1991). Roosts in caves, crevases, trees, and buildings in the Panhandle and Trans-Pecos.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3?

western hog-nosed skunk *Conepatus leuconotus*

Habitats include woodlands, grasslands & deserts, to 7200 feet, most common in rugged, rocky canyon country; little is known about the habitat of the ssp. telmalestes

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S4

western small-footed myotis bat *Myotis ciliolabrum*

Mountainous regions of the Trans-Pecos, usually in wooded areas, also found in grassland and desert scrub habitats; roosts beneath slabs of rock, behind loose tree bark, and in buildings; maternity colonies often small and located in abandoned houses, barns, and other similar structures; apparently occurs in Texas only during spring and summer months; insectivorous

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

western spotted skunk *Spilogale gracilis*

Brushy canyons, rocky outcrops (rimrock) on hillsides and walls of canyons. In semi-arid brushlands in U.S., in wet tropical forests in Mexico. When inactive or bearing young, occupies den in rocks, burrow, hollow log, brush pile, or under building.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

western yellow bat *Lasiurus xanthinus*

Forages over water both perennial and intermittent sources, found at low elevations (< 6,000 feet), roosts in vegetation (yucca, hackberry, sycamore, cypress, and especially palm); also hibernates in palm; locally common in residential areas landscaped with palms in Tuscon and Phoenix, Arizona; young born in June; insectivore

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4G5	State Rank: S1

MOLLUSKS

Franklin Mountain talus snail *Sonorella metcalfi*

Terrestrial; bare rock, talus, scree; inhabits igneous talus most commonly of rhyolitic origin

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2	State Rank: S1

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EL PASO COUNTY

MOLLUSKS

Franklin Mountain wood snail *Ashmunella pasonis*

Terrestrial; bare rock, talus, scree; talus slopes, usually of limestone, but also of rhyolite, sandstone, and siltstone, in arid mountain ranges

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G2G3	State Rank: S1?

Huecos Mountains talus snail *Sonorella huecoensis*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G1G2	State Rank: S1?

REPTILES

Big Bend slider *Trachemys gaigeae*

Aquatic: Rivers with permanent water; ponds, impoundments, and stock tanks along the Rio Grande; basks on shore, emergent rocks, logs, vegetation mats, or at water surface.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2

Chihuahuan Desert lyre snake *Trimorphodon vilkinsonii*

Terrestrial: Rocky areas with plenty of crevices and fissures. Preferred habitats include rock piles, outcrops and talus slopes. Also occurs in desert flats, succulent and scrub, and mountain canyons to about 6000 feet.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S4

gray-checkered whiptail *Aspidoscelis dixoni*

Terrestrial: The habitat comprises rocky plains, dry washes, canyon bottoms, and desert scrub (ocotillo, creosotebush, opuntia) (Bartlett and Bartlett 1999); generally on rocky soils of desert shrublands and degraded grasslands on alluvial benches, canyon bottoms, and lower southwestern mountain slopes (Scudday 1973, Degenhardt et al. 1996).

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2

longnose leopard lizard *Gambelia wislizenii*

This species occurs in open gravelly or sandy habitats that are sparsely vegetated with scattered brush. When threatened, this lizard will retreat to brush piles and rodent burrows to escape.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4

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EL PASO COUNTY

REPTILES

mexican hog-nosed snake *Heterodon kennerlyi*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: N
Endemic:	Global Rank: G4	State Rank: SNR

mountain short-horned lizard *Phrynosoma hernandesi*

Terrestrial: Generally restricted to high elevation grasslands and forested areas with open ground; soil may vary from rocky to sandy; burrows into soil or occupies rodent burrow when inactive.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2

roundtail horned lizard *Phrynosoma modestum*

This species seems to prefer rocky or gravelly substrates in open areas that are sparsely vegetated.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

Texas horned lizard *Phrynosoma cornutum*

Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4G5	State Rank: S3

western box turtle *Terrapene ornata*

Terrestrial: Ornate or western box trutles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

western hognose snake *Heterodon nasicus*

Terrestrial: Shortgrass or mixed grass prairie, with gravel or sandy soils. Often found associated with draws, floodplains, and more mesic habitats within the arid landscape. Frequently occurs in shrub encroached grasslands.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4

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EL PASO COUNTY

REPTILES

western massasauga *Sistrurus tergeminus*

Terrestrial: Shortgrass or mixed grass prairie, with gravel or sandy soils. Often found associated with draws, floodplains, and more mesic habitats within the arid landscape. Frequently occurs in shrub encroached grasslands.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S3

western rattlesnake *Crotalus viridis*

Terrestrial: Dry desert and prairie grasslands, shrub desert rocky hillsides; edges of arid and semi-arid river breaks.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

PLANTS

Alamo beardtongue *Penstemon alamosensis*

Rocky soils derived from limestone (in Texas), usually in sheltered sites, often on north facing slopes and in mesic canyon bottoms, occasionally in rock crevices or among unbrowsed shrubs; flowering late April-June

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S1

Bigelow's desert grass *Blepharidachne bigelovii*

Restricted to xeric limestone or various gypsum-influenced habitats; Perennial; Flowering March-Dec; Fruiting March-Dec

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

Comal snakewood *Colubrina stricta*

In El Paso County, found in a patch of thorny shrubs in colluvial deposits and sandy soils at the base of an igneous rock outcrop; the historic Comal County record does not describe the habitat; in Mexico ,found in shrublands on calcareous, gravelly, clay soils with woody associates; flowering late spring or early summer

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2	State Rank: S1

dense cory cactus *Escobaria dasyacantha var. dasyacantha*

Lechuguilla-sotol or creosote bush shrublands, grasslands, and oak-juniper woodlands on gravelly, rocky, and/or loamy soils over igneous or limestone substrates at moderate elevations 750-1800 m (2450-5900 ft) in the Chihuahuan Desert; flowering March-May (-July), fruiting (May-) June-August

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3T3	State Rank: S3

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EL PASO COUNTY

PLANTS

desert night-blooming cereus *Peniocereus greggii var. greggii*

Chihuahuan Desert shrublands or shrub invaded grasslands in alluvial or gravelly soils at lower elevations, 1200-1500 m (3900-4900 ft), on slopes, benches, arroyos, flats, and washes; flowering synchronized over a few nights in early May to late June when almost all mature plants bloom, flowers last only one day and open just after dark, may flower as early as April

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4T3	State Rank: S2

fleshy tidestromia *Tidestromia carnosa*

Occurs in saline or gypseous soils in open situations; Annual; Flowering March-Nov; Fruiting April-Nov

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2

great sage *Salvia summa*

Limestone cliffs and slopes in the Guadalupe and Franklin Mountains; Perennial; Flowering April-June; Fruiting May-Oct

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2

Hueco rock-daisy *Perityle huecoensis*

North-facing or otherwise mostly shaded limestone cliff faces within relatively mesic canyon system; flowering spring-fall

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G1	State Rank: S1

lyreleaf twistflower *Streptanthus carinatus ssp. carinatus*

Occurs on igneous and limestone slopes and alluvial fans (Carr 2015).

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4T3T4	State Rank: S3

Mt. Davis brickellbush *Brickellia parvula*

Occurs on rocky slopes and ridges in the mountains of the southwestern U.S. at elevations between 1200 and 2100 m; Perennial; Flowering Aug-Sept; Fruiting Sept-Oct

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S1

Payson's hiddenflower *Cryptantha paysonii*

Rocky limestone slopes in mountains; Perennial; Flowering May; Fruiting May-June

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S1

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EL PASO COUNTY

PLANTS

Plank's catchfly *Silene plankii*

Franklin Mountains of El Paso County, occurring in crevices on shaded igneous cliff faces above ca. 5000 ft.; Perennial; Flowering summer-early autumn

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2	State Rank: S1

resin-leaf brickellbush *Brickellia baccharidea*

Mixed desert shrublands on bajada slopes and in arroyos on sandy or gravelly soils derived from limestone, but also known from igneous substrates; flowering September-April

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S1

sand prickly-pear *Opuntia arenaria*

Deep, loose or semi-stabilized sands in sparsely vegetated dune or sandhill areas, or sandy floodplains in arroyos; flowering May-June

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2	State Rank: S2

Scheer's cory cactus *Coryphantha scheeri var. uncinata*

Rocky hillsides (Carr 2015).

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4TUQ	State Rank: S2

smooth bur-cucumber *Sicyos glaber*

Mesic canyons in the Chisos and Guadalupe Mountains (Carr 2015).

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S1

Sneed's pincushion cactus *Escobaria sneedii var. sneedii*

Xeric limestone outcrops on rocky, usually steep slopes in desert mountains, in the Chihuahuan Desert succulent shrublands or grasslands; flowering April-September (peak usually in April, sometimes opportunistically after summer rains; fruiting August - November

Federal Status: LE	State Status: E	SGCN: Y
Endemic: N	Global Rank: G2G3QT2Q	State Rank: S2

Stebbin's desert dandelion *Malacothrix stebbinsii*

Shrubland among boulders of dark ingeous rock; sandy yucca, ephedra, grass flats; steep-walled metamorphic rock canyon (TEX-LL specimens Carr 19661, Worthington 24704 & 24701). April.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3?	State Rank: S1

Texas false saltgrass *Allolepis texana*

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EL PASO COUNTY

PLANTS

Sandy to silty soils of valley bottoms and river floodplains, not generally on alkaline or saline sites; Perennial; Flowering (May-) July-October depending on rainfall

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2	State Rank: S1

Vasey's bitterweed *Hymenoxys vaseyi*

Occurs on xeric limestone cliffs and slopes at mid- to high elevations in desert shrublands.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2	State Rank: S1

Waterfall's milkvetch *Astragalus waterfallii*

Rocky limestone slopes; Perennial; Flowering Feb-May; Fruiting April- May

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3?	State Rank: S3

Wheeler's spurge *Euphorbia geyeri var. wheeleriana*

Sparingly vegetated, loose eolian quartz sand on reddish sand dunes or coppice mounds; flowering and fruiting at least August-September, probably earlier and later, as well

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5T2	State Rank: S1

Wright's fishhook cactus *Mammillaria wrightii var. wrightii*

Franklin Mountains (Carr 2015)

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4T3	State Rank: S1

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EJSCREEN Census 2010 Summary Report

Location: User-specified point center at 31.957435, -106.426279
Ring (buffer): 1-miles radius
Description: acsElPaso

Summary	Census 2010
Population	444
Population Density (per sq. mile)	184
People of Color Population	307
% People of Color Population	69%
Households	132
Housing Units	155
Land Area (sq. miles)	2.41
% Land Area	100%
Water Area (sq. miles)	0.00
% Water Area	0%

Population by Race	Number	Percent
Total	444	-------
Population Reporting One Race	423	95%
White	291	66%
Black	85	19%
American Indian	5	1%
Asian	14	3%
Pacific Islander	2	0%
Some Other Race	25	6%
Population Reporting Two or More Races	21	5%
Total Hispanic Population	197	44%
Total Non-Hispanic Population	247	56%
White Alone	137	31%
Black Alone	79	18%
American Indian Alone	4	1%
Non-Hispanic Asian Alone	14	3%
Pacific Islander Alone	1	0%
Other Race Alone	0	0%
Two or More Races Alone	12	3%

Population by Sex	Number	Percent
Male	227	51%
Female	217	49%

Population by Age	Number	Percent
Age 0-4	46	10%
Age 0-17	149	34%
Age 18+	295	66%
Age 65+	7	2%

Households by Tenure	Number	Percent
Total	132	
Owner Occupied	119	90%
Renter Occupied	13	10%

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.
Source: U.S. Census Bureau, Census 2010 Summary File 1.

EJScreen Report (Version 2.0)

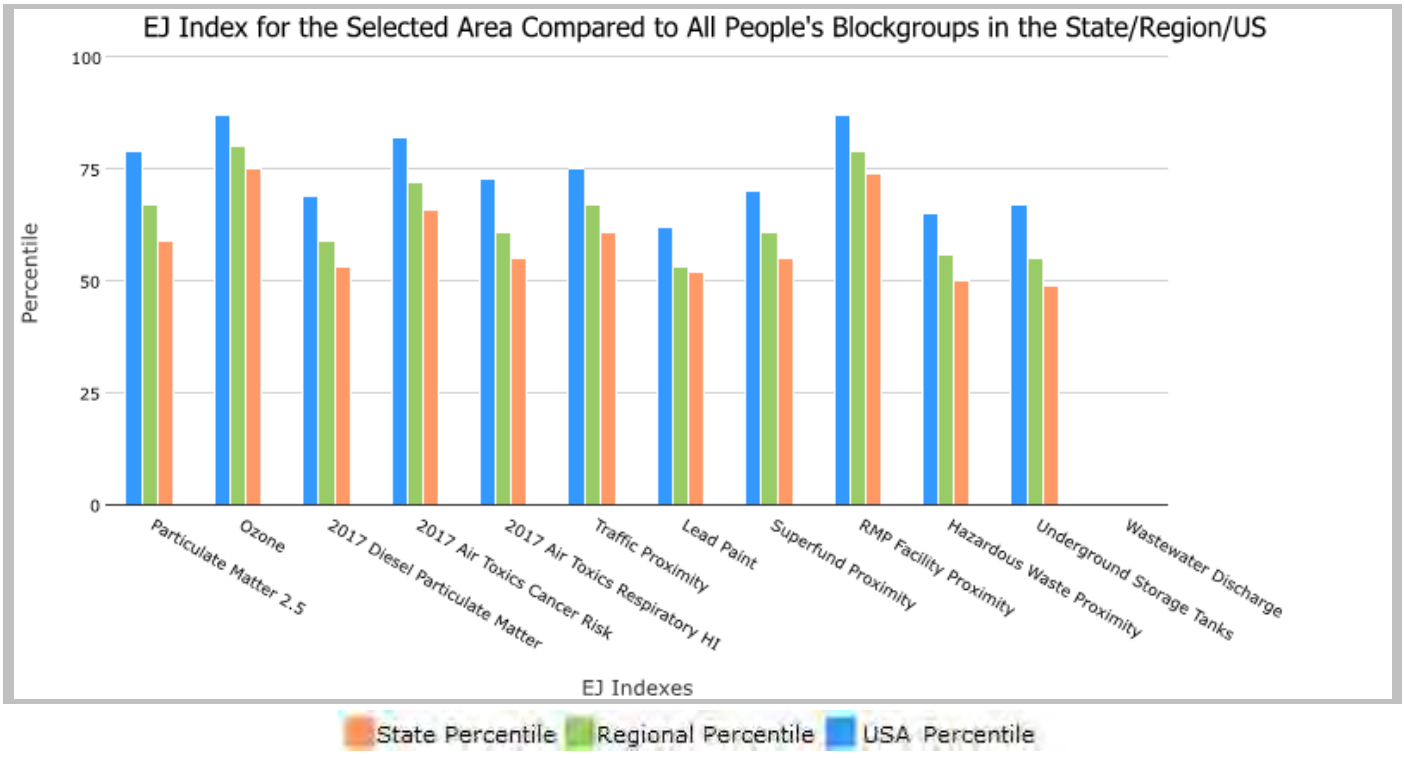
1 mile Ring Centered at 31.957435,-106.426279, TEXAS, EPA Region 6

Approximate Population: 1,216

Input Area (sq. miles): 3.14

acsElPaso

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
Environmental Justice Indexes			
EJ Index for Particulate Matter 2.5	59	67	79
EJ Index for Ozone	75	80	87
EJ Index for 2017 Diesel Particulate Matter*	53	59	69
EJ Index for 2017 Air Toxics Cancer Risk*	66	72	82
EJ Index for 2017 Air Toxics Respiratory HI*	55	61	73
EJ Index for Traffic Proximity	61	67	75
EJ Index for Lead Paint	52	53	62
EJ Index for Superfund Proximity	55	61	70
EJ Index for RMP Facility Proximity	74	79	87
EJ Index for Hazardous Waste Proximity	50	56	65
EJ Index for Underground Storage Tanks	49	55	67
EJ Index for Wastewater Discharge	N/A	N/A	N/A



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

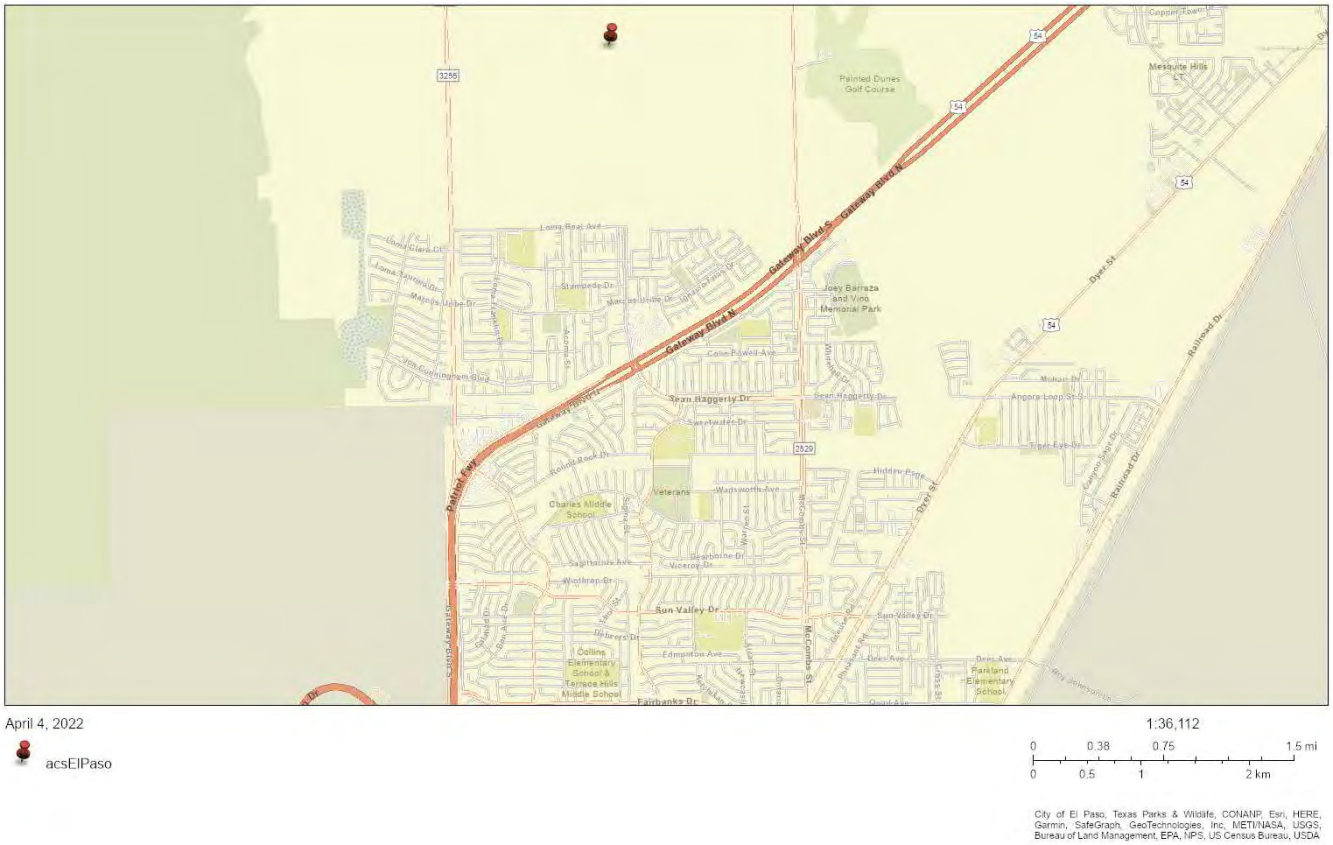
EJScreen Report (Version 2.0)

1 mile Ring Centered at 31.957435,-106.426279, TEXAS, EPA Region 6

Approximate Population: 1,216

Input Area (sq. miles): 3.14

acsElPaso



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJScreen Report (Version 2.0)

1 mile Ring Centered at 31.957435,-106.426279, TEXAS, EPA Region 6

Approximate Population: 1,216

Input Area (sq. miles): 3.14

acsElPaso

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Pollution and Sources							
Particulate Matter 2.5 (µg/m^3)	7.18	9.57	2	9.32	6	8.74	15
Ozone (ppb)	55.4	40	99	41.1	95	42.6	92
2017 Diesel Particulate Matter* (µg/m^3)	0.0831	0.214	9	0.219	<50th	0.295	<50th
2017 Air Toxics Cancer Risk* (lifetime risk per million)	30	31	83	32	70-80th	29	80-90th
2017 Air Toxics Respiratory HI*	0.2	0.36	6	0.37	<50th	0.36	<50th
Traffic Proximity (daily traffic count/distance to road)	170	510	44	470	48	710	44
Lead Paint (% Pre-1960 Housing)	0	0.15	26	0.16	21	0.28	11
Superfund Proximity (site count/km distance)	0.019	0.084	23	0.08	25	0.13	16
RMP Facility Proximity (facility count/km distance)	1	0.92	72	0.83	74	0.75	77
Hazardous Waste Proximity (facility count/km distance)	0.082	0.72	16	0.8	18	2.2	13
Underground Storage Tanks (count/km^2)	0.17	2.2	20	2	24	3.9	26
Wastewater Discharge (toxicity-weighted concentration/m distance)	N/A	0.33	N/A	0.5	N/A	12	N/A
Socioeconomic Indicators							
Demographic Index	46%	46%	52	44%	56	36%	70
People of Color	70%	58%	59	52%	67	40%	77
Low Income	23%	34%	35	36%	31	31%	40
Unemployment Rate	4%	5%	53	5%	51	5%	52
Linguistically Isolated	5%	8%	55	6%	65	5%	72
Less Than High School Education	7%	16%	35	15%	34	12%	43
Under Age 5	12%	7%	90	7%	91	6%	93
Over Age 64	3%	12%	6	13%	5	16%	3

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice

EJScreen is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJScreen documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJScreen outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

EJSCREEN ACS Summary Report

Location: User-specified point center at 31.957435, -106.426279
Ring (buffer): 1-miles radius
Description: acsElPaso

Summary of ACS Estimates	2015 - 2019
Population	1,216
Population Density (per sq. mile)	503
People of Color Population	846
% People of Color Population	70%
Households	384
Housing Units	412
Housing Units Built Before 1950	0
Per Capita Income	32,898
Land Area (sq. miles) (Source: SF1)	2.41
% Land Area	100%
Water Area (sq. miles) (Source: SF1)	0.00
% Water Area	0%

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	1,216	100%	690
Population Reporting One Race	1,133	93%	1,665
White	748	62%	612
Black	191	16%	337
American Indian	36	3%	187
Asian	48	4%	110
Pacific Islander	27	2%	103
Some Other Race	83	7%	316
Population Reporting Two or More Races	83	7%	201
Total Hispanic Population	549	45%	557
Total Non-Hispanic Population	666		
White Alone	370	30%	410
Black Alone	174	14%	317
American Indian Alone	0	0%	14
Non-Hispanic Asian Alone	48	4%	110
Pacific Islander Alone	27	2%	103
Other Race Alone	0	0%	14
Two or More Races Alone	48	4%	128
Population by Sex			
Male	580	48%	426
Female	636	52%	381
Population by Age			
Age 0-4	150	12%	232
Age 0-17	374	31%	327
Age 18+	841	69%	454
Age 65+	36	3%	93

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2015 - 2019 .

EJSCREEN ACS Summary Report

Location: User-specified point center at 31.957435, -106.426279
Ring (buffer): 1-miles radius
Description: acsElPaso

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population 25+ by Educational Attainment			
Total	674	100%	384
Less than 9th Grade	29	4%	100
9th - 12th Grade, No Diploma	21	3%	95
High School Graduate	121	18%	194
Some College, No Degree	149	22%	212
Associate Degree	51	8%	145
Bachelor's Degree or more	303	45%	262
Population Age 5+ Years by Ability to Speak English			
Total	1,065	100%	646
Speak only English	651	61%	509
Non-English at Home[1+2+3+4]	415	39%	432
[1]Speak English "very well"	303	28%	362
[2]Speak English "well"	87	8%	235
[3]Speak English "not well"	9	1%	48
[4]Speak English "not at all"	16	1%	67
[3+4]Speak English "less than well"	25	2%	81
[2+3+4]Speak English "less than very well"	111	10%	235
Linguistically Isolated Households*			
Total	19	100%	86
Speak Spanish	14	72%	85
Speak Other Indo-European Languages	0	0%	14
Speak Asian-Pacific Island Languages	5	28%	40
Speak Other Languages	0	0%	14
Households by Household Income			
Household Income Base	384	100%	201
< $15,000	14	4%	72
$15,000 - $25,000	10	2%	46
$25,000 - $50,000	92	24%	151
$50,000 - $75,000	60	16%	129
$75,000 +	209	54%	248
Occupied Housing Units by Tenure			
Total	384	100%	201
Owner Occupied	190	50%	189
Renter Occupied	193	50%	166
Employed Population Age 16+ Years			
Total	888	100%	514
In Labor Force	704	79%	435
Civilian Unemployed in Labor Force	25	3%	94
Not In Labor Force	184	21%	211

Data Note: Datail may not sum to totals due to rounding. Hispanic population can be of anyrace.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS)
*Households in which no one 14 and over speaks English "very well" or speaks English only.

EJSCREEN ACS Summary Report

Location: User-specified point center at 31.957435, -106.426279
Ring (buffer): 1-miles radius
Description: acsElPaso

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population by Language Spoken at Home*			
Total (persons age 5 and above)	2,039	100%	653
English	1,333	65%	661
Spanish	648	32%	466
French	0	0%	19
French Creole	N/A	N/A	N/A
Italian	N/A	N/A	N/A
Portuguese	N/A	N/A	N/A
German	22	1%	99
Yiddish	N/A	N/A	N/A
Other West Germanic	N/A	N/A	N/A
Scandinavian	N/A	N/A	N/A
Greek	N/A	N/A	N/A
Russian	N/A	N/A	N/A
Polish	N/A	N/A	N/A
Serbo-Croatian	N/A	N/A	N/A
Other Slavic	N/A	N/A	N/A
Armenian	N/A	N/A	N/A
Persian	N/A	N/A	N/A
Gujarathi	N/A	N/A	N/A
Hindi	N/A	N/A	N/A
Urdu	N/A	N/A	N/A
Other Indic	N/A	N/A	N/A
Other Indo-European	0	0%	19
Chinese	0	0%	19
Japanese	N/A	N/A	N/A
Korean	3	0%	19
Mon-Khmer, Cambodian	N/A	N/A	N/A
Hmong	N/A	N/A	N/A
Thai	N/A	N/A	N/A
Laotian	N/A	N/A	N/A
Vietnamese	16	1%	78
Other Asian	0	0%	19
Tagalog	17	1%	63
Other Pacific Island	N/A	N/A	N/A
Navajo	N/A	N/A	N/A
Other Native American	N/A	N/A	N/A
Hungarian	N/A	N/A	N/A
Arabic	0	0%	19
Hebrew	N/A	N/A	N/A
African	N/A	N/A	N/A
Other and non-specified	0	0%	19
Total Non-English	706	35%	929

Data Note: Detail may not sum to totals due to rounding. Hispanic popultion can be of any race.
N/A meansnot available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2015 - 2019.
*Population by Language Spoken at Home is available at the census tract summary level and up.

APPENDIX D:
SITE PHOTOGRAPHS

Appendix D - Site Reconnaissance Photo Log
El Paso Water Aquifer Storage and Recovery ■ El Paso, Texas
Photos taken: March 4, 2022



Photo #1 View from the eastern boundary, looking west towards the center of the project area.



Photo #2 View from the eastern portion of the site, looking north.



Photo #3 View from the eastern portion of the site, looking south.



Photo #4 View of the vegetative communities along the eastern portion of the site, looking southwest.



Photo #5 View of an uninhabited nest along the eastern quarter of the site, south of the property fence line.



Photo #6 View of a second uninhabited nest along the eastern quarter of the site, south of the property fence line.

Appendix D - Site Reconnaissance Photo Log
El Paso Water Aquifer Storage and Recovery ■ El Paso, Texas
Photos taken: March 4, 2022



Photo #7 View of the dirt roadway, electrical pole ROW, and abandoned AST located near the center of the site.



Photo #8 View of the vegetative communities east and northeast of the abandoned water tank.



Photo #9 View of the graded areas just northwest of the abandoned water tank.



Photo #10 View of the draining arroyo just southwest of the abandoned water tank.



Photo #11 View of the Whitethorn Acacia and surrounding vegetative communities.



Photo #12 View of a Honey Mesquite featuring four uninhabited nests along the western half of the site.

Appendix D - Site Reconnaissance Photo Log
El Paso Water Aquifer Storage and Recovery ■ El Paso, Texas
Photos taken: March 4, 2022



Photo #13 View of the arroyo streambed located along the western quarter of the site, featuring upland vegetation.



Photo #14 View of the slight change in the vegetative community along the western quarter of the site.



Photo #15 View from the western boundary, looking east.



Photo #16 View from the western boundary, looking north.



Photo #17 View from the western boundary looking northwest towards the culvert outlet.



Photo #18 View from the western boundary, looking south.

APPENDIX E:
CORRESPONDENCE LOG AND AGENCIES CORRESPONDENCE

From: noreply@thc.state.tx.us
Sent: Thursday, July 7, 2022 9:32 AM
To: Hall, John D; reviews@thc.state.tx.us
Subject: Section 106 Submission

TEXAS HISTORICAL COMMISSION
real places telling real stories

Re: Project Review under Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas
THC Tracking #202211123
Date: 07/07/2022
El Paso Aquifer Storage and Recovery (ASR) Project (Permit 30506)
N/A
El Paso,TX 79934

Description: widening of an arroyo to increase groundwater recharge

Dear John D. Hall:
Thank you for your submittal regarding the above-referenced project. This response represents the comments of the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission (THC), pursuant to review under Section 106 of the National Historic Preservation Act and the Antiquities Code of Texas.

The review staff, led by Caitlin Brashear and Drew Sitters, has completed its review and has made the following determinations based on the information submitted for review:

Above-Ground Resources

- No historic properties are present or affected by the project as proposed. However, if historic properties are discovered or unanticipated effects on historic properties are found, work should cease in the immediate area; work can continue where no historic properties are present. Please contact the THC's History Programs Division at 512-463-5853 to consult on further actions that may be necessary to protect historic properties.

Archeology Comments

- Property/properties are not eligible for designation as State Antiquities Landmarks.
- This draft report is acceptable. Please submit of one bound and one unbound paper final report, a completed Abstracts in Texas Contract Archeology online form, a curation form, and complete and redacted tagged PDF copies of the final report for the above referenced permit. Archeological project area shapefiles are due with the submittal of the draft report; if this has not occurred, please submit the via the tab on eTrac. For questions on how to submit these please visit our video training series at: https://www.youtube.com/playlist?list=PLONbbv2pt4cog5t6mCqZVaEAx3d0MkgQC
- No historic properties affected. However, if cultural materials are encountered during construction or disturbance activities, work should cease in the immediate area; work can continue where no cultural materials are present. Please contact the THC's Archeology Division at 512-463-6096 to consult on further actions that may be necessary to protect the cultural remains.
- THC/SHPO concurs with information provided.
- Property/properties are not eligible for listing in the National Register of Historic Places.

We have the following comments: Please address the following comment in the final report. In your description of the San Andres Salt Trail (41EP2901), you reference Barclay (2021) who claimed that the site was originally assigned the trinomial 41EP3122. This is a typo and should read 41EP322 (see Burt et al. 2006:9; TAC Permit No. 3909). Please revise.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this review process, and for your efforts to preserve the irreplaceable heritage of Texas. If the project changes, or if new historic properties are found, please contact the review staff. If you have any questions concerning our review or if we can be of further assistance, please email the following reviewers: caitlin.brashear@thc.texas.gov, drew.sitters@thc.texas.gov.

This response has been sent through the electronic THC review and compliance system (eTRAC). Submitting your project via eTRAC eliminates mailing delays and allows you to check the status of the review, receive an electronic response, and generate reports on your submissions. For more information, visit http://thc.texas.gov/etrac-system.

Sincerely,



for Mark Wolfe, State Historic Preservation Officer
Executive Director, Texas Historical Commission

Please do not respond to this email.

APPENDIX F:
CULTURAL RESOURCES ASSESSMENT

April 27, 2022

Moreno Cardenas, Inc.
2505 E Missouri Ave Ste 100
El Paso, TX 79903-3930

Attention: Troy Svede, Project Manager
Telephone: 915-867-3098

RE: **Cultural Resources Survey Report - DRAFT**
El Paso Aquifer Storage and Recovery (ASR) Project
El Paso, El Paso County, Texas
Terracon Project No. 9622P002

Dear Mr. Svede:

Terracon is pleased to submit this draft report for the intensive pedestrian cultural resources survey of an approximate 10,560 linear-foot (3,219 meter) proposed Aquifer Storage and Recovery (ASR) project sponsored by El Paso Water in El Paso, El Paso County, Texas.

Overall, two new historic-age archaeological sites were documented, and 42 shovel tests were excavated within the APE. Three shovel tests were placed within Site 41EP7327, one shovel test was excavated within Site 41EP7328, two shovel tests were placed at isolated prehistoric finds, and one shovel test was placed near the previously recorded Site 41EP352. The remaining 35 shovel tests were placed within the eastern 1,400 meters of the APE where ground surface visibility was below 50-percent. Shovel tests were devoid of archaeological materials, were excavated to an average depth of 45 centimeters below surface where they were terminated within subsoil or caliche gravels.

Observed deposits during visual inspection, shovel testing, and the geomorphic setting suggest a low potential for intact and/or buried cultural resources. Neither Site 41EP7327 or 41EP7328 demonstrated integrity or materials that would suggest potential for listing on the National Register of Historic Places (NRHP), or as a State Antiquities Landmark (SAL). Therefore, Terracon recommends that the project should be allowed to proceed as archaeological sites considered eligible for listing in the NRHP or designation as a SAL were not identified within the project area.

Sincerely,
Terracon Consultants, Inc.

Pagano, Victoria C
Digitally signed by Pagano, Victoria C
DN: cn=Pagano, Victoria C, ou=General Users, email=Victoria.Pagano@terracon.com
Date: 2022.04.27 10:59:42 -05'00'

Victoria Pagano, MA, RPA
Senior Archaeologist

John D. Hall, MA, RPA
Principal Investigator/
Authorized Project Reviewer

DRAFT Cultural Resources Survey Report

El Paso Aquifer Storage and Recovery (ASR) Project
El Paso, El Paso County, Texas

April 2022

Terracon Project No. 9622P002

John D. Hall, MA, RPA, Principal Investigator

Texas Antiquities Permit No. 30506



Prepared for:
El Paso Water
El Paso, Texas

Prepared by:
Victoria C. Pagano, MA, RPA,
Caitlin A. Gulihur, MA, RPA, and John D. Hall, MA, RPA
Terracon Consultants, Inc.
San Antonio, Texas

6911 Blanco Road (210)641-2112
San Antonio, TX 78216 terracon.com

Terracon

Environmental ■ Facilities ■ Geotechnical ■ Materials

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ABSTRACT

Terracon archaeologists conducted intensive pedestrian survey of an approximate 10,560 linear-foot (3,219 meter) proposed aquifer storage and recovery (ASR) project sponsored by El Paso Water in El Paso, El Paso County, Texas. Archeological survey took place within the approximately 300-foot-wide right-of-way (ROW) corridor of the proposed project area. The 10,560-foot-long by 300-foot-wide alignment was considered the area of potential effect (APE); the APE is approximately 72 acres.

The proposed ASR basin begins at McCombs Street and extends west for approximately 10,560 linear-feet (3,219 meters) to FM3225/Martin Luther King Jr. Boulevard. Fieldwork was conducted by Terracon archaeologists John D. Hall (Principal Investigator, Antiquities Permit # 30506), Caitlin A. Gulihur, and Victoria C. Pagano on March 15–17, 2022. Project records will be curated at the Centennial Museum at the University of Texas at El Paso. Supplemental survey photos can be found in Appendix A. Detailed shovel test and provenience description (PD) maps and logs can be found in Appendix B. Applicable site data and relevant historical topographic maps can be found in Appendix C.

Overall, two new historic-age archaeological sites were documented, and 42 shovel tests were excavated within the APE. Three shovel tests were placed within Site 41EP7327, one shovel test was excavated within Site 41EP7328, two shovel tests were placed at isolated prehistoric finds, and one shovel test was placed near the previously recorded Site 41EP352. The remaining 35 shovel tests were placed within the eastern 1,400 meters of the APE where ground surface visibility was below 50-percent. Shovel tests were devoid of archaeological materials, were excavated to an average depth of 45 centimeters below surface where they were terminated within subsoil or caliche gravels.

Observed deposits during visual inspection, shovel testing, and the geomorphic setting suggest a low potential for intact and/or buried cultural resources. Neither Site 41EP7327 or 41EP7328 demonstrated integrity or materials that would suggest potential for listing on the National Register of Historic Places (NRHP), or as a State Antiquities Landmark (SAL). Therefore, Terracon recommends that the project should be allowed to proceed as archaeological sites considered eligible for listing in the NRHP or designation as a SAL were not identified within the project area.

Cultural Resources Survey Report:
El Paso Aquifer Storage and Recovery Project
El Paso, El Paso County, Texas

Terracon Project No. 9622P002
Antiquities Permit 30506

1.0 INTRODUCTION

Terracon archaeologists conducted intensive pedestrian survey of an approximate 10,560 linear-foot (3,219 meter) proposed aquifer storage and recovery (ASR) project sponsored by El Paso Water in El Paso, El Paso County, Texas (Figure 1).

The project is sponsored by El Paso Water and will take place on land owned by the City of El Paso; therefore, the action is under the purview of Antiquities Code of Texas (ACT), regulated by Texas Historical Commission (THC). Additionally, it is understood that the project will involve approval from the United States Department of the Interior, Bureau of Reclamation (BOR), and therefore is subject to compliance with Section 106 National Historic Preservation Act (NHPA) of 1966, as amended. As such, fieldwork was conducted by Terracon archaeologists John D. Hall (Principal Investigator, Antiquities Permit # 30506), Caitlin A. Gulihur, and Victoria C. Pagano on March 15–17, 2022. Project records will be curated according to Council of Texas Archeologists (CTA) and THC standards at the Centennial Museum at the University of Texas at El Paso. Supplemental photographs, detailed shovel test data, and site forms can be found in appendices following this report.

The proposed ASR basin begins at McCombs Street and extends west for approximately 10,560 linear-feet (3,219-meters) to FM3225/Martin Luther King Jr. Boulevard with a 300-foot (90 meter) right of way (ROW; Figure 2). Depth of disturbance associated with this project is estimated to be between 20–30 feet below the existing ground surface. The 10,560-foot-long by 300-foot-wide alignment was considered the area of potential effect (APE) for the project; the APE is approximately 72 acres.

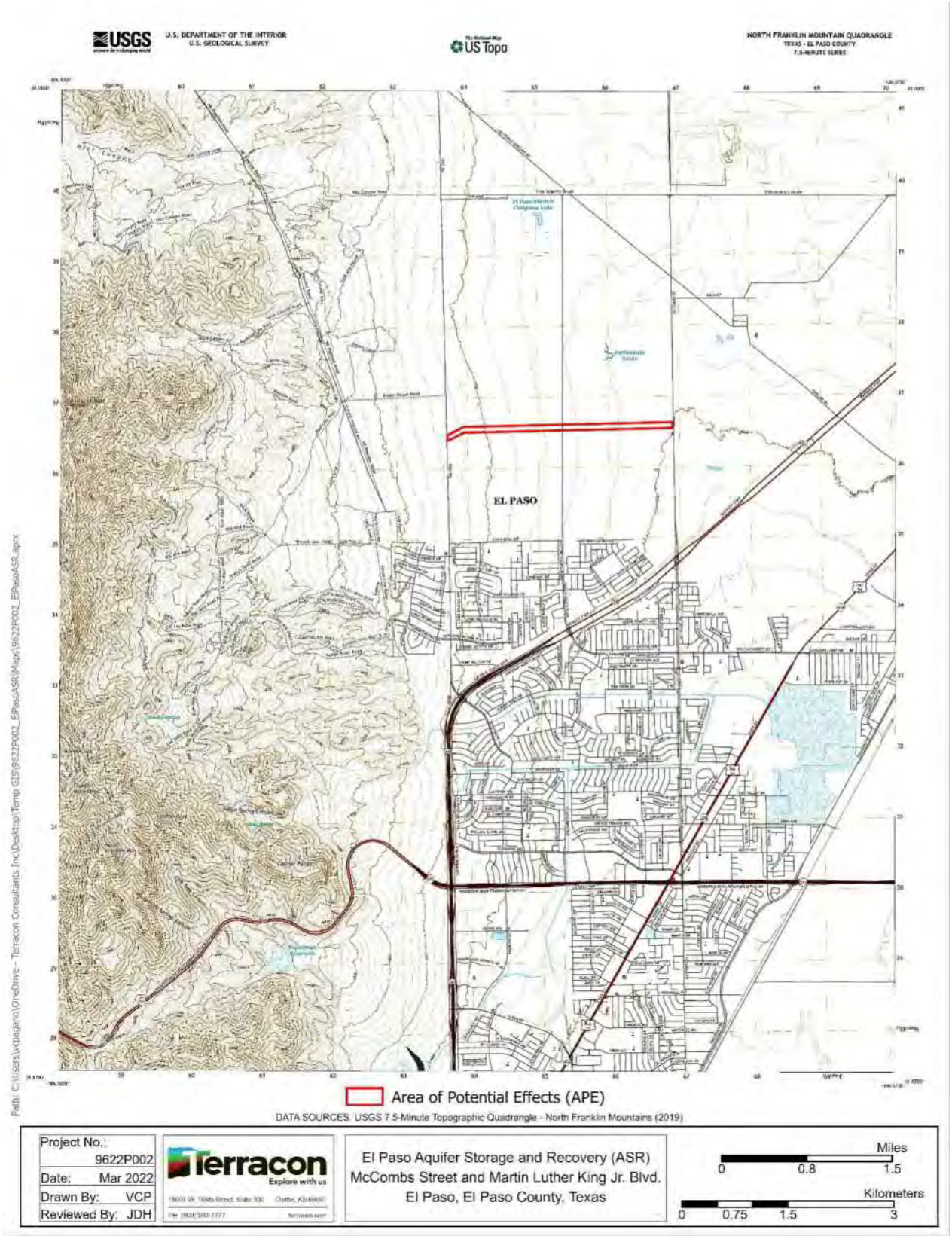


Figure 1. Topographic overview of the APE on the USGS 7.5-Minute North Franklin Mountains (2019) topographic quadrangle map.

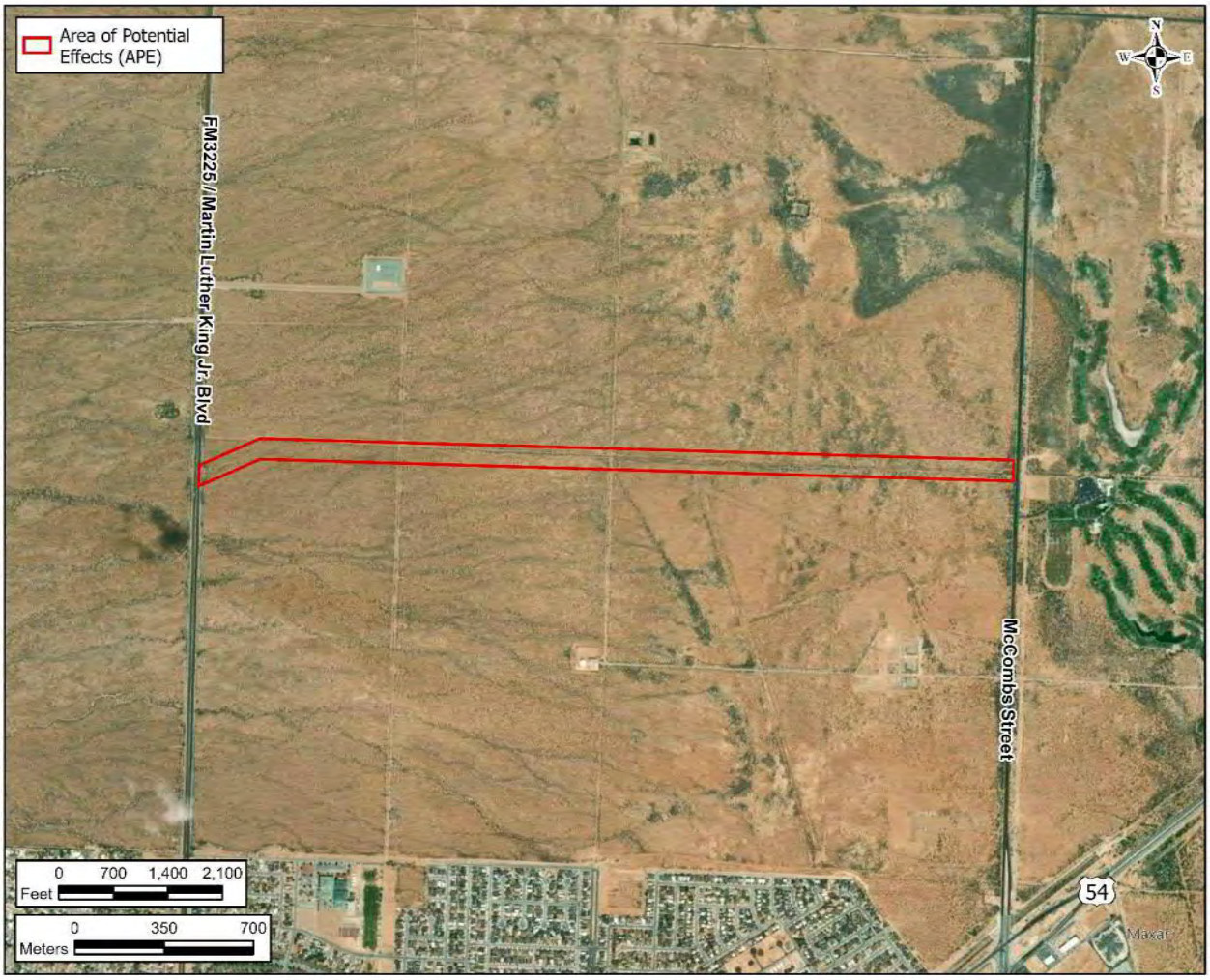


Figure 2. Aerial overview of the APE.

2.0 ENVIRONMENTAL SETTING

Environments are composed of such interconnected elements as underlying bedrock geology, soil, biology (i.e., plants and animals), and climate. Environmental conditions are coupled with initial patterning and subsequent preservation of materials left behind by humans, the culmination of which is referred to as site formation processes. Understanding and evaluating potential site formation processes aids in assessing the presence and preservation of cultural resources. It is therefore important to consider environmental conditions of the past and present when assessing cultural resources of all ages.

The project area can be found on the North Franklin Mountains United States Geological Survey (USGS) 7.5 Minute Quadrangle (2019) and is located within the Chihuahuan Deserts Level 3 ecoregion (Griffith et al. 2007). In more specific terms, the western 260 meters of the APE is located within the Low Mountains and Bajadas (24c) Level 4 ecoregion, which is characterized as disjunct areas that are scattered across West Texas with mixed geology that includes Permian, Cretaceous, and Tertiary-age deposits. Vegetation within these regions tend to consist of desert

shrubs (e.g., lechuguilla, ocotillo, prickly pear, sotol, and sparse patches of grama) in lower elevations with juniper and pinion pine at higher elevations (Griffith et al. 2007). The remaining 2,863 meters of the APE is located within the Chihuahuan Basins and Playas (24a) Level 4 ecoregion, which is characterized as wide alluvial fans, basins, and river valleys formed during Basin and Range tectonism. These playas and basin floors include vegetation typical of desert shrubs and grasses, such as creosote, saltbush, blackbrush, and grama grasses (Griffith et al. 2007).

2.1 Geology and Soils

Bedrock geology of the proposed APE is split between Young Quaternary deposits (Qb and Qf) and Windblown Sand deposits (Qws; Figure 3; USGS, TNRIS, & BEG 2022). Young Quaternary deposits (Qb and Qf) are described as Holocene and Pleistocene lacustrine and fluviatile deposits of silt, sand, clay and gypsum in semiarid, flat-floored desert valley or depressions. The Windblown Sand deposits (Qws) are characterized by eolian (i.e., windblown) sands of Holocene age.

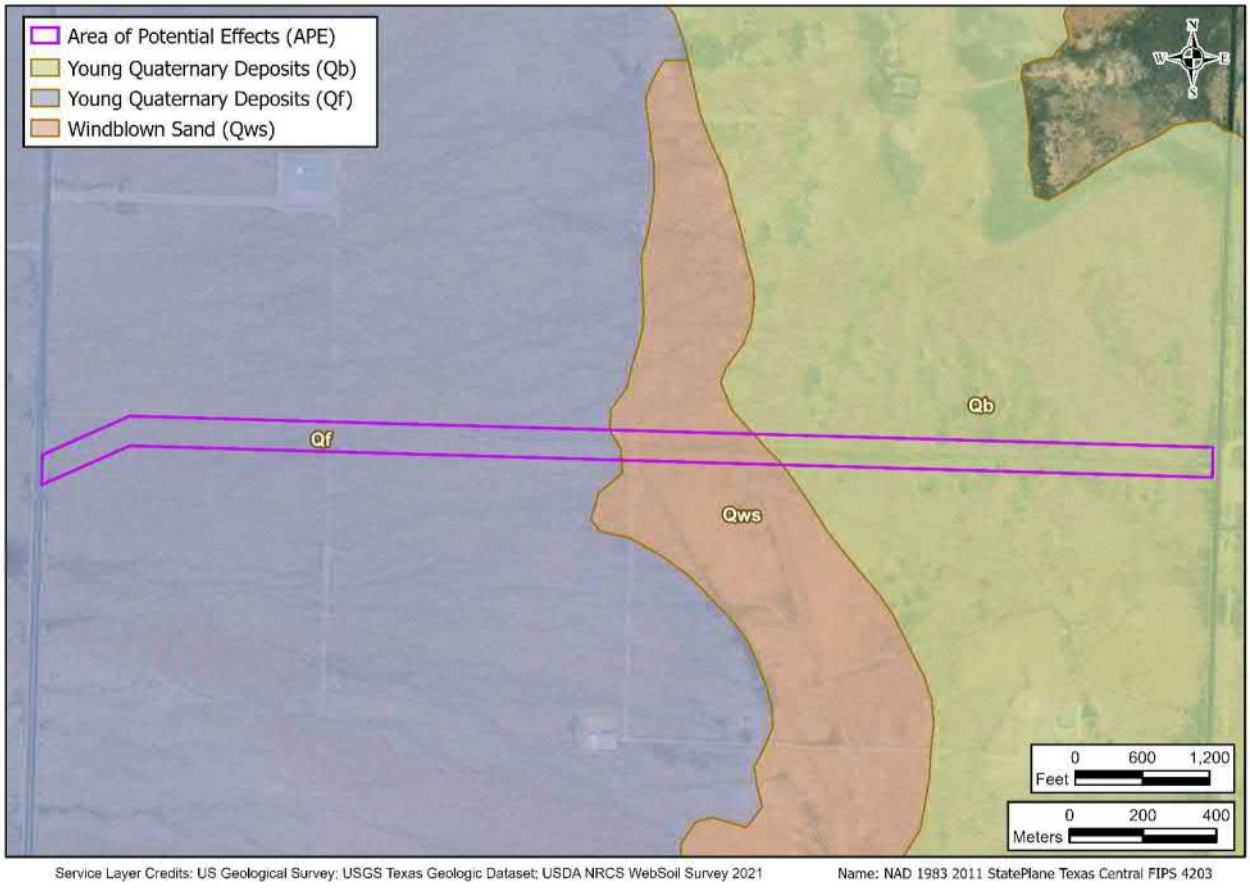


Figure 3. Mapped Qb, Qf, and Qws geology along the APE.

As mapped by the U.S. Department of Agriculture Natural Resource Conservation Service, Soil Survey Staff (NRCS and NCSS 2022), the soils mapped within the project area are the Pajarito

association (PAA) and Turney-Berino association (TBB) soils (Figure 4). The Pajarito association consists of well drained sandy to moderately sandy sediments derived from mixed sediments, and are typically located on upland plains, bajadas, stream terraces and alluvial fans, with slopes between 0 to 15 percent. The Turney-Berino association consists of well drained sandy clay loams derived from loamy calcareous alluvium within bajadas, terraces and piedmont with slopes that range from 0 to 5 percent.

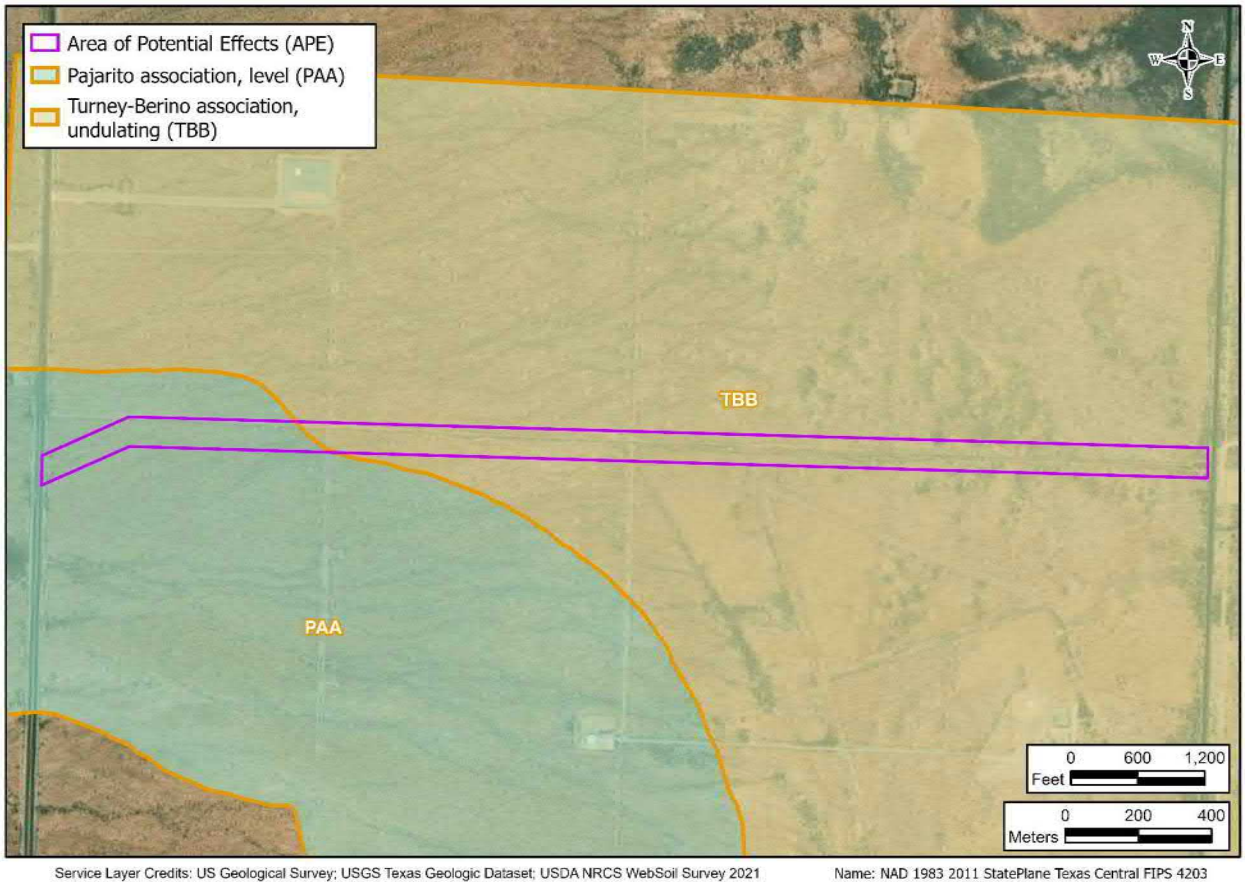


Figure 4. Mapped soils within the APE.

3.0 WESTERN TEXAS AND SOUTHERN NEW MEXICO ARCHAEOLOGY

Generally, the cultural chronology of the Western Texas and Southern New Mexico area can be divided into three periods: prehistoric, protohistoric, and historic. The protohistoric effectively marks the boundary between the prehistoric and historic periods and is characterized by the initial introduction of Europeans into the western hemisphere. The following brief description of the cultural history of the Western Texas and Southern New Mexico area is a summary of a vast suite of data and interpretations.

3.1 Prehistoric Period

The Paleoindian period (ca. 10,000–6000 BC) has historically been divided into three periods, based on technology and land use, including the Clovis, Folsom, and Late Paleoindian periods (Holliday 1997). The Clovis, Folsom, and late Paleoindian cultures in western Texas and southern New Mexico represent a hunting-and-gathering adaptation that focused on large game animals, likely following herds of Bison throughout the Tularosa Basin and visiting local playas for other resources. The subsequent Archaic period (6000 BC–ca. AD 200) is characterized by broad-spectrum hunter-gatherers whose seasonal mobility was conditioned primarily by the abundance and distribution of plant resources (Vierra 2005). The Archaic period is characterized as a time of increasing population with adaptive changes to hunting and gathering techniques through technological development, a gradually increasing dependence on plants, as well as increasingly complex subsistence-settlement systems. Because the Archaic period covers such a large span of time, it has been conventionally divided into Early (6000–4000 BC), Middle (4000–1200 BC), and Late (1200 BC–AD 200) subdivisions (Huckell 1996; Miller and Kenmotsu 2004).

Following the Archaic period, the Ceramic period in the Tularosa Basin is divided into three phases, the Mesilla phase (AD 200–1000), the Doña Ana phase (AD 1000–1300), and the El Paso phase (AD 1300–1450). The Mesilla phase corresponds to the Early Pithouse period, characterized by the widespread use of utilitarian ceramics, known locally as the El Paso brownware tradition, as well as decreased mobility, and the addition of maize agriculture to a generalized foraging diet (Miller and Kenmotsu 2004; Whalen 1981, 1994). The Doña Ana phase represents the Pithouse to Pueblo transition in the Jornada Mogollon region (Whalen 1981), characterized by a time of economic diversity, with a mix of foraging and agriculture, in response to extreme shifts in rainfall. The El Paso phase is considered a time of settlement reorganization and increasing reliance on maize agriculture throughout the Tularosa Basin (Whalen 1981). The Puebloan occupation of the Tularosa Basin appears to end abruptly around AD 1450, but the reasons for this abandonment remain unclear (Miller and Kenmotsu 2004).

3.2 Protohistoric and Historic Periods

The Protohistoric period refers to the transition between the prehistoric period and the era of recorded Euroamerican history in the region. More specifically, for the modern day western Trans-Pecos Texas and south-central New Mexico, the Protohistoric period includes a 230-year span from the presumed abandonment of the El Paso phase settlements to the Pueblo Revolt of 1680 (Miller 2001). The early portion of this period is poorly understood, especially with regard to changes following the abandonment of most El Paso phase settlements. Miller (2001) indicates that historical-period Native American groups in the Tularosa Basin practiced a general foraging strategy, similar to that of the Archaic period.

The beginning of the Historic period in southern New Mexico and western Texas normally is associated with the arrival of Spanish explorers in 1540. During the period 1598–1680, the Spanish established themselves among the Pueblos along the Rio Grande and elsewhere in New

Mexico (Sanchez, Spude, and Gomez 2013). The Pueblo Revolt of 1680 drove the Spanish out and the Pueblo people enjoyed about a decade of autonomy. From 1692 until the early 1800s, Spanish exploration, missionization, and settlement continued throughout the American Southwest. Mexico declared its independence from Spain in October 1821, thus beginning the Mexican period (1821–1856). The City of El Paso remained part of Mexico, although this was disputed by the Texans, following the conclusion of Texas War of Independence in 1836. The city was captured by American forces early in the Mexican-American War and the northern portion of the city was part of the Mexican Cession, permanently splitting El Paso from Ciudad Juárez (Timmons 2021). The Treaty of Guadalupe Hidalgo of 1848 ended the war between Mexico and the United States, and Mexico ceded a vast territory including most of New Mexico. Anglo-Americans quickly migrated to El Paso, setting up communities and establishing Fort Bliss in 1854 (Timmons 2021).

In 1854, the San Andreas Salt Trail was established by Hispanic communities residing in the communities of San Elizario and Socorro along the Rio Grande Valley. The trail was developed to provide these communities access to the salt flats, known as *salines de San Andreas*, located in what is now White Sands Missile Range. In the 1850s, these salt flats were claimed as private property with titles granted by the State of Texas, despite the Mexican community considering them to be public property. Disputes of access to this resource led to the Magoffin Salt War of 1854. A second salt war erupted in 1877, resulting in one of the largest mob riots in the early history of El Paso and surrounding communities. The San Andreas Salt Trail was seldom used after the Magoffin Salt War, but the trail remained an important route for ranchers and travelers, and later for military operations associated with Fort Bliss and White Sands Missile Range (Bowden 1962; Burt et al. 2006; Freeman 1981)

The City of El Paso began to expand when the railroads arrived in 1881 and 1882. The railroads allowed for the rapid growth of cattle grazing throughout New Mexico and west Texas, a mining boom, as well as the immigration of Euroamerican settlers (Sanchez, Spude, and Gomez 2013). During the early 19th century, the Rio Grande irrigation project diverted water from the Rio Grande to agricultural fields throughout the El Paso area, which replaced much of the earlier acequias established by Hispanic settlers of the Rio Grande Valley (Ackerly and Phillips 1997). The construction of the El Paso County Water Improvement District No. 1 took place between 1912–1940. The district's original intended use was agriculture/subsistence as well as being used as an irrigation facility. Today it serves the same purpose with the district's significance still being tied to agriculture.

3.3 Desktop Literature Review

A review of the Texas Archeological Sites Atlas (Atlas) database with emphasis on a one-mile buffer indicates that the APE has previously not been surveyed for cultural resources. According to the Atlas, no previously recorded sites are located within the APE (Figure 5); however, 13 archaeological sites are within one mile of the APE (THC Atlas 2022; Table 1). Three of the 13

previously recorded archaeological sites are State Antiquities Landmarks (SALs), including the Old San Andres Salt Trail (41EP2901; Appendix A, Photos 7–8).

Five of the previously recorded sites have been determined ineligible for listing in the National Register of Historic Places (NRHP), and five have undetermined NRHP eligibility, or eligibility information is not available in Atlas.

One archaeological site (41EP352) is located immediately adjacent to the APE (Figure 5). Site 41EP352 was originally recorded in 1975 by the El Paso Archaeological Society as a large prehistoric artifact scatter with over 600 ceramics. The site was revisited by Kauffman and Stuart (1994), but very few artifacts were noted at the site in 1994. According to the Atlas, the NRHP-eligibility of 41EP352 is undetermined.

According to Atlas records (Atlas 2022), seven previous cultural resources surveys are depicted within the one-mile buffer (Table 2), none of which intersect the APE (see Figure 5). These surveys were performed for the U.S. Army Corps of Engineers, the Federal Energy Regulatory Commission, El Paso Public Service Board, Bureau of Land Management, and the El Paso Water Utilities Commission.



Figure 5. Previous investigations and sites recorded within a 1-kilometer radius of the proposed line.

Table 1. Summary of previously recorded cultural resources within one-mile buffer.

Site No.	*Site Type*	*Reference*	*NRHP Eligibility Determination by THC*
41EP318	Prehistoric campsite	Perez 2014	Ineligible
41EP351	Prehistoric lithic scatter	Kauffman and Stuart 1994	Undetermined
41EP352	Prehistoric lithic scatter	Kauffman and Stuart 1994	Undetermined
41EP353	Prehistoric artifact scatter	Kauffman and Stuart 1994	State Antiquities Landmark
41EP354	Prehistoric lithic scatter, campsite	Kauffman and Stuart 1994	State Antiquities Landmark
41EP355	Not in Atlas	Not in Atlas	Not in Atlas
41EP2616	Prehistoric lithic scatter	Johnson 1985	Not in Atlas
41EP2819	Prehistoric campsite	Perez 2014	Ineligible
41EP2820	Prehistoric campsite	Perez 2014	Ineligible
41EP2901	Old San Andres Salt Trail	Kauffman and Stuart 1994	State Antiquities Landmark
41EP5337	Not in Atlas	Not in Atlas	Not in Atlas
41EP5527	Historical-period trash dumps	Ackerly 2001	Ineligible
41EP6115	Prehistoric artifact scatter	Young and Willis 2011	Ineligible

Table 2. Summary of previous investigations within one-mile buffer.

Year	*Antiquities Code Permit #*	*Company/Reference*	*Sponsor*
2001	2707	Dos Rios Consultants, Inc./ Ackerly 2001	U.S. Army Corps of Engineers, Albuquerque District
2002	--	Environmental Planning Group/ Not in Atlas	Federal Energy Regulatory Commission
2005	3909	Geo-Marine, Inc./ Burt et al. 2006	El Paso Public Service Board
2006	4034	TRC/ Goar et al. 2006	Bureau of Land Management
2014	6705	Versar, Inc./ Swanson et al. 2014	El Paso Water Utilities Commission
2014	6762	TRC/ Perez 2014	El Paso Water Utilities Commission
2021	9783	ARCADIS/ Barclay 2021	El Paso Water Utilities Commission

The earliest readily available aerial imagery and historical topographic maps of the area (ca.1946 and 1942, respectively) depicts the APE as open land with FM3225/Martin Luther King Jr. Boulevard present along the western boundary (Netronline 2022; NGMDB and NGP 2022). Imagery and topographic maps (ca. 1955 and 1967; Appendix C, Exhibits C-3 and C-4) indicate that the Skyport Airport (4E7) was established sometime between 1955 and 1967 just south of the APE, as well as the addition of several ranch roads, a water well, and FM2529 (now McCombs Street; Freeman 2021). Subsequent imagery and maps show the moving boundary of urban El Paso, well installations, and the removal of the Skyport Airport (4E7) from maps by 1995.

4.0 METHODS

Intensive pedestrian survey including visual inspection and judgmental shovel testing was conducted to evaluate the approximately 10,560 linear-foot (3,219 meter) by 300-foot (90 meter) right of way (ROW). Because the APE is located in El Paso, and archaeological sites and features are typically visible on the surface, the pedestrian survey transect interval within the APE was no more than 10 meters (m) wide. The initial pedestrian survey included a visual inspection along 10-meter transects, followed by judgmental shovel testing at 100-meter intervals along three transects spaced 30 meters apart.

At the request of the THC, shovel testing was employed in settings that have the potential for buried cultural materials. Not all areas were subject to shovel testing due to either previous disturbances or low potential for archeological resources. During the field investigations, shovel tests were focused in areas identified as having more recent (Holocene) aeolian or alluvial sediments, in locations with poor ground surface visibility, when archaeological sites were identified, or at isolated prehistoric archaeological materials. Provenience descriptions were taken at isolated artifacts, artifact clusters, and/or other locations relevant to the survey.

Shovel tests were excavated in 20-centimeter (cm) arbitrary levels, and excavated sediment was be passed through ¼-inch hardware mesh to screen for artifacts or other cultural material. Shovel tests were recorded through field notes, photography, and hand-held global positioning system (GPS) device. Cultural materials encountered through the course of shovel test excavations were described and returned to their approximate origin.

Archeological sites encountered were recorded with the Texas Archeological Research Laboratory and minimally assessed for eligibility for inclusion in the NRHP or listing as a State Antiquities Landmark, as appropriate. Archaeological sites were defined as 20 or more artifacts within a 15-m area, more than one temporally associated features, or one feature associated with any number of artifacts. There was a “no-collection” policy for this survey; however, exceptionally rare or unusual diagnostic artifacts (if encountered) would be collected, such as diagnostic projectile points and non-local decorated ceramics. Non-diagnostic artifacts were documented following the Council of Texas Archeologists (CTA) Standards for Intensive Terrestrial Survey Guidelines.

Records are temporarily housed in Terracon's office in Austin and will be permanently curated by the Centennial Museum at the University of Texas at El Paso upon completion of the project.

4.1 Artifact Analysis

Artifacts encountered through the course of investigations were described and photographed on-site, and then returned to their respective places. The importance of the artifacts is in their capacity to relate temporal and other information about the former occupants of the site, and as such they are categorized according to their material and subdivided by unique or diagnostic characteristics. Bottle glass has many diagnostic traits that offer varying amounts of information relating to the time, materials, and process in which a particular vessel was manufactured depending upon the preservation of that vessel (Lindsey 2014).

4.2 Evaluation Criteria

Once identified, cultural resources are evaluated for their importance or significance under federal and state law. For a cultural resource to be deemed eligible for inclusion in the National Register of Historic Places (NRHP), the resource must be at least 50 years old and must possess significance and integrity. The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location design, setting, materials, workmanship, feeling, and association and:

a. That are associated with the events that have made a significant contribution to the broad patterns of our history; or
b. That are associated with the lives of persons significant in our past; or
c. That embody 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; or
d. That have yielded, or may be likely to yield, information important in our prehistory or history (36 CFR 60.4).

Additionally, the State of Texas affords important cultural resources a level of protection beyond that of NRHP status if the resource meets the criteria for listing as a State Antiquities Landmark (SAL). SAL criteria are divided into four categories based on the type of resource: archaeological site (13 TAC 26.10), shipwreck (13 TAC 26.11), cache and collection (13 TAC 26.12), and historic structure (13 TAC 26.19). Under each category is a short list of eligibility requirements that mirror NRHP criteria with a few notable inclusions; the concept of integrity is explicitly built into the criteria for archaeological sites and historical structures, potential looting and vandalism is considered for archaeological sites, and historic structures must already be listed on the NRHP.

5.0 RESULTS

Qualified professional archaeologists conducted intensive pedestrian survey including targeted shovel testing and pedestrian survey of approximately 10,560 linear-feet (3,219-meters) within a 300-foot (90 meter) right of way (ROW) between FM3225/Martin Luther King Jr. Boulevard and McCombs Street in far northeast El Paso (Figure 6). Upon inspection, it was found that the APE has been historically impacted in several locations by the creation of ranch roads, installation of fencing and utility lines, and both historical and modern dumping of trash. The extent of the disturbance is easily delineated by recent imagery with exception of the historical dump sites.

Overall, one previously recorded archaeological site was investigated (41EP2901), two new historic-age archaeological sites were documented (41EP7327 and 41EP7328), and 42 shovel tests were placed within the APE. Three shovel tests were placed within Site 41EP7327 (CG01, JH02, and VP01), one shovel test was excavated within Site 41EP7328 (VP02), two shovel tests were placed at isolated prehistoric materials (CG02 and JH05), and one shovel test (JH01) was placed near the previously recorded Site 41EP352 (Appendix B: Figure B-1). The remaining 35 shovel tests were placed within the eastern 1,400 meters of the APE where ground surface was below 50 percent and there was greater indication of intact sediments (Figure 7). Ground surface visibility was excellent in the western portion of the APE (Figure 8). Shovel tests were excavated to an average depth of 45 centimeters below surface, revealing profiles of sandy loam-loamy sand over subsoil or caliche (Figure 9; Table 3; see Appendix B for detailed log).

In addition, a limited number of isolated occurrences were documented within the APE (PDs 1, 4–10; see Appendix B: Table 2), including sun-colored amethyst (SCA) glass (PDs 1, 5, 6), historical-period ceramic (PD 8), a utilized obsidian flake (PD 7), a rhyolite flake (PD 4), and a historical-period well and water tank (PDs 9–10).

Table 3. Sample of shovel tests excavated in APE (see Appendix B for full shovel test log).

ST #	Depth (cmbs)	+/-	Ground Cover	Munsell & Color	Texture	Comments
CG03	0-20	-	5-20%	7.5YR 5/6 Strong brown	Loamy sand	Soft loamy sand; fine gravels; fine roots
	20-41	-	--	7.5YR 6/6 Reddish yellow	Loamy sand	Fine gravels; terminated due to weakly cemented subsoil
CG09	0-41	-	5-20%	7.5YR 4/6 Strong brown	Loamy sand	Soft loamy sand; fine gravels; fine roots
	41-51	-	--	7.5YR 5/6 Strong brown	Loamy sand	Gravels up to golf ball size increasing with depth; gravels coated with carbonate; terminated due to gravels and subsoil
CG11	0-28	-	60-80%	7.5YR 5/4 Brown	Loamy sand	Soft loamy sand; fine gravels; fine roots
	28-42	-	--	7.5YR 6/4 Light brown	Loamy sand	Gravels up to golf ball size increasing with depth; gravels coated with carbonate; terminated due to gravels and subsoil

ST #	Depth (cmbs)	+/-	Ground Cover	Munsell & Color	Texture	Comments
JH01 (41EP352)	0-70	-	90+%	5YR 5/6 Yellowish red	Loamy sand	25m north of 41EP352 boundary; short sparse grasses with clumps of creosote; subrounded to rounded gravels; gravels at surface and increase at 50cmbs; terminated at weakly cemented gravels
JH05 (Isolate 7)	0-28	-	20-40%	5YR 5/4 Reddish brown	Sandy loam	Loose clay loam with moderate amount of gravels and one creosote root
	28-48	-	--	5YR 7/3 Pink	Sandy loam	Compact calcic horizon with numerous carbonate coated gravels, probably stage III calcic development
JH10	0-40	-	80-90%	5YR 4/6 Yellowish red	Sand	Very loose sand with almost no gravels; some fine rootlets and organic staining
	40-47	-	--	5YR 4/6 Yellowish red	Sandy clay loam	Very compact sandy clay loam with numerous carbonate coated gravels, caliche nodules; terminated with subsoil
VP02 (41EP7327)	0-40	-	<5%	5YR 4/6 Yellowish red	Silty sand	Within PD20, artifacts at surface; subrounded to round gravels; fine carbonate filaments at 30cmbs; loose at surface and slightly firm with depth
	40-50	-	--	5YR 8/3 Pink	Cemented gravels	Petrocalcic horizon(?); centimeter gravels with carbonate coats and matrix; terminated with cemented gravels

5.1 Site 41EP2901 (San Andres Salt Trail)

A remnant of the San Andreas Salt Trail (41EP2901) was originally recorded in 1985 by Rex Gerald as 41EP3122, located along a drainage ditch near U.S. Highway 54 (Barclay 2021). The site was rerecorded by Kauffman and Stuart (1994) and assigned the 41EP2901 designation. Kauffman and Stuart (1994) recommended 41EP2901 as NRHP-eligible, as well as a SAL. The trail was formerly designated a SAL by the THC in 1995.

The presumed alignment of the San Andreas Salt Trail crosses generally northwest-southeast through the approximate center of the APE (see Figure 6). The alignment of the San Andreas Salt Trail is not mapped in Atlas through the APE; however, inspection of recent and historical aerial imagery indicates the San Andreas Salt Trail runs generally parallel to the subsequent Skyport Airport (4E7). Based on these aerial images, Terracon archaeologists investigated the intersection of the APE with the presumed San Andreas Salt Trail alignment. An ephemeral road or trail was identified immediately south, outside the APE (Figure 10), which corresponded to this presumed alignment. Unfortunately, the presumed alignment of the trail within the APE has been impacted by a modern dirt road, a utility line, modern dumping, and erosion of a small drainage (Figure 11). Due to these disturbances, the San Andreas Salt Trail is not visible within the APE.

Page removed to protect site location



Figure 7. Poor ground visibility in the eastern portion of the APE, near shovel test JH8. View to the west with the Franklin Mountains in the background.



Figure 8. Excellent ground visibility in western portion of APE, view to the west.



Figure 9. Overview of petrocalcic horizon exposed in small drainage, western portion of APE. Terracon archaeologist Victoria Pagano as scale, view to the north.



Figure 10. Overview of presumed alignment of 41EP2901. View from southern end of APE looking south.



Figure 11. Overview of presumed alignment of 41EP2901 within APE, view to the south. Note disturbances from utility line, bladed road, erosion, and modern dumping.

5.2 Site 41EP7327

Site 41EP7327 (Appendix A: Photos 17–34, 47; Appendix C: 41EP7327 Site Data) was recorded as a historical-period dump that contains clusters and scatters of historical and modern trash from the mid-20th century until present day (Figures 12–13). The site is approximately 1.98-acres (309 m E-W by 26 m N-S) in size and was horizontally defined by visual inspection of the surface. Three shovel tests were excavated within the site to test for intact or potential for buried deposits; all shovel tests were negative for buried archaeological materials.

The site assemblage can be characterized by several scattered dump piles (concrete, cinder block, glass bottle bases and shards, bricks, and miscellaneous metal pieces) across the site with occasional isolated pieces of pull-tab cans, non-native ceramics, and paint/spray paint cans. Generally, the setting, vegetation, and ground surface of the site can be described as locally flat rangeland with waist high vegetation, short grasses, and clusters of creosote and black brush. Historical imagery and topographic maps indicate that the area surrounding the site has been generally unimproved throughout modern history (Appendix C, Exhibit C-3). The addition of the roads and airfield landing area in the mid-20th century made access to the site area fairly easy and attractive for the disposal of trash.

The site is does not appear to have intact deposits, nor does the assemblage demonstrate unique or diagnostic materials. Therefore, lacking integrity of cultural deposits, Terracon recommends that the site is not eligible for the NRHP and/or designation as a SAL.



Figure 12. Site 41EP7327 overview from JH02 towards center; facing west.

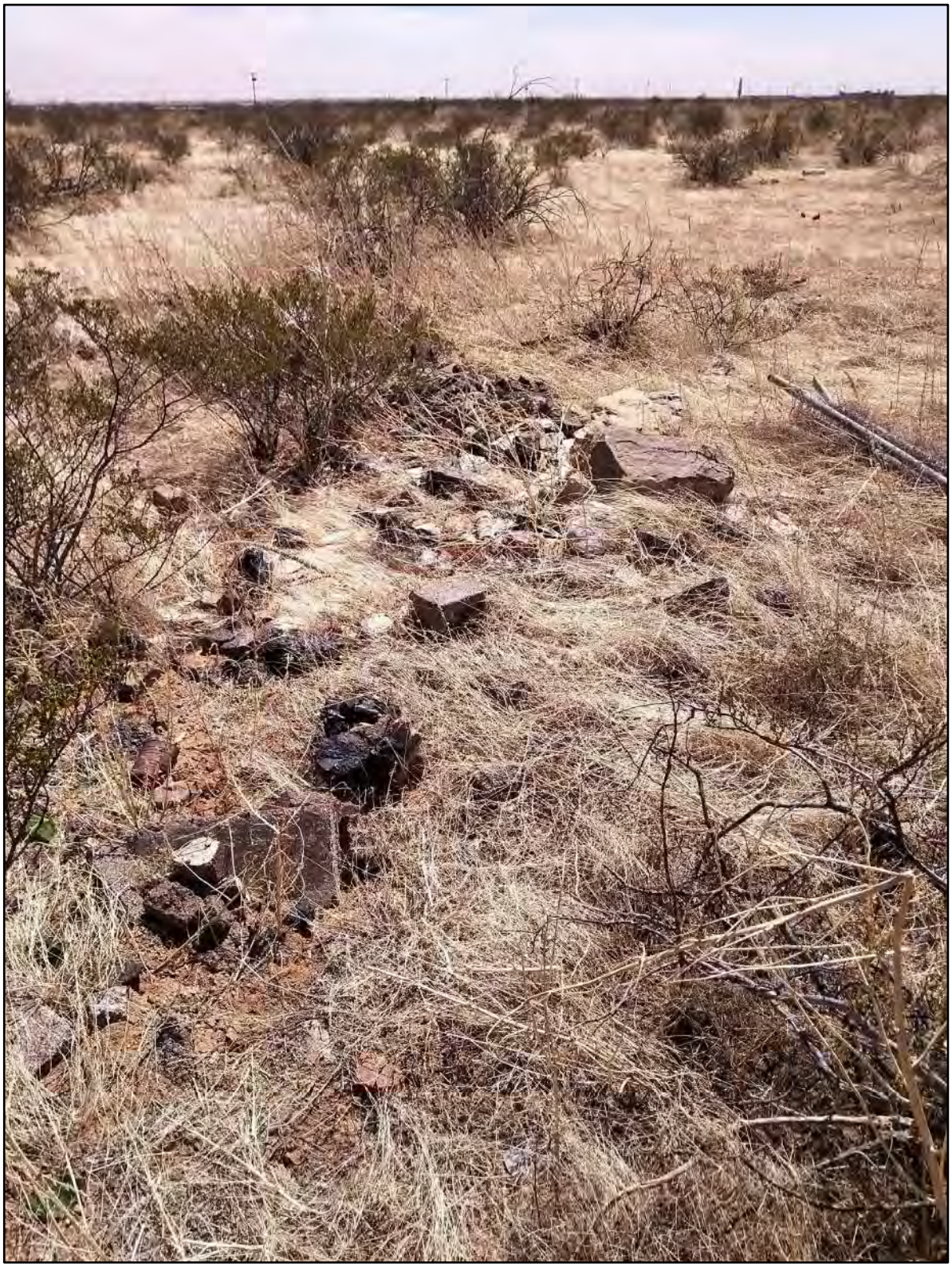


Figure 13. Dump of cinder block, brick, tile, metal, wood, concrete, limestone slag, pvc pipe, rubber hose, plumbing fixtures, and metal tripod at surface within 41EP7327. View to the south.

5.3 Site 41EP7328

Site 41EP7328 (Appendix A: Photos 6, 35–42; Appendix C: 41EP7328 Site Data) was recorded as a historical-period artifact scatter that consists of a moderately dense scatter of historical and modern trash from the mid-20th century until present day (Figures 14–15). The site is approximately 0.21-acres (46m E-W by 21.8m N-S) in size and was horizontally defined by visual inspection of the surface. One shovel test (VP02) was excavated within the site to test for intact or potential for buried deposits, which was negative for archaeological materials.



Figure 14. Overview of 41EP7328 from the southern boundary facing north.



Figure 15. Artifact surface density and ground surface visibility on 41EP7328 with 1m scale.

The site assemblage can be characterized by scattered (mostly fragmented) materials across the defined area which was bisected by a ranch road. Modern plastics and glass were mixed amongst the scattered pull tab cans, historical glass bottle bases with makers marks, historical glass shards (i.e., SCA glass). Generally, the setting, vegetation, and ground surface of the site can be described as locally flat rangeland with waist high vegetation, short grasses, and clusters of creosote and black brush. Additionally, the site is bisected by a dirt road believed to be associated to ranching as well as the Skyport Airport (4E7) that is immediately to the south. Historical imagery and topographic maps indicate that the area surrounding the site has been generally unimproved throughout modern history, however, the addition of the Skyport Airport (4E7) and several ranch roads in the mid-20th century made access to the site area fairly easy and attractive for the disposal of trash (Appendix C: Exhibit C-3).

The site does not appear to have intact deposits, nor does the assemblage demonstrate materials that are unique or in their primary context. Therefore, lacking integrity of cultural deposits, Terracon recommends that the site is not eligible for the NRHP and/or designation as a SAL.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Terracon archaeologists conducted intensive pedestrian survey of an approximate 10,560 linear-foot (3,219 meter) proposed aquifer storage and recovery (ASR) project sponsored by El Paso Water in El Paso, El Paso County, Texas. Archeological survey took place within the approximately 300-foot-wide ROW corridor of the proposed project area (approximately 72 acres).

Upon inspection, it was found that the APE has been historically impacted in several locations by the creation of ranch roads, installation of fencing and utility lines, and both historical and modern dumping of trash. The extent of the disturbance is easily delineated by recent imagery with exception of the historical dump sites.

Overall, one previously recorded (41EP2901), and two new historic-age archaeological sites were documented (41EP7327 and 41EP7328), and 42 shovel tests were excavated within the APE. Three shovel tests were placed within Site 41EP7327, one shovel test was excavated within Site 41EP7328, two shovel tests were placed at isolated prehistoric materials, and one shovel test was placed near the previously recorded Site 41EP352. The remaining 35 shovel tests were placed within the eastern 1,400 meters of the APE where ground surface visibility was below 50 percent and there was greater indication of intact sediments. Shovel tests were devoid of archaeological materials, were excavated to an average depth of 45 centimeters below surface where they were terminated within subsoil or caliche gravels.

The San Andreas Salt Trail (41EP2901) was not visible within the APE and this portion of the site has likely been disturbed by modern road grading, utility line construction, trash disposal, and erosion. Neither Site 41EP7327 or 41EP7328 demonstrated integrity or materials that would suggest potential for listing to the NRHP, or as a SAL. Given the lack of association of the materials at 41EP7327 and 41EP7328 with a structure in historical aerial photographs and topographic maps, and the uncertainty of when the materials were dumped and where they originated from, archival research was not conducted for these sites. Therefore, Terracon recommends that the project should be allowed to proceed as archaeological sites considered eligible for listing in the NRHP or designation of a SAL were not identified within the APE. Additionally, observed deposits during survey and the geomorphic setting suggest a low potential for intact buried resources.

In the unlikely event that human remains, or cultural features are discovered during construction, construction should cease in the vicinity of the remains and Terracon, the Texas Historical Commission’s Archeology Division, or other proper authorities, should be contacted.

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APPENDIX A
Supplemental Photos



Photo 1. Eastern portion of project alignment



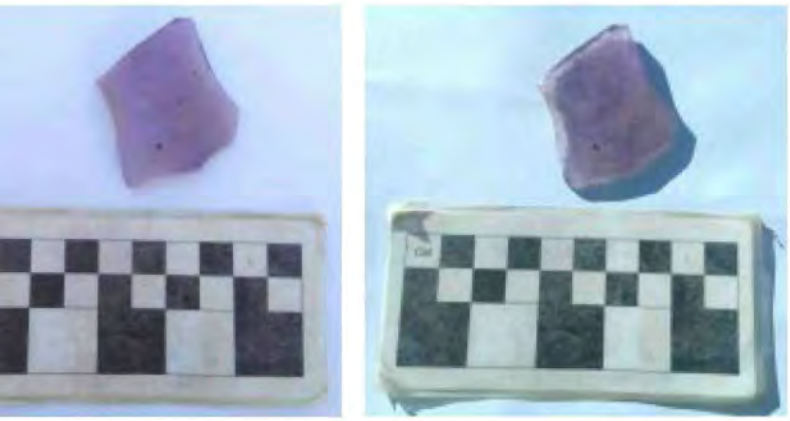
Photo 2. Eastern portion of project alignment



to 3. View of petrocalcic horizon in drainage - west/central project area



Photo 4. General view, west/central portion of project alignment



o 5. PD01- Sun colored amethyst glass; (left) side 1; (right) side 2



Photo 6. 41EP7328: PD02 - Scatter of purple glass (~20 shards) likel bottle



Photo 7. PD03 - Presumed alignment of San Andreas salt trail (41EP2901)



Photo 8. PD03 - Intersection of San Andreas trail with project area sh disturbance



o 9. PD04 – (left) Black rhyolite flake, side 1; (right) Black rhyolite flake, side 2



Photo 10. PD04 - View of ST CG02 and PD04 at tape measure



Photo 11.PD05 - Mouth and partial neck of bottle; purple glass

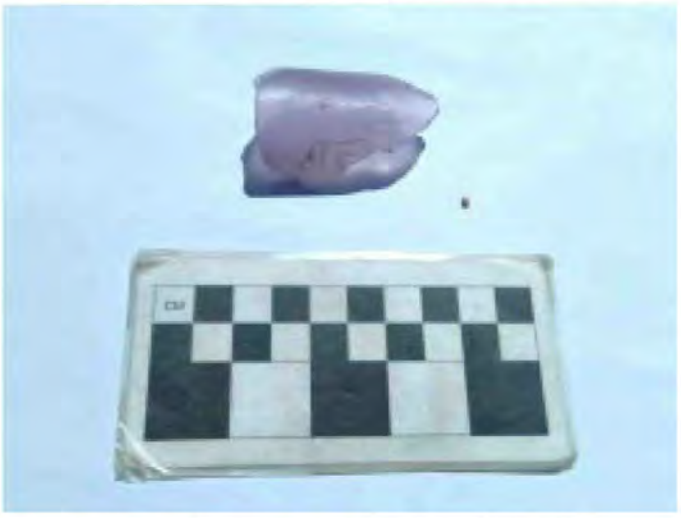


Photo 12. PD06 - Sun colored amethyst glass



oto 13. PD07 – (left) Utilized obsidian flake, side 1; (right) Utilized obsidian flake, side 2



Photo 14. PD08 - Potential historical crockery; orange glaze with gree



o 15. PD09 - Historical water well/tank from 1955 topographic map



Photo 16. PD09/PD10 - Historical water well/tank from 1955 topogra map



17. Site (41EP7327) PD11 - View from NW project boundary; JH at PD15, VP at PD16



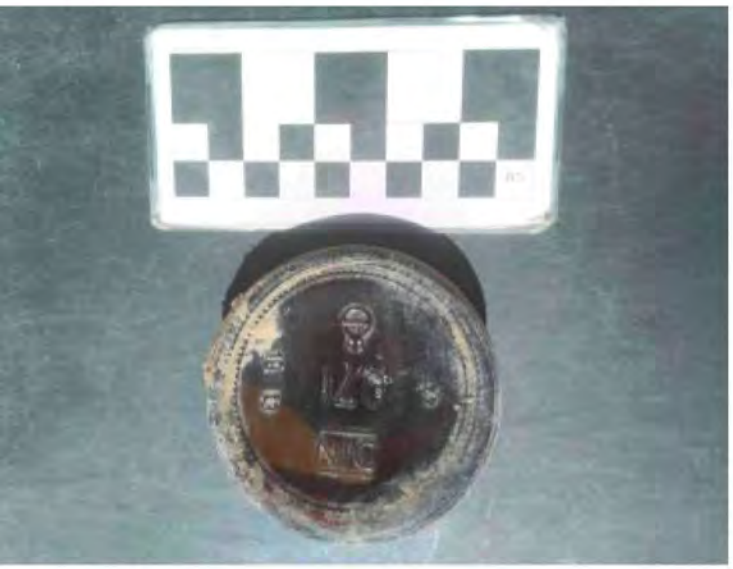
Photo 18. Site (41EP7327) PD11: PD19 - Overview photo



19. Site (41EP7327) PD11: View of tile and cinder blocks dumped on site



Photo 20. Site (41EP7327): PD12 - Clear glass bottle base; "I-inside stippled base; Owens-Illinois Glass Co., ca.1954-present (Lockhart e 2016)



o 21. Site (41EP7327): PD13 - Brown glass bottle base; "G-under-crown"; Gerresheimer Glas, 1939-? (Lockhart et. Al. 2016)

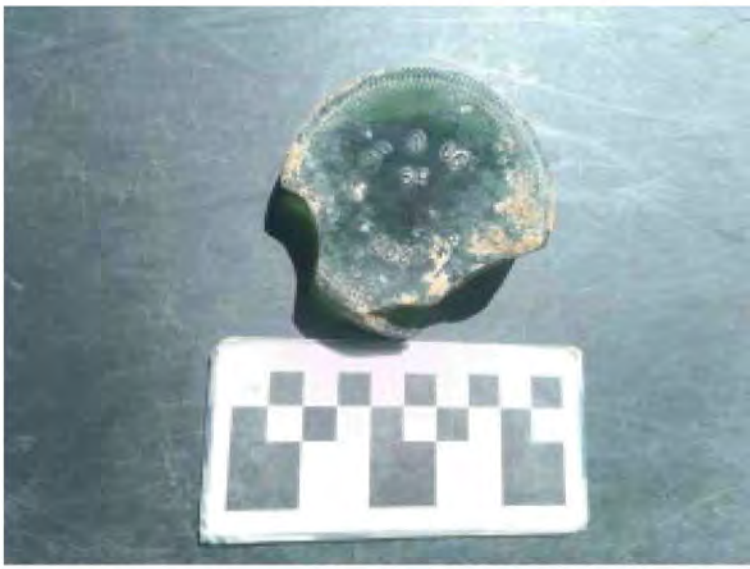


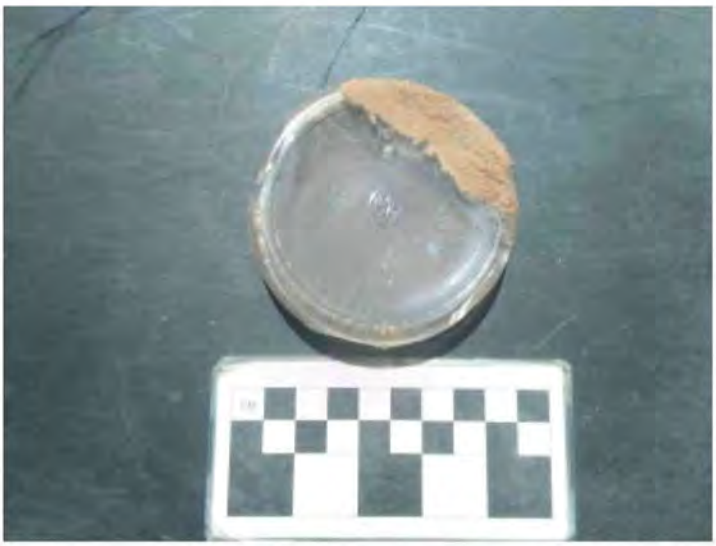
Photo 22. Site (41EP7327): PD13 - Green glass bottle base; "I-inside Owens-Illinois Glass Co., ca.1954-present; date code "66" (Lockhart 2016)



23. Site (41EP7327): PD13 - Green glass bottle base; "G-overlaid-C"; Glass Container Corp, 1945-?; (Toulouse 1971, p. 220)



Photo 24. Site (41EP7327): PD13 - Clear glass bottle base; "blan keystone"; Knox Glass Bottle Co., ca. mid 20th c. (Lockhart et. al. 2



hoto 25. Site (41EP7327): PD19 - Clear glass bottle base; "VM ogram in a circle", Vidriera Monterrey; ca. 1936-ca. 1985) (Lockart 2016, "Mexican Marks", p. 7-8)

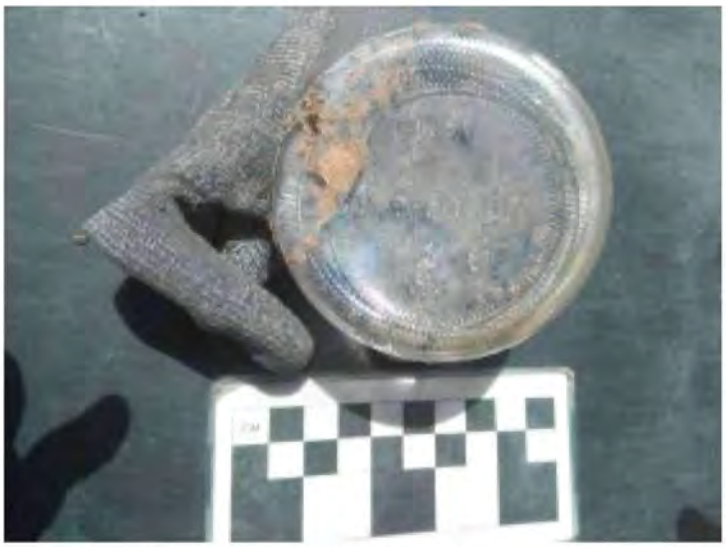


Photo 26. Site (41EP7327): PD19 - Clear glass bottle base; "Ancho Monogram", ca.1938-ca.1980 (Lockhart 2016, " Anchor Hocking Gl Corp.", p.461)



o 27. Site (41EP7327): Dump of gravel and tar paper - adjacent to fence and drainage/road



Photo 28. Site (41EP7327): PD15 - tile, non-native ceramics, and b glass



o 29. Site (41EP7327): PD14 - Simoniz cleaner can and Coors pull tab can



Photo30. Site (41EP7327): Rusted out car seat



o 31. Site (41EP7327): PD17 - Colorless Ball wide mouth jar, "G3"; ca. 1930-? (Lockhart 2016)



Photo 32. Site (41EP7327): Green glass bottle base; Owens-Illinc ca.1954-present; (Lockhart et. al. 2016; "O Logos")



Photo 33. Site (41EP7327): Concrete pile on the surface



Photo 34. Site (41EP7327): PD16 - 20th c. Whiteware with and with decoration



o 35. Site (41EP7328): PD20: Site overview from east facing west



Photo 36. Site (41EP7328): PD20: Site overview from north facing s



37. Site (41EP7328): PD20: Site overview, artifact surface density



Photo 38. Site (41EP7328): PD21 - Colorless bottle glass base; "circ
Brockway Glass Co., ca. 1933-2000; (Lockhart et. al. 2016 "Brockw
Machine Bottle Co. and Brockway Glass Co.", p. 319-322)



39. Site (41EP7328): Green Sprite bottle, "Tamano Super Grande";
ca. mid 20th c. (Lockhart and Brown 2019)



Photo 40. Site (41EP7328): Colorless glass bottle base; "OLMEC



oto 41. Site (41EP7328): Coke aqua bottle base; "Toledo OHIO"



Photo 42. Site (41EP7328): Colorless glass bottle base; "Skippy", Ov
Illinois, ca.1954-present (Lockhart et. al. 2016; "O Logos")

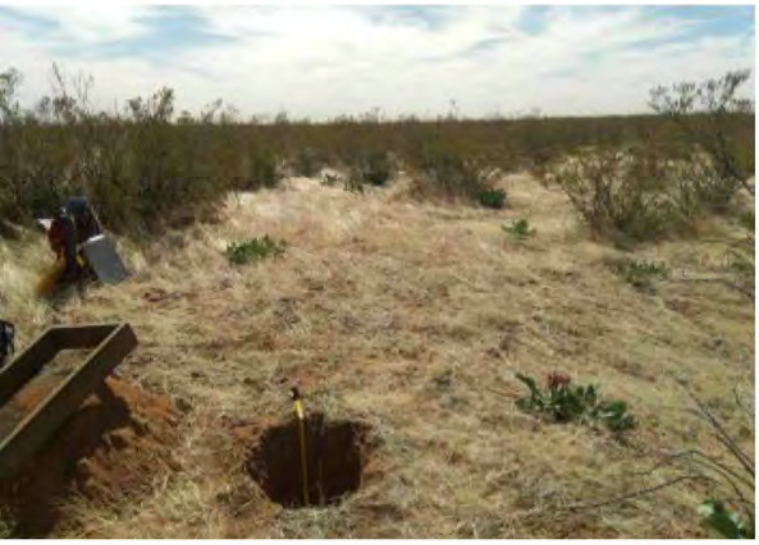


Photo 43. JH01 ST overview facing 41EP352; facing south



Photo 44. JH01 ST Profile overview: 0-70cmbs



Photo 45. Overview from JH07; facing west



Photo 46. JH07 ST Profile overview



Photo 47. VP05 - ST Overview/GSV: facing towards 41EP7327

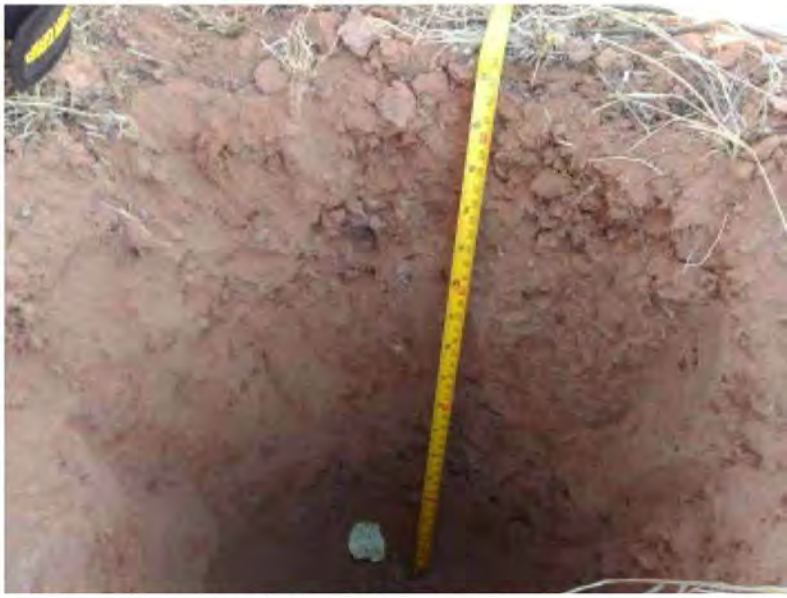


Photo 48. VP05 - ST Profile: 0-45cmbs; terminated within carbonate g subsoil



Photo 49. VP10 - ST Overview/GSV – vegetation



Photo 50. VP10 - ST Profile: 0-50cmbs; terminated within impassi compact gravelly subsoil



Photo 51. VP14 - No dig, good GSV >30% - 30cm scale



Photo 52. Shovel test CG13 - No dig, note good ground surface visi

APPENDIX B

Shovel Test and Point Description Logs and Maps

Pages removed to protect site location

Appendix B. Table 1. Detailed shovel test data.

ST #	Depth (cmbs)	+/-	Ground Cover	Munsell & Color	Texture	Inclusion %	Comments
CG01 (41EP7328)	0-24	-	60-80%	5YR 5/4 Reddish brown	Loamy sand	Common (5-20%)	Soft loamy sand; gravels up to golf ball sized; grass roots
	24-41	-	--	5YR 4/6 Yellowish red	Loamy sand	Many (>20-50%)	More compact than above; gravels up to golf ball sized; few fine carbonate specks; terminated due to weakly cemented subsoil
CG02 (Isolate PD04)	0-7	-	<5%	7.5YR 6/4 Light brown	Silty sand	Common (5-20%)	Soft, windblown sediment; gravels up to quarter-sized; few fine roots
	7-31	-	--	7.5YR 5/4 Brown and 5/6 Strong brown	Loamy sand	Many (>20-50%)	Slightly damp; 50/50 color split; gravels up to golf ball sized; transition to caliche at bottom of layer
	31-45	-	--	--	--	--	Caliche - terminated at caliche horizon
CG03	0-20	-	5-20%	7.5YR 5/6 Strong brown	Loamy sand	Common (5-20%)	Soft loamy sand; fine gravels; fine roots
	20-41	-	--	7.5YR 6/6 Reddish yellow	Loamy sand	Many (>20-50%)	Fine gravels; terminated due to weakly cemented subsoil
CG04	0-19	-	80-90%	7.5YR 5/6 Strong brown	Loamy sand	Common (5-20%)	Soft loamy sand; fine roots; gravels and cobbles up to baseball sized
	19-39	-	--	5YR 5/6 Yellowish red	Loamy sand	Many (>20-50%)	Gravels and cobbles up to softball size; few carbonate specks; weakly cemented; terminated within subsoil
CG05	0-36	-	60-80%	7.5YR 4/6 Strong brown	Loamy sand	Common (5-20%)	Soft loamy sand; fine roots; gravels up to golf ball sized
	36-53	-	--	7.5YR 6/6 Reddish yellow	Loamy sand	Many (>20-50%)	Gravels up to golf ball size; few carbonate specks; weakly cemented; terminated within subsoil
CG06	0-36	-	80-90%	7.5YR 4/6 Strong brown	Loamy sand	Common (5-20%)	Soft loamy sand; fine gravels; fine roots
	36-47	-	--	7.5YR 6/6 Reddish yellow	Loamy sand	Many (>20-50%)	Fine gravels; some fine carbonate specks; weakly cemented; terminated due to subsoil
CG07	0-31	-	60-80%	7.5YR 4/6 Strong brown	Loamy sand	Common (5-20%)	Soft loamy sand; fine gravels; fine roots
	31-47	-	--	7.5YR 6/6 Reddish yellow	Loamy sand	Common (5-20%)	Fine gravels; some fine carbonate specks; weakly cemented; terminated due to subsoil

ST #	Depth (cmbs)	+/-	Ground Cover	Munsell & Color	Texture	Inclusion %	Comments
CG08	ND	ND	ND	ND	ND	ND	No Dig - Good ground surface visibility
CG09	0-41	-	5-20%	7.5YR 4/6 Strong brown	Loamy sand	Common (5-20%)	Soft loamy sand; fine gravels; fine roots
	41-51	-	--	7.5YR 5/6 Strong brown	Loamy sand	Many (>20-50%)	Gravels up to golf ball size increasing with depth; gravels coated with carbonate; terminated due to gravels and subsoil
CG10	0-32	-	90+%	7.5YR 4/6 Strong brown	Loamy sand	Common (5-20%)	Soft loamy sand; fine gravels; fine roots
	32-41	-	--	7.5YR 5/6 Strong brown	Loamy sand	Many (>20-50%)	Gravels up to golf ball size increasing with depth; gravels coated with carbonate; terminated due to gravels and subsoil
CG11	0-28	-	60-80%	7.5YR 5/4 Brown	Loamy sand	Common (5-20%)	Soft loamy sand; fine gravels; fine roots
	28-42	-	--	7.5YR 6/4 Light brown	Loamy sand	Many increased to Very Many (>50%)	Gravels up to golf ball size increasing with depth; gravels coated with carbonate; terminated due to gravels and subsoil
CG12	ND	ND	ND	ND	ND	ND	No Dig - Good ground surface visibility
CG13	ND	ND	ND	ND	ND	ND	No Dig - Good ground surface visibility
JH01 (41EP352)	0-70	-	90+%	5YR 5/6 Yellowish red	Loamy sand	Many (>20-50%)	25m north of 41EP352 boundary; short sparse grasses with clumps of creosote; subrounded to rounded gravels; gravels at surface and increase at 50cmbs; terminated at weakly cemented gravels
JH02 (41EP7328)	0-30	-	5-20%	5YR 4/4 Reddish brown	Sandy loam	Few (<5%)	Sandy loam with few gravels
	30-35	-	--	5YR 4/6 Yellowish red	Sandy loam	Few (<5%)	Sandy loam with few carbonate nodules and exhibiting some oxidation (RMF); terminated due to subsoil
JH03	0-37	-	90+%	5YR 4/6 Yellowish red	Sandy loam	Common (5-20%)	Sandy loose loam with common gravels; terminated at subsoil exhibiting carbonate nodules and compactness

ST #	Depth (cmbs)	+/-	Ground Cover	Munsell & Color	Texture	Inclusion %	Comments
JH04	0-43	-	40-60%	5YR 5/4 Reddish brown	Sandy loam	Many (>20-50%)	Very loose sandy loam with numerous gravels
	43-56	-	--	2.5YR 8/3 Pink	Sandy loam	Common (5-20%)	Very compact calcic horizon (stage III) with coated gravels; terminate within calcic horizon
JH05 (Isolate PD07)	0-28	-	20-40%	5YR 5/4 Reddish brown	Sandy loam	Common (5-20%)	Loose clay loam with moderate amount of gravels and one creosote root
	28-48	-	--	5YR 7/3 Pink	Sandy loam	Common (5-20%)	Compact calcic horizon with numerous carbonate coated gravels, probably stage III calcic development
JH06	0-17	-	60-80%	5YR 4/6 Yellowish red	Sandy loam	Common (5-20%)	Loose sandy loam with numerous gravels and fine rootlets
	17-40	-	--	5YR 4/6 Yellowish red	Sandy loam	Few (<5%)	Compact sandy loam with numerous caliche coated gravels and carbonate filaments throughout; terminate with subsoil
JH07	0-34	-	100%	5YR 4/4 Reddish brown	Sandy loam	Few (<5%)	Moderately loose sandy loam with a few gravels and rootlets
	34-40	-	--	5YR 4/6 Yellowish red	Sandy loam	Common (5-20%)	Moderately compact sandy loam with increasing caliche coated gravels and carbonate filaments; terminate within subsoil
JH08	0-33	-	100%	5YR 4/4 Reddish brown	Sandy loam	Few (<5%)	Loosely compact sandy loam with few gravels and rootlets
	33-45	-	--	5YR 4/6 Yellowish red	Sandy loam	Common (5-20%)	Very compact sandy loam with carbonate and coated gravels and slight reddish oxidation; terminated within subsoil
JH09	0-15	-	90+%	5YR 4/3 Reddish brown	Sandy loam	Few (<5%)	Very loose sandy loam with rootlets and few gravels
	15-23	-	--	5YR 4/6 Yellowish red	Sandy loam	Few (<5%)	Moderately loose sandy loam with more reddish hue and coarser sand grains
	23-34	-	--	5YR 4/6 Yellowish red	Sandy clay loam	Few (<5%)	Very compact sandy clay loam with carbonate nodules; terminated at subsoil
JH10	0-40	-	80-90%	5YR 4/6 Yellowish red	Sand	Few (<5%)	Very loose sand with almost no gravels; some fine rootlets and organic staining
	40-47	-	--	5YR 4/6 Yellowish red	Sandy clay loam	Common (5-20%)	Very compact sandy clay loam with numerous carbonate coated gravels, caliche

ST #	Depth (cmbs)	+/-	Ground Cover	Munsell & Color	Texture	Inclusion %	Comments
							nodules; terminated with subsoil
JH11	0-35	-	90+%	5YR 4/6 Yellowish red	Sand	Common (5-20%)	Very loose sand with numerous gravels and a few rootlets
	35-48	-	--	5YR 5/6 Yellowish red	Sandy loam	Common (5-20%)	Compact sandy loam with carbonate coated and caliche nodules; terminated with subsoil
VP01 (41EP7328)	0-30	-	90+%	5YR 4/4 Reddish brown	Sandy loam	Few (<5%)	Within PD11 with glass at surface; ~5 <2cm colorless glass shards within upper 10cmbs; few subrounded to round gravels
	30-45	-	--	5YR 4/6 Yellowish red	Sandy clay loam	Common (5-20%)	Fine carbonate and compact/weakly cemented subrounded-rounded gravels; slightly moist; terminated within gravelly subsoil
VP02 (41EP7327)	0-40	-	<5%	5YR 4/6 Yellowish red	Silty sand	Many (>20-50%)	Within PD20, artifacts at surface; subrounded to round gravels; fine carbonate filaments at 30cmbs; loose at surface and slightly firm with depth
	40-50	-	--	5YR 8/3 Pink	Cemented gravels	Very Many (>50%)	Petrocalcic horizon(?); centimeter gravels with carbonate coats and matrix; terminated with cemented gravels
VP03	0-35	-	80-90%	5YR 6/6 Reddish yellow (dry)	Sand	Few to Many	Waist high scrub with low GSV; very loose sand with few subangular and subrounded gravel that increased with depth; weakly cemented sand and gravel
VP04	0-15	-	80-90%	5YR 6/6 Reddish yellow (dry)	Sand with cemented gravels	Many (>20-50%)	Waist high scrub with low GSV; very loose veneer of sand over weakly cemented sand/gravel; subrounded to subangular gravel; terminated within weakly cemented sand and gravel
VP05	0-35	-	80-90%	5YR 4/4 Reddish brown	Sandy loam	Few (<5%)	Bunched creosote and short grasses; low GSV; carbonate filaments at surface increasing with depth; subrounded to rounded gravel
	35-45	-	--	5YR 4/6 Yellowish red	Sandy clay loam	Common (5-20%)	Gravel increased with depth; carbonate on gravel;

ST #	Depth (cmbs)	+/-	Ground Cover	Munsell & Color	Texture	Inclusion %	Comments
							terminated within gravelly carbonate subsoil
VP06	0-35	-	100%	5YR 4/4 Reddish brown	Sandy loam	Few (<5%)	Bunched creosote and short grasses; low GSV; carbonate filaments at surface increasing with depth; subrounded to rounded gravel
	35-45	-	--	5YR 4/6 Yellowish red	Sandy clay loam	Common (5-20%)	Gravel increased with depth; carbonate on gravel; terminated within gravelly carbonate subsoil
VP07	0-20	-	80-90%	5YR 6/6 Reddish yellow (dry)	Loamy sand	Common (10%)	Bunched creosote and short grasses; fairly loose dry sand with some pebbles; slightly moister towards bottom of level
	20-45	-	--	5YR 4/6 Yellowish red	Sandy clay loam	Common (10%)	Moist; clayey becoming increasingly compact and impassible with depth; terminated within very compact subsoil
VP08	ND	ND	ND	ND	ND	ND	No Dig - Good ground surface visibility and ranch road
VP09	0-20	-	90+%	5YR 6/6 Reddish yellow (dry)	Loamy sand	Few (<5%)	Within fence median between two ranch roads; loose sand with few pebbles
	20-55	-	--	5YR 4/6 Yellowish red	Sandy loam	Few (<5%) to Common (10%)	Slightly moist; becoming increasingly compact and impassible with depth; terminated within very compact subsoil
VP10	0-40	-		5YR 6/6 Reddish yellow (dry) to 4/6 (moist)	Loamy sand	Few (<5%)	Within fence median between two ranch roads; loose sand with few pebbles
	40-50	-		5YR 4/6 Yellowish red	Sandy loam	Common (5-20%)	Gravels increased with depth and compactness; terminated within compact gravelly subsoil
VP11	ND	ND	ND	ND	ND	ND	No Dig - Good ground surface visibility
VP12	0-15	-	100%	5YR 6/6 Reddish yellow (dry)	Silty sand	Few (<5%)	Within fence median between two ranch roads; loose silty sand with few pebbles
	15-50	-	--	5YR 4/6 Yellowish red	Silty clay	Few (<5%) to Common (20%)	Carbonate filaments at 25-30cmbs that increased with depth; gravel increased with depth; terminated within carbonate gravelly subsoil

ST #	Depth (cmbs)	+/-	Ground Cover	Munsell & Color	Texture	Inclusion %	Comments
VP13	ND	ND	ND	ND	ND	ND	No Dig - Good ground surface visibility
VP14	ND	ND	ND	ND	ND	ND	No Dig - Good ground surface visibility
VP15	ND	ND	ND	ND	ND	ND	No Dig - Good ground surface visibility
VP16	ND	ND	ND	ND	ND	ND	No Dig - Good ground surface visibility
VP17	ND	ND	ND	ND	ND	ND	No Dig - Good ground surface visibility
VP18	ND	ND	ND	ND	ND	ND	No Dig - Good ground surface visibility

*ND = No dig
*GSV = Ground surface visibility

Appendix B. Table 2. Point description log.

Point #	Description
PD01	Sun-colored amethyst glass
PD02	Scatter of sun-colored amethyst glass (~20 shards likely one jar)
PD03	Presumable San Andreas Salt Trail
PD04	Black rhyolite flake
PD05	Mouth and partial neck of sun-colored amethyst glass
PD06	Sun-colored amethyst glass
PD07	Utilized obsidian flake
PD08	Potential historical crockery
PD09	Historical water storage tank
PD10	Historical shallow tank
PD11	Historical site 01 (41EP7328); scatter of dumped concrete, glass bottles, and metal
PD12	Bottle base
PD13	Glass frag concentration
PD14	Simoniz floor wax can and pull-tab banquet Coors
PD15	Scatter of colorless glass with printing, white ware, tiles, and metal/ wood drawers?
PD16	Two types of whitewares
PD17	Ball wide mouth screw top jar "G3"
PD18	Owens Illinois base; green
PD19	Clear glass frags
PD20	Historical period scatter near airstrip
PD21	Clear bottle base

APPENDIX C
Archaeological Site Data

Pages removed to protect site location

APPENDIX G:
PUBLIC INVOLVEMENT DOCUMENTATION