Pacific Gas and Electric Company

Topock Compressor Station
Soil Investigation Project

Draft EIR

SCH# 2012111079

Prepared for:
California Department of Toxic Substances Control

July 2014

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TABLE OF CONTENTS

PG&E Topock Compressor Station Soil Investigation Project Draft EIR

Page

Acronyms and Abbreviations

Page

Page

Page

Appendices

Figures

Page

Figures (cont.)

Page

Figures (cont.)

Tables

Page

Tables (cont.)

ACRONYMS AND ABBREVIATIONS

µm	micrometer
A&P	Atlantic and Pacific
AB	Assembly Bill
ACEC	Area of Critical Environmental Concern
ADT	Average Daily Traffic
AE	Applied Earthworks, Inc.
AFY	acre-feet per year
AMM	avoidance and minimization measure
amsl	above mean sea level
AOC	Area of Concern
APCO	Air Pollution Control Officer
APE	Area of Potential Effects
AQAP	*1991 Air Quality Attainment Plan*
ARB	California Air Resources Board
ARMR	*Archaeological Resource Management Reports*
ASTM	American Society for Testing and Materials
AT&SF	Atchison, Topeka and Santa Fe Railway
BACT	best available control technology
BDO	Boards, Departments and Offices
bgs	below ground surface
BIA	U.S. Bureau of Indian Affairs
BIAMP	Bird Avoidance and Minimization Plan
BLM	U.S. Bureau of Land Management

BMP	Best Management Practice
BNSF	Burlington Northern Santa Fe Railway
BOR	U.S. Bureau of Reclamation
CAAQS	California ambient air quality standards
CACA	Corrective Action Consent Agreement
CalEEMod	California Emissions Estimator Model
CAL FIRE	California Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CGP	Construction General Permit
CH_4	methane
CHPMP	Cultural and Historical Properties Management Plan
CHRIS	California Historical Resources Information System
CLP	USEPA Contract Laboratory Program
CM/FS Work Plan	Corrective Measures/Feasibility Study Work Plan
CMP	comprehensive management plan

CMS/FS	*Corrective Measures Study/Feasibility Study*
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalents
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
Cortese List	Hazardous Waste and Substances Sites List
County	San Bernardino County
Cr(III)	trivalent chromium
Cr(T)	total chromium
Cr(VI)	hexavalent chromium
CRHR	California Register of Historical Resources
CRIT	Colorado River Indian Tribe
CRPR	CNPS California Rare Plant Rank
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibels
DEIR	draft environmental impact report
DEM	digital elevation model
DOI	United States Department of the Interior
DOI Consent Decree	Remedial Action/Remedial Design Consent Decree between the United States of America and Pacific Gas & Electric Company

DOT	U.S. Department of Transportation
DPM	diesel particulate matter
DPR	California Department of Parks and Recreation
DQO	Data Quality Objective
DTSC	California Department of Toxic Substances Control
EHS	San Bernardino County Department of Public Health, Division of Environmental Health Services
EIR	environmental impact report
EM	Electromagnetic Induction
EPA	California Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ERA	Ecological Risk Assessment
ERPW	East Ravine Sediment and Pore Water
ESA	Endangered Species Act
EZ	exclusion zone
FAA	Federal Aviation Administration
FCAA	Federal Clean Air Act
FCAAA	Federal Clean Air Act Amendments of 1990
FCR	field contact representative
FEIR	final environmental impact report
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
Final Groundwater CMS/FS	*Final Groundwater Corrective Measures Study/Feasibility Study Report for SWMU 1/AOC 1 and AOC 10*

Final RFI/RI Report Volume 3 (Soil)	Final RCRA Facility Investigation and Remedial Investigation Report (RFI/RI Report) Volume 3 (Soil)
FLPMA	Federal Land Policy and Management Act
FMIT	Fort Mojave Indian Tribe
FTA	Federal Transit Administration
GANDA	Garcia and Associates
GHG Plan	San Bernardino County's GHG Emissions Reduction Plan
HDCR	Hualapai Department of Cultural Resources
HDPE	high-density polyethylene
HHRA	Human Health Risk Assessment
GHG	greenhouse gas
GIS	Geographic Information System
gpm	gallons per minute
GPR	ground-penetrating radar
H_2S	hydrogen sulfide
HAP	Hazardous Air Pollutants
HFC	hydrofluorocarbon
HI	Hazard Index
HMD	Hazardous Materials Division
HNWR	Havasu National Wildlife Refuge
HSWA	Hazardous and Solid Waste Amendments
Hz	hertz
I-40	Interstate 40

IDW	investigation-derived waste
IM	Interim Measure
IM-3	Interim Measure 3
IM-3 Facility	Interim Measure 3 Groundwater Extraction and Treatment Facility
Interested Tribes	Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, the Hualapai Indian Tribe, and the Fort-Yuma Quechan Tribe
IRZ	in situ reactive zone
kWh	kilowatt-hours
LACM	Natural History Museum of Los Angeles County
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
LCRWSP	Lower Colorado River Water Supply Project
L_{eq}	energy-equivalent noise level
L_{max}	maximum noise level
L_{min}	minimum noise level
LOS	Level of Service
LUST	Leaking Underground Storage Tank
Maze	Topock Maze
MBTA	Migratory Bird Treaty Act
MCLs	maximum contaminant levels
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
MET	meteorological weather
mg/kg	milligrams per kilogram
MLD	Most Likely Descendant

MMRP	Mitigation Monitoring and Reporting Program
MRZ	Mineral Resource Zone
MS4	municipal separate storm sewer system
msl	mean sea level
MW	Monitoring Well
MWh	megawatt-hour
my	million years
N_2O	nitrous oxide
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
NED	National Elevation Dataset
NEPA	National Environmental Policy Act
NESHAP	national emissions standards for hazardous air pollutants
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NOI	Notice of Intent
NOP	notice of preparation
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	U.S. National Park Service
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
NWP	Nationwide Permit
OEHHA	Office of Environmental Health Hazard Assessment

OHV	Off-Highway Vehicle
PA	Programmatic Agreement
PAH	polycyclic aromatic hydrocarbon
PBA	*Programmatic Biological Assessment for Pacific Gas and Electric Topock Compressor Station Remedial and Investigative Actions*
PCB	polychlorinated biphenyl
PFC	perfluorocarbon
PFYC	Potential Fossil Yield Classification
PG&E	Pacific Gas and Electric Company
PM10	Particulate Matter 10
ppd	pounds per day
PPV	peak particle velocity
PQS	professional qualifications standards
PRC	Public Resources Code
PRMP	Paleontological Resources Management Plan
PRPA	Paleontological Resources Preservation Act
RAWP	Human Health and Ecological Risk Assessment Work Plan
RCNM	FHWA Roadway Construction Noise Model
RCRA	Resource Conservation and Recovery Act
REAP	Rain Event Action Plan
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RFI/RI	Resource Conservation and Recovery Act Facility Investigation and Remedial Investigation Report

RFI/RI Report	*Revised Final RCRA Facility Investigation and Remedial Investigation Report*
RFI/RI Report Volume 1	*Revised Final RCRA Facility Investigation and Remedial Investigation Report Volume 1 – Site Background and History*
RFI/RI Report Volume 2	*Final RCRA Facility Investigation and Remedial Investigation Report Volume 2 – Hydrogeologic Characterization and Results of Groundwater and Surface Water Investigation*
RFI/RI Report Volume 2 Addendum	*Final RCRA Facility Investigation and Remedial Investigation Report Volume 2 Addendum – Hydrogeologic Characterization and Results of Groundwater and Surface Water Investigation*
RMP	Resource Management Plan
RMS	root mean square
ROG	reactive organic gases
ROW	right-of-way
RV	recreational vehicle
RWQCB	Regional Water Quality Control Board
SBAIC	San Bernardino Archaeological Information Center
SBCM	Museum of San Bernardino County
Scoping Plan Update	California Air Resources Board First Update to the Climate Change Scoping Plan
SCRMA	Special Cultural Resource Management Area
Section 106	Section 106 of the National Historic Preservation Act
SERC	State Emergency Response Commission
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan

SLF	Sacred Lands File
SO_2	sulfur dioxide
Soil CMS/FS	*Soil Corrective Measures Study/Feasibility Study*
Soil RFI/RI Work Plan	*Soil RCRA Facility Investigation/Remedial Investigation Work Plan*
Soil Work Plan	*Soil RCRA Facility Investigation/Remedial Investigation Work Plan*
SOP	Standard Operating Procedure
Station	Topock Compressor Station
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TACs	toxic air contaminants
TAL/TCL	Target Compound and Target Analyte Lists
TBC	To Be Considered
TCA	Topock Cultural Area
TCP	Traditional Cultural Property
TCRA	timecritical removal action
TDS	total dissolved solids
TMDL	Total Maximum Daily Load
TPH	total petroleum hydrocarbon
TRC	Technical Review Committee
TWG	Technical Working Group
UA	Undesignated Area
ug/kg	micrograms per kilogram

ug/L	micrograms per liter
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VdB	decibel notation
VMG	Vertical Magnetic Gradient
VOC	volatile organic compound
VRM	Visual Resource Management
WDR	Waste Discharge Requirements
WWII	World War II
XRF	x-ray fluorescence

CHAPTER 1
Summary

1.1 Introduction

This summary provides an overview of the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Soil Investigation Project (Project) and the environmental analyses that are contained within this draft environmental impact report (DEIR) as required by the California Environmental Quality Act (CEQA) (Public Resources Code, Section 21000 et seq. and California Code of Regulations Title 14 Section 15000 et seq. [CEQA Guidelines]). This DEIR is an informational document prepared by the lead agency that must be considered by decision makers before approving or denying a proposed project. The California Department of Toxic Substances Control (DTSC) is the lead agency for this Project.

1.2 Background

Past activities at the PG&E Topock Compressor Station (Station) have resulted in the release of chemicals of potential concern (COPCs) into soil and groundwater. Under certain exposure conditions, these COPCs are harmful to human health and the environment. Investigation and remediation at the Station and the surrounding area (Project Site) is being conducted under the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). Both RCRA and CERCLA are federal laws. RCRA provides a framework for the U.S. Environmental Protection Agency (USEPA) to remediate hazardous waste sites in the United States. The authority under RCRA, however, can be delegated to states. In California, DTSC implements RCRA under such delegated authority from the federal USEPA through state law.

1.3 Summary of the Proposed Project

DTSC is the lead agency under CEQA for the preparation of this DEIR, which addresses the potential environmental effects of actions associated with soil investigation activities at the Station. Soil within the Station fence line and in the vicinity of the Station has been affected by historical releases of COPCs, including hexavalent chromium [Cr(VI)][1] and other metals, petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), dioxins

1 Cr(VI) is a form of chromium. Chromium is a metal naturally found in rocks, soil, and the tissue of plants and animals. Cr(VI) is used in industrial products and processes and is a known carcinogen when inhaled (i.e., through breathing). On May 28, 2014, the California Department of Public Health adopted a new groundwater Maximum Contaminant Level for Cr(VI) of 0.01 mg/L, effective July 1, 2014.

and furans, pesticides, and asbestos (CH2M HILL 2013). Various other COPCs have also been detected at concentrations above screening levels.[2]

The proposed Project involves soil investigation activities within the Project Site. These investigation activities required to determine the nature and extent of soil contamination at the Station and surrounding area are evaluated and summarized in the *Soil RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan* (Soil RFI/RI Work Plan or Soil Work Plan) (CH2M HILL 2013; **Appendix A** to this DEIR) and the *Corrective Measures/Feasibility Study Work Plan* (CM/FS Work Plan) (CH2M HILL 2008). The proposed Project would provide sufficient data for the completion of the RFI/RI process that is consistent with applicable state law and would support evaluation of possible remedy action if determined necessary. The results of the investigation activities will be compiled and combined with all investigation data sets for the preparation of the Final RFI/RI Report Volume 3 (Soil). The investigation of soil which is the subject of this DEIR, along with existing data at the Project Site will enable the evaluation and selection of corrective measures, if necessary, in a future *Soil Corrective Measures Study/Feasibility Study* (Soil CMS/FS). If soil remediation is determined necessary, the remedial alternatives will be evaluated in a separate environmental review under CEQA.

1.3.1 Project Location

The proposed Project would be implemented at and in the vicinity of the Station, which is located in the Mojave Desert approximately 12 miles southeast of the City of Needles, California, and approximately 4 miles south of the community of Golden Shores, Arizona (see Figure 3-1 in Chapter 3 of this document). The Station is within a 66.8-acre parcel of land owned by PG&E that is located approximately 1,500 feet west of the Colorado River and less than 1 mile south of Interstate 40. The area of the Station that is developed (buildings and/or paving) is fenced and encompasses approximately 15 acres.

The areas within which soil investigation activities, such as equipment staging, access/haul routes, and observations, would occur includes the area inside the Station fence line as well as surrounding areas of the Station that may have been affected by historical operational practices (see Figures 3-2 through 3-6 in Chapter 3 of this document). The Project Site totals approximately 128.5 acres and encompasses areas beyond PG&E's property line.

The lands adjoining the PG&E parcel are owned and/or managed by a number of government agencies and private entities, including lands owned by the Fort Mojave Indian Tribe (FMIT); the Havasu National Wildlife Refuge, which is managed by the U.S. Fish and Wildlife Service (USFWS); lands managed by the Department of the Interior (DOI) (including the U.S. Bureau of Land Management and U.S. Bureau of Reclamation); California Department of Transportation

2 Soil screening levels are used to identify chemical concentrations that would require further soil investigation and possible remediation. The screening levels are based on naturally-occurring background concentrations, DTSC California Human Health Screening Levels, USEPA Regional Screening Levels, or ecological comparison values. If human or ecological-based screening levels are lower than the background concentration, the background concentration is used as the screening level.

(Caltrans)—leased land; the Burlington Northern Santa Fe Railway (BNSF); and other privately owned lands (see Figure 3-7 in Chapter 3 of this document).

1.3.2 Project Objectives

The primary and fundamental objective of the soil investigation activities is to gather sufficient soil samples to be able to reliably characterize the nature and extent of soil and sediment contamination within the Project Site. If approved, soil and sediment would be analyzed for COPCs previously identified in the Project Site (inside and outside the Station fence line) that resulted from historical Station practices, as informed by prior soil sampling, thereby enabling completion of the Final RFI/RI Report Volume 3 (Soil) and risk assessment as required by the 1996 Corrective Action Consent Agreement[3] as soon as practicable and consistent with applicable state laws and regulations. Additional Project objectives include:

- Finalizing the evaluation of soil properties and contaminant distribution to support preparation of the future Soil CMS/FS, including gathering a sufficient level of information to identify a range of remedial alternatives;
- Assessing whether soil contaminant concentrations pose a threat to groundwater; and
- Assessing whether soil and sediment contamination have the potential to migrate off-site and, if so, gathering sufficient information to assess measures that may be required to prevent and minimize such migration to ensure protection of health, safety, and the environment.

The soil investigation activities do not predetermine remedial design options or alternatives. Rather, the data collected from implementation of the Project would be combined with the existing data sets to address the Data Quality Objectives outlined in the Soil Work Plan and inform DTSC if additional action or remediation is necessary for the identified investigation areas. The investigation of soil would also inform and enable, if necessary, the evaluation and selection of corrective measures in a future Soil CMS/FS.

1.3.3 Description of the Proposed Project

The proposed Project includes soil sampling and analysis as described in the Soil Work Plan; potential bench scale tests, pilot studies, and geotechnical evaluations to support a future Soil CMS/FS; and potential plant or other biota sampling activities to support ecological risk assessment. Bench scale tests and pilot studies may be implemented after soil sampling analysis is completed to evaluate potential soil remedy options if remedial action is necessary.

[3] In 1996, PG&E and DTSC entered into a Corrective Action Consent Agreement pursuant to DTSC's Resource Conservation and Recovery Act Corrective Action Program to more fully investigate the nature and extent of contamination at the Station and in the surrounding area, including soil contamination (see Section 2.3 for more information).

1.3.3.1 Soil Sampling and Sample Analysis

The soil sample and sample analysis involves the collection of surface and subsurface soil and sediment samples, and the chemical analysis of those samples for COPCs based on the historical use of the area and previous soil investigations. The following list is a summary of activities that are included as part of the soil sampling and analysis. For a complete description of the activities, see Chapter 3, "Project Description."

- Acquire permission or permits to access certain restricted areas.
- Create physical access to certain locations (e.g., grading, boulder removal, or vegetation trimming, pruning, or clearing) where no or limited access currently exists.
- Establish temporary weather- and dust-monitoring stations, as determined necessary.
- Set up staging areas for equipment and displaced soil storage, maintenance/fueling, and decontamination; to the extent feasible, all of the staging areas will be located in previously disturbed and existing operational areas with either existing natural topographic boundaries or fencing that defines the staging area boundaries.
- Stake sample locations.
- Conduct pre-investigation field checks.
- Identify potential conflicts with subsurface utilities.
- Conduct video surveys and flow testing/dye testing of storm drain lines.
- Drill or excavate soil borings.
- Install Soil Vapor Probes.
- Collect and preserve soil, pore water, and sediment samples for laboratory analyses.
- Perform certain analyses in the field using field-testing equipment and methods.
- Properly abandon boreholes.
- Transport the samples to the analytical laboratory.
- Analyze the samples for selected COPCs.
- Evaluate for data gaps and ultimately present data and conclusions in a written report.
- Manage investigation-derived waste (IDW); any long-term storage of excavated soil would also be in existing operational areas.

1.3.3.2 Geotechnical Evaluations

Geotechnical evaluations would be performed on select samples to provide information to support the development of the Soil CMS/FS. In addition, some areas would be investigated using geophysical methods to identify the presence of subsurface objects or obstructions. It is anticipated that geotechnical evaluations would be undertaken within or near Areas of Concern (AOCs) that have steep slopes and where remediation is determined necessary. Geotechnical borings would be drilled using hollow-stem auger drills. Soil samples would be collected using the standard penetration test and modified California ring samplers for index properties, strength, and compaction characteristics.

1.3.3.3 Bench Scale Tests and Pilot Studies

Bench scale tests and pilot studies may be implemented to evaluate potential soil remedy options if remedial action is necessary. The bench scale tests and pilot studies to be considered will be guided by the results of the soil sampling activities and soil risk assessment.

Bench Scale Tests

A total of three bench tests may be proposed that would evaluate: soil washing; in situ soil flushing; and in situ fixation/chemical reduction/stabilization. The tests would consist of collecting three to five 5-gallon buckets of contaminated soil for each treatment methodology for off-site testing. The soil would be excavated using either hand tools or an excavator and would then be shipped to an off-site laboratory for testing. Soil used for bench scale testing would be disposed of by the laboratory and would not be reused on-site.

Pilot Studies

In Situ Soil Flushing

The in situ soil flushing pilot study would consist of a pilot test area plot located in an area known to have contamination, flushing it with water (possibly containing flushing reagents), and testing the then flushed soil to see if the contaminants are removed from the soil. The in situ soil flushing pilot study would include the construction of either an infiltration gallery or four injection wells for the application of water. Contaminants would be transferred from soil to water, which would then be recovered via six extraction wells. Recovered water would then be treated using the existing on-site treatment facility or it would be trucked to an off-site treatment facility. While the exact location for the soil flushing has not yet been determined, plausible areas where soil flushing would be a viable remedial technology would be within the bottom of Bat Cave Wash. Existing vegetation would be avoided.

In Situ Stabilization/Chemical Fixation

The in situ stabilization/chemical fixation pilot study would involve the addition of reagents to react with targeted constituents in the soil to chemically convert contaminants into insoluble minerals that are permanently stable at the Project Site. This would include construction of a small-scale on-site treatment delivery system (infiltration gallery or four injection wells) over an area known to have contaminated soil. Reagents would be applied to soil by infiltrating a liquid from the surface or through the injection wells. While the exact location has not yet been determined, plausible areas where in situ stabilization/fixation would be a viable remedial technology would be within the bottom of Cave Wash and within the Station. Existing vegetation would be avoided in the bottom of Bat Cave Wash.

Plant or Other Biota Sampling

Plant or other biota sampling may be conducted to evaluate the potential risk to herbivorous and invertivorous wildlife populations. To minimize additional soil sampling, tissue samples would be collected from locations where soil sampling has already been completed or planned provided adequate biomass is available from those locations. The tissue sampling methods recommended would not require use of motorized equipment and tissue would be collected from areas providing foraging habitat.

1.4 Summary of Project Alternatives

The following provides a summary of each of the alternatives that are considered in this DEIR. For a full discussion of the alternatives and an evaluation of their potential environmental effects, refer to Chapter 7, "Alternatives to the Proposed Project."

1.4.1 Reduction of Project Footprint Alternative (Avoid Mouth of Bat Cave Wash)

Under the Reduction of Project Footprint Alternative, the Project footprint would be reduced to omit soil investigation activities in the mouth of Bat Cave Wash. This would result in the elimination of 23 borehole locations in a grid pattern of generally about 100 feet between samples. Also, additional potential boreholes that are part of the 25 percent contingency would not be conducted. Under the current Project design, up to 3 acres of Salt Cedar habitat are anticipated to be temporarily impacted; 50 percent (up to 1.5 acres) of which would be impacted within the mouth of Bat Cave Wash through trimming, pruning, or clearing of vegetation for access and sampling/drilling. Under this alternative, the impacts to riparian habitat (i.e., Salt Cedar habitat) would be reduced by approximately 50 percent. This alternative would also reduce the extent of impacts to the Topock Traditional Cultural Property (see Section 4.4.1.6) by limiting the Project footprint.

1.4.2 Reduction of Project Noise Alternative

Under the Reduction of Project Noise Alternative, a Project restriction would be put in place such that only one piece of equipment would be allowed to be in operation at any given time, in comparison to three pieces of equipment that are assumed in the analysis for the proposed Project. Putting this restriction in place would likely result in an extension of the Project schedule by one month.

1.5 Summary of Known Controversial Issues

CEQA Guidelines require that the summary of an environmental impact report (EIR) include a synopsis of known issues of controversy that have been raised by agencies and the public (CEQA Guidelines, Section 15123). A notice of preparation (NOP) for the Project was released on November 28, 2012, and is included in this DEIR as **Appendix B**. The NOP and the scoping process are described in Chapter 2 of this DEIR. Agency and public scoping meetings were held from December 11 to December 13, 2012, to receive oral comments on the scope and content of the DEIR. The following is a summary of the known issues that were received during the NOP comment period:

- **<u>Issue</u>:** Concerns regarding contamination in the Project Site and the scope and duration of investigative and remedial actions being considered, and clarification on the relationship between soil investigation activities and groundwater remediation (e.g., how the soil investigation areas were determined; the size of the contaminated groundwater plume and how much time would be required to investigate contamination; timelines and background discussions for soil investigations and groundwater cleanup).
  - **<u>Where Addressed in the DEIR</u>:** Contamination is discussed in the environmental analysis in Sections 4.2, "Air Quality"; 4.5, "Hazardous Materials"; and 4.6, "Hydrology and Water Quality." The scope of soil investigation is described in detail in Chapters 2, "Introduction," and 3, "Project Description," and in Sections 4.5, "Hazardous Materials," and 4.6, "Hydrology and Water Quality." The duration of the investigative process is described in Chapter 3, "Project Description." The relationship of groundwater cleanup with implementation of the proposed Project is discussed in Chapters 2, "Introduction," and 3, "Project Description."

- **<u>Issue</u>:** Potential impacts to the environment of the investigation and remediation process, particularly the impact to Native American cultural and archaeological resources in the immediate vicinity of the Station and the surrounding landscape (e.g., how the geographic description was chosen; analysis of social change in regards to the Project).
  - **<u>Where Addressed in the DEIR</u>:** The description of potential impacts to Native American cultural and archaeological resources is included in Section 4.4, "Cultural Resources," of this DEIR. Section 4.7, "Noise," also discusses issues of particular concern to Native American Tribes.

- **<u>Issue</u>:** Range of environmental issues that should be addressed in the DEIR (i.e., whether all of the alternatives to investigation will be properly/fully addressed in the DEIR).
  - **<u>Where Addressed in the DEIR</u>:** The purpose of this DEIR is to evaluate the potential environmental effects associated with implementation of the proposed Project to all resources that could be affected. Section 2.5 provides a list of those resources that are analyzed in this DEIR and Section 5.3 provides rationale for those resources that were not evaluated in detail. Chapter 7, "Alternatives to the Proposed Project," provides a comparative analysis of the alternatives to the proposed Project. The process of identifying investigative and remedial technologies is not the focus of this document. Details regarding the available technologies and effectiveness of each are presented in the Soil Work Plan (CH2M HILL 2013; Appendix A).

1.6 Issues to Be Resolved

DTSC has prepared this DEIR using the review of available technical information regarding potential alternatives to the investigation of the contaminated soil. As required by CEQA, DTSC must evaluate the material in this DEIR, including the identified mitigation measures and potentially feasible alternatives, before deciding whether to approve the Project or an alternative to the Project. Aside from those basic decisions, at this time, there are no issues to be resolved regarding the selection of alternatives or regarding implementation of the proposed Project.

1.7 Summary of Impacts and Mitigation

Information in **Table 1-1**, "Summary of Impacts and Mitigation," has been organized to correspond with the environmental issues discussed in Chapter 4, "Environmental Analysis."

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Aesthetics			
IMPACT AES-1: The proposed Project would not have a substantial adverse effect on a scenic vista.	Less than Significant	No mitigation is required.	N/A
IMPACT AES-2: The proposed Project would not substantially damage scenic resources, including trees, rock outcroppings, or historic buildings, within a state scenic highway.	Less than Significant	No mitigation is required.	N/A
IMPACT AES-3: The proposed Project would introduce incremental change comparable in height and character to the existing built elements in the landscape and as such would not substantially degrade the existing visual character of the Project Site.	Less than Significant	No mitigation is required.	N/A
IMPACT AES-4: The proposed Project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.	Less than Significant	No mitigation is required.	N/A
IMPACT AES-5: The proposed Project would not conflict with plans and policies protecting visual resources.	Less than Significant	No mitigation is required.	N/A
Air Quality			
IMPACT AIR-1: The proposed Project would not exceed the Mojave Desert Air Quality Management District daily or annual thresholds of significance. The proposed Project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation, nor result in a cumulatively considerable net increase of any nonattainment pollutant.	Less than Significant	No mitigation is required.	N/A
IMPACT AIR-2: The proposed Project would not emit carbon monoxide in quantities that would pose health effects. The duration of proposed soil investigation activities would constitute a small percentage of the total 70-year sensitive receptor exposure period for toxic air contaminants. The proposed Project would not expose sensitive receptors to substantial pollutant concentrations.	Less than Significant	No mitigation is required.	N/A
Biological Resources			
IMPACT BR-1: Implementation of the proposed Project could result in disturbance and/or removal of riparian vegetation, wetlands and other waters of the United States under U.S. Army Corps of Engineers and California Department of Fish and Wildlife jurisdiction along the Colorado River; specifically within Bat Cave Wash and East Ravine.	Significant	**Mitigation Measure BR-1: No-net-loss of Wetland, Riparian or other Sensitive Habitat Function or Value** The Project shall be implemented to avoid effects to the habitat values and functions of identified jurisdictional areas (i.e., floodplain and riparian areas, wetlands, and waters of the United States and habitats designated by CDFW as sensitive, including ephemeral washes and western honey mesquite bosque). Before undertaking ground-disturbing activities within East Ravine and Bat Cave Wash, a qualified biologist shall coordinate with PG&E to ensure that the footprints of investigation activities, including drill pads, staging areas, and access routes, are designed to avoid disturbance to sensitive habitats to	Less than Significant

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		the extent feasible. Where complete avoidance is not feasible, Project activities shall be implemented to ensure no-net-loss of habitat value or function. The following avoidance measures shall be implemented when working in Bat Cave Wash and East Ravine: • No plants or vegetation shall be completely removed – only pruning, trimming, clearing, or similar approaches which allow the natural regrowth of the plant will be allowed; • Vegetation pruning, trimming, or clearing shall only occur to access investigation sites and clear around the sample areas where absolutely necessary; • The only vegetation to be cut off at the base (cleared rather than pruned or trimmed) will be salt cedar at the mouth of Bat Cave Wash. The roots of the salt cedar at the mouth of Bat Cave Wash will be left in place where possible to allow for natural, rapid regrowth of vegetation; • No more than 20 percent of the crown on all native trees, such as palo verde, shall be trimmed, and no main branches shall be trimmed. This is consistent with what is recommended by the International Society of Arboriculture (ISA 2011); • Complete removal of vegetation in any work area shall be prohibited; and • Project equipment and materials from work areas shall be completely removed and, if the area is not paved, it shall be raked/brushed to remove tire tracks. A biological monitor shall be present for all vegetation trimming, pruning, and clearing to ensure the above measures are implemented and that vegetation is protected to the extent feasible.	
IMPACT BR-2: Implementation of the proposed Project would not affect special-status plants. Mousetail suncup is the only special-status plant species that was observed within the Project Site. However, there are no Project activities planned in areas where Mousetail suncup is established.	Less than Significant	No mitigation is required.	N/A
IMPACT BR-3: Implementation of the proposed Project could affect special status invertebrates, specifically the MacNeill's sootywing skipper, either directly or through habitat modifications. Impacts to MacNeill's sootywing skipper habitat at East Ravine would be minimal as all work will be completed by hand and access to each pore water sampling site would be by boat or by foot.	Less than Significant	No mitigation is required.	N/A
IMPACT BR-4: While the proposed Project could result in the temporary loss of foraging habitat for these species, the loss of foraging habitat would not substantially affect any special-status birds due to the abundance of foraging habitat in the vicinity of the Project Site. Implementation of the proposed Project could affect the active nests of special-status birds. In addition, visual or noise disturbance of active nests could result in nest abandonment and loss of sensitive bird species.	Significant	Mitigation Measure BR-4: Disturbance of Special-Status Birds. The following measures shall be implemented to avoid impacts to active nests and nesting birds and to ensure compliance with the Migratory Bird Treaty Act and California Fish and Game Code: • Where possible, vegetation trimming, pruning, or clearing and other activities shall be timed to avoid the nesting season for special-status bird species that may be present (March 15 through September 30). • If vegetation removal or other Project activities are necessary in vegetated areas between March 15 and September 30, focused surveys for active nests of special-	Less than Significant

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		status birds (including Arizona Bell's vireo, California black rail, Yuma clapper rails and other species identified in Table 4.3-3) shall be conducted no more than 72 hours before such activities begin. A qualified biologist shall conduct pre-investigation surveys to identify active nests that could be affected. The appropriate area to be surveyed and the timing of the survey may vary depending on the activity and species that could be affected and shall be determined by the qualified Project biologist. For the Yuma clapper rail, the pre-investigation surveys shall specifically identify habitat within 300 feet of investigation areas, in accordance with measures set forth in the Bird Avoidance and Minimization Plan (BIAMP) which was finalized on April 30, 2014 (CH2M HILL 2014). • The qualified Project biologist shall implement all of the avoidance and minimization measures that are outlined in the BIAMP (CH2M HILL 2014). • The biologist shall consult the BIAMP (CH2M HILL 2014) for required nesting bird avoidance buffers and requirements for the on-site biological monitor. Buffers vary depending on the species of bird, so the BIAMP (CH2M HILL 2014) should be consulted once a nest is identified.	
IMPACT BR-5: Implementation of the proposed Project could affect desert tortoises, either directly or through habitat modifications.	Significant	Mitigation Measure BR-5: Disturbance of Desert Tortoise and Loss of Habitat. Consistent with the PBA and the USFWS letter concurring with the PBA, the following measures shall be implemented: • Before any ground-disturbing Project activities begin, a qualified desert tortoise biologist (i.e., an experienced tortoise expert whom USFWS would be confident in the evaluation and survey for the presence of the desert tortoise under the PBA) shall identify potential desert tortoise habitat in areas that could be affected by the Project activities. The qualified biologist shall conduct a pre-investigation desert tortoise clearance survey prior to the start of investigative activities. They shall also conduct monitoring on a spot basis (1–2 days for a 2-week period) or as a result of a change in investigation boundaries or limits. • PG&E shall designate a field contact representative (FCR) who will be responsible for overseeing compliance with the mitigation measures. The FCR shall be trained by the qualified biologist and have authority to halt activities that are in violation of the mitigation measures/or pose a danger to listed species. The FCR will have a copy of the mitigation measures when work is being conducted on the site. The FCR may be a project manager, PG&E representative, or biologist. • Prior to Project activities and immediately prior to the initiation of ground disturbance, a qualified desert tortoise biologist shall conduct worker awareness training for all PG&E employees and the contractors involved with the proposed Project. • The FCR will be on-site during all Project activities. The qualified biologist will examine work areas for desert tortoises and their sign (i.e., burrows, scat, tracks, remains, and pallets), ensuring 100 percent coverage of the area, and clear each area of activity prior to work initiation. Any desert tortoise burrows and pallets outside of, but near, the project footprint shall be flagged at that time so that they	Less than Significant

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		may be avoided during work activities. At conclusion of work activities, all flagging shall be removed. Should any live tortoises be found during the clearance survey, or if a tortoise moves into the work area, all work shall stop immediately and the animal shall be left to move out of the work area on its own accord. Tortoises shall not be handled. Encounters with desert live desert tortoises shall be reported to BLM Lake Havasu biologists. Information to be reported will include for each individual: the location (narrative, vegetation type, and maps) and date of observation; general conditions and health; any apparent injuries and state of healing; and diagnostic markings. • All workers shall be required to check under their equipment or vehicle before it is moved. If a desert tortoise is encountered under vehicles or equipment, the vehicle shall not be moved until the animal has voluntarily moved to another location or to a safe distance from the parked vehicle.	
IMPACT BR-6: Implementation of the proposed Project could affect ring-tailed cat, either directly or through habitat modifications.	Significant	Mitigation Measure BR-6: Disturbance of Ring-Tailed Cat and Loss of Habitat. The following measures shall be implemented: • Pre-investigation surveys for ring-tailed cats will be conducted by a qualified biologist prior to the start of investigation activities. No activities that will result in disturbance to nests or ring-tailed cats will proceed prior to completion of the surveys. If no active nests are found, no further action is needed. If a ring-tailed cat nest is present, part b (below) will be implemented. The CDFW will also be notified of any active nests within the proposed disturbance zones. • Ring-tailed cats are fully protected under Fish and Game Code Section 4700, as described above. If an active ring-tailed cat nest is found, the Project shall be redesigned to avoid the loss of the site occupied by the nest if feasible. If the Project cannot be redesigned to avoid the nest, the CDFW will be contacted for their input. If approved by the CDFW, demolition of the nest site will commence outside of the breeding season (February 1 to August 30). If a non-breeding nest is found in a site scheduled to be removed, prior to disturbance, the CDFW will be notified to review and approve proposed procedures to ensure that no take occurs as a result of the action. Sites with nests that need to be removed will first be disturbed at dusk, just prior to removal that same evening, to allow ring-tailed cats to escape during the darker hours.	Less than Significant
IMPACT BR-7: Increased sedimentation and turbidity and the release of contaminants during Project activities could adversely affect fish habitat and movement in the Colorado River.	Less than Significant	No mitigation is required.	N/A
IMPACT BR-8: Implementation of the proposed Project would not have substantial adverse effects on the viability of populations of species covered in the Lower Colorado River Multi-Species Conservation Program (LCR MSCP), the effectiveness of the LCR MSCP's conservation strategy, and attainment of the goals and objectives of the LCR MSCP. Additionally, the Project would not conflict with resource management goals of the USFWS, BLM, or	Less than Significant	No mitigation is required.	N/A

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
DOI.			
IMPACT BR-9: Implementation of the proposed Project would not substantially interfere with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	Less than Significant	No mitigation is required.	N/A
Cultural Resources			
IMPACT CR-1: Implementation of the proposed Project could cause a substantial adverse change in the significance of the historical resource identified as the Topock TCP as a result of the physical destruction and alteration to the characteristics of the property that convey its historical significance and qualify it for inclusion in the CRHR as defined in CEQA Guidelines Section 15064.5. The substantial adverse change to the TCP and its contributing elements would result from ground-disturbing activity that would directly and adversely affect the soil, landforms, and prehistoric archaeological resources; pruning or alteration of the natural growth of native and traditional plant species; and the presence of equipment, workers, and vehicles, which would introduce activities that are inconsistent with the natural setting associated with the Topock TCP. These activities would also materially affect the cultural values ascribed to the TCP by Tribes.	Significant	**Mitigation Measure CR-1: Historical Resource Identified as the Topock TCP** **CR-1a: Tribal Coordination** ***CR-1a-1: Tribal Document Review and Comment.*** Interested Tribes shall continue to be afforded the opportunity to review and comment on all cultural resources-related documentation prepared as a result of this Project. Tribal comments shall be considered to the extent feasible by DTSC, in coordination with Interested Tribes, PG&E, and representative landowners (BLM, BOR, FMIT, PG&E, and USFWS). Cultural resources documents shall include, but not be limited to, pre-investigation verification survey memoranda; daily archaeological monitoring logs; monitoring report to be prepared at the close of ground-disturbing activities; annual monitoring reports; and any documentation arising as a result of the inadvertent discovery of potential historical resources of a Tribal nature pursuant to CR-2d (Inadvertent Discovery of Potential Historical Resources and Unique Archaeological Resources). Interested Tribes shall also be afforded the opportunity to review and comment on technical documents including, but not limited to, soil investigation-related plans and reports, bench and pilot study implementation plans, and biological resources reports. ***CR-1a-2: Tribal Access.*** Interested Tribes shall be provided access to the Project Site to the extent PG&E has the authority to facilitate such access and be consistent with existing laws, regulations, and agreements as they pertain to property within the Project Site. On federal property, access shall be governed by the provisions of Appendix B (*Tribal Access Plan*) of the CHPMP. On non-federal property, access shall be accommodated by PG&E to the extent feasible**;** the access plan may place restrictions on access into certain areas, such as the Station and the existing evaporation ponds, subject to DTSC review with regard to health and safety concerns and to ensure noninterference with approved investigation activities. PG&E shall retain copies of all access-related communications to be provided to DTSC on a quarterly basis, as required by CR-1a-3. ***CR-1a-3: Tribal Communication.*** Consistent with past practices and the communication processes previously entered into by PG&E with Interested Tribes, PG&E shall continue to communicate with Interested Tribes prior to the start of and during investigation activities for the Project. PG&E shall document, and accommodate where feasible, the Tribes' preferences for method of communication and for transmitting large documents, and shall seek to avoid scheduling conflicts between scientific survey (i.e., pre-investigation historical resources verification survey, annual historical resources monitoring, and biological resources survey) and Topock-related meeting activities to the greatest extent possible. Outreach efforts between the Interested Tribes and PG&E	Significant and Unavoidable

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		shall be communicated by PG&E to DTSC quarterly during investigation activities for review and input. Communication protocols as they relate to Tribal involvement in the worker cultural resources sensitivity training shall be governed by CR-1b. Communication protocols as they relate to Tribal monitoring of scientific survey and Project-related ground-disturbing activities shall be governed by CR-1d. Communication protocols as they relate to Tribal monitoring of annual historical resource monitoring shall be governed by CR-2c. Communication protocols as they relate to inadvertent discoveries of potential historical resources as defined by CEQA will be governed by CR-2d. Human remains will be governed by CR-4. **CR-1b: Worker Education Program** A worker cultural resources sensitivity program shall continue to be implemented for the Project consistent with existing practices. Specifically, an initial sensitivity training session shall be provided by PG&E to all Project employees, contractors, subcontractors, and other professionals prior to their involvement in any ground-disturbing activities, with subsequent training sessions to be held as new personnel become involved in the Project. PG&E shall invite Interested Tribes to participate in and present Tribal perspectives during the training sessions. The sensitivity program shall address: the cultural (Native American, archaeological, and paleontological) sensitivity of the Project Site and a tutorial providing information on how to identify these types of resources; appropriate behavior; worker access routes and restrictions; work area cleanliness; procedures to be followed in the event of an inadvertent discovery; safety procedures when working with monitors; and consequences in the event of noncompliance. PG&E shall notify DTSC and the Interested Tribes no less than 2 weeks prior to the initial training session. Subsequent training sessions may be of a less formal nature; however, they must be comprehensive in the subject matter covered. DTSC and Tribes will be notified prior to the occurrence of subsequent training sessions and afforded the opportunity to participate. The program agenda and materials together with attendance rosters will be provided to DTSC within 1 week of each training session. **CR-1c: Pre-Investigation Historical Resources Field Check** ***CR-1c-1: Personnel Qualifications Standards.*** Cultural resources consulting staff shall meet, or be under the direct supervision of individuals meeting, the minimum professional qualifications standards (PQS) set forth by the Secretary of the Interior (codified in 36 CFR Part 61; 48 FR 44739). DTSC shall have approval authority over PG&E's cultural resources consultant. ***CR-1c-2: Pre-Investigation Historical Resources Field Check.*** A pre-investigation historical resources field check shall be conducted by PG&E not less than four weeks prior to the commencement of ground-disturbing activities. The field check shall include all sampling locations, including any future pilot study areas, new access areas, and equipment and materials staging areas, plus a 50-foot buffer surrounding sampling areas where topography allows. Sampling activities may occur within the buffer area without additional field check. Interested Tribes shall be afforded the opportunity to participate	

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		and shall be provided 2 weeks (14 calendar days) notice prior to the start of the field check. The objective of the field check will be to verify that additional resources qualifying as historical resources under CEQA are not present within the investigative location areas. Interested Tribes shall be afforded the opportunity to identify, and DTSC to consider, for the purposes of avoidance, any physical features of Tribal significance within the field check area, including but not limited to trails, rock features, desert pavement areas, and cleared circles that might be considered contributors to the TCP. A *Pre-Investigation Historical Resources Field Check Memorandum* following the California Office of Historic Preservation's (OHP's) *Archaeological Resource Management Reports (ARMR)* guidelines, shall be prepared by PG&E that documents the methods of the field check, participants involved in the field check, and the results of the field check. Interested Tribes shall be invited to prepare a section that reports Tribal observations during the field check, and asked to provide any observations to PG&E within 2 weeks. The Memorandum shall be submitted to DTSC for review and comment within 3 weeks from completion of the field check, and the submission shall include any Tribal observations given to PG&E within the two-week time frame set forth above. Tribal review and comment of the *Pre-Investigation Historical Resources Field Check Memorandum* shall be governed by CR-1a-1. In the event that resources qualifying as historical resources under CEQA are found in the investigation areas, including physical features of traditional cultural value to Interested Tribes as contributors to the TCP or archaeological resources, are identified during the field check, treatment of such resources shall be governed by procedures outlined in CR-1e and CR-2, respectively. If avoidance of the identified resources is determined by DTSC, in coordination with respective landowners, Interested Tribes, and PG&E to be infeasible because it would impede the fundamental Project objective to obtain sufficient information to allow for a complete soil characterization of the area, protective actions (such as elevated ramps, protective coverings or other types of temporary capping) shall be taken to reduce or minimize impacts to the resource to the maximum extent feasible. Any protective measures would be implemented in coordination with DTSC. Work areas would be restored to pre-investigation conditions consistent with CR-1e-6. **CR-1d: Cultural Resources Monitoring Program** The Cultural Resources Monitoring Program shall be consistent with Appendix C (*Topock Remediation Project Programmatic Agreement Tribal and Archaeological Monitoring Protocols*) of the PA and Section 6.6.4, "*Construction Monitoring*," of the CHPMP. PG&E shall include DTSC as a party requiring notification and coordination along with the parties already listed in the Appendix C Monitoring Protocols. Archaeological monitoring shall be conducted during all Project-related ground-disturbing activities for the purpose of identifying and avoiding impacts to archaeological resources that could potentially qualify as historical resources under CEQA. Archaeological monitors shall work under the direct supervision of an archaeologist meeting the PQS as described in CR-1c-1 and shall complete daily monitoring logs. Upon completion of investigation activities, a Soil Investigation Monitoring Report shall be prepared following ARMR guidelines. The monitoring	

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		report shall document dates of monitoring and monitoring participants, activities observed, soil types observed, and any archaeological resources encountered. PG&E shall provide Interested Tribes an opportunity to contribute their observations to the monitoring report. To be included in the monitoring report, the Tribal section must be provided to PG&E within 8 weeks after completion of monitoring activities. DPR 523 forms, following the OHP's *Instructions for Recording Historical Resources,* shall be prepared and filed with the SBAIC for all newly identified resources and shall be appended to the monitoring report. The report shall be provided to the Tribes for review and comment consistent with CR-1a-1. The report shall be provided to DTSC and the Tribes for review and comment within 16 weeks of Project completion. Interested Tribes shall be invited to monitor during scientific survey (as defined in CR-1a-3) and all ground-disturbing activities associated with the Project. PG&E shall provide Tribal monitors with reasonable compensation consistent with historic rates, for all monitoring work performed. Interested Tribes shall be afforded a minimum of 1 week's notice prior to the commencement of project-related ground-disturbing activities. During Project activities, Interested Tribes shall be provided with weekly work forecasts to facilitate scheduling of monitors. Because Project implementation activities are often unpredictable, there may be changes in work activities. Interested Tribes shall be notified by PG&E of any scheduling changes as soon as possible. PG&E will utilize daily field meetings, telephone, and email as methods of communicating work schedules. Tribal Monitors shall be alerted at the end of each work day whether work activities will be taking place the following day. **CR-1e: Protective Measures for the Topock TCP** ***CR-1e-1: Avoidance and Preservation in Place.*** PG&E shall carry out, and require all subcontractors to carry out, all Project activities in ways that minimize significant impacts to resources associated with the Topock TCP consistent with Stipulation I (B) of the PA and Section 7.1 of the CHPMP, and to the maximum extent feasible as it relates to the Project objectives of soil characterization as determined by DTSC, in coordination with PG&E, Interested Tribes, and respective landowners. ***CR-1e-2: Restrict Personnel Access Beyond Delineated Work Areas.*** Work areas (including sampling locations, new access areas, and materials and equipment staging areas) shall be fenced, or otherwise delineated, in coordination with Tribal monitors to prevent incursion of personnel outside of designated work areas. ***CR-1e-3: Prioritized use of Previously Disturbed Areas.*** Priority shall be given to siting project elements within previously disturbed areas (areas disturbed within the last 50 years) over undisturbed or pristine areas to the maximum extent feasible as determined by DTSC, in coordination with Interested Tribes, PG&E, and respective landowners, to minimize impacts to intact landforms and natural features important to Tribes as part of the Topock TCP. Interested Tribes shall be afforded the opportunity to express, and DTSC shall consider, whether there are specific instances where disturbed areas may be more culturally sensitive than non-disturbed areas. ***CR-1e-4: Avoidance of Indigenous Plants of Biological and Cultural Significance.*** Prior to Project initiation, a qualified biologist capable of identifying both native and non-native plants within the region (to species) shall flag (or otherwise mark) indigenous	

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		plant specimens that shall be protected and avoided. The qualified biologist shall educate all on-site Project personnel about the indigenous plants prior to their involvement in Project activities at the Project Site. During Project activities, a biological monitor shall be present at all times to ensure the indigenous plant species of biological and traditional cultural significance as identified in Appendix D-3 of this DEIR are protected and avoided during Project implementation to the extent practicable. Flagging of indigenous plant species and worker education (consistent with CR-1b) shall occur prior to Project initiation. Protection of identified species shall occur through biological monitoring during investigative activities and Project implementation. ***CR-1e-5: Minimize Noise Disturbances.*** Impacts to the natural auditory setting associated with the TCP shall be minimized to the extent feasible as governed by NOI-1. ***CR-1e-6: Work Area Restoration.*** As discussed in the "Project Description," Section 3.5.6, following completion of work in each work area, all Project equipment and materials shall be removed from the work areas. If the area is not paved, the area will be raked/brushed to remove tire tracks and restored to substantially the same condition(s) as prior to the soil investigation sampling, to minimize impacts to the natural environment associated with the Topock TCP. ***CR-1e-7: Displaced Soil Procedures*****.** Treatment, handling, and disposition of Resource Conservation and Recovery Act (RCRA) and non-RCRA hazardous materials, nonhazardous materials, and clean materials shall comply with *Management Protocol for Handling and Disposition of Displaced Site Material, Topock Remediation Project, Needles*, *CA* of the Soil RCRA Facility Investigation/Remedial Investigation Work Plan. Soil export, including clays, and soil import will be limited where feasible as determined by DTSC, consistent with the *Protocol*. ***CR-1e-8: Technical Review Committee*****.** The Technical Review Committee (TRC), constituting a multidisciplinary panel of independent scientific and engineering experts to advise the Interested Tribes, shall continue through soil remedy selection and construction phase of the Groundwater Remedy (whichever comes later), at which time the necessity and dollar value of the TRC shall be assessed by PG&E and, with the approval of DTSC, shall either be extended, reduced, or terminated. This TRC is the same committee established by CUL-1a-4 of the January 2011, Certified Groundwater Remedy EIR. ***CR-1e-9: Open Grant Funding.*** Open grant funding, constituting two part-time cultural resource specialist/project manager positions, shall continue through soil remedy selection and construction phase of the Groundwater Remedy (whichever comes later), at which time the necessity and dollar value of the open grant program shall be assessed by PG&E and, with the approval of DTSC, shall either be extended or terminated. This Open Grant Funding is the same as established by CUL-1a-11 of the January 2011, Certified Groundwater Remedy EIR.	
IMPACT CR-2: Known historical resources would be avoided through Project design. No known unique archaeological resources have been identified within the Project Site. Implementation of the proposed Project could, however, cause a substantial adverse change	Significant	**Mitigation Measure CR-2: Historical Resources (Other than the Topock Traditional Cultural Property [TCP]) and Unique Archaeological Resources.** ***CR-2a: Avoidance and Preservation in Place.*** PG&E shall carry out, and require all subcontractors to carry out, all investigation activities in ways that avoid significant	Significant and Unavoidable

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
in the significance of unknown historical resources (other than the TCP) and unknown unique archaeological resources pursuant to CEQA Guidelines Section 15064.5 resulting from ground-disturbing activity.		impacts to historical resources consistent with General Principle I(B) of the PA and Section 7.3 of the CHPMP to the maximum extent feasible as it relates to the Project objectives of soil characterization as determined by DTSC, in coordination with Tribes, PG&E, and respective landowners. ***CR-2b: Additional Protective Measures.*** Mitigation Measures CR-1a through CR-1d, CR-1e-2, and CR-1e-3 shall be implemented to further reduce impacts to historical resources (other than the Topock TCP) and unique archaeological resources. ***CR-2c: Annual Historical Resources Monitoring Program.*** PG&E shall add the known 20 historical resources (including 15 archaeological resources and 5 historic-period built resources located within the Project Site [see Table 4.4-3]), plus any additional historical resources that may be identified during Project implementation, to the established annual monitoring program as prescribed by Section 6.6.5, “Periodic Site Monitoring,” of the CHPMP. Monitoring shall continue on an annual basis (or less frequently as determined by DTSC) until completion of the soil investigation. PG&E shall afford Tribes the opportunity to participate in Tribal monitoring during the annual monitoring program and provide, at a minimum, 2 weeks’ written notice to Tribes prior to the commencement of annual monitoring. The annual monitoring program shall include: confirmation of resource boundaries with submeter GPS; any relocation of previously identified features; confirmation of locations, quantities, and types of artifacts present; and photography to document whether any change in resource condition has occurred. Field observations shall be documented in a Site Condition Assessment Form and a database spreadsheet (such as Microsoft Access of Excel) in accordance with Section 6.6.5, “Periodic Site Monitoring” of the CHPMP. DPR 523 form updates, following OHP *Instructions for Recording Historical Resources,* will be prepared and filed with the SBAIC for all resources where changes in setting or condition are observed. The Site Condition Assessment Forms, database spreadsheet, and DPR 523 form updates shall be provided to DTSC upon completion of each annual monitoring event. PG&E shall notify DTSC upon scheduling and completion of each annual monitoring event. Each annual monitoring event shall be documented in an *Annual Monitoring Report* following *ARMR* guidelines and shall be submitted to DTSC by December 1 of each year. Review and comment of the report by Tribes shall be governed by CR-1a-1. ***CR-2d*: *Inadvertent Discovery of Potential Historical Resources and Unique Archaeological Resources.*** In the event that resources potentially qualifying as historical resources or unique archaeological resources per CEQA Guidelines Section 15064.5 are inadvertently discovered during ground-disturbing activities, work in the vicinity of the discovery shall immediately cease within a 50-meter radius and temporary protective measures shall be implemented. The radius of the protected area may be modified if determined appropriate by the relevant landowner, PG&E, and the Tribal Monitor, with approval by DTSC. PG&E shall notify DTSC within 24 hours of the discovery of any potential historical or unique archaeological resources. Avoidance and preservation in place shall be the preferred manner of mitigating impacts to such resources to maintain the important relationship between artifacts and their archaeological context in order to preserve each resource’s scientific value, as well as to	

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		preserve the cultural values ascribed to resources by the Tribes. The feasibility of avoidance, as it relates to the Project objectives, shall be determined by DTSC, in coordination with PG&E, Tribes, and respective landowners. Preservation alternatives for consideration shall include (and are listed here in order of preference as indicated by Interested Tribes from most to least preferred): avoidance, data recovery of the materials associated with the resource, and capping. Treatment of discoveries shall be managed under Stipulation IX, “Discoveries” of the PA and Section 8, “Discoveries” and Appendix C, “Discovery Plan” of the CHPMP. PG&E shall notify DTSC and coordinate with the parties already listed in the Appendix C Discovery Plan protocols. Avoided resources may be determined discretionarily eligible by DTSC pursuant to CEQA Section 15064.5(a)(3) as individual resources eligible for listing in the NRHP and the CRHR and as contributors to the Topock TCP. In the event, data recovery is the only feasible mitigation available, resources subject to data recovery shall be evaluated for individual listing in the NRHP and CRHR and as contributors to the Topock TCP, taking into consideration all four register criteria, and as unique archaeological resources. Curation of recovered archaeological materials recovered from federal lands shall be consistent with Stipulation XIII(A) and (B) of the PA. Curation of recovered materials from non-federal lands shall be coordinated by and between DTSC, Tribes, and the respective landowner.	
IMPACT CR-3: Implementation of the proposed Project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature as a result of ground disturbing activity.	Significant	**Mitigation Measure CR-3: Paleontological Resources** **CR-3a: Worker Education Program** PG&E shall fully enforce participation in the Worker Education Program as governed by CR-1b to ensure personnel awareness of cultural and paleontological sensitivities associated with the Project Site. **CR-3b: Inadvertent Discovery of Paleontological Resources** In the event of inadvertent discovery of paleontological resources, all work shall be halted within a 50-meter radius and temporary protective measures shall be implemented until the discovery can be evaluated by a qualified paleontologist (defined as a paleontologist meeting the requirements of the Society of Vertebrate Paleontology [SVP, 2010]). The radius of the protected area may be modified if determined appropriate by the relevant landowner, PG&E, and the qualified paleontologist, with approval by DTSC. (Appropriate treatment of the discovery shall be determined by DTSC, in coordination with the qualified paleontologist, PG&E, and respective landowners. Based on the nature of the discovery, the qualified paleontologist shall also reassess the need to initiate paleontological monitoring and make recommendations of such to DTSC, PG&E, and the respective landowner. PG&E shall provide DTSC notification of any paleontological discoveries within 24 hours.	Less than Significant
IMPACT CR-4: Implementation of the proposed Project could, through the process of ground-disturbing activities, disturb human remains, including those interred outside of formal cemeteries.	Significant	**Mitigation Measure CR-4: Human Remains** In the event of inadvertent discovery of human remains, all work shall be halted within a 50-meter radius and temporary protective measures shall be implemented. The radius of the protected area may be modified if determined appropriate by the relevant landowner, PG&E, and the Tribal Monitor, with approval by DTSC. Avoidance and preservation in	Significant and Unavoidable

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		place shall be emphasized as the preferred manner of mitigation for human remains and disturbances shall be avoided to the maximum extent feasible as it relates to the Project objectives of soil characterization, as determined by DTSC, in coordination with Tribes, PG&E, and respective landowners. PG&E shall notify DTSC of any inadvertent discovery of human remains within 24 hours of the discovery. On non-federal land, PG&E shall contact the San Bernardino County Coroner to evaluate the remains and follow the procedures and protocols set forth in Section 15064.4 (e)(1) of the California Environmental Quality Act. If the Coroner determines the remains are Native American in origin, the Coroner shall contact the NAHC. As provided in PRC Section 5097.98, the NAHC shall identify the person or persons believed to be most likely descended from the deceased Native American. The MLD shall be afforded the opportunity to provide recommendations concerning the future disposition of the remains and any associated grave goods as provided in PRC 5097.98. Per PRC Section 5097.98, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred with the MLD regarding their recommendations, taking into account the possibility of multiple human remains. On federal land, the BLM Havasu City Field Office shall be notified and human remains and associated funerary objects shall be treated pursuant to the Native American Graves Protection and Repatriation Act and in accordance with Sections IX and XIII of the PA and Section 8.2 and Appendix D of the CHPMP.	
Hazards and Hazardous Materials			
IMPACT HAZ-1: Implementation of the proposed Project could result in the release of hazardous materials from the use of equipment (fuels, oils and grease, solvents) or from the release of chemicals from the sampled media at hazardous levels.	Less than Significant	No mitigation is required.	N/A
IMPACT HAZ-2: The Station is a listed hazardous waste site. Implementation of the proposed Project could create a significant hazard to the public or the environment by the potential release of contaminants known to be present in soil and groundwater at and beneath the Station.	Less than Significant	No mitigation is required.	N/A
IMPACT HAZ-3: Soil investigation equipment that uses internal combustion engines could ignite wildland fires that could expose people or structures to significant risk. However, the CAL FIRE fire hazard severity zone map identifies the Project Site as within the lowest level of its fire hazard severity zones which is the lowest possible risk category. Moreover, the Project would adhere to substantive provisions of federal and state regulations that address spark arrester protection to prevent potential wildland fire impacts.	Less than Significant	No mitigation is required.	N/A

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Hydrology and Water Quality			
IMPACT HYDRO-1: Implementation of the proposed Project could result in the exceedance of water quality standards or otherwise substantially degrade water quality as a result of releasing contaminants or sediment from waste soil into the environment.	Less than Significant	No mitigation is required.	N/A
IMPACT HYDRO-2: The proposed soil investigation activities would use water from the Station water supply system. The source of this water is from groundwater. The use of this water could deplete groundwater supplies; however the estimated volume of water use would be within the Station's allotment.	Less than Significant	No mitigation is required.	N/A
IMPACT HYDRO-3: Access improvement and site preparation associated with implementation of the proposed Project could disturb surface soil, underlying soil, runoff water, or existing drainage patterns, which could increase erosion, siltation, surface runoff, or flooding.	Less than Significant	No mitigation is required.	N/A
Noise			
IMPACT NOI-1: Ambient noise levels at existing noise-sensitive land uses may experience increased noise levels due to soil investigation activities for short term periods. The proposed Project would exceed applicable County standards for a place of worship and could result in a temporary substantial increase in ambient noise levels.	Significant	**Mitigation Measure NOI-1: Potential Impacts to Noise Levels and Noise Standards.** Investigation activities shall be limited to the daytime hours between 7:00 A.M. to 7:00 P.M., and prohibited on Sundays and federal holidays. • Investigation activities shall be limited to the daytime hours between 7:00 A.M. to 7:00 P.M., and prohibited on Sundays and federal holidays. • Investigation equipment shall be properly maintained per manufacturer specifications and fitted with the best available noise suppression devices (e.g., mufflers, silencers, wraps). Pneumatic powered socket wrenches shall be shrouded or shielded, and all intake and exhaust ports on power equipment shall be muffled or shielded. • Investigation equipment shall not idle for extended periods of time (more than 15 minutes) when not being utilized during investigation activities. • A disturbance coordinator shall be designated by PG&E, which will post contact information in a conspicuous location near investigation areas so that it is clearly visible to nearby noise-sensitive receptors as labeled in Figure 4.7-2. In addition, mailing of the same information will be sent to nearby noise-sensitive receptors as labeled in Figure 4.7-2 and Interested Native American Tribes (Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, Hualapai Indian Tribe, and Quechan Tribe). The coordinator will manage complaints resulting from the investigation noise. Reoccurring disturbances will be evaluated by a qualified acoustical consultant retained by PG&E to ensure compliance with applicable standards. The disturbance coordinator will contact nearby noise-sensitive receptors as labeled in Figure 4.7-2 and Interested Tribes, advising them of the investigation schedule. The disturbance coordinator will also	Significant and Unavoidable

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		consider the timing of soil investigation activities in relation to Tribal ceremonial events that are sensitive to noise, which will be accommodated by PG&E to the extent practicable.	
IMPACT NOI-2: The proposed Project would utilize equipment that would not exceed Federal Transit Administration criteria for generation of ground-borne vibration. The proposed Project would not generate excessive ground-borne vibration and therefore any related ground-borne noise levels.	Less than Significant	No mitigation is required.	N/A
IMPACT CUM-1: Implementation of the proposed Project, in combination with other projects in the geographic scope, could cause a substantial adverse change in the significance of the historical resource identified as the Topock Traditional Cultural Property (TCP); cause a substantial adverse change in the significance of unknown historical resources; and disturb human remains, including those interred outside of formal cemeteries.	Significant	Implement **Mitigation Measures CR-1, CR-2,** and **CR-4**.	Significant and Unavoidable

CHAPTER 2
Introduction

This draft environmental impact report (DEIR) has been prepared by Environmental Science Associates, under contract to the California Department of Toxic Substances Control (DTSC), the lead agency under the California Environmental Quality Act (CEQA) (Public Resources Code, Section 21000 et seq.; as implemented by the California Code of Regulations [CCR], Title 14, Chapter 3, Section 15000 et seq. [CEQA Guidelines]), to evaluate the reasonably foreseeable and potentially significant adverse environmental effects associated with the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Soil Investigation Project (Project) at the PG&E Topock Compressor Station (Station) and surrounding area (Project Site). Under CEQA, DTSC must identify and consider the potentially significant adverse environmental effects of the proposed actions before making a final decision to approve the proposed Project discussed in this DEIR. This DEIR will be used in the planning and decision-making process by the lead agency (DTSC) and all responsible and trustee agencies.

This introductory chapter provides an overview of the environmental review process required under CEQA; background information related to the proposed Project; agency roles and responsibilities; and the organization and terminology used in this DEIR. A detailed description of the proposed Project can be found in Chapter 3, and is based on the soil investigation activities described in the *Soil RCRA Facility Investigation/Remedial Investigation Work Plan* (Soil RFI/RI Work Plan or Soil Work Plan) (CH2M HILL 2013; Appendix A to this DEIR) and the additional tests and studies described in the *Corrective Measures/Feasibility Study Work Plan* (CM/FS Work Plan) (CH2M HILL 2008).

2.1 Purpose of this Environmental Impact Report

The overall soil investigation and remediation at the Station is being conducted under the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). Both RCRA and CERCLA are federal laws. RCRA provides a framework for the U.S. Environmental Protection Agency (USEPA) to remediate hazardous waste sites in the United States. The authority under RCRA, however, can be delegated to states. In California, DTSC implements RCRA under such delegated authority from the federal USEPA through state law. Under RCRA, the term “corrective action,” refers collectively to the investigation and cleanup process at a hazardous waste site. The selection and approval of a final corrective action to remediate the contaminated soil at the Station and surrounding area is a discretionary action that will be made by DTSC. The subject of this DEIR, the soil investigation activities (Project), is limited to the investigation and testing of soil and sediment at the Project Site and does not include cleanup actions. Information gathered through the proposed soil investigation activities will inform DTSC if additional action or cleanup (remediation) is necessary. The information gathered will also inform and enable, if necessary, the evaluation and selection of corrective measures in a future *Soil Corrective Measures Study/Feasibility Study* (Soil CMS/FS). Activities associated with the proposed soil investigation effort may result in direct or indirect change in the physical environment. Therefore, the proposed Project is subject to environmental review under CEQA. Pursuant to CEQA Guidelines Section 15367, DTSC is the CEQA lead agency for the proposed Project.

An environmental impact report (EIR) is an informational document that is intended to inform regulatory agency decision makers and the public of the significant adverse environmental effects of a proposed project (in this instance, the investigation of soil and sediment at the Project Site) and any feasible mitigation measures that may substantially reduce or avoid the significant impacts. It also discusses alternatives to the proposed project that could accomplish most of the primary project objectives while substantially reducing or avoiding significant environmental impacts.

In accordance with Section 15125 of the CEQA Guidelines, an EIR must include a description of the physical environmental conditions in the vicinity of the project as they exist at the time of the notice of preparation (NOP), or, if no NOP is published, at the time the environmental analysis begins. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant. The environmental analyses contained in Chapter 4 of this DEIR uses the NOP date as the baseline for the description of the physical conditions that might be affected by the Project.

The purpose of an EIR is not to recommend approval or denial of a proposed project. Rather, an EIR is required to identify the significant adverse environmental effects of a proposed project to the physical environment, and to identify measures that avoid or mitigate those impacts to the extent feasible. When environmental impacts are identified as significant and unavoidable in the sense that no feasible mitigation measures or alternatives have been identified that would reduce the impact to a less than significant level, DTSC may still approve the Project after adopting all feasible mitigation measures and alternatives if, through the adoption of CEQA findings and statement of overriding considerations, it finds that social, economic, legal, technological, or other benefits outweigh these impacts.

2.2 Background

2.2.1 Station History and Activities

In 1951, the PG&E Station began compressing natural gas for transportation through pipelines to PG&E’s service area in central and northern California. As natural gas is compressed, its temperature increases and the compressed gas must be cooled. From 1951 to 1985, PG&E added chromium to the water used in the cooling towers and other equipment to prevent corrosion of the cooling tower equipment. During parts of those years, cooling tower wastewater containing hexavalent chromium [Cr(VI)][1] was discharged into natural washes adjacent to the Station. Over time, Cr(VI) accumulated in the soil, seeped into the groundwater, and created a groundwater contaminant plume that extends from below the Station toward the Colorado River. Based on results from periodic testing of the river water, the Cr(VI) plume is not impacting river water. Other historic operational activities occurred at the Station resulting in the release of other chemicals of potential concern (COPCs) into the soil and groundwater.

Soil within the Station fence line and in the vicinity of the Station has also been affected by historical releases of COPCs, including Cr(VI) and other metals, acids, petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), dioxins and furans, pesticides, and asbestos (CH2M HILL 2013). Various other COPCs have also been detected at concentrations above soil screening levels.[2] Currently, groundwater beneath the Project Site is undergoing parallel investigation and remediation activities (CH2M HILL 2009; DTSC 2011).

2.2.2 Soil and Groundwater Investigation Activities

The following summarizes the primary investigation documents compiled for activities in and around the Station. For completeness, both soil and groundwater reports are summarized.

Investigative activities at and in the vicinity of the Station date back to the late 1980s with the identification of Solid Waste Management Units (SWMUs) through a RCRA Facility Assessment (RFA). Closure activities of former hazardous waste management facilities at the Station were performed from 1988 to 1993. The RCRA Facility Investigation (RFI) began in 1996 when DTSC and PG&E executed a Corrective Action Consent Agreement (CACA), summarized below in Section 2.3. Since that time, additional data collection and evaluation has been performed to characterize the nature and extent of contamination in and around the Station, and to identify potential remedial alternatives.

PG&E completed the *Revised Final RCRA Facility Investigation and Remedial Investigation Report (RFI/RI Report), Volume 1 – Site Background and History* (RFI/RI Report Volume 1) in August 2007 and DTSC and the U.S. Department of the Interior (DOI) approved it later in 2007. The RFI/RI Report Volume 1 contains information on Station operations and history, and descriptions of SWMUs, Areas of Concern (AOCs), and other Undesignated Areas (UAs). In a letter dated August 17, 2007, PG&E proposed an addendum to RFI/RI Report Volume 1 that would include the Monitoring Well (MW)-20 bench and the Interim Measure (IM)-3 treatment plant within the RCRA Corrective Action effort at the Station. On March 26, 2013, PG&E submitted a Draft Addendum to the RFI/RI Report Volume 1 containing information on the

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[1] Cr(VI) is a form of chromium. Chromium is a metal naturally found in rocks, soil, and the tissue of plants and animals. Cr(VI) is used in industrial products and processes and is a known carcinogen when inhaled (i.e., through breathing). On May 28, 2014, the California Department of Public Health adopted a new Maximum Contaminant Level for Cr(VI) of 0.01 mg/L, effective July 1, 2014.

[2] Soil screening levels are used to identify chemical concentrations that would require further soil investigation and possible remediation. The screening levels are based on naturally-occurring background concentrations, DTSC California Human Health Screening Levels, USEPA Regional Screening Levels, or ecological comparison values. If human- or ecological-based screening levels are lower than the background concentration, the background concentration is used as the screening level.

MW-20 bench, IM-3, and other investigation areas identified since 2007. The RFI/RI Report Volume 1 Draft Addendum was reviewed by DTSC, Native American Tribes, and other stakeholders. The RFI/RI Report Volume 1 Draft Addendum was approved on June 4, 2014. PG&E completed the *Final RCRA Facility Investigation and Remedial Investigation Report (RFI/RI Report), Volume 2 – Hydrogeologic Characterization and Results of Groundwater and Surface Water Investigation* (RFI/RI Report Volume 2) in a report dated February 11, 2009; DTSC and DOI approved it later in 2009. The RFI/RI Report Volume 2 defines the nature and extent of contamination in groundwater, surface water, pore water, and river sediment. Based on the data and conclusions presented in the RFI/RI Report Volume 2, the only media affected by past releases to groundwater at the Station is groundwater. The data show no effects on surface water, pore water, or river sediment in the vicinity of the Project Site.

PG&E completed the *Final RCRA Facility Investigation and Remedial Investigation Report (RFI/RI Report), Volume 2 Addendum – Hydrogeologic Characterization and Results of Groundwater and Surface Water Investigation* (RFI/RI Report Volume 2 Addendum) in a report dated June 29, 2009; DTSC and DOI approved it later in 2009. The RFI/RI Report Volume 2 Addendum supplemented the RFI/RI Report Volume 2 conclusions regarding molybdenum and selenium and the results of the Arizona groundwater investigation.

PG&E completed the *Final Groundwater Corrective Measures Study/Feasibility Study Report for SWMU 1/AOC 1 and AOC 10* (Final Groundwater CMS/FS) in a report dated December 2009; DTSC and DOI approved it later in 2009. The Final Groundwater CMS/FS presents the identification and evaluation of various remedial alternatives to address the remedial action goals for groundwater contamination associated with the historic discharges to Bat Cave Wash (SWMU 1/AOC 1) and within AOC 10 (East Ravine) at the Station. The Final Groundwater CMS/FS includes a description of current conditions, remedial action objectives, identification and screening of remedial technologies, and development and evaluation of nine remedial action alternatives. The Final Groundwater CMS/FS recommended Alternative E – In situ Treatment with Fresh Water Flushing for the remediation of groundwater.

The Soil Work Plan was prepared through a multiyear public involvement process. In May 2011, PG&E submitted the Draft Soil RFI/RI Work Plan to the agencies, Native American Tribes, and other stakeholders. Comments were received between July and August 2011. Three Topock Technical Work Group (TWG) meetings were held in September and December 2011 with Native American Tribes and other stakeholders at the Station to discuss comments on the Draft Soil RFI/RI Work Plan. On September 15, 2011, DTSC and DOI specifically met with the Fort Mojave Indian Tribe (FMIT) and the Hualapai Tribe. Items discussed during these meetings included comments related to perimeter and storm drain sampling, AOC 14 MW-24 Bench, UA-1, management of displaced soil, mouth of Bat Cave Wash, East Ravine sediment, pore water sampling, and sampling inside the Station fence line. On April 4, 2012, a meeting was held with Native American Tribes and other stakeholders in Needles to discuss risk evaluation and land use related items. On June 15, 2012, a meeting was held with Native American Tribes and other stakeholders to discuss items related to the response to comments table for the Soil Work Plan. The FMIT submitted a letter dated July 23, 2012, regarding items related to the Draft Soil RFI/RI Work Plan, to which DOI and DTSC responded in a joint letter dated August 31, 2012. A revised version of the Draft Soil Work Plan was circulated for public review and comment in September 2012. Comments were submitted by DTSC, DOI, the FMIT, and the Hualapai Indian Tribe. Responses to these comments were provided by PG&E (see Appendix I of the Soil Work Plan). The Soil Work Plan was then revised and presented to DTSC and DOI in a final document dated January 2013 (CH2M HILL 2013). An Errata to the Soil Work Plan was submitted to provide minor revisions and additional information regarding the boundary marking of staging and investigation areas, and activities within staging areas, dated January 2014 (CH2M HILL 2014).

Following completion of the soil investigations at the Project Site, PG&E will prepare the Final RFI/RI Report Volume 3 (Soil), which will include characterization of the nature and extent of soil and sediment contamination resulting from Station operations. It is anticipated that the Final RFI/RI Report Volume 3 (Soil) will be completed in the fall of 2016. If any soil remedy is proposed, it would be implemented following completion of a future Soil CMS/FS and associated environmental review as required by CEQA. Input received from the public on the proposed soil remedy will be considered by DTSC prior to approval. This will be followed by remedy design, if required.

2.2.3 Groundwater Remediation

In addition to soil contamination, groundwater beneath and near the Station has been contaminated by chemicals associated with historical releases in areas known as Bat Cave Wash and East Ravine. Investigation and cleanup of the contaminated groundwater is being conducted under both RCRA (DTSC lead) and CERCLA (DOI lead), as discussed in Section 2.3 below. The main contaminant of concern in groundwater is Cr(VI), which was used in the past as an additive to the cooling water at the Station, and is harmful to human health and ecological receptors in the environment. Other chemicals present in the groundwater include total chromium [Cr(T)], molybdenum, selenium, and nitrates.

As part of the corrective action process, in 2004 DTSC determined that immediate action was necessary at the Station, as a precautionary measure, to ensure that Cr(VI) contaminated groundwater does not reach the Colorado River. IMs were instituted to protect the Colorado River. IMs are cleanup actions that are taken to protect public health and the environment while long-term solutions are being developed and evaluated. There have been three separate but related IMs at the Station since 2004 in response to the need to control the groundwater plume. IM-1, IM-2, and mostly IM-3, are collectively referred to as the IM. The IM currently consists of three steps: (1) groundwater extraction from the areas of groundwater containing Cr(VI) for hydraulic control in the Colorado River floodplain, (2) treatment of extracted groundwater in a groundwater treatment plant known as the IM-3 plant, and (3) reinjection of the treated groundwater back into the subsurface through injection wells. This treated groundwater meets the standards set by DTSC and the Regional Water Quality Control Board. While potential soil contamination cleanup activities in the future may be a key component of the overall cleanup efforts at the Station, the groundwater and soil remediation efforts represent separate projects which have independent utility.

A final environmental impact report (FEIR) (DTSC 2011) and Errata was certified by the DTSC for the Topock Compressor Station Groundwater Remediation Project (Groundwater FEIR) on January 31, 2011 (SCH No. 2008051003). The approved Groundwater Remediation Project, as discussed in the Groundwater FEIR and final project approval documents, involves manipulation of subsurface water flow to move a contaminated groundwater plume with Cr(VI) and other COPCs, originating from past operations at the Station, through a treatment zone. This treatment zone or "in situ reactive zone (IRZ)" will be created by introducing a carbon substrate such as, but not limited to, ethanol, molasses, lactate, or whey to induce microbial growth which, in turn, creates an environment where the Cr(VI) is reduced to less toxic Cr(III) and precipitated.

The Groundwater FEIR considered the potentially significant adverse environmental impacts of adopting the preferred remedy, determined to be Alternative E—In Situ Treatment with Freshwater Flushing—through the Final Groundwater CMS/FS process, completed in December 2009. In addition, DTSC prepared the *Topock Compressor Station Groundwater Remediation Project Environmental Impact Report Addendum No. 1 for Alternative Freshwater Source Evaluation Activities* (DTSC 2013) in August 2013, which evaluated additional freshwater sources for consideration in the Groundwater Remediation Project.

The Groundwater Remediation Project is currently in the design stage, and construction of the final remedy is scheduled to begin in mid-2015. As described in the Groundwater FEIR, the Groundwater Remediation Project and the activities associated with soil investigation and cleanup have independent utility (DTSC 2011). The soil investigation activities will not change the scope of the Groundwater Remediation Project. The proposed soil investigation activities are therefore not an expansion of the Groundwater Remediation Project and should not change the nature or scope of the Groundwater Remediation Project. The two projects involve different contaminants and distinct environmental risks; while Cr(VI) may be present in the soil, as well as the groundwater, elevated concentrations of various metals, dioxins/furans, PAHs, PCBs, and total petroleum hydrocarbons (TPHs), as well as some SVOCs, have also been detected in the soil. Because of the nature of the contamination and contaminated substrate, the two projects would necessarily employ different technologies on different schedules for different durations.

In summary, potential soil contamination cleanup activities in the future may prove to be a key component of the overall cleanup efforts at the Station, but the proposed soil investigation effort is a separate project from the Groundwater Remediation Project and has independent utility. In addition, if the soil investigation activities that are the subject of this DEIR indicate that soil remediation is necessary, future environmental review would be required before initiating any remediation of contaminated soil. Accordingly, this DEIR is limited to the soil investigation activities described in Chapter 3, "Project Description."

2.2.4 Tribal Perspectives

The Topock area and adjacent lands along the Colorado River, beginning in the Hoover Dam area and extending to the Mexican border, are the ancestral home of a number of Native American Tribes, including the Cahuilla, Chemehuevi, Cocopah, Halchidoma, Havasupai, Hualapai, Maricopa, Mojave, Quechan, Serrano, and Yavapai peoples. Six of these Native American Tribes, the Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes (CRIT), FMIT, the Fort-Yuma Quechan Indian Tribe, and the Hualapai Indian Tribe, have actively participated in the Topock project and are hereafter referred to as "Interested Tribes" (see Section 4.4.1.7). Each of these Interested Tribes has been, and continues to be, economically and culturally reliant on the Colorado River and all are historically and spiritually rooted in the Colorado River region. Although each Interested Tribe has its own history and belief system tied to the region and the river, the Interested Tribes share an interest in the health and welfare of all people, the land, wildlife, things above and below ground, and natural resources. As indicated in the *Topock Compressor Station Tribal Cultural Values Assessment*, several of the Interested Tribes feel that:

> Plants, animals, minerals, artifacts, rock arrangements, view-sheds, the Colorado River, and many other tangible and intangible elements are interwoven into the very fabric of tribal cultures. Topock, in being such a significant religious and spiritual "place," involves a dynamic understanding of traditions, religion, ceremonies, oral histories, and a plethora of other social-communal aspects, that is difficult for non-tribal entities to grasp with its many different layers of existence (McDowell et al. 2013).

More information on the Tribal Perspectives of the six Interested Tribes is found in Section 4.4, "Cultural Resources," Section 4.4.1.4.

2.3 Corrective Action Process

The Project Site is undergoing investigation and remediation under both RCRA and CERCLA. In 1996, PG&E and DTSC entered into a CACA pursuant to DTSC's RCRA Corrective Action Program to more fully investigate the nature and extent of contamination at the Station and in the surrounding area, including soil contamination. Since 1996, there have been continued activities related to the investigation of the Station, including soil and groundwater sampling, and the initiation of IMs.

In addition, in July 2005, PG&E entered into an Administrative Consent Agreement with the federal agencies (DOI, U.S. Bureau of Land Management [BLM], U.S. Bureau of Reclamation [BOR], and U.S. Fish and Wildlife Service [USFWS] under CERCLA [DOI 2005]). Later, in 2013, the U.S. District Court for the Central District of California entered the *Remedial Action Remedial Design Consent Decree between the United States of America and Pacific Gas & Electric Company* (DOI Consent Decree) under CERCLA with the DOI as the federal lead agency (DOI 2013). The 2013 DOI Consent Decree governs only the remedial action addressing contaminated groundwater; the terms of the 2005 Administrative Consent Agreement remain in effect for response actions associated with releases of hazardous substances at or from the Compressor Station other than the remedial action addressing contaminated groundwater, including the soil investigation.

In accordance with the 2005 Administrative Consent Agreement between the federal agencies and PG&E (DOI 2005), the various on-site response and corrective actions required to investigate and clean up contamination are exempt from obtaining permits pursuant to CERCLA Section

121(e)(1). CERCLA response actions are exempt by law from the requirement to obtain federal, state, and local permits related to any activities conducted completely on-site. This does not, however, remove the requirement to meet the substantive provisions of applicable laws. Because all soil investigation activities are related to cleanup on-site, the federal exemption would apply.

Under RCRA, the term "corrective action" refers collectively to the investigation and cleanup process at a hazardous waste site. The corrective action process encompasses several steps that include: (1) understanding a facility's current and historic operational and environmental practices; (2) data collection/sampling to determine the nature and extent of any contamination present at the site; and, (3) if needed, conduct remedial activities to cleanup identified contamination that poses excessive risk. Below is a general overview and sequence of the main steps undertaken as part of the corrective action process, implemented here in conjunction with the CERCLA response action process:

- Preliminary review of pertinent existing information is executed.
- A visual site inspection is undertaken to verify preliminary information about the site and includes a developed sampling strategy, if needed.
- A sampling visit is undertaken to gather limited field data.
- An RFA is completed. An RFA is a more detailed, preliminary site assessment to determine whether or not potential substances or other constituents of concern exist in soil or groundwater at or near a facility, which may be required to undergo some form of corrective action under RCRA.
- An RCRA RFI/RI is undertaken. An RFI/RI is an in-depth investigation designed to gather data needed to determine the nature and extent of contamination at a site.
- A human and ecological risk assessment is completed. A risk assessment is a qualitative and quantitative evaluation of the risks posed to human health and/or the environment by the actual or potential presence and/or use of specific pollutants that are identified in the RFI/RI.
- CMS/FS is completed. A CMS/FS develops and evaluates alternatives that can be used to remediate/cleanup contaminants that are identified as a concern by the risk assessment.
- A statement of basis is completed. A statement of basis is a decision document that describes DTSC's proposed final remedy and cleanup standards and the basis for those findings.
- Corrective Measure Implementation is undertaken, which includes the design, construction, and implementation of the selected remedy.
- A corrective action certification is given when the remedy achieves the predetermined objectives and when DTSC deems the cleanup action complete.

2.4 Environmental Review Process

As required by CEQA Guidelines Section 15375, an NOP is a notice sent by the lead agency to notify the responsible agencies, trustee agencies, the Office of Planning and Research, and involved federal agencies that the lead agency plans to prepare a DEIR for the proposed Project. The purpose of the notice is to solicit information, guidance, and recommendations regarding the scope, focus, and content of the DEIR. An NOP was prepared for the proposed Project and is included as Appendix B of this DEIR. The NOP identified the Project Site, described the need for and objectives of the Project, and identified the probable environmental effects of the Project. The NOP was circulated to responsible and trustee agencies, federal agencies, Native American Tribes, and interested members of the public. The NOP public comment period began on November 28, 2012, and concluded on January 14, 2013, providing a 45-day comment period. In response to a request for additional time, DTSC extended the comment period to January 18, 2013, yielding an ultimate comment period of 49 days. Agency and public scoping meetings were held from December 11 to December 13, 2012, to receive oral comments on the scope and content of the DEIR.

Concurrent with the issuance of the NOP, three public scoping meetings were held during the 49-day public comment period. The meetings were open to the agencies mentioned above and to any interested organizations and individuals, including Native American Tribes that have expressed interest in the potential effects of proposed soil investigation activities on cultural resources located on the Project Site. Several Native American Tribes were invited to attend the scoping meetings.

In addition to the NOP scoping meetings, an extensive communication program was conducted with Native American Tribes that included formal meetings with Native American Tribal councils, informal meetings and field visits with cultural resources personnel and Native American Tribal representatives, and solicitation of written comments. Information obtained through the scoping meetings and the subsequent communication program has been incorporated into this DEIR.

Public and agency review of the Project will be further facilitated by DTSC through distribution of this DEIR for a 45-day public review period. The public review period will extend from July 7, 2014, to August 21, 2014. This DEIR, as well as appendices and all supporting materials and references, can be found at the Project websites (www.dtsc-topock.com and www.dtsc.ca.gov) and the following locations:

Needles Public Library
1111 Bailey Avenue
Needles, CA 92363

Chemehuevi Indian Reservation Environmental Protection Office
2000 Chemehuevi Trail
Havasu Lake, CA 92363

Golden Shores/Topock Library Station
13136 South Golden Shores Parkway
Topock, AZ 86436

Colorado River Indian Tribes Public Library
Second Avenue and Mojave Road
Parker, AZ 85344

Parker Public Library
1001 Navajo Avenue
Parker, AZ 85344

Lake Havasu City Library
1770 McCulloch Boulevard
Lake Havasu City, AZ 86403

California Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630

Two public meetings will be held at the locations and times identified below to present the contents of this DEIR and to receive written and oral comments. Public meetings will include an open house where the public is invited to review technical information that is presented in the DEIR, and a public hearing that will give the public opportunity to provide oral public comments to DTSC. Following the close of the DEIR public review period, DTSC will prepare and publish a second document that contains responses to comments received on the DEIR. The DEIR, comments, and responses together constitute the FEIR, which will be used by DTSC for consideration during decision making for the Project.

Needles, California:
Needles Senior Center
1699 Bailey Avenue
Needles, CA 92363
Tuesday, July 22, 2014
Open House—5:30 p.m. to 6:30 p.m.
Public Hearing—6:30 p.m. to 8:00 pm.

Golden Shores, Arizona:
Golden Shores Community Center
13136 Golden Shores Parkway
Golden Shores, AZ 86436
Wednesday, July 23, 2014
Open House—5:30 p.m. to 6:30 p.m.
Public Hearing—6:30 p.m. to 8:00 p.m.

Please submit your written comments on the DEIR, with the subject line “Topock DEIR Comments,” postmarked or dated (for e-mails) no later than August 21, 2014, to:

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2.5 Scope of This Environmental Impact Report

The scope of the analysis contained within this DEIR is focused on the environmental resource areas that could be affected by the proposed soil investigation activities. The DEIR therefore addresses the following environmental issues:

- aesthetics
- air quality
- biological resources
- cultural resources
- hazards and hazardous materials
- hydrology and water quality
- noise

Based on the scope and nature of the proposed Project, it was determined that several resource areas do not warrant a detailed analysis in the DEIR These issue areas include: agriculture, geology and soils, greenhouse gas emissions, land use and planning, minerals, population and housing, public services, recreation, transportation and traffic, and utilities and service systems. Section 5.3 of this DEIR provides a discussion of those resource areas and the reasoning and evidence as to why a detailed analysis is not included in the DEIR.

2.6 DEIR Organization

This DEIR is organized into chapters, as identified and briefly described below. Chapters are further divided into sections (e.g., Section 4.2, "Air Quality").

Chapter 1, "Summary": This chapter presents a summary of the proposed Project activities and the potential environmental impacts. It describes mitigation measures that would be implemented and level of significance after mitigation (as fully described in Chapter 4). It also provides a summary of alternatives to the proposed Project, a summary of known controversial issues, and a summary of issues to be resolved.

Chapter 2, "Introduction": This chapter presents a discussion of the purpose and use of this DEIR; the history and activities that have occurred at the Station; the soil and groundwater contamination identified in the vicinity of the Station to date; the environmental review and CEQA process; and the organization of this DEIR.

Chapter 3, "Project Description": This chapter provides a detailed description of the proposed Project. It defines the Project objectives and describes all the features of the proposed Project.

Chapter 4, "Environmental Analysis": For each environmental issue listed in Section 2.5, this chapter describes the existing environmental and regulatory setting, evaluates the potential environmental impacts associated with the proposed Project, identifies mitigation for significant impacts, and discusses the level of significance after implementation of those mitigation measures.

Chapter 5, "Other CEQA Sections": This chapter identifies those areas where environmental impacts are considered significant and unavoidable. It also summarizes those resource areas where there is no potential for significant impacts and therefore no further analysis is necessary. The growth inducing effects of the proposed Project are also considered in this chapter.

Chapter 6, "Cumulative Impacts": This chapter identifies other past, present, and reasonably foreseeable actions at and in the vicinity of the Station. It evaluates the cumulative impacts associated with implementation of the proposed Project in combination with the other identified projects. Where necessary, it identifies additional mitigation measures in order to reduce or avoid significant cumulative impacts.

Chapter 7, "Alternatives to the Proposed Project": This chapter provides additional meaningful information regarding Project alternatives to be considered by decision makers in compliance with Section 15126.6 of the CEQA Guidelines. This alternatives analysis evaluates a range of potential alternatives that may reduce environmental impacts associated with implementation of the proposed Project. In addition, this chapter summarizes the alternatives that were rejected from further consideration because they did not meet Project goals and objectives, or were determined to be impractical or infeasible.

Chapter 8, "Bibliography": This chapter sets forth a comprehensive listing of all sources of information used in the preparation of this DEIR. This includes organizations and persons that were contacted during the preparation of this DEIR.

Chapter 9, "List of Preparers": This chapter identifies the lead agency personnel and consultants involved with preparation of this DEIR.

Chapter 10, "Glossary": This chapter provides a glossary of key terms and definitions that are used throughout the DEIR.

Appendices: This DEIR includes several appendices that provide either background information or additional technical support for the analysis.

2.7 Terminology Used in This DEIR

This DEIR includes the following CEQA terminology to denote the significance of environmental impacts of the proposed Project:

- **Less than significant impact:** A less than significant impact does not result in a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the Project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance (see CEQA Guidelines Section 15382). Impacts determined to be less than significant do not require mitigation measures.
- **Significant impact:** Public Resources Code Section 21068 defines a significant impact as "a substantial, or potentially substantial, adverse change in the environment." The environmental checklist included as Appendix G of the CEQA Guidelines provides additional guidance for determining which impacts would be regarded as significant. This DEIR applies the thresholds contained within Appendix G and uses the CEQA definition of "significant impact." Feasible mitigation measures or alternatives to the Project must be identified and adopted if they would avoid or substantially reduce the significant impact.
- **Potentially significant impact:** A potentially significant impact is one that, if it were to occur, would be considered a significant impact as described above; however, the likelihood of the impact's occurrence is uncertain. For example, although the DEIR may provide evidence that buried archaeological resources could be found in a particular location, the actual discovery cannot be determined until the time of Project construction. For CEQA purposes, a potentially significant impact is treated (i.e., mitigated) as if it were a significant impact. Mitigation measures or alternatives to the Project must be identified and adopted if they would avoid or substantially reduce the significant impact.
- **Significant and unavoidable impact:** A significant and unavoidable impact is a substantial adverse effect on the environment that cannot be mitigated to a less than significant level. A project with significant and unavoidable impacts could still proceed, but DTSC would be required to prepare a statement of overriding considerations, pursuant to CEQA Guidelines

Section 15093, explaining why DTSC would proceed with the Project in spite of the potential for significant environmental impacts.

- **Threshold of significance:** A threshold of significance is a criterion applied by the lead agency to identify significant adverse environmental impacts. A threshold is defined by a lead agency based on examples found in CEQA or the CEQA Guidelines, scientific and factual data relative to the lead agency jurisdiction, views of the public in affected areas, the policy/regulatory environment of affected jurisdictions, and other factors.

CHAPTER 3
Project Description

3.1 Introduction

This section provides a detailed description of the proposed soil investigation activities that are the subject of this draft environmental impact report (DEIR). The description of the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Soil Investigation Project (Project) at the PG&E Topock Compressor Station (Station) and surrounding area (Project Site) is based on the soil investigation activities described in the *Soil RCRA Facility Investigation/Remedial Investigation Work Plan* (Soil RFI/RI Work Plan or Soil Work Plan) (CH2M HILL 2013; Appendix A to this DEIR) and the treatability studies described in the *Corrective Measures/Feasibility Study Work Plan* (CM/FS Work Plan) (CH2M HILL 2008). In addition, PG&E provided supplemental information to the California Department of Toxic Substances Control (DTSC) about the proposed soil investigation activities, including the descriptions of those activities contained in this chapter.

Implementation of the proposed soil investigation activities would enable DTSC to characterize the nature and extent of chemicals of potential concern (COPCs) that have been identified at the Project Site. The results of this investigation would be reported in the Final RCRA Facility Investigation and Remedial Investigation Report (RFI/RI Report) Volume 3 (Soil) document and will present a combined data set with all previous investigations. The Project would also provide data to be used in the preparation of a soil risk assessment. The information derived from the Project would support the development of a *Soil Corrective Measures Study/Feasibility Study* (Soil CMS/FS) and remedial design, if necessary. The Soil CMS/FS would provide remedial options for the identified contaminated areas. Although this DEIR focuses on information-gathering activities, the information gained regarding the scope and extent of contamination will help DTSC identify future potential remedial actions that may be proposed for cleanup. Additional environmental review will be conducted for soil remediation activities, if proposed.

Groundwater remediation was analyzed as a separate action with independent utility in a final environmental impact report (FEIR) certified by DTSC in 2011 (DTSC 2011) and is not a component of the proposed Project. To the extent groundwater-remediation-related activities are reasonably foreseeable and may cause related impacts, those impacts are considered in the respective resource area cumulative impacts discussions of this DEIR.

3.2 Intended Uses of This EIR

The California Environmental Quality Act (CEQA) Guidelines identify the lead agency as the public agency with the principal responsibility for carrying out or approving a project (CEQA

Guidelines Section 15367). DTSC is the CEQA lead agency for the proposed Project because DTSC has the primary approval authority for the Project. DTSC is a department within the California Environmental Protection Agency charged with overseeing the investigation and cleanup of contaminated sites.

This document has been prepared in sufficient detail to support DTSC's decision on the proposed Project. DTSC (the CEQA Lead Agency) intends to use this document as it considers whether to approve the Project, and any other approvals and actions that may be necessary to implement the Project. DTSC also will use this document to the extent it considers any follow-up activities to the soil investigation that may be necessary prior to the consideration and approval of a soil remedy.

In addition, this document could be used by other agencies in conjunction with various approvals or consultations required for Project implementation. Although not required by any statute, private organizations may choose to consider the information in this document to aid decisions on Project-related authorizations. **Table 3-1** lists the approvals and authorizations that may be required from other agencies and private organizations to implement the Project.

In accordance with the 2005 Administrative Consent Agreement between federal agencies and PG&E (DOI 2005), the on-site response actions required to investigate soil contamination are exempt from obtaining federal, state, and local permits pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Section 121(e)(1). This does not, however, remove the requirement to meet the substantive provisions of applicable laws. The 2005 Administrative Consent Agreement is discussed in further detail in Section 2.3 of this DEIR.

TABLE 3-1
APPROVALS AND AUTHORIZATIONS THAT MAY BE REQUIRED FOR THE SOIL INVESTIGATION PROJECT

Agency/Organization	Required Approvals, Authorizations, or Consultations
Federal Agencies	
U.S. Department of the Interior (DOI)	DTSC anticipates that the DOI will issue an approval letter and understands that DOI's approval constitutes the only required federal permission to implement the Project, including accessing the Havasu National Wildlife Refuge and other federal property.
U.S. Bureau of Land Management (BLM)	In compliance with Section 106 of the National Historic Preservation Act, the BLM must consult with the Tribes and other signatories and invited signatories to the Programmatic Agreement (PA) regarding the Project, pursuant to the requirements of the PA's Consultation Protocol.
U.S. Fish and Wildlife Service (USFWS)	Project activities have been previously authorized by the 2007 Programmatic Biological Assessment (PBA), which has been extended until December 31, 2017.
State Agency	
California Department of Transportation (Caltrans)	Project activities within the Interstate 40 (I-40) right of way (Area of Concern [AOC] 27, Monitoring Well [MW]-24 Bench) or that necessitate Interstate 40 lane closure may require Caltrans approval and compliance with any applicable substantive requirements.
Private Organizations	
Burlington Northern Santa Fe Railway (BNSF)	Project activities (AOC 14 and AOC 1) require approval to cross BNSF railroad tracks and to pass through a BNSF railroad culvert.
Private Pipeline Companies	As needed, activities located in the right of way of any pipelines will be subject to prior coordination with the owner/manager of the associated facilities, and may require positive identification and location of pipelines by such activities as potholing.

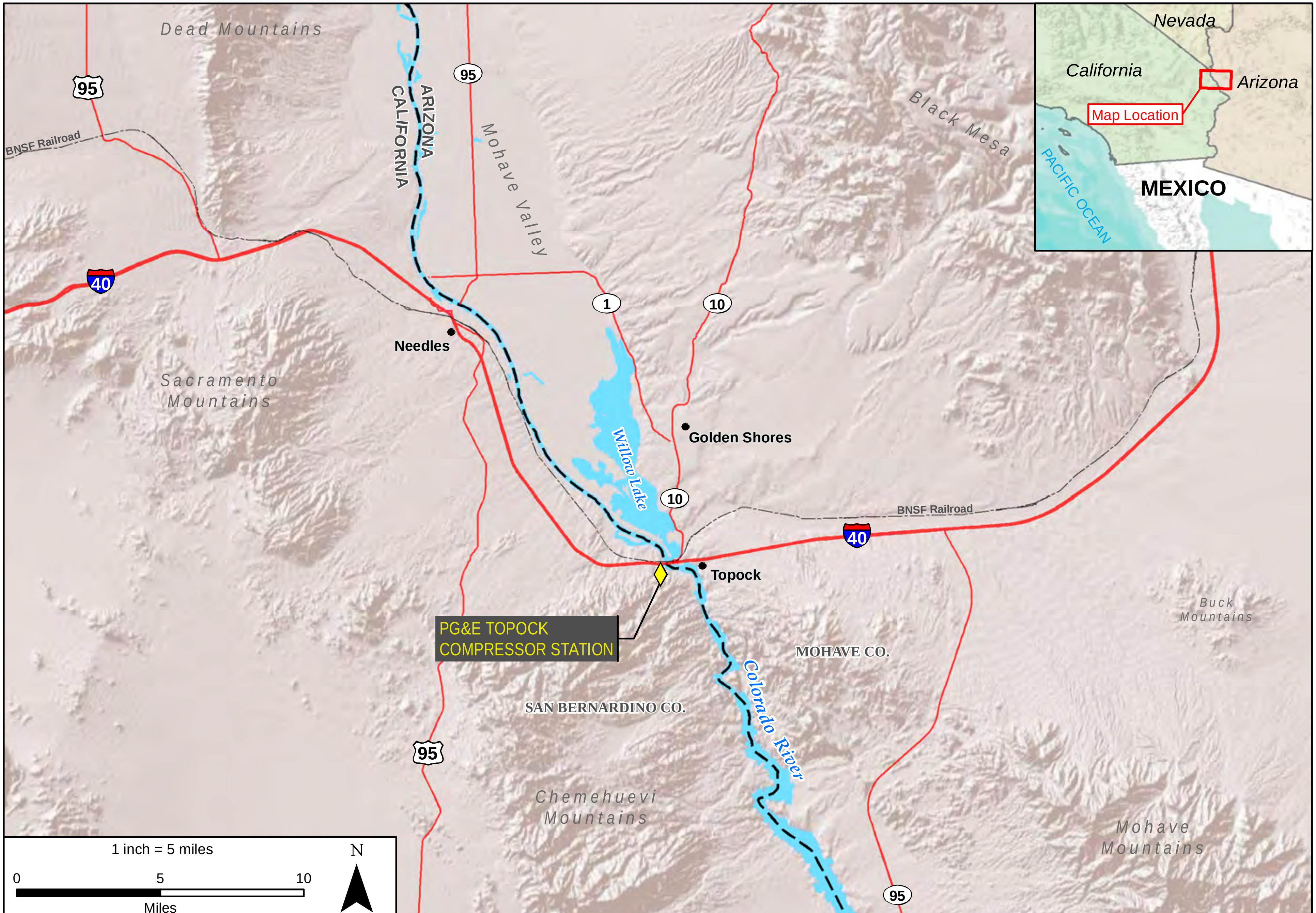
3.3 Project Location

The proposed soil investigation activities would be implemented at and in the vicinity of the Station, which is located in the Mojave Desert approximately 12 miles southeast of the City of Needles, California, and approximately 4 miles south of the community of Golden Shores, Arizona (**Figure 3-1**). The Station is within a 66.8-acre parcel of land owned by PG&E that is located approximately 1,500 feet west of the Colorado River and less than 1 mile south of I-40. The area of the Station that is developed (buildings and/or paving) is fenced and encompasses approximately 15 acres.

The Project Site for this DEIR is shown in **Figure 3-2** and includes areas within which soil investigation activities would occur, such as AOCs and Solid Waste Management Units (SWMUs), as well as the approximately 26 acres anticipated to be needed for equipment staging, access/haul routes, and observation areas. Investigation within the Project Site would occur both inside and outside the Station fence line (see Figure 3-2). The Project Site totals approximately 128.5 acres and encompasses areas beyond PG&E's property line. **Figures 3-3** through **3-6** show details regarding the investigation locations throughout the Project Site. The types of activities proposed within the Project Site are described in Section 3.5.

The lands adjoining the PG&E parcel are owned and/or managed by a number of government agencies and private entities, including lands owned by the Fort Mojave Indian Tribe (FMIT); the Havasu National Wildlife Refuge, which is managed by the USFWS; lands managed by the DOI (including the BLM and Bureau of Reclamation); Caltrans – leased land; the BNSF; and other privately owned lands (**Figure 3-7**).

The majority of the Project Site is located within an area that was evaluated in the Groundwater FEIR (see Section 2.2.3 for more information) and is also within the Area of Potential Effects (APE) that has been defined by the DOI under Section 106 of the National Historic Preservation Act for purposes of Native American consultation by federal agencies associated with the Station soil and groundwater investigation and remedial activities (see **Figure 3-8** and Section 4.4 for more information).



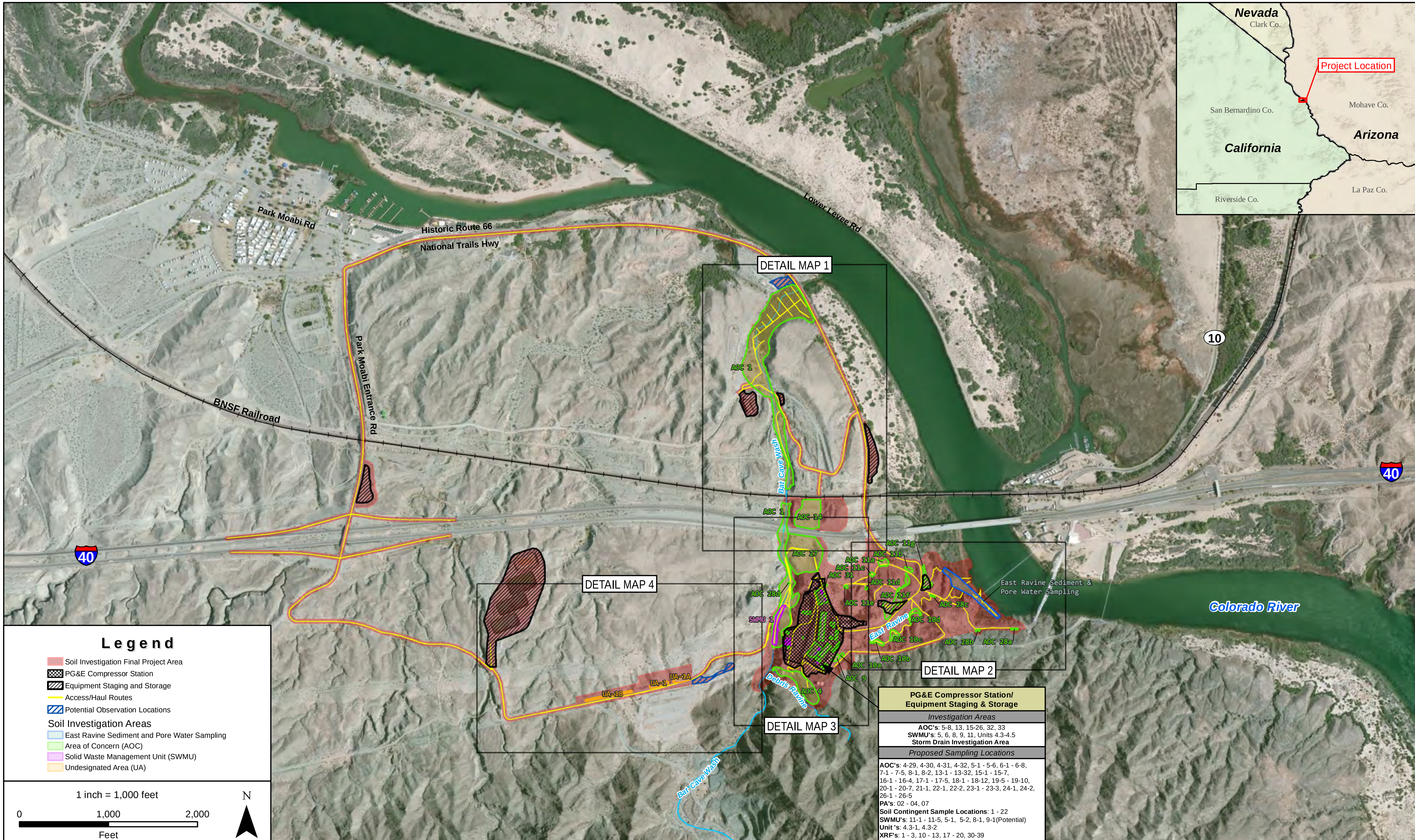
Topock Soil Investigation
Project EIR
Created By Parus Consulting, Inc.
Map Creation Date: 02/27/2014
Background Source: ESRI Topographic

Regional Location Map

Figure 3-1

ESA

PARUS CONSULTING, INC.



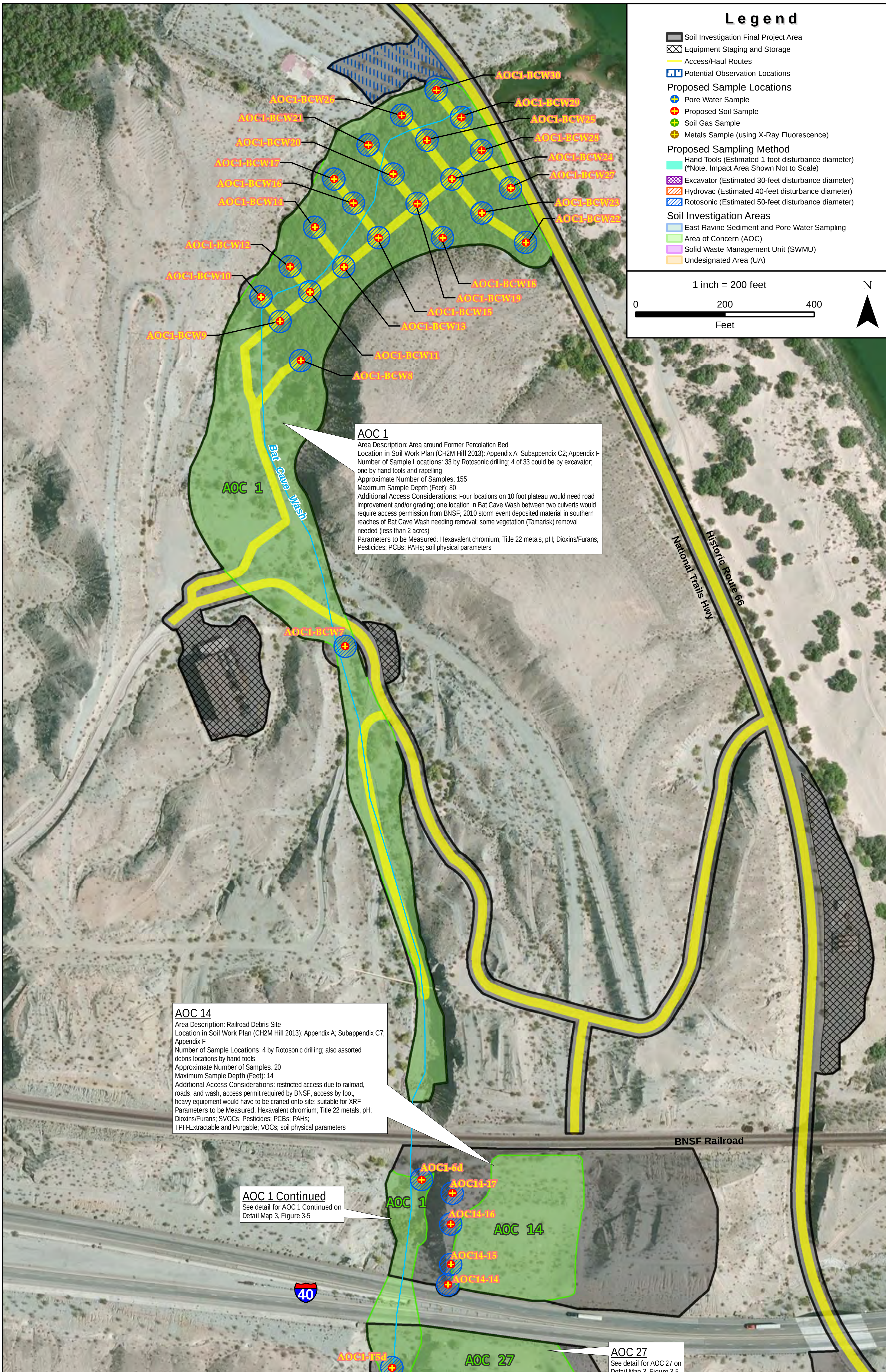
Topock Soil Investigation
Project EIR
Created By Parus Consulting, Inc.
Map Creation Date: 03/19/2014 Background Source: ESRI Aerial

Soil Investigation Project Site

Figure 3-2

ESA

PARUS CONSULTING, INC.



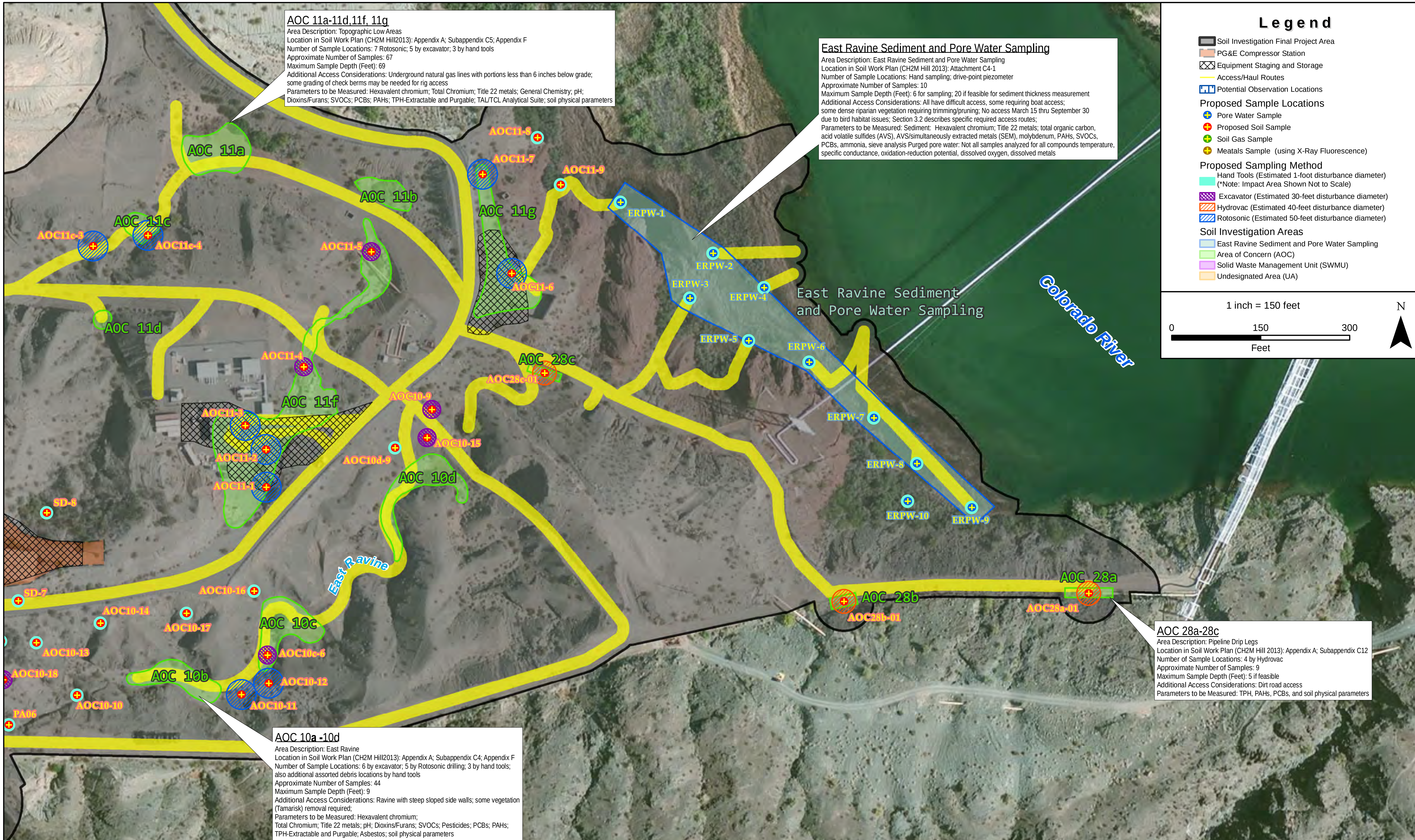
Topock Soil Investigation Project EIR
Created By Parus Consulting, Inc.
Map Creation Date: 02/24/2014
Background Source: ESRI Aerial

Soil Investigation Detail Map 1

Figure 3-3

ESA

PARUS CONSULTING, INC.



Topock Soil Investigation
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Soil Investigation Detail Map 2

Figure 3-4

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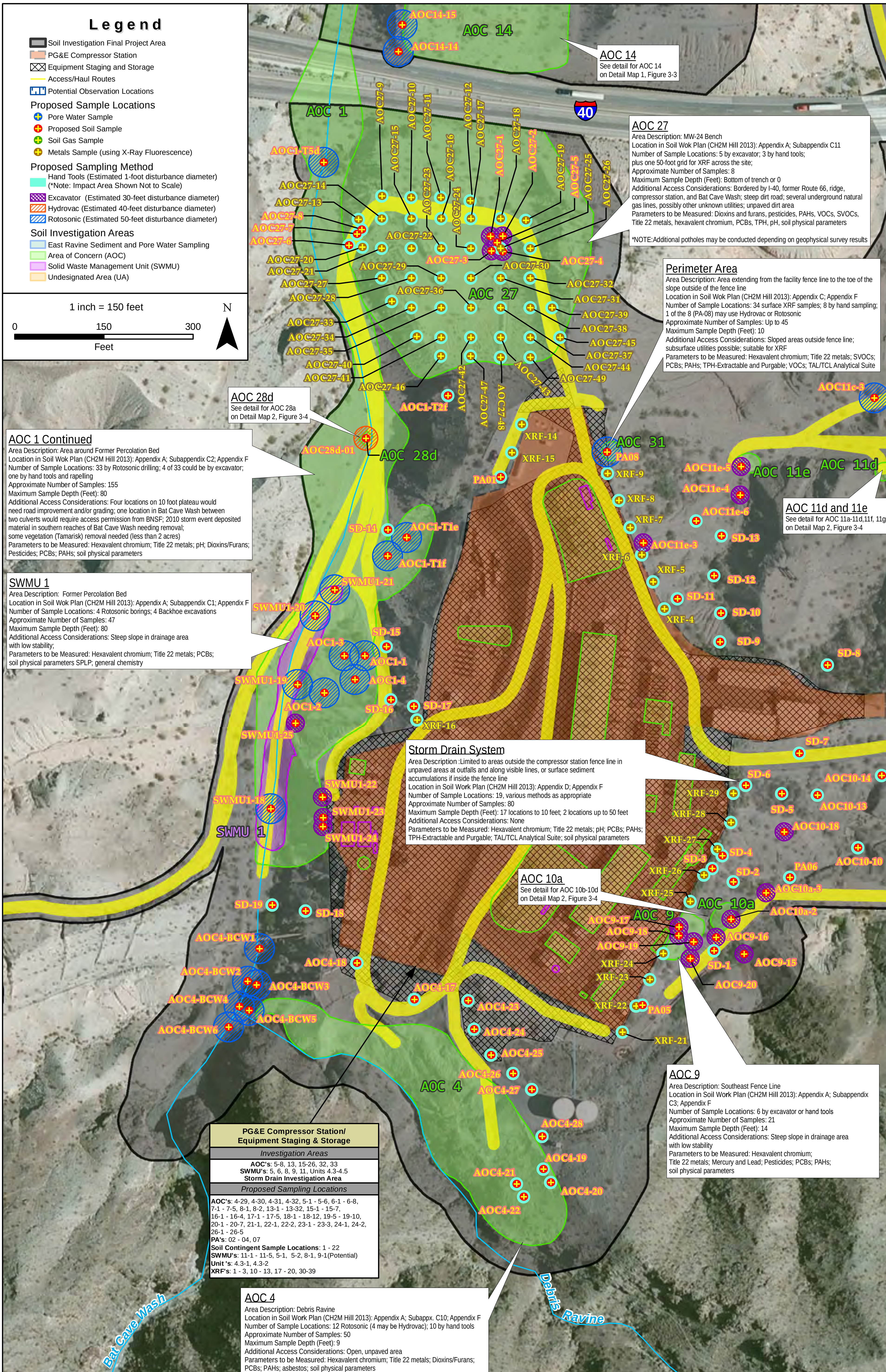

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Project EIR
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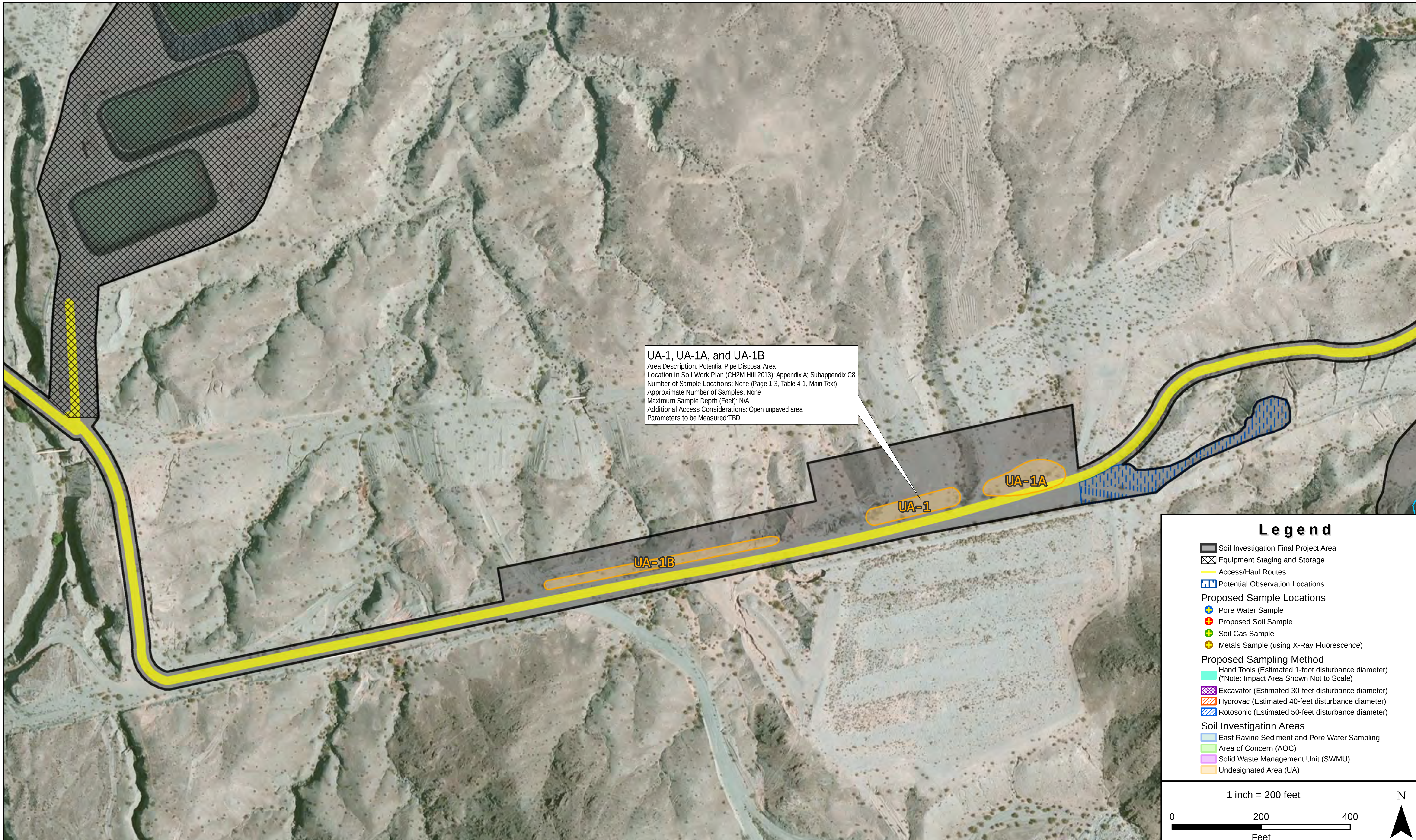
Soil Investigation Detail Map 3

Figure 3-5

ESA

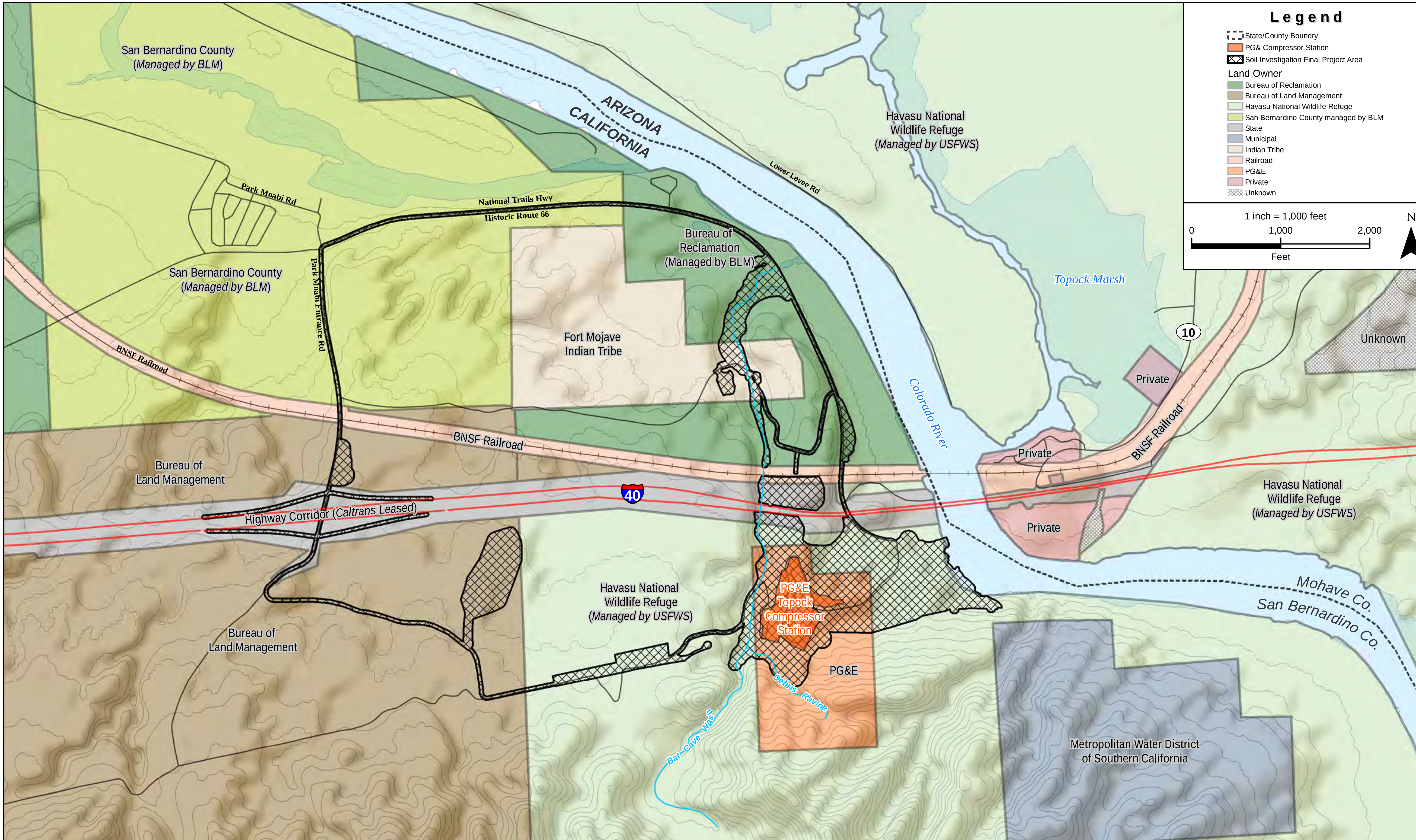
PARUS CONSULTING, INC.



Topock Soil Investigation
Project EIR
Created By Parus Consulting, Inc.
Map Creation Date: 02/24/2014 Background Source: ESRI Aerial

Soil Investigation Detail Map 4

Figure 3-6



Topock Soil Investigation
Project EIR

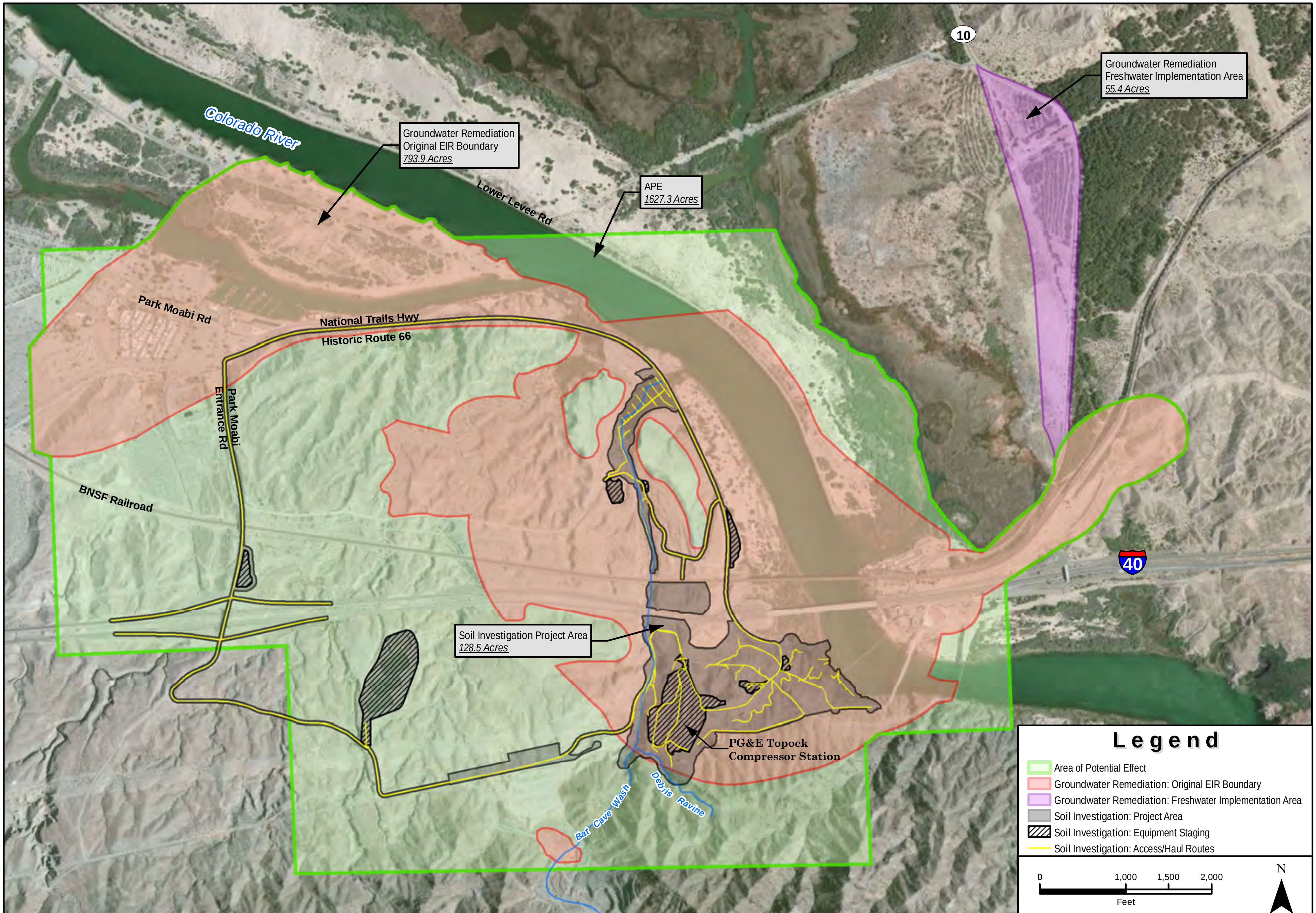
Created By Parus Consulting, Inc. Map Creation Date: 02/27/2014
Sources: ESRI Terrain, Ownership data provided by CH2M Hill

Land Ownership

Figure 3-7

ESA

PARUS CONSULTING, INC.



Topock Soil Investigation Project EIR
Created By Parus Consulting, Inc.
Map Creation Date: 10/10/2013
Background Source: ESRI Bing Maps Aerial

Topock Remediation Study Areas

Figure 3-8

ESA
PARUS CONSULTING, INC.

3.4 Project Objectives

The primary and fundamental objective of the soil investigation activities is to gather sufficient soil samples to be able to reliably characterize the nature and extent of soil and sediment contamination within the Project Site. If approved, soil and sediment would be analyzed for COPCs previously identified in the Project Site (inside and outside the Station fence line) that resulted from historical Station practices, as informed by prior soil sampling, thereby enabling completion of the Final RFI/RI Report Volume 3 (Soil) and risk assessment as required by the 1996 Corrective Action Consent Agreement as soon as practicable and consistent with applicable state laws and regulations. Additional Project objectives include:

- Finalizing the evaluation of soil properties and contaminant distribution to support preparation of the future Soil CMS/FS, including gathering a sufficient level of information to identify a range of remedial alternatives;
- Assessing whether soil contaminant concentrations pose a threat to groundwater; and
- Assessing whether soil and sediment contamination have the potential to migrate off-site and, if so, gathering sufficient information to assess measures that may be required to prevent and minimize such migration to ensure protection of health, safety, and the environment.

The soil investigation activities do not predetermine remedial design options or alternatives. Rather, the data collected from implementation of the Project would be combined with the existing data sets to address the Data Quality Objectives outlined in the Soil Work Plan and inform DTSC if additional action or remediation is necessary for the identified investigation areas. The investigation of soil would also inform and enable, if necessary, the evaluation and selection of corrective measures in a future Soil CMS/FS.

3.5 Description of the Soil Investigation Project

3.5.1 Project Overview

This section provides an overview of the soil investigation activities that would be implemented at the Project Site in order to meet the objectives stated above. The proposed Project includes soil sampling and analysis as described in the Soil Work Plan; potential bench scale tests, pilot studies, and geotechnical evaluations to support the Soil CMS/FS; and potential plant or other biota sampling activities to support ecological risk assessment. Bench scale tests and pilot studies may be implemented after soil sampling analysis is completed to evaluate potential soil remedy options if remedial action is necessary. A summary of Project features is included in **Table 3-2**.

TABLE 3-2
SUMMARY OF PROJECT FEATURES

Project Feature	Quantity	Size	Location
Borings – Inside Station fence line	141	Varies by Sampling Method Hand Tools – Max 10x10 feet Drill Rig – Max 30 foot radius Hydrovac – Max 40 foot radius Backhoe – Less than 50 feet in any one direction	SWMU 5, 6, 8, 9; Unit 4.3; AOCs 5, 6, 7, 8, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26
Boring – Outside Station fence line	151	Varies by Sampling Method Hand Tools – Max 10x10 feet Drill Rig – Max 30 foot radius Hydrovac – Max 40 foot radius Backhoe – Less than 50 feet in any one direction	SWMU 1; Perimeter Area; Storm Drains; East Ravine Sediment and Pore Water; AOCs 1, 4, 9, 10, 11, 14, 27, 28
Borings - Contingency	Up to 25% of the above	See above	To Be Determined
Staging Areas	8	Combined total of 26 acres	Previously disturbed areas within Station, near IM-3, at evaporation ponds & along Route 66
Geotechnical Borings	Up to 8	Maximum 30-foot radius	Steep slopes along Station at SWMU 1; AOCs 1, 4, 9, 10, 11, 14, 27, 31
Plant or other biota samples	8 to 10	1 foot by 1 foot pits	Previously sampled locations
Decontamination Pads	1	75 by 60 feet	Adjacent to the Station
Bench Scale Tests	3 tests	Three to five 5-gallon buckets per test	To Be Determined, if conducted
Pilot Test - In Situ Soil Flushing*	1	35 by 115 feet	Bottom of Bat Cave Wash, if conducted
Pilot Test - In Situ Soil Stabilization*	1	35 by 115 feet	Bottom of Bat Cave Wash, if conducted
Pilot Test - In Situ Soil Stabilization	1	35 by 115 feet	Within Station fence line, if conducted

* The pilot studies in Bat Cave Wash may utilize the same Project features.

3.5.2 Soil Sampling and Sample Analysis

3.5.2.1 Soil Sampling and Sample Analysis Overview

The Soil Work Plan identifies the investigation objectives and describes the proposed field testing, laboratory testing, and reporting activities that are part of the proposed soil investigation activities. The Soil Work Plan proposes investigation activities at a total of 292 locations with up to 876 total individual samples. Specific locations and number of samples collected at each location may vary based on access considerations, the results of field screening, and field observations. Further, because of unforeseen circumstances or data gaps, additional samples/sampling locations may be necessary. As part of this DEIR, therefore, a contingency of up to 25 percent additional sampling locations (i.e., up to 73 locations) is included in the DEIR evaluation and, if all were to be needed, would extend the timeframe of the sampling by approximately 2 to 3 months. The sample-collection methods and equipment, the areas to be sampled, and access considerations are described in this section.

The investigation and closure activities completed at the Project Site to date are summarized in the Soil Work Plan and its appendices. The specific appendices for each area are identified in **Table 3-3** at the end of this section. Based on the investigation and closure activities completed at the Project Site to date, the Soil Work Plan identifies the AOCs and SWMUs that require further investigation. In many instances, investigation locations are within the provisional boundaries of previously identified areas of contamination (i.e., within AOCs and SWMUs). However, there are instances where investigation activities are proposed outside of these areas in an attempt to adequately define the extent of contamination. As such, the Project Site encompasses all areas that may be affected by investigation activities, through testing, access, or staging. Areas where testing would occur are identified at general locations, as shown in Figures 3-3 through 3-6.

Details of the proposed sampling program are presented in Table 3-3 at the end of this section. Table 3-3 lists the specific areas proposed for soil investigation activities and summarizes the following information about each area: specific areas; number of sample locations estimated for each area; sampling methods proposed to be used, based on site conditions; number of samples planned to be collected at each location; maximum anticipated depths of sampling; access considerations; and COPCs to be analyzed. The following types of areas are described in Table 3-3:

- <u>SWMUs</u>: DTSC defines SWMUs as areas that may be contaminated due to past management of solid wastes without proper protective practices in place. There are six SWMUs for this Project, which are both within and outside of the Station fence line and are subject to the overall Project Site's environmental investigation to determine if they will need to be remediated.
- <u>AOCs</u>: DTSC defines AOCs as areas that are being evaluated and may be contaminated due to past practices and/or proximity to the Project Site. There are 30 AOCs for this Project located both within and outside of the Station fence line and which are subject to the overall Project Site's environmental investigation to determine if they will need to be remediated.
- <u>Oil/water units (Units 4.3, 4.4, and 4.5)</u>: There are three oil/water units, which are components of the former oily water treatment system within the fence line of the Station. These units are subject to the overall Project Site's environmental investigation to determine if they will need to be remediated. As a result of the footprint of the units and because the COPCs are the same for all three units, the Soil Work Plan is investigating them as a single unit at this time, pending the results of this investigation.
- <u>Perimeter area</u>: The Station is located along a prominent ridge. The perimeter area is defined as the area outside the immediate fence line of the Station to the bottom of the slope. The perimeter area is subject to the overall Project Site's environmental investigation to determine if specific areas are contaminated and, if so, need to be remediated.
- <u>Storm drain system</u>: The storm drain system consists of active and abandoned storm drain lines within the Station and outfalls from the system outside the fence line. The storm drain system is subject to the overall Project Site's environmental investigation to assess whether

and to what degree the storm drains have served and/or are serving as a conduit for transport of contaminants. Results of the investigation will inform DTSC if remediation is needed and/or if repairs would be necessary.

- Undesignated Areas (UAs): The Potential Pipeline Disposal Area (UA-1) and the Former 300B Pipeline Liquids Tank (UA-2) are UAs outside the Station fence line. A geophysical survey is proposed at the Potential Pipeline Disposal Area; no investigative sampling is currently proposed at the Former 300B Pipeline Liquids Tank because sufficient data were collected during the Part A Phase I investigation. The results of the survey and other investigative activities will determine future steps, if any.

3.5.2.2 Soil Sampling and Sample Analysis Activities

The Soil Work Plan proposes the collection of surface and subsurface soil and sediment samples and the chemical analysis of those samples for COPCs based on information gained from past soil investigations. Geotechnical and other analyses would be performed on select samples to provide information to support the development of the Soil CMS/FS. In addition, some areas would be investigated using geophysical methods to identify the presence of subsurface objects. The proposed Project includes, but may not be limited to, the following activities, as identified in the Soil Work Plan (see subsections that follow for additional details):

- Acquire permission or permits to access certain restricted areas;
- Create physical access to certain locations on the existing network of roads where limited access currently exists (e.g., grading, boulder removal, or vegetation trimming, pruning, or clearing);
- Establish temporary weather and dust monitoring stations, as determined necessary;
- Set up staging areas for equipment and displaced soil storage, maintenance/fueling, and decontamination; To the extent feasible, staging areas will be located in previously disturbed and existing operational areas, with either existing natural topographic boundaries or fencing that defines the staging area boundaries;
- Stake sample locations;
- Before beginning soil investigation activities, conduct pre-investigation field checks;
- Identify potential conflicts with subsurface utilities;
- Conduct video surveys and flow testing/dye testing of storm drain lines;
- Drill or excavate soil borings;
- Install soil vapor probes;
- Collect and preserve soil, soil gas, pore water, and sediment samples for laboratory analyses;
- Perform certain analyses in the field using field testing equipment and methods;
- Plug and abandon boreholes;

- Transport the samples to the analytical laboratory;
- Analyze the samples for selected COPCs;
- Evaluate for data gaps and ultimately present data and conclusions in a written report; and
- Manage investigation-derived waste (IDW); any long-term storage of excavated soil would also be in existing operational areas.

3.5.2.3 Access to Sampling Locations

The proposed Project would require access to sampling locations either by a truck- or track-mounted drilling rig/backhoe/excavator or on foot for hand sampling. Samples collected at the mouth of East Ravine would be accessed on foot or by boat. The proposed sampling methods and locations are based on DTSC's experience and knowledge of the Project Site; while the actual collection methods may vary slightly in the field based on field conditions and Project Site access restrictions, the full extent of potential effects on the environment from the proposed collection methods are covered in this DEIR although efforts will be made to employ the least invasive method(s) feasible. Existing infrastructure within the Project Site includes Station facilities such as plant water lines, industrial (oily water) waste lines, various types of cooling water lines, lubricating oil lines, and plant air lines; natural gas pipelines and other utilities, storm drain lines, equipment, and pipeline bridges; the BNSF railroad tracks; I-40; overhead and underground telecommunications and power cables; and roads. In addition, groundwater wells and interim measure (IM) structures associated with the groundwater remedial activities exist in the area.

The proposed sampling locations are accessible by the existing network of roads throughout the Project Site; this road network would be used to the extent practicable. The proposed access routes are shown in Figure 3-2. As previously noted, the Project Site is crossed by various subsurface utilities, such as natural gas pipelines. Unpaved access roads that cross over utilities may require that additional cover material be placed on the roadbed to protect the utilities. Clean fill material stored in or around the Station would be used for this purpose. The roads would be maintained throughout the operation period of the proposed Project. In addition, some areas outside the Station fence line may require trimming, pruning, or clearing of vegetation or movement of boulders to access proposed sampling locations. After sampling activities are complete, all Project equipment and materials would be removed from the work area and if the area is not paved, the area will be raked/brushed to remove tire tracks. The specific areas known to require grading or vegetation clearance are described in the following pages.

- <u>SWMU 1 – Former Percolation Bed</u>: The proposed sample locations are shown in Figure 3-5. The eight soil boring locations are within and along Bat Cave Wash. Four of the five soil borings located within the wash would require the use of a rubber-tired or track-mounted sonic drill rig. Existing dirt roads would provide access to the wash. The fifth location is at the base of the slope, and would be sampled using a backhoe, excavating to 9 feet below ground surface (bgs); this location can be accessed from within Bat Cave Wash using the same access route used by the sonic drill rig. Boulders in the wash may need to be moved to access some locations and concrete slabs may need to be removed near the toe of the slope.

Three soil borings are located on the wash, near the top of the slope. These three borings would be excavated by a backhoe. The backhoe can access the top of the slope from the Station and would not require additional access modifications. These three borings would be shallow potholes.

- <u>AOC 1 – Area Around Former Percolation Bed</u>: The 31 proposed soil borings at AOC 1 are located within and along the mouth of Bat Cave Wash adjacent to SWMU 1, beginning west of the Station and extending north to where the wash meets the National Trails Highway and then joins the Colorado River. The proposed sample locations are shown in Figures 3-3 and 3-5. An existing dirt road located to the west of the station and extending to the north provides access to the wash near the Station and south of I-40, depending on its current condition and ability to support the weight of the drill rig and support vehicles. The wash area just south of I-40 can also be accessed by a dirt road extending from the north part of the Station north of AOC 6. Boring AOC 1-6d is located between two culverts (I-40 and the BNSF railroad) and would require an access permit from BNSF. The borings located north of the BNSF railroad can be accessed from the National Trails Highway, including the thickly-vegetated area at the far northern end of the wash near the Colorado River. Up to two acres of vegetation (salt cedar, tamarisk trees, and plants) would be cleared just above the ground surface using a chain saw and wood chipper to facilitate access to the borings within the mouth of Bat Cave Wash (root balls would be left in place to allow regrowth). Borings AOC 1-1 through AOC 1-4 are located on a 10-foot plateau that may need access pathway improvement and/or grading to facilitate access. At least 26 of the soil borings would be drilled using a drill rig, which may be either a rubber-tired or track-mounted sonic drill rig. Borings AOC 1-BCW26 through 30, located at far northern extent of AOC 1 along the National Trails Highway could be excavated by backhoe. Boring AOC 1-T2F, located along the east slope of Bat Cave Wash northwest of AOC 1-6 outside the Station fence line, would require rappelling and can only be sampled using hand tools.
- <u>AOC 4 – Debris Ravine</u>: A January 2010 storm event deposited a large amount of material (i.e., large and small cobbles) in the southern reaches of Bat Cave Wash near the confluence with AOC 4. This material may be cleared prior to collection of the samples using a sonic drilling rig at borings AOC 4-BCW1 through AOC 4-BCW6. The proposed sample locations are shown in Figure 3-5.
- <u>AOC 9 – Southeast Fence Line (Outside Visitor Parking Area)</u>: AOC 9 is on a steep slope just outside and southeast of the Station fence line. The proposed sample locations are shown on Figure 3-5. Most of the sample locations are on the steep slope or in drainage areas along the pipeline access road located at the toe of the slope beneath the AOC. The slope areas are generally unstable and not level, thereby limiting sampling methods to hand tools and/or a backhoe. Some vegetation trimming and modification may be necessary (in particular, at AOC 9-15).
- <u>AOC 10 – East Ravine</u>: AOC 10 is a ravine with steep-sloped side walls. The majority of proposed sample locations are on the slopes of the ravines, resulting in access limited to hand tools or backhoe. Some drilling locations are in the bottom of the wash and may be accessible

by a track-mounted or rubber-tired drilling rig. The proposed sample locations are shown in Figure 3-4. Some vegetation may be trimmed and pruned to facilitate access; however, an existing dirt road would provide primary access and no additional improvements are anticipated.

- East Ravine Sediment and Pore Water (ERPW) Sampling: This area is east of AOC 10 along the Colorado River. The proposed sample locations are shown in Figure 3-4. All of these sampling locations have difficult access, with some requiring boat access and some requiring trimming of vegetation. All sampling would be performed with hand tools. No access is allowed from March 15 through September 30 due to bird habitat restrictions. The access descriptions are summarized below.
  - ERPW-1: Access would be achieved down a steep hill and an existing narrow path. The path is relatively solid and tends to have adequate footing.
  - ERPW-2: During Project Site reconnaissance, this location was accessed from the east by parking a small boat adjacent to the vegetation along the river and trekking in on foot. The vegetation was extremely thick and would require more trimming than is feasible. Access over part of the area was achieved by laying narrow planks along the top of the vegetation to serve as a stable walking platform generally over the top of the vegetation. It is anticipated that a combination of temporary walking planks and limited trimming would be the most effective means of access while minimizing impacts to habitat.
  - ERPW-3: Access can be achieved down a steep hill and through a grove of mesquite trees. The path down the hill is over unconsolidated material and has poor footing, which would make access more challenging. The grove of mesquite trees is thick, and some branches may need to be trimmed to allow access with hand-sampling equipment.
  - ERPW-4: Access to this location would be achieved in a similar way as described for location ERPW-2.
  - ERPW-5: Access to this location would be achieved using the general access route for surface water sampling location.
  - ERPW-6: During the reconnaissance, access to this location was achieved by using a canoe to get within approximately 50 feet of the proposed sampling location. The final 50 feet was traversed on foot with staff wearing waders. Water levels were deep enough that sampling on foot at that time would have been challenging. Sediment in this area is also extremely soft. Project Site conditions would likely be more favorable for sampling during winter months with lower water levels.
  - ERPW-7: This location was accessed during the Project Site reconnaissance using a canoe, and water levels at that time were likely too deep to adequately conduct sampling on foot using waders. It is likely a small boat could also access this location, which would provide a sampling platform more stable than a canoe. Lower water levels during winter months may allow sampling to be conducted on foot using waders.
  - ERPW-8: Access to this location would be in a similar method as to location ERPW-7.
  - ERPW-9: A canoe was used during the Project Site reconnaissance to access this location. The water levels at the time of reconnaissance were favorable for sampling on foot using waders.

- ERPW-10: This location was proposed by DTSC after the Project Site reconnaissance had occurred; therefore, access to this location was not specifically evaluated during the initial reconnaissance. It is anticipated that access can be achieved using a canoe, similar to accessing locations ERPW-7 and ERPW-9, to access the shoreline and then by foot from there. This location is uphill from the shoreline, and pore water may not be present at the depths specified for sampling in the Soil Work Plan, in which case only sediment samples would be collected.

- AOC 11 – Topographic Low Areas: The proposed sample locations are shown in Figure 3-4. Several underground natural gas transmission lines cross AOC 11. Some portions of these lines are buried less than 6 inches bgs and other portions are above the ground surface. Sampling is typically not permitted within 10 feet of these lines and crossing these lines with heavy equipment is restricted. Protective berms made of clean fill would be constructed to enable crossing over these lines, if needed. Remnants of two former check berms are located in the Northeast Ravine. The check berm associated with area AOC 11c was breached during the 2008 sampling event to allow drilling equipment to access the upper areas of the AOC. Only minor grading occurred at the other former check berm, which is associated with area AOC 11e. Several sample locations are proposed in the upper areas of the AOC. Additional modification of these check berms may be necessary to access these Phase 2 sample locations.

- AOC 14 – Railroad Debris Site: Access to this area is restricted because it is surrounded by the BNSF railroad, I-40, former access roads, and Bat Cave Wash. An access permit would be required from BNSF and the area is accessible only on foot. Heavy equipment such as the drill rig would have to be moved onto the Project Site by crane from I-40. The proposed sample locations are shown in Figure 3-5.

- AOC 27 – MW-24 Bench: AOC 27 is bordered by I-40, former Route 66 and a ridge, the Station, and Bat Cave Wash on all sides. The proposed sample locations are shown in Figure 3-5. The Project Site would be accessed by a steep dirt road from north of the Station fence line. There are several underground natural gas lines and possibly other unknown utilities, which would require protection from heavy equipment crossing over the top. Additional trenching/potholing not pictured in Figure 3-5 may be conducted at this AOC based on the results of geophysical surveys (see the Soil Work Plan).

- Storm Drain System: Sampling related to the storm drain system would be limited to areas outside the Station fence line in unpaved areas at outfalls and inside the fence line along visible lines, where surface sediment accumulates, or based on video camera surveys. There is limited location information on active and inactive storm drain lines. The alignment investigation would include visual, geophysical (ground-penetrating radar [GPR], electromagnetic induction (EM), and vertical magnetic gradient scans), flow testing/dye testing, and video camera tracing, as feasible, to better define piping locations. The proposed sample locations are shown in Figure 3-5. The results of the alignment investigation may reveal storm drains in locations where sampling might require grading or the removal of boulders or vegetation trimming.

3.5.2.4 Survey of Subsurface Utilities

The proposed Project involves intrusive soil sampling activities that could encounter subsurface utilities such as natural gas, electrical, water, storm drains, and sewer pipes during the grading of roads to access Project sites or during sampling activities. When determining the proposed soil sampling locations, and in order to identify and avoid subsurface utilities, the Station utility plans were reviewed. However, because of the long history of piping and other subsurface utilities at the Station and the uncertainty that all such items have been previously or accurately documented, the proposed drilling locations at AOC 17, AOC 27, and the storm drain system would also be cleared for the presence of subsurface utilities by conducting a geophysical survey or potholing using alternative methods, including EM, vertical magnetic gradient (VMG), or GPR. In addition, the storm drain alignment would be investigated using video survey and flow testing/dye testing methods, as feasible. These surveys would serve to guide the investigation to safe locations for drilling, as well as identify areas where subsurface objects, voids, or changes might affect other Project activities. To further protect against encountering subsurface utilities, sampling locations that cannot be accessed by a hydrovac truck would be hand excavated to the desired sampling depth or a minimum of 5 to 10 feet bgs. The necessary geophysical survey equipment may be brought to the various survey locations using existing roads. The survey would be conducted on foot and would not require additional access beyond that described in the physical access subsection above. The following survey methods would be implemented to identify locations of subsurface utilities.

Electromagnetic Induction

Buried metal, such as subsurface utilities or waste, could be electrically conductive compared to surrounding soil and therefore may be detected using the EM method. The EM method employs a portable power source, a transmitter, and receiver coils to induce and measure an electromagnetic current in the ground. Current flowing in the transmitter coil generates a magnetic field that induces small electrical currents in the ground beneath the instrument. These currents generate secondary magnetic fields that are detected by the receiver coil. The ratio of primary to secondary field strengths is proportional to terrain conductivity and can result in an audible tone or be read directly on the EM instrument meter that is calibrated in units of conductivity. In addition to an audible tone or direct reading, EM scans can also provide contour maps that are analyzed to identify magnetic anomalies that may be due to buried ferrous metal. The larger the object and closer it is to the instrument (that is, ground surface), the more contours are present in the area.

Vertical Magnetic Gradient

The VMG technique measures the intensity of the earth's magnetic field. Ferrous (iron) metal objects are readily detected with magnetics because they produce localized variations (anomalies) in magnetic field intensity. VMG surveys provide better resolution of near-surface objects and are less affected by surface objects than total field magnetometers that measure only total magnetic intensity. The distribution and configuration of VMG contours depict the distribution and intensity of VMG values within the surveyed area. Areas where contours are closely spaced indicate steep magnetic gradients caused by buried objects. If the source of a steep gradient is linear, then the contours tend to parallel the linear feature; if a buried object is localized (for example, a tank or a drum), the contours tend to enclose the object. Lower values may indicate the presence of nonferrous buried objects.

Ground-Penetrating Radar

The GPR system uses radar technology to obtain a continuous, high-resolution profile of the subsurface, depicting variations in the electrical properties of the shallow subsurface. The GPR system continuously radiates an electromagnetic pulse into the ground through a transducer (antenna) that is moved across the ground surface. Because most Earth materials are transparent to electromagnetic energy, only a portion of the radar signal is reflected back to the surface from interfaces representing variations in electrical properties. Subsurface interfaces that produce strong reflections are typically the boundary between a buried metallic object, such as a metal pipe, and the surrounding soil. GPR can be used to locate both metallic and nonmetallic objects and voids. The reflected signals are received by the antenna and are transmitted to a display monitor and/or a graphical recorder. The resulting records can provide information regarding the location of buried utilities, utility trench boundaries, buried objects (such as former foundations and landfill debris), and changes in subsurface conditions. The investigation depth of GPR is highly site-specific and can vary from a few feet to 10 feet or more. In general, GPR performs well (i.e., has greater signal penetration) in electrically resistive material (e.g., dry, coarse-grained soil) and performs poorly in electrically conductive (moist, clayey) soil.

Flow Testing/Dye Testing

According to PG&E, the alignments and connections of portions of the storm drain system are uncertain and would be investigated using flow testing and dye testing methods, as needed. Flow testing involves the addition of water from the Station water supply to specific catch basins or other entry points to the system and observing the flow of that water through catch basins to outfall discharge points. This process would also identify portions of lines that are blocked and require cleanout, and help clarify how certain lines are connected. Soil removed from blocked lines would be managed as IDW, and sampled and analyzed to assess the appropriate disposition. If needed, dye testing may be conducted to further refine flow paths. The dye would be a nontoxic dye approved for discharge into sensitive aquatic environments.

Water from the flow testing would be allowed to flow as though it were rainwater, with special provisions for collecting dye-test water, if needed. Samples of discharge water would be collected from accessible outfalls and would be analyzed for Title 22 metals, hexavalent chromium, total petroleum hydrocarbons (TPHs), polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) or other constituents identified in the vicinity of the drain inlets. Prior to flow-testing activities, PG&E would collect a source water sample from the water pipeline or truck providing the flow test water, and analyze it for the same suite of chemicals to determine COPCs concentrations in the source water, if any, and to allow comparison between source water and discharge water samples. If elevated concentrations of COPCs are present in the discharge water, some contamination can be presumed to be present in the storm drain line, thus requiring further investigation.

Video Survey

Video surveys would be used to investigate storm drain lines and potentially to assess industrial lines (AOC 20). Because some storm drain lines and most industrial lines are 4 inches or less in diameter, standard video survey equipment cannot be used. During the pre-investigation phase, PG&E would test an experimental methodology described in this section to assess whether it is feasible to conduct video surveys of small-diameter pipelines. This includes guiding stiff fish tape (also known as draw wire or draw tape) through the line being investigated to an exit point, attaching a long rope to the loose end once at the exit point and attaching a down-hole camera with built-in light-emitting diode (LED) lights. The fishing tape would then be recoiled and the camera carefully pulled through the drain. Because of the size of the lines, any obstructions in the lines are likely to be significant barriers to continuing the survey. If obstructions are encountered, an attempt will be made to survey the line from the other direction.

3.5.2.5 Establish Weather Monitoring Stations

Weather conditions can play an important role in determining potential dust migration pathways. Wind speed and direction, temperature, humidity, and rain may be monitored using meteorological weather (MET) stations during soil sampling activities. MET stations that may be used would be temporary, portable, battery-operated units, and set up on tripods. The units are 6 to 8 feet tall, with a small, 3- to 4-foot wide area. Weather data can be used to: (1) inform the field and construction personnel when wind speed exceeds a specified threshold, (2) determine upwind and downwind directions, (3) provide real-time temperature data, and (4) estimate the likelihood of precipitation or rain.

3.5.2.6 Establish Dust Monitoring Stations

During soil sampling activities, air monitoring may be conducted to assess air quality within and adjacent to work areas and work perimeters. Air monitoring may be performed to: (1) ensure worker safety within the work area and verify that engineering control measures are effective in preventing airborne contaminants from migrating outside the work area, and (2) document that soil sampling activities do not result in the migration of soil contaminants by air beyond the work area boundaries.

Both direct-read real-time dust monitoring and air sampling may be conducted during Project activities. Portable battery-operated dust monitors and air sampling pumps would be set up at various locations within and around the Project Site where sampling activities are occurring. Dust monitors and sampling pumps may be set up on small tripods and will be located based on wind direction and location of Project Site work. The monitors would be installed if activities have the potential to create significant visible dust, or if extensive potholing or trenching was performed. Locations would be dependent on location of excavation or trenching activities and wind direction. The monitors would be removed immediately after activities are completed.

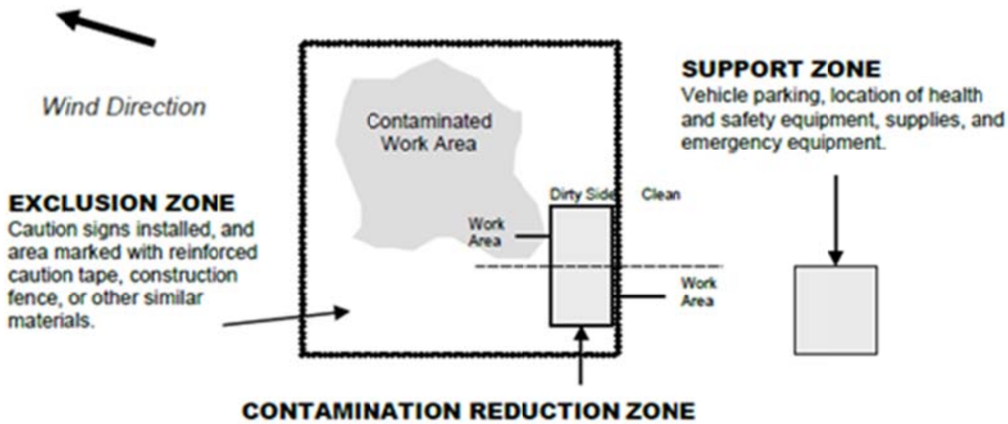
3.5.2.7 Staging Areas

Eight equipment staging areas have been identified throughout the Project Site and would vary in their use, depending on the location of sampling activities and storage/staging needs. These staging areas, with a total area of approximately 26 acres, have been located to the extent feasible in areas that are already graded, developed, or disturbed, such as within the fenced and developed areas at the Station, near the existing IM-3 facilities, at the existing evaporation ponds, and along Route 66. Many of the staging areas to be used for soil sampling activities have been used for staging during previous RFI/RI-related activities, and all are located in previously disturbed and existing operational areas with either existing natural topographic boundaries or fencing that defines the staging area boundaries. Fencing is in place around the Station, the evaporation ponds, and the IM-3 treatment plant. In areas where natural boundaries or fencing are not sufficient to define the staging area, PG&E would temporarily mark the boundaries of the staging areas with traffic cones, caution tape, or straw wattles. For example, during the operation of IM-3 injection wells, the Native American Tribes expressed a preference for unobtrusive, low-visibility boundary markers, so straw wattles were used as the primary means of boundary marking, with other delineation devices used only in strategic locations. Staging areas are shown in Figure 3-2 and in more detail in Figures 3-3 through 3-6.

Staging areas would generally be used for parking of vehicles and other equipment such as drilling rigs, backhoes or excavators, and equipment trailers. Because it is not known what other activities would be occurring at the same time as the soil sampling, it is not possible to precisely plan which staging areas would be used or define what activities would take place in each individual staging area. There may be various types of vehicles or equipment parked at different staging areas at different times during the investigation. Although soil sampling does not require large stockpiles of materials, staging areas may be used for storage of bentonite and/or cement used to seal boreholes. These materials would typically be in bags, stored on pallets, and covered with tarps or plastic sheeting. It is anticipated no more than six pallets would be stored on-site at any one time during this investigation.

3.5.2.8 Work Area Exclusion Zone

The work area exclusion zone (EZ) is where activities take place that may involve exposure to site contaminants and/or hazardous materials or conditions. This zone shall be demarcated to prevent unauthorized entry. More than one EZ may be established if there are different levels of protection to be employed or different hazards that exist in the same work area. The EZ shall be large enough to allow adequate space for the activity to be completed, including field personnel and equipment, as well as necessary emergency equipment. The EZ shall be demarcated with some form of physical barrier or signage. The physical barrier or signage shall be placed so that it is visible to personnel approaching or working in the area. Barriers and boundary markers shall be removed when no longer needed. Exact dimensions of the EZ will depend on the area and method of sampling and will vary at each location. EZs may be as large as 150 feet x 50 feet when drilling with a larger rig, or as small as 10 feet x 10 feet for hand sampling.



3.5.2.9 Drilling or Excavation for Soil Samples

Soil samples would be taken using one or more of the following options: (1) small hand tools (trowel, shovel, slide-hammer, and hand auger); (2) a sonic or hollow-stem auger drilling rig; (3) a hydrovac truck in conjunction with hand tools; or (4) a backhoe or excavator. Efforts will be made to use the least intrusive method feasible depending on location. Hand tools would be used in areas of limited access, areas with topographic constraints, or areas with other constraints. The hydrovac process would be used for borings up to approximately 10 feet bgs. Backhoes or excavators would be used for trenching and for collecting soil samples in sloped and unstable areas. A sonic drill rig would be used for soil borings deeper than 10 feet bgs. The drill rigs would use conventional truck-mounted drilling equipment or all-terrain-capable equipment (track-mounted or rubber balloon tires), depending on access considerations. Examples of the larger sonic drilling rig and hydrovac equipment are shown in Figure 3-9.

The approximate footprint and dimensions of typical sonic or hollow-stem drilling rigs that may be used for the Project are:

- Truck-mounted Tsi 150T is 33 feet long by 8 1/2 feet wide by 12 3/4 feet (folded) to 36 1/2 feet (unfolded) high
- Track-mounted 8140LS is 24.8 feet long by 7 feet wide by 24 feet (unfolded) high
- Rubber-tired S-27 CRS is 20 feet long by 9 feet wide by 8 feet (folded) high
- Rubber-tired CME-85 hollow-stem auger rig is 30 feet long by 9 feet wide by 35.5 feet (mast up) high

Example of a Track-Mounted Rotosonic Drill Rig and Support Vehicle
Used for Locations with Difficult Access

Typical Hydrovac Truck

SOURCE: PG&E 2012

Figure 3-9
Example Photographs of Equipment
Used for Soil Investigation Activities

The approximate footprint of a typical hydrovac truck is:

- Truck-mounted MaxVax Model 700 mounted on a 2012 International 7400 Chassis is 30 feet long by 8 feet wide by 11 1/2 feet high

The approximate footprint of typical backhoe and excavator are described below.

- Caterpillar 416 to 450–series backhoes or similar is 18 to 26 feet long by 8 feet wide by 12 to 14 feet (folded) high
- Caterpillar 329D long reach excavator or similar is 47 feet to 57 long by 11 feet wide by 10 feet (folded) high

For clearance of the vegetation at the mouth of Bat Cave Wash within AOC 1, the following equipment would be used:

- Bobcat S220 Loader: 10 feet long, 6 feet wide
- Bobcat 435 excavator with rubber tracks: 17 feet long, 7 feet wide
- 12-inch wood chipper: 15 feet long, 5 feet wide
- Gas-powered hand-held chainsaw

The sonic drilling method has proven to be effective for deeper soil borings that must drill through larger-diameter cobbles and rock. The sonic drilling equipment is mounted on a flatbed truck or trailer platform and has an approximate 30-foot-radius footprint. The drilling technique uses high-frequency resonant energy transferred down the drill rods to advance a core barrel or casing into subsurface formations. Samples are typically collected in a continuous core barrel with a liner, and samples for chemical analyses are cut from this core, preserved, and sent to the analytical laboratory for analysis along with chain of custody documentation.

The method also allows for the use of split-barrel samplers and Shelby tubes, if desired. The method requires minimal to no fluids, such as water, to assist in drilling.

Hollow-stem augers utilize rotating augers to drill a borehole, and sample collection is typically conducted through the inside of the augers using a split-spoon device. At the Project Site, hollow-stem auger drilling is most suitable for geotechnical drilling and sampling where blow counts are required to assess material properties; in general, this is not a preferred drilling method for environmental sample collection. This is because cobbles and boulders can deflect or refuse advancement of the augers resulting in the need for additional adjacent borehole(s) to reach the design depth of the given borehole. Further, soil sample collection with hollow-stem auger/split-spoon methods can be especially challenging in the formations encountered at the Project Site when boulders or cobbles block the opening of the sampler.

The hydrovac method is effective for shallower borings where utility clearance is needed, up to 10 feet bgs, and has an approximate 40-foot-radius footprint. The hydrovac sampling approach provides added safety when sampling in areas that are known to or may contain subsurface utilities. The hydrovac method vacuums soil out of the pothole or borehole, rather than advancing a drilling bit that might cut unmarked and unknown utilities. Water may also be added to the borehole while drilling with this method. The method enables the operator to visually inspect the borehole as drilling proceeds and thus avoid damage to utilities. Samples are collected by hand tools such as a trowel or by inserting a hand auger soil sampler into the bottom of the borehole. The hydrovac method is not a preferred drilling method for environmental sample collection as it can alter the reliability of certain analytical data.

Surface or shallow sample collection using a backhoe (or excavator) is effective for sloped and unstable areas. The arm of the backhoe can be extended to the sample location, leaving the backhoe located on more stable ground. The approximate footprint for the backhoe equipment is less than 50 feet in any one direction. A backhoe also allows for potholing, where field staff can visually inspect the pothole and make decisions in the field. Samples are collected by hand tools such as a trowel or by inserting a hand auger soil sampler into the bottom of the excavation. Excavated material would be used to backfill the excavation from which it originated. The backhoe would then use its bucket to press down the refilled surface to restore some stability. Alternately, the surface may be restored to match surrounding conditions with an asphalt patch or concrete.

Some surface or shallow soil or sediment samples would be collected using hand tools such as a trowel, depending on access considerations. The collection of sediment and pore water samples along the western shore of the Colorado River in the vicinity of the East Ravine may require boat access and some limited vegetation trimming, pruning, or clearing. The proposed sediment sampling in this East Ravine area would be accomplished by a hand auger and pore water collected via a drive-point piezometer or similar tools.

To support the drilling rig, one or more support trucks and one or more pickup trucks may be used to transport personnel, equipment, and materials from staging areas to the drill site. A forklift may also be used to transport cuttings and excess core generated from drilling the soil borings to 55-gallon drums or lined, steel roll-off soil bins that would be temporarily staged. The number and size of drums and roll-off bins would vary depending on how many borings are installed, the drilling method used, and how quickly investigation activities are required to proceed.

Standard practices, such as use of plastic sheeting over the ground surface, would be employed in the drilling and staging areas, as necessary, to keep the drilling materials and equipment clean and to minimize contact of the drilling materials and equipment with the ground surface. Materials to be temporarily stored at the drilling sites may include drilling equipment. Additional supplies and equipment not in use would be stored at the Station, near the core storage area, or within the already developed or disturbed areas within the Project Site. Drilling and borehole sealing activities would conform to state and local regulations.

Soil vapor probes would be installed in some locations within the Station. These probes would be temporarily in place for approximately 6–12 months. There would be four single-depth probes installed within AOC 13 and one multi-depth probe installed within AOC 26 in accordance with Standard Operating Procedure (SOP) B18, described in Appendix G of the Soil Work Plan. The probes typically consist of a stainless steel probe with a mesh screen at the desired sampling interval connected to the surface by a Teflon tube. The probe assembly is surrounded with a sand filter pack from the bottom of the borehole to approximately 0.5 to 1 foot above the probe screen, followed by granular bentonite to approximately 1 foot above the sand pack, followed by a hydrated bentonite slurry to approximately 1 foot bgs. The probe assembly would be finished with a traffic-rated, flush-mounted well box set in a cement pad. The probes would be installed in the borehole as described below:

- AOC 13-5, AOC 13-6, and AOC 13-11 probes are proposed around the compressor building. The probes would be installed by hand or hydrovac at a minimum of 4 feet bgs and include one round of soil vapor sampling.
- AOC 13-16 probe is proposed near the oil storage tank area and waste sump. The probe would be installed by hand or hydrovac at a minimum of 4 feet bgs and include one round of soil vapor sampling.
- AOC 26-1 is proposed at the former sump in AOC 26. This would be a multi-depth nested probe (5, 25, and 50 feet bgs). The probes would be installed using sonic drilling methods. Two rounds of soil vapor sampling have been proposed, one in the summer and one in the winter, which may require installation for over 1 year.

3.5.2.10 Sample Collection

Appendix F in the Soil Work Plan itemizes the sample containers, preservation methods, and holding times for each proposed sample and includes glass jars, zipper-top baggies, and Summa canisters (for soil gas and air samples). Sample collection and preservation methods are described in Section 2.2.5 of the Soil Work Plan. Most samples would be tested for a variety of COPCs by preserving the soil or sediment samples in the field and sending the samples to an off-site analytical laboratory.

Some of the soil samples and debris would be tested in the field for the presence of metals using x-ray fluorescence (XRF) equipment consisting of a hand-held portable Niton XRF meter and a trowel for either collecting soil samples for ex situ soil analysis or homogenizing and smoothing sample surfaces for in situ soil analysis. In situ testing is performed on an approximately 4-inch by 4-inch wide area, homogenized and smoothed to a depth of approximately 3 inches. A section of x-ray window film is placed over the area to be tested to protect the detection end of the instrument. The nose of the instrument is placed against the film for a period of 3 to 5 minutes, depending on the metals being analyzed. Most non-soil materials (e.g., concrete) would be analyzed in situ.

Most soil samples would be analyzed ex situ at a location where the XRF is set up for the day, or in a field laboratory setting. The same volume of soil that would have been homogenized in place for the in situ analysis is placed into a pan, homogenized and sifted as needed, placed into a sample cup, and covered with x-ray window film. The method can also be used on soil or sediment by placing the soil or sediment in a sample cup or a plastic bag.

Small, temporary shade structures may be set up during sampling activities (approximately 10-foot by 10-foot instant canopies). Temporary plastic safety fencing (4 feet high, orange) may also be set up to define an EZ during sampling activities or trenching. These temporary structures would be removed immediately after sampling concluded. Decontamination of sampling tools would be conducted on a temporary decontamination pad lined with plastic sheeting located on PG&E property at specific locations to be determined based on field conditions at each location, including preferred access routes, sample locations, and investigation equipment used. Heavy equipment such as drill rigs and drill rods would be transported by support truck or drill rig to the concrete lined decontamination pad located adjacent to the Station access road.

3.5.2.11 Investigation-Derived Waste

Several types of waste materials, known as IDW, would be generated during the drilling and sampling activities. IDW materials that would be generated include drill cuttings, sampling equipment wash water (decon water), personal protective equipment, and incidental trash. Appendix J of the Soil Work Plan describes the management procedures for the handling and characterization of IDW, including both hazardous and nonhazardous materials. The IDW management procedures are designed to ensure that IDW is appropriately handled to be protective of human health and the environment. In addition, the management process is designed to maximize the amount of soil that is reused on-site. Attachment 1 of Appendix J of the Soil Work Plan focuses on the reuse procedures, taking into consideration the FMIT statement regarding Project Site background and cultural significance of on-site soil.

The estimated amount of IDW materials that may be generated ranges from less than 5 cubic yards up to 20 cubic yards of solid waste and up to 2,000 gallons of water. Drums (55-gallon) or lined soil bins would be used to contain excess drill cuttings at the drill sites or within the fence line at the Station, and would be managed as IDW, as discussed further in this section. Water generated during decontamination activities would be stored temporarily in drums, bins, or portable storage tanks. These tanks would be located temporarily at the drilling sites and/or at the existing IDW staging areas developed during previous investigations.

Secondary containment (i.e., spill and splash containment) would be set up at the drilling area for the portable storage tanks or bins. After characterization, water generated from decontamination activities, estimated at up to 2,000 gallons, would likely be processed on-site at the existing IM-3 treatment facility and re-injected into the aquifer. Prior to disposal, the water would be tested to determine if it contains contaminants (i.e., organics) that IM-3 is not designed to treat. If the water contains contaminants that IM-3 will not treat, then it would be disposed off-site at an appropriate facility. While the amount of water to be transported off-site is unknown at this time, less than five trips are expected to be necessary. Based on disposal activities conducted to date at the Station, the off-site facility likely would be in the Phoenix or Los Angeles areas. Drill cuttings would typically be contained in 55-gallon drums or roll-off bins at the borehole sites, or in an IDW staging area during the drilling and sampling activities pending receipt of IDW characterization analytical results to determine the appropriate disposition (see Appendix J of the Soil Work Plan for more information on IDW characterization methods).

The displaced soil would be analyzed and characterized as either RCRA or non-RCRA hazardous waste, nonhazardous clean soil (unregulated) or nonhazardous soil for long-term storage (also unregulated). Hazardous soil, if encountered, would be promptly disposed of off-site. Based on existing data, hazardous soil is not anticipated to be encountered. Previous soil disposed of from the Project Site was classified as nonhazardous or non-RCRA hazardous. After sampling and characterization, the drums or bins with hazardous soil cuttings would be removed within 90 days of generation from the IDW staging area using heavy trucks and transported for disposal in a permitted off-site hazardous waste disposal facility (e.g., Kettleman Hills Landfill located outside of Kettleman City in Kings County, California, or a similar facility such as Clean Harbors Buttonwillow Landfill in Buttonwillow, California).

Nonhazardous incidental wastes from drilling activities, such as trash (e.g., gloves, disposable clothing, food waste) would typically be collected at the end of each drilling shift and either hauled off the drill site at the end of the day or placed in dumpsters or roll-off bins that would be hauled off-site periodically by truck to an appropriately permitted municipal solid waste or recycling facility located within approximately 200 miles of the Project Site. Up to approximately two dumpsters or roll-off bins of nonhazardous incidental wastes would be generated during the soil investigation. Disposition of cleared vegetation would be in accordance with direction from DOI and would likely not include off-site disposal. For example, vegetation cleared from the mouth of Bat Cave Wash needed to provide access for sampling would be chipped and left in place and/or used as bedding for the access routes within the tamarisk area.

Unregulated soil would include cuttings from boreholes that IDW analytical testing indicates would not be considered hazardous, does not pose a risk to ecological or human receptors, and does not require disposal at a hazardous waste facility. This unregulated soil would be stockpiled at two designated soil storage areas, in accordance with Appendix J, Attachment 1, of the Soil Work Plan. Displaced unregulated soil resulting from sampling activities and identified for long-term storage would be stored within the PG&E parcel (if soil originated from within the Station fence line) and at the Station evaporation ponds (if the soil originated from outside the Station fence line). Attachment 1 of the Soil Work Plan describes the protocols, including planning (including Native American Tribal input), short-term and long-term handling and storage procedures, contamination assessment, and determination of final disposition. Excavated material used to backfill the excavation from which it originated would employ Best Management Practices (BMPs) as described in Section 3.5.7. It is estimated that the drums and bins temporarily staged at a drill site would not remain in excess of 45 days.

3.5.2.12 Borehole Decommissioning

Standard well and boring decommissioning procedures required by San Bernardino County and the California Department of Water Resources (DWR) (DWR 1991) would be followed for the decommissioning of all borings. After sampling has been completed, boreholes would be grouted from the total depth to within 6 to 12 inches of the ground surface with a bentonite-cement grout installed continuously in one operation to effectively seal the hole. Native soil would be used to fill the top 6 to 12 inches. The maximum area around a boring that may be disturbed for excavation and restoration activities is estimated to be a maximum of approximately 20 feet in diameter, excluding the access route used by the drilling rig that installed the borehole. The borehole abandonment rig would use that same access route.

3.5.3 Bench Scale Tests and Pilot Studies

In addition to the soil sampling activities described above, the proposed Project includes activities, as explained herein, to support the future Soil CMS/FS. Specifically, bench scale tests and pilot studies may be implemented to evaluate potential soil remedy options if remedial action is necessary. The bench scale tests or pilot studies to be considered will be guided by the results of the soil sampling activities and soil risk assessment. The possible remedial options are described in the *Corrective Measures/Feasibility Study Work Plan* (CH2M HILL 2008). The following sections summarize activities associated with bench scale tests and pilot studies.

3.5.3.1 Bench Scale Tests

Bench scale tests may be performed to evaluate the potential for soil washing, soil stabilization/fixation, or solidification to be effective and economical remediation techniques. Bench scale tests yield quantitative performance data and rough design and cost information.

A total of three bench tests may be performed that would evaluate soil washing, in situ soil flushing, and in situ fixation/chemical reduction/stabilization. The locations to be tested would be based on the results of the soil sampling activities. The tests would consist of collecting three to five 5-gallon buckets of contaminated soil for each treatment methodology for off-site testing (for a total of nine to fifteen 5-gallon buckets). The soil would be excavated using either hand tools or a backhoe or excavator and shipped to an off-site laboratory for testing. Soil used for bench scale testing would be disposed of by the laboratory and will not be reused on-site.

3.5.3.2 Pilot Studies

In Situ Soil Flushing

Background – Description of In Situ Soil Flushing for Soil Remediation

Remediating contaminated soil using in situ soil flushing treatment methodology involves application of water or additives containing water to soil to enhance contaminant solubility. Soil flushing is often used in combination with groundwater remedial methods. Contaminants are leached from soil into the flushing solution and allowed to migrate down to groundwater, which is then recovered, treated, and recycled or disposed of as appropriate.

In situ flushing is performed through injection wells or infiltration galleries of an aqueous solution into a zone of contaminated soil/groundwater, followed by downgradient extraction of groundwater and elutriate (flushing solution mixed with contaminants) and aboveground treatment and discharge or re-injection. Flushing solutions include plain water sometimes augmented by surfactants, co-solvents, oxidation/reductive or complexing reagents or other facilitators. In situ flushing typically uses surfactants to enhance conventional pump-and-treat technology through increasing the efficiency of a flushing pore volume, or accelerating natural flushing action. Some of the more important Project Site-related parameters include variations in hydraulic conductivity, degree of heterogeneity and soil organic content. Soil permeability is a key factor in assessing the applicability of this technology. The site specificity of application of this technology necessitates extensive predesign data collection through pilot studies.

Description of Pilot Studies to Test the Effectiveness of In Situ Soil Flushing

If in situ soil flushing is considered a viable remedial option, a pilot test may be conducted to assist in further evaluation of its effectiveness and economics. Such a test would consist of a pilot test area plot located in an area known to have contamination, flushing it with water (possibly containing flushing reagents), and testing the then-flushed soil to see if the contaminants are gone from the soil. Contaminants would be transferred from soil to water, which would then be recovered via extraction wells. Recovered water would then be treated, using either the existing on-site treatment facility, or trucked to an offsite treatment facility.

While there are currently no pilot studies planned, plausible areas where soil flushing would be a viable remedial technology would be within SWMU 1/AOC 1 – Bat Cave Wash. For the purposes of this DEIR, it is assumed that a pilot study for in situ flushing would be located in the bottom of Bat Cave Wash, in an area that is generally devoid of vegetation. Existing vegetation would be avoided.

The in situ soil flushing pilot study would include the construction of either an infiltration gallery or injection well network for applying water. A plausible dimension of the pilot test area would be approximately 35 feet by 115 feet. In situ flushing equipment would be housed in either a small trailer (≈25 feet) or conex container, which will contain mixing equipment, monitor, and pump controls. Field appurtenances would include short, shallow infiltration trenches or injection wells, and flush solution recovery wells.

Infiltration trenches are anticipated to be approximately 30 inches wide by 25 feet long and buried at a depth of up to 2 feet. Installation excavation is anticipated to be performed by a backhoe and would take 5 to 7 days to install. If an infiltration gallery treatment solution delivery approach is used, it is proposed that four 30-foot horizontal trench laterals would be installed at a depth of approximately 3 to 5 feet bgs. If pilot area characterization information indicates the use of injection wells is more appropriate for delivery, it is proposed that a network of up to four 4- to 6-inch-diameter injection wells be installed and screened within impacted soil zones. In addition, as part of the pilot study, a network of six 4-inch diameter recovery wells would be installed within the proposed 35-foot by 115-foot in situ treatment pilot test area. Well depths will be dependent upon soil characterization data collected through the soil investigation. It is assumed that a pilot test duration of approximately 120 days of active flushing would be sufficient for this test. Assuming an application rate of 1 to 1.5 gallons per minute per well, the amount of flush solution for a 120-day test would range between 700,000 to 1,000,000 total gallons of water (approximately 8,000 gallons per day). This water would be sourced from the Station water supply via a temporary 1-inch-diameter rolled high-density polyethylene (HDPE) tubing to be run aboveground from the Station down into Bat Cave Wash.

Recovered flush water would be pumped and piped to a temporary holding tank located at the Station and recovered flush solution would be temporarily stored within a 20,000-gallon tank located at the Station. This tank would be pumped to a 7,000-gallon tanker truck for transfer on a daily basis. It is assumed flush water would be transported to:

- The IM-3 water treatment plant for treatment;
- An off-site treatment facility in Los Angeles (if water is hazardous) or Phoenix (if water is nonhazardous); or
- If the recovered water is hazardous, it may also be treated on-site with a portable water treatment system to nonhazardous levels and subsequently trucked to Phoenix.

Once pilot studies are complete, infiltration galleries would be removed and backfilled with native material. All injection and recovery wells will be removed and holes abandoned in accordance with DTSC guidelines (DWR Bulletin 74-90, California Well Standards) and American Society for Testing and Materials (ASTM) Standard 5299-99, Standard Guide for Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes and Other Devises for Environmental Activities. Post-remediation soil sampling would be performed after the pilot test to assess contaminant concentrations in the treatment zone. It is assumed up to six soil borings would be drilled within the treatment area using sonic drill rigs.

In Situ Stabilization/Chemical Fixation

Background – Description of In Situ Stabilization/Chemical Fixation for Soil Remediation

Remediating contaminated soil using in situ stabilization/chemical fixation involves the addition of reagents to react with targeted constituents in the soil to chemically convert contaminants into insoluble minerals that are permanently stable under the natural redox conditions existing at the Project Site. Reagents can be applied to soil by infiltrating a liquid from the surface or through injection wells.

Description of Pilot Studies to Test the Effectiveness of In Situ Stabilization/Chemical Fixation

If in situ stabilization/fixation technology is considered a viable remedial option, a pilot test may be conducted to assist in further evaluation of its effectiveness and economics. Such a test would consist of construction of a small-scale on-site treatment delivery system (infiltration gallery or injection wells) over an area known to have contaminated soil. Reagent selection and percent addition will be determined based on the bench scale tests described previously in this section. Potential reagents for investigation include: reduction/oxidation solutions; sodium dithionite; calcium/sodium polysulfide; sodium metabisulfite; complexing solutions; diphenyl carbazide; and ECOBOND® solution. Selection will be made of the most effective reagents and their anticipated concentrations. One or more of these reagents may be used in the pilot tests.

While there are currently no pilot studies planned, plausible areas where in situ stabilization/fixation would be a viable remedial technology would be within SWMU 1/AOC 1 – Bat Cave Wash and within the Station. It is assumed that the proposed 35-foot by 115-foot in situ treatment pilot test area in the bottom of Bat Cave Wash (described previously for in situ soil flushing) could be bifurcated with one side used for an in situ soil flushing pilot study and the other used for in situ fixation/stabilization pilot study. In addition, a second in situ stabilization/fixation pilot study within the Station may be conducted. In situ fixation/stabilization pilot study within the Station would be executed using injection wells.

In situ fixation/stabilization reagents would be delivered to the ground via either an in infiltration gallery or injection wells. The configuration of these delivery systems was described under in situ soil flushing. Water would be sourced from the Station water supply via a temporary 1-inch-diameter rolled HDPE tubing; however, for the in situ fixation/stabilization pilot study, the water needs are much less, totaling approximately 200,000 gallons, and there is no need to recover and treat flushing solutions.

As described above, once pilot studies are complete, infiltration galleries would be removed and backfilled with native material. All injection and recovery wells will be removed and holes abandoned in accordance with DTSC guidelines (DWR Bulletin 74-90, California Well Standards) and ASTM Standard 5299-99, Standard Guide for Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes and Other Devices for Environmental Activities. Post-remediation soil sampling would be performed after the pilot test to assess contaminant concentrations in the treatment zone. It is assumed up to six soil borings would be drilled within the treatment area using sonic drill rigs.

3.5.4 Geotechnical Evaluations

Geotechnical borings may be drilled in areas to collect information to evaluate strength characteristics of subsurface soil and slope stability. Slope stability analyses may be performed to evaluate the maximum slope ratio that can be maintained or maximum loads that may be placed at a given location during sampling or remediation activities. It is anticipated that geotechnical evaluations would be undertaken within or near AOCs that have steep slopes and where remediation is determined necessary. AOCs with or near significant slopes include: SWMU 1/AOC 1, AOC 4, AOC 9, AOC 10, AOC 11, AOC 14, AOC 27, and AOC 31. It is assumed that up to eight geotechnical evaluations would be undertaken. Geotechnical borings would be drilled using hollow-stem auger drill. Soil samples would be collected using the standard penetration test and modified California ring samplers for index properties, strength, and compaction characteristics.

3.5.5 Plant or Other Biota Samples

After the proposed soil investigation activities are complete, a Human Health Risk Assessment (HHRA) and an Ecological Risk Assessment (ERA) (a paper study) would be performed, following the approach presented in the Human Health and Ecological Risk Assessment Work Plan (RAWP). The ERA makes a number of conservative assumptions, and as such, it may indicate theoretical potential risk to herbivorous and invertivorous wildlife populations. In that event, a validation study composed of collecting and analyzing biota tissue samples from the Project Site may be considered to reduce uncertainty in the ERA.

In the event that a validation study is required, plant and invertebrate tissue samples and potentially co-located soil samples would need to be collected from the Project Site. The sampling at the Project Site would focus on the areas of the soil investigations, although specific AOCs cannot be determined at this time without completing the predictive ERA. To minimize additional soil sampling, tissue samples would be collected from locations where soil sampling has already been completed or planned (which can be representative of co-located data) provided adequate biomass is available from those locations.

As part of the study, tissue and co-located soil samples would also need to be collected from a reference area representative of ambient conditions. The reference area could be identified within the boundary of the APE, but outside of the soil investigation areas.

The tissue sampling methods recommended would not require use of motorized equipment and tissue would be collected from areas providing foraging habitat. The following summarizes some general approaches to sampling:

- Plant Tissue Sampling – Based on review of diet composition of representative receptors and listed special-status and culturally-sensitive plants, no collection of special-status and culturally-sensitive plant species will be necessary. Plant tissue samples would be collected using less invasive methods, for example by hand pruning without sacrificing individual plants. Tissue would be collected from as few plants as practical to provide a representative sample of diet concentrations in that specific sampling location. Tissue collection could require 1 to 2 weeks of field work in each area and focus on leafy vegetation rather than more intrusive seed collection, as allowed by study objectives.
- Invertebrate Tissue Sampling –Pit traps could be set where soil from a location is pushed aside to create a shallow pit (approximately 1 foot square by 1 foot deep) using a hand auger, shovel, or trowel. While the specific number of pits would depend on the area needing assessment, for the purposes of this DEIR, it is assumed it will be 8 to10 pits co-located with soil sample locations. A 1-gallon vessel (jug/can) could be put in a shallow pit with the lip of the vessel at ground surface, and invertebrates can be collected using these baited traps. A thin plywood cover board would be placed over the trap and secured from other predators. It is conceivable that this effort could take 1 to 2 weeks of daily trapping to collect sufficient biomass in a desert environment. Once sampling is completed, the traps would be removed and soil would be pushed back to cover the shallow pits.

As the soil investigation proceeds, additional data may identify additional key chemicals of potential ecological concern (COPECs) (e.g., dioxins/furans, PCBs, or other organic chemicals). If unacceptable risk is predicted for carnivorous receptors, a validation study may be required where small mammal tissue would need to be collected from the Project Site. Tissue would be collected using Sherman live or similar traps deployed on the ground surface. Trapping in each area could require 1 to 2 weeks to collect sufficient biomass for analysis. The sampling methods would only be minimally invasive, focusing on locations where soil sampling has already been completed or planned (which can be representative of co-located data) provided adequate biomass is available from those locations.

3.5.6 Work Area Restoration

Once soil investigation activities are complete, all Project equipment and materials would be removed from the work area. If not paved, the area would be raked/brushed to remove tire tracks and restored to substantially the same condition(s) as prior to the soil investigation sampling. At the mouth of Bat Cave Wash, up to 2 acres of vegetation would be trimmed, pruned, or cleared using a chainsaw and wood chipper. Complete vegetation removal is not anticipated in any work areas (see Section 3.5.2.1). Trimming, pruning, or clearing of vegetation may be needed to access some sites and clear around sample areas. No action will be taken to revegetate work areas. As described in the Soil Work Plan, roots would be left in place to allow for regrowth of vegetation (including the mouth of Bat Cave Wash, where root balls would be left in place). Revegetation is expected to occur naturally and rapidly within one to two growing seasons based on past on-site experience. For example, in 2007, vegetation was cleared in the area where MW-52 and MW-53 were installed, near the Colorado River and I-40. Vegetation in this area grew back within two growing seasons.

As described in Section 3.5.3.2, any infiltration galleries associated with the pilot studies would be removed and backfilled with native material. All injection and recovery wells would be removed and holes abandoned in accordance with DTSC guidelines (DWR Bulletin 74-90, California Well Standards) and ASTM Standard 5299-99, Standard Guide for Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities. SOPs (Section 3.5.7) for well decommissioning would also be followed.

3.5.7 Standard Operating Procedures and Best Management Practices

The soil investigation activities will adhere to SOPs and BMPs to ensure protection of health, safety, and the environment. The relevant SOPs and BMPs will become conditions of approval of the Project. Section 2.2 of the Soil Work Plan, Standard Operating Procedures (CH2M HILL 2013), describes SOPs and BMPs to be used for the soil investigation activities. SOPs and BMPs are part of the Project and will be implemented and followed throughout the Project. Specific SOPs described in Section 2.2 of the Soil Work Plan include the methods, equipment, and procedures for the following activities:

- borehole drilling requirements
- surface soil sampling
- subsurface soil sampling
- debris sampling
- geophysical surveys
- XRF screening
- soil vapor sampling

- potholing/trenching and sampling
- surveying
- vegetation management
- waste management
- decontamination

In addition, many of the soil sample collection and handling activities will follow SOPs from the *Topock Program Sampling, Analysis, and Field Procedures Manual, PG&E Topock Compressor Station, Needles, California* (CH2M HILL 2005). The SOPs relevant to the soil investigation activities associated with this Project are included in Appendix G of the Soil Work Plan and include the following SOPs:

- SOP-B2 Soil Classification and Logging Procedures
- SOP-B3 Borehole Sampling and Logging of Soil Borings
- SOP-B4 Boring Abandonment
- SOP-B5 Decontamination of Personnel and Equipment, Well Drilling, and Subsurface Sampling and Investigations
- SOP-B7 Homogenization of Soil and Sediment Samples
- SOP-B9 Drilling-Sonic Method
- SOP-B11 Site Clearance and Permitting
- SOP-B15 Volatile Organic Compound (VOC) Soil Sampling
- SOP-B16 Field-portable X-Ray Fluorescence Soil Sampling
- SOP-B17 Standard Operating Procedure for the Installation of Permanent Soil Gas Sampling Implants
- S-B18 Collection of Soil Gas Samples from Temporary and Permanent Soil Gas Probes using SUMMA Canisters and a Helium Leak Check
- SOP-B19 Remote Equipment Refueling

Section 2.2.1 of the Soil Work Plan, Best Management Practices, provides a general description of BMPs associated with dust control, noise control, worker safety, access routes, general housekeeping practices, and other potentially undesirable effects associated with the investigation. Appendix J of the Soil Work Plan provides additional details for the management of displaced soil and hazardous waste.

3.5.8 Soil Investigation Schedule and Effort

Implementation of soil sampling activities are anticipated to begin in early 2015, pending approval of the Soil Work Plan and completion of the CEQA process. The soil sampling activities are estimated to be completed within 12 months of initiation. Subsequent activities to support the future Soil CMS/FS would be undertaken after the completion of the soil sampling activities, estimated to be in late 2016 and are anticipated to last from 13 to 27 months. Bench scale tests would precede the pilot studies, and each pilot study would be implemented independently to utilize the same equipment and worker force. The geotechnical evaluation and plant or other biota sampling would be conducted independently of bench scale tests and pilot studies, although these activities could occur concurrently with the bench scale tests and pilot studies.

3.5.8.1 Soil Sampling and Sample Analysis

Work phases and approximate timelines for soil sampling and sample analysis are as follows:

- Permitting and site planning – 2 months
- Field mobilization – 1 month
- Field implementation – 9 months

The field implementation phase would occur over three stages that would include field investigation, data compilation, and stakeholder coordination. It is understood that these stages could overlap over the duration of the Project. The field investigation would occur for approximately 5 months. Workers would be present on-site each work day throughout the duration of investigation. During times when concurrent investigation activities are under way, a maximum of 13 employees would be accessing the Project Site plus agency oversight personnel, an archaeological monitor, and invited Native American Tribal monitors. Most workers would drive to the Project Site daily from nearby communities, including Needles, Laughlin, and Lake Havasu City. In addition, an average of 10 passenger vehicle deliveries would occur daily for the 5 months of active field investigation time. **Table 3-4** outlines the field implementation stages. Data compilation and stakeholder coordination would occur throughout the field effort.

TABLE 3-4
SOIL SAMPLING FIELD IMPLEMENTATION SCHEDULE

Activity	Estimated Field Staff	Estimated Duration in Months
XRF sampling/geophysical and asbestos surveys	Up to 4 staff	2
Compile data from XRF and survey	N/A	1
Meet with stakeholders to make decisions on sample locations	N/A	1
Hand sampling, drilling, hydrovac, backhoe sampling	Up to 13 staff	2
Compile data from hydrovac inside fence line	N/A	1
Meet with stakeholders to make decisions on sample locations	N/A	1
Additional hydrovac locations	Up to 4 staff	1

The length of time required for the field implementation is dependent on a number of factors, including the nature and extent of contaminants encountered, geologic conditions encountered during drilling, the time required for grading or vegetation access, any necessary regulatory and landowner approvals, the availability of drilling contractors, and concurrent sequencing of work. Drilling would be limited to daylight hours to minimize the need for lighting and to conserve energy to the extent feasible. If a significant number of contingency samples are required, then the estimated duration could be extended up to 2 or 3 months.

In general, drilling activities would include the mobilization of equipment, supplies, and workers to and from the Project Site. Heavy equipment would include drill rigs to drill the boreholes and support trucks for materials and equipment, as described above. Trucks would be necessary for transporting workers, equipment, and materials to the Project Site, and for transporting workers, equipment, materials, collected samples, and waste from the Project Site. Most of the trips to the Project Site are expected to occur either early morning or end of day; deliveries may occur throughout the day. Anticipated vehicle use and trips are outlined in **Table 3-5**.

Eight equipment staging areas have been identified throughout the Project Site and would vary in their use, depending on the location of sampling activities and storage/staging needs (see Figure 3-2). These staging areas, with a total area of approximately 26 acres, have been located to the extent feasible in areas that are already graded, developed, or disturbed, such as within the fenced and developed areas at the Station, near the existing IM-3 facilities, at the existing evaporation ponds, and along Route 66 (Figure 3-4). Equipment staging areas would be clearly demarcated based on existing disturbed areas and natural topographic limitations. In addition, two “observation areas” have been identified that would be used by PG&E, DTSC, and other stakeholders to view Project progress. No equipment or materials would be stored in these locations.

TABLE 3-5
TOTAL VEHICLE USE AND TRIPS FOR SOIL SAMPLING

Equipment/Truck	Estimated Trips
Drill rig	2 - 4
Drilling support/supply truck (7 weeks)	7 - 14
Hydrovac truck	2 - 4
Hydrovac support truck	2 - 4
Backhoe	2 - 4
Backhoe support truck (2 weeks)	2 - 4
Waste hauler	2 - 6
Worker’s trucks/cars	1,320 - 1,500

Water for drilling activities, decontamination of equipment, and dust suppression would be trucked from the existing water tanks or water source at the Station or transported by hose where feasible (up to 2,000 gallons for soil sampling plus 500 gallons for contingency sampling if necessary). Water at the Station is supplied by wells located on the Arizona side of the Colorado

River. Water use at the Station varies tremendously by season. The majority of the water is used by the cooling towers, and much higher demand occurs in the summer. The amount of water potentially used by drilling activities is minimal compared to the amount of water used by the Station.

3.5.8.2 Bench Scale Tests and Pilot Studies

Bench Scale Tests

A total of three bench tests may be proposed that would evaluate soil washing, in situ soil flushing, and in situ fixation/chemical reduction/stabilization. Work phases and approximate timelines for bench scale tests are as follows:

- Permitting, procurement, and site planning – 2 months
- Field implementation – 1 month

The locations for bench scale tests would be based on the results of the soil sampling activities. The tests would consist of collecting three to five 5-gallon buckets of contaminated soil for each treatment methodology for off-site testing (for a total of nine to fifteen 5-gallon buckets). Work would be undertaken by an engineer and subcontractors using hand tools. The bench scale tests would require daily truck trips would involve daily trips for an engineer and subcontractor for an approximate total of 40 trips.

Pilot Studies

A total of three pilot studies may be proposed: one in situ soil flushing pilot study; one in situ stabilization/fixation pilot study that would use a bifurcated pilot test area (using either an infiltration gallery or injection well delivery system) located in the bottom of Bat Cave Wash; and one in situ stabilization/fixation pilot study within the Station that would use injection wells. The pilot tests in the bottom of Bat Cave Wash and on the Station would not be undertaken concurrently. If both are implemented, they would be one after the other, in order for the same equipment and work force would be used. Work phases and approximate timelines for pilot tests are as follows:

Pilot Studies in the Bottom of Bat Cave Wash

- Permitting, procurement, and site planning – 2 months
- Field mobilization (including installing infiltration galleries, wells, piping, and pumps) – 1 month
  - One trip for back hoe, drill rig, pilot test trailer, (2) 20,000 gallon baker tanks, and 5,000-gallon tank (6 trips)
  - Daily trips for two engineers (40 trips) and subcontractor (20 trips)
- Field implementation – 6 months
  - Daily trips for engineer (120 trips), subcontractor (120 trips), and 7,000 gallon tanker truck (120 trips)
- Post-pilot testing sampling – 2 weeks

- One trip for drill rig (1 trip)
- Daily trips for geologist (10 trips) and geologist assistant (10 trips)

- Decommissioning/restoration – 2 weeks
  - Daily trips for engineer (10 trips) and subcontractor (20 trips)

The total duration for a joint in situ soil flushing and in situ stabilization/fixation pilot study in the bottom of Bat Cave Wash would be approximately 10 months. Total truck trips for the pilot studies in Bat Cave Wash are estimated at approximately 482 trips. Workers would include engineers, drill rig operators, geologists, and subcontractors. Assuming an application rate of 1 to 1.5 gallons per minute per well, the amount of water needed for a 120 day test would range between 700,000 to 1,000,000 total gallons of water for the in situ soil flushing pilot, and an additional 200,000 gallons for the in situ stabilization/fixation pilot study for a total of up to 1,200,000 gallons. This water would be sourced from the Station water supply via a temporary 1-inch-diameter rolled HDPE tubing that would run above ground.

Pilot Study in the Station

- Permitting, procurement, and site planning – 2 months
- Field mobilization (including installing infiltration galleries, wells, piping, and pumps) – 1 month
  - One trip for back hoe, drill rig, and pilot test trailer (3 trips)
  - Daily trips for two engineers (40 trips) and subcontractor (20 trips)
- Field implementation – 6 months
  - Daily trips for engineer (120 trips) and subcontractor (120 trips)
- Post-pilot testing sampling – 2 weeks
  - One trip for drill rig (1 trip)
  - Daily trips for geologist (10 trips) and geologist assistant (10 trips)
- Decommissioning/restoration – 20 weeks
  - Daily trips for engineer (10 trips) and subcontractor (20 trips)

The total duration for an in situ stabilization/fixation pilot study within the Station would be approximately 10 months. Total truck trips for this pilot study are estimated at approximately 354 trips. Workers would include engineers, drill rig operators, geologists, and subcontractors. Water use would total approximately 200,000 gallons sourced from the Station water supply via a temporary 1-inch-diameter rolled HDPE tubing that would run above ground.

3.5.8.3 Geotechnical Evaluations

It is assumed that up to eight geotechnical evaluations would be undertaken to collect information to evaluate strength characteristics of subsurface soil and slope stability within or near AOCs that have steep slopes and where remediation is determined necessary. Work phases and approximate timelines for geotechnical evaluations are as follows:

- Field Implementation – 2 months (3 to 5 days per evaluation)
- One trip to the site for the hollow-stem auger rig (8 trips total)
- Daily trips to the site for driller, geologist, and geologist assistant (120 trips total)

Total truck trips for the geotechnical evaluations are estimated at approximately 128 trips. Workers would include drill operator, geologist, and assistant. Geotechnical borings would be drilled using hollow-stem auger drill, no water would be needed.

3.5.8.4 Plant and Other Biota Samples

In the event that an ERA validation study is required, plant, invertebrate, and mammal tissue samples may need to be collected from the Project Site. Work phases and approximate timelines for plant and other biota sampling are as follows:

- Plant tissue sampling – 2 weeks
  - Two daily trips for biologists (20 trips total)
- Invertebrate tissue sampling – 2 weeks
  - Two daily trips for biologists (20 trips total)
- Small mammal tissue sampling – 2 weeks
  - Two daily trips for biologists (20 trips total)

Total truck trips for plant and other biota sampling are estimated at approximately 60 trips. Workers would include biologists using hand tools such as a hand auger, shovel, or trowel. No water would be needed for plant or other biota sampling.

TABLE 3-3
SOIL INVESTIGATION AREAS – TOPOCK COMPRESSOR STATION PROJECT SITE, NEEDLES, CALIFORNIA

Soil Investigation Areas	Area (square feet)	Number of Locations and Sampling Methods[a]	Total Number of Soil Samples[a]	Maximum Sample Depth (Feet)	Access Considerations	Parameters to be Measured[b]	Location in Soil Work Plan	Notes
SWMU 1 – Former Percolation Bed	19,000	4 Rotosonic borings; 4 Backhoe excavations	47	80	Access to Bat Cave Wash likely by dirt road west of AOC 16; potential boulder restrictions	Hexavalent chromium; Title 22 metals; PCBs; soil physical parameters SPLP; general chemistry	Appendix A; Subappendix C1, Table C1-10; Appendix F	
SWMU 5 – Sludge Drying Beds	2,000	2 Hydrovac borings	4, if feasible	3, if feasible	Paved access road; adjacent unpaved areas; Hydrovac accessible; utilities & risers; XRF if feasible	Hexavalent chromium; Title 22 metals; SVOCs; PAHs; TPH-Extractable and Purgable; VOCs; TAL/TCL Analytical Suite; soil physical parameters	Appendix B; Subappendix B2, Table B2-3; Appendix F	Beds removed; COPCs = TPH & PAHs
SWMU 6 – Chromate Reduction Tank	31	1 Hydrovac boring	4, if feasible	10, if feasible	Paved access; adjacent unpaved areas; utilities & risers	Hexavalent chromium; Title 22 metals; SVOCs; PAHs; TPH-Extractable and Purgable; VOCs; TAL/TCL Analytical Suite	Appendix B; Subappendix B3, Table B3-3; Appendix F	No XRF
SWMU 8 – Process Pump Tank	110	1 Hydrovac boring	2, if feasible	3, if feasible	Paved access; utilities & risers	Hexavalent chromium; Title 22 metals; SVOCs; PAHs; TPH-Extractable and Purgable; VOCs; TAL/TCL Analytical Suite	Appendix B; Subappendix B4, Table B4-3; Appendix F	No XRF
SWMU 9 – Transfer Sump	24	Potentially 1 Hydrovac boring	TBD	TBD	Paved access; unpaved; utilities & risers; XRF feasible	TBD	Appendix B; Subappendix B5, Figure B5-2	Results from nearby units would be used by DTSC to decide if and where sampling is needed
SWMU 11 – Former Sulfuric Acid Tanks	780	5 Hydrovac borings	10	3, if feasible	Concrete walkways and unpaved areas; utilities & risers; One location suitable for XRF	Hexavalent chromium; Title 22 metals; pH; TAL/TCL Analytical Suite; soil physical parameters	Appendix B; Subappendix B6, Table B6-2; Appendix F	
AOC 1 – Area around Former Percolation Bed	182,000	33 Rotosonic borings; 4 of the 33 could be backhoe excavations; 1 by hand tools and rappelling	155	80	Access roads west of AOC 16, north of AOC6, or dirt roads north of I-40 and BNSF railroad tracks; four locations on 10-foot plateau may need access pathway improvement and/or grading; one location in Bat Cave Wash between two culverts will require BNSF access permit; some vegetation (Tamarisk) trimming and pruning needed (less than 2 acres or 87,120 square feet)	Hexavalent chromium; Title 22 metals; pH; Dioxins/Furans; Pesticides; PCBs; PAHs; soil physical parameters	Appendix A; Subappendix C2, Table C2-19; Appendix F	
AOC 4 – Debris Ravine	69,000	12 Rotosonic borings; 4 of 12 may be by Hydrovac borings; 10 by hand tools	66	9	Open, unpaved area; 2010 storm event deposited material in southern reaches of Bat Cave Wash that may need removal	Hexavalent chromium; Title 22 metals; Dioxins/Furans; PCBs; PAHs; asbestos	Appendix A; Subappendix C10, Table C10-15; Appendix F	
AOC 5 – Cooling Tower A	15,000	6 Hydrovac borings	18	10	Paved access; utilities & risers; Most suitable for XRF	Hexavalent chromium; Title 22 metals; pH; TAL/TCL Analytical Suite; soil physical parameters	Appendix B; Subappendix B7, Table B7-5; Appendix F	
AOC 6 – Cooling Tower B	14,000	5 Hydrovac borings; 2 by hand tools	16	10, if feasible	Unpaved and accessible; utilities & risers; most suitable for XRF	Hexavalent chromium; Title 22 metals; pH; PCBs; TAL/TCL Analytical Suite; soil physical parameters	Appendix B; Subappendix B8, Table B8-8; Appendix F	
AOC 7 – Hazardous Materials Storage Area	740	5 Hydrovac borings	10	3, if feasible	Mixed paved & unpaved; accessible; utilities & risers; some suitable for XRF	Hexavalent chromium; Title 22 metals; pH; SVOCs; PCBs; PAHs; TPH-Extractable and Purgable; VOCs; TAL/TCL Analytical Suite; soil physical parameters	Appendix B; Subappendix B9, Table B9-2; Appendix F	
AOC 8 – Paint Locker	120	1 Hydrovac boring; 1 by hand tools	4	3, if feasible	One paved & one unpaved; accessible; utilities & risers; one suitable for XRF	Title 22 metals; TPH-Extractable and Purgable; VOCs; TAL/TCL Analytical Suite; soil physical parameters	Appendix B; Subappendix B10, Table B10-2; Appendix F	
AOC 9 – Southeast Fence Line (Visitor Parking Area)	3,400	6 by hand tools or backhoe	21	14	Steep slope or in drainage area with low stability; some vegetation trimming or pruning likely at AOC9-15	Hexavalent chromium; Title 22 metals; Mercury and Lead; Pesticides; PCBs; PAHs; soil physical parameters	Appendix A; Subappendix C3, Table C3-16; Appendix F	
AOC 10 – East Ravine	20,910	14; 6 by Backhoe excavations; 5 by Rotosonic borings; 3 by hand tools; also additional assorted debris locations by hand tools	44	9	Ravine with steep sloped side walls	Hexavalent chromium; Total Chromium; Title 22 metals; pH; Dioxins/Furans; SVOCs; Pesticides; PCBs; PAHs; TPH-Extractable and Purgable; Asbestos; soil physical parameters	Appendix A; Subappendix C4, Table C4-18; Appendix F	

TABLE 3-3
SOIL INVESTIGATION AREAS – TOPOCK COMPRESSOR STATION PROJECT SITE, NEEDLES, CALIFORNIA

Soil Investigation Areas	Area (square feet)	Number of Locations and Sampling Methods[a]	Total Number of Soil Samples[a]	Maximum Sample Depth (Feet)	Access Considerations	Parameters to be Measured[b]	Location in Soil Work Plan	Notes
ERPW Sampling (Part of AOC 10)	NA	10 by hand tools; drive-point piezometer	10	6 for sampling; 20 if feasible for sediment thickness measurement	All have difficult access, some requiring boat access; some dense riparian vegetation requiring trimming No access March 15 through September 30 due to bird habitat issues; Section 3.2 of Attachment C4-1 describes specific required access routes	Sediment: Hexavalent chromium; Title 22 metals; total organic carbon, acid volatile sulfides (AVS), AVS/simultaneously extracted metals (SEM), molybdenum, PAHs, SVOCs, PCBs, ammonia, sieve analysis Purged pore water: temperature, specific conductance, oxidation-reduction potential, dissolved oxygen, dissolved metals	Attachment C4-1	
AOC 11 – Topographic Low Areas	56,628	7 Rotosonic borings; 5 Backhoe excavations; 3 by hand tools	67	69	Underground natural gas lines with portions less than 6 inches below grade; some grading of check berms may be needed for rig access	Hexavalent chromium; Total Chromium; Title 22 metals; General Chemistry; pH; Dioxins/Furans; SVOCs; PCBs; PAHs; TPH-Extractable and Purgable; TAL/TCL Analytical Suite; soil physical parameters	Appendix A; Subappendix C5, Table C5-11; Appendix F	
AOC 12 – Fill Area	4,900	None	None	N/A	N/A	N/A	Appendix A; Subappendix C6	No further investigations needed
AOC 13 – Unpaved Areas within the Station	N/A	24 Hydrovac borings; 8 by hand tools	74	10	Paved & unpaved; accessible; some suitable for XRF	Hexavalent chromium; Title 22 metals; SVOCs; PCBs; PAHs; TPH-Extractable and Purgable; VOCs; Asbestos; TAL/TCL Analytical Suite; soil physical parameters; VOCs (TO-15)	Appendix B; Subappendix B11, Table B11-10 (32 soil borings & 4 soil gas); Appendix F	Some air samples
AOC 14 – Railroad Debris Site	79,000	4 Rotosonic borings; also assorted debris locations by hand tools	20	14	Restricted access due to railroad, roads, and wash; access permit required by BNSF; access by foot; heavy equipment would have to be craned onto site; suitable for XRF	Hexavalent chromium; Title 22 metals; pH; Dioxins/Furans; SVOCs; Pesticides; PCBs; PAHs; TPH-Extractable and Purgable; VOCs; soil physical parameters	Appendix A; Subappendix C7, Table C7-15; Appendix F	
AOC 15 – Auxiliary Jacket Cooling Water Pumps	810	2 Hydrovac borings; 5 by hand tools	14	3, if feasible	Unpaved; accessible; utilities & risers; suitable for XRF	Hexavalent chromium; Title 22 metals; pH; SVOCs; PCBs; PAHs; TAL/TCL Analytical Suite; soil physical parameters	Appendix B; Subappendix B12, Table B12-4; Appendix F	5 locations in gravel area 3 feet above grade;
AOC 16 – Sandblast Shelter	880	2 Hydrovac borings; 2 by hand tools	7	3, if feasible	Unpaved; accessible; utilities & risers; suitable for XRF	Title 22 metals; TAL/TCL Analytical Suite; soil physical parameters	Appendix B; Subappendix B13, Table B13-4; Appendix F	
AOC 17 – On-site Septic System	2,500	5 Hydrovac borings	20	10, if feasible	Paved; accessible; utilities & risers; unsuitable for XRF	Hexavalent chromium; Title 22 metals; Dioxins/Furans; SVOCs; PCBs; PAHs; TPH-Extractable and Purgable; VOCs; TAL/TCL Analytical Suite; soil physical parameters	Appendix B; Subappendix B14, Table B14-2; Appendix F	Geophysical Survey (Page 2-9, Main Text)
AOC 18 – Combined Hazardous Waste Transference Pipeline	N/A	12 Hydrovac borings	36	6, if feasible	Paved & unpaved; Some locations on a slope; utilities & risers	Hexavalent chromium; Title 22 metals; pH; SVOCs; PCBs; PAHs; TPH-Extractable and Purgable; VOCs; TAL/TCL Analytical Suite	Appendix B; Subappendix B15, Table B15-4; Appendix F	Figure B15-2 appears to shows most locations accessible by Hydrovac
AOC 19 – Former Cooling Liquid Mixing Area and Former Hotwell	1,100	3 Hydrovac borings; 3 by hand tools	18	10, if feasible	Paved & unpaved; utilities & risers; suitable for XRF	Hexavalent chromium; Title 22 metals; pH; TAL/TCL Analytical Suite; soil physical parameters	Appendix B; Subappendix B16, Table B16-5; Appendix F	
AOC 20 – Industrial Floor Drains	N/A	7 Hydrovac borings	14	3, if feasible	4 paved, 3 unpaved locations; utilities & risers; unsuitable for XRF	Hexavalent chromium; Title 22 metals; PCBs; PAHs; TPH-Extractable and Purgable; VOCs; soil physical parameters	Appendix B; Subappendix B17, Table B17-2; Appendix F	
AOC 21 – Round Depression near Sludge Drying Bed	1,800	1 Hydrovac boring	3	6, if feasible	Appears unpaved; utilities & risers; suitable for XRF	Hexavalent chromium; Title 22 metals; Calcium; Sodium; pH; SVOCs; PCBs; PAHs; TPH-Extractable and Purgable; VOCs; TAL/TCL Analytical Suite; soil physical parameters	Appendix B; Subappendix B18, Table B18-2; Appendix F	
AOC 22 – Unidentified Three Sided Structure	757	2 Hydrovac borings	4	3, if feasible	Unpaved; utilities & risers; suitable for XRF	Hexavalent chromium; Title 22 metals; pH; SVOCs; PCBs; PAHs; TPH-Extractable and Purgable; VOCs; soil physical parameters	Appendix B; Subappendix B19, Table B19-2; Appendix F	
AOC 23 – Former Water Conditioning Building	1,000	3 Hydrovac borings; 2 of the 3 are also suitable for hand tools	6	3, if feasible	Paved; utilities & risers; one location unsuitable for XRF, other 2 are suitable	Hexavalent chromium; Title 22 metals; pH; Dioxins/Furans; SVOCs; PCBs; PAHs; TPH-Extractable and Purgable; VOCs; Asbestos; soil physical parameters	Appendix B; Subappendix B20, Table B20-2; Appendix F	
AOC 24 – Stained Area and Former API Oil/Water Separator	580	2 Hydrovac borings	6	10, if feasible	Unpaved; utilities & risers; suitable for XRF	Hexavalent chromium; Title 22 metals; pH; SVOCs; PCBs; PAHs; TPH-Extractable and Purgable; VOCs; soil physical parameters	Appendix B; Subappendix B21, Table B21-2; Appendix F	

TABLE 3-3
SOIL INVESTIGATION AREAS – TOPOCK COMPRESSOR STATION PROJECT SITE, NEEDLES, CALIFORNIA

Soil Investigation Areas	Area (square feet)	Number of Locations and Sampling Methods[a]	Total Number of Soil Samples[a]	Maximum Sample Depth (Feet)	Access Considerations	Parameters to be Measured[b]	Location in Soil Work Plan	Notes
AOC 25 – Compressor and Generator Engine Basements	18,000	See AOC 13	See AOC 13	See AOC 13	See AOC 13	See AOC 13	Addressed in AOC 13 (Appendix B11); Appendix B; Subappendix B22	Access restrictions prevent sampling; addressed by AOC 13 boring and gas sampling program (App B, Table B-12)
AOC 26 – Former Scrubber Oil Sump	1,646	5 Hydrovac borings or small drilling rig	26	75	Unpaved; utilities & risers; suitable for XRF	Hexavalent chromium; Title 22 metals; pH; SVOCs; PCBs; PAHs; TPH-Extractable and Purgable; VOCs; soil physical parameters; VOCs (TO-15)	Appendix B; Subappendix B23, Table B23-2; Appendix F	One multiple depth soil vapor probe to 5, 25, and 50 feet bgs
AOC 27 – MW-24 Bench	149,686	5 Backhoe excavations; 3 by hand tools; plus one 50-foot grid for XRF across the site	8	Bottom of trench or 0	Bordered by I-40, former Route 66, and ridge, Station, and Bat Cave Wash; steep dirt road; several underground natural gas lines, possibly other unknown utilities; unpaved dirt area	Dioxins and furans, pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH, soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution	Appendix A; Subappendix C11	Geophysical Survey (Page 2-9, Main Text)
AOC 28 – Pipeline Drip Legs	3,222	4 Hydrovac borings	13	5, if feasible	Dirt road access	TPH, PAHs, PCBs, and soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution	Appendix A; Subappendix C12	
AOC 29 –IM-3 Treatment Plant AND AOC 30 – MW-20 Bench	40,276 61,778	None (To be addressed during closure of IM-3 Treatment Plant & the groundwater remedy system)	None	N/A			Not addressed in this Work Plan	
AOC 31 – Former Teapot Dome Oil Pit	829	Located within and discussed in association with the Perimeter Area	None	N/A			Appendix C	Being sampled as part of Perimeter Area sample PA-08. See Perimeter sampling below for details.
AOC 32 – Oil Storage Tanks and Waste Oil Sump	2,805	None	None	N/A	utilities & risers		Addressed in AOC 13 (Appendix B11); Appendix B; Subappendix B24	Active unit; tanks and sump; Access restrictions; addressed by AOC 13 boring and gas sampling program (App B, Table B-12)
AOC 33 – Former Potential Former Burn Area near AOC 17	874	Located within and discussed in association with the Perimeter Area	None	N/A			Appendix B; Subappendix B14	Addressed as part of AOC 17, Appendix B14
Unit 4.3 – Oil/Water Holding Tank	44	2 Hydrovac borings	4	3, if feasible	Paved; utilities & risers; unsuitable for XRF	Hexavalent chromium; Title 22 metals; pH; SVOCs; PCBs; PAHs; TPH-Extractable and Purgable; VOCs; Asbestos; TAL/TCL Analytical Suite	Appendix B; Subappendix B25, Table B25-2; Appendix F	
Unit 4.4 – Oil/Water Separator	28	None	None	N/A	N/A	Included with Unit 4.3 (Table B-12)	Appendix B; Subappendix B25	Included with Unit 4.3 (Table B-12)
Unit 4.5 – Portable Waste Oil Storage Tank	3	None	None	N/A	N/A	Included with Unit 4.3 (Table B-12)	Appendix B; Subappendix B25	Included with Unit 4.3 (Table B-12)
UA 1 – Potential Pipe Disposal Area	8,225	None	None	N/A	Open unpaved area	tbd	Appendix A; Subappendix C8	Geophysical Survey (Page 2-9, Main Text)
UA 2 – Former 300B Pipeline Liquids Tank	829	None	None	N/A	Open unpaved area	None	Appendix A; Subappendix C9	Site previously remediated
Perimeter Area	N/A	34 surface XRF samples; 8 by hand tools; 1 of the 8 (PA-08) may use Hydrovac or Rotosonic borings	Up to 45	10	Sloped areas outside fence line; subsurface utilities possible; suitable for XRF	Hexavalent chromium; Title 22 metals; SVOCs; PCBs; PAHs; TPH-Extractable and Purgable; VOCs; TAL/TCL Analytical Suite	Appendix C; Appendix F	Geophysical Survey (Page C-1-2, Appendix C)
Storm Drain System	N/A	19, various methods as appropriate.	80	17 locations up to 10 feet; 2 locations up to 50 feet	Sampling limited to outside fence line in unpaved areas at outfalls & along visible lines, or surface sediment accumulations if inside the fence line	Hexavalent chromium; Title 22 metals; pH; PCBs; PAHs; TPH-Extractable and Purgable; TAL/TCL Analytical Suite; Geotechnical Parameters	Appendix D; Appendix F	Limited location information on active and inactive storm drain lines; alignment investigation includes visual, geophysical (GPR, EM, and VGM scans), flow testing, and video camera tracing, as feasible

TABLE 3-3
SOIL INVESTIGATION AREAS – TOPOCK COMPRESSOR STATION PROJECT SITE, NEEDLES, CALIFORNIA

a For boreholes drilled using a sonic or hydrovac drilling rig, and in some cases using a backhoe, multiple samples are to be collected at various depths from each borehole. Due unforeseen circumstances or data gaps, additional sampling locations may be necessary; a contingency of 25 percent additional sample locations is considered in this analysis.
b Sample parameters may vary with sample location depending on-site conditions

NOTES:

- AOC = area of concern
- AVS = acid volatile sulfide
- BNSF = Burlington Northern Santa Fe Railroad
- COPCs = constituents of potential concern
- General chemistry includes either sodium, potassium calcium, magnesium, manganese, and iron or alkalinity, cation exchange capacity, electric conductance, orthophosphate, pH, phosphate, sulfide, total organic carbon, chloride
- Geotechnical Analysis includes moisture density relationship, unconfined compression tests, Atterberg limits, gradiation, pH, redox, sulfate, sulfide, total salts, chloride, and resistivity
- N/A = not applicable
- Not all analytes will be tested in all samples
- PAHs = polycyclic aromatic hydrocarbons
- PCBs = polychlorinated biphenyls
- Soil physical parameters include Atterberg limits, relative compaction, alkalinity, cation exchange capacity, particle size distribution, porosity, density, and/or total organic carbon
- SPLP is the synthetic precipitation leaching procedure used to analyze leachate on soil samples for total and hexavalent chromium
- SVOCs = semivolatile organic compounds
- SEM = scanning electron microscope
- SWMU = solid waste management unit
- TAL/TCL Analytical Suite – Target Analyte List/Target Compound List - The Contract Laboratory Program (CLP) laboratories use CLP analytical methods for the isolation, detection, and quantitation of specific target compounds and analytes. The CLP Target Compound and Target Analyte Lists (TCL/TALs) were originally derived from the EPA Priority Pollutant List. In the years since the inception of the CLP, compounds and analytes have been added to, and deleted from, the list based on advances in analytical methods, evaluation of method performance data, and the needs of the Superfund program. The target compounds and analytes for TCL include volatile and semivolatile compounds, and pesticides/Arochlors (PCBs). The target compounds and analytes for TAL include metals and cyanide. Further details are on the USEPA website at http://www.epa.gov/superfund/programs/clp/target.htm
- tbd = to be determined
- Title 22 metals include antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc;
- TPH extractable = total petroleum hydrocarbons in the diesel range
- TPH purgable = total petroleum hydrocarbons in the gasoline range
- UA = undesignated area
- VOCs = volatile organic compounds
- XRF = x-ray fluorescence; a field method for testing metals concentrations

Sampling Equipment:

- Rotosonic drilling rig footprint - SOP-B9
  - Truck-mounted Tsi 150T is 33 feet long by 8-1/2 feet wide by 12 3/4 (folded) to 36 1/2 feet (unfolded) high
  - Track-mounted 8140LS is 24.8 ft long by 7 feet wide by 24 (unfolded) feet high
  - Rubber tired S-27 CRS is 20 feet long by 9 feet wide by 8 (folded) feet high
  - boreholes = 4-6 inches diameter
  - Also requires support truck (pick-up to larger size)
- Backhoe or excavator footprint
  - Caterpillar 416 to 450 –series backhoes: 18 to 26 feet long by 8 feet wide by 12 to 14 feet high (folded)
  - Caterpillar 329D long reach excavator or similar: 47 feet to 57 long by 11 feet wide by 10 (folded)
- Hydrovac footprint
  - Truck-mounted Maxvax Model 700 mounted on a 2012 International 7400 Chassis is 30 feet long by 8 feet wide by 11 1/2 feet high

CHAPTER 4
Environmental Analysis

The focus of Chapter 4 is on the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Soil Investigation Project (Project) activities that were found to have the potential to result in significant adverse impacts to the physical environment. Sections 4.1 through 4.7 discuss the existing environmental setting (or conditions), environmental impacts associated with implementation of the Project, and mitigation measures to avoid or substantially reduce significant impacts, where necessary, for the following resource areas:

- aesthetics
- air quality
- biological resources
- cultural resources
- hazardous materials
- hydrology and water quality
- noise

Each section in this draft environmental impact report that addresses the resource areas listed above (Sections 4.1 through 4.7) includes the following components:

Existing Setting: This subsection presents the existing environmental conditions at the Project Site and in the surrounding area as appropriate, in accordance with Section 15125 of the California Environmental Quality Act (CEQA) Guidelines. The discussions of the environmental setting focus on information relevant to the issues under evaluation.

Regulatory Background: This subsection presents information on the laws, regulations, plans, and policies that relate to the issue area being discussed. Regulations originating from local, state, and federal levels are discussed as appropriate.

Environmental Impacts: This subsection identifies the impacts of the proposed Project on the existing environment, in accordance with CEQA Guidelines Sections 15125 and 15143. Before presenting an evaluation of impacts, the section describes the analysis methodology and the thresholds of significance used to identify impacts. All potential Project impacts are identified alphanumerically and sequentially throughout this section. For example, in the biological resources analysis, potential impacts are identified as IMPACT BR-1, IMPACT BR-2, etc. The impact is first introduced by a heading, followed by a discussion that includes the analyses and supporting evidence. An impact statement follows the discussion of each impact, providing a summary of the impact and either a statement of potential significance or of less than significance. For potentially significant impacts, mitigation is introduced (e.g., Mitigation Measure BR-1), followed by timing, responsibility of mitigation implementation, and the significance conclusion after implementation of mitigation.

4.1 Aesthetics

This section describes the existing conditions relating to visual and aesthetic resources within the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Soil Investigation Project (Project) Site and surrounding area and the potential impacts on these resources that could result from the proposed Project.

Visual or aesthetic resources are generally defined as both the natural and built features of the landscape that are seen and that contribute to the public's experience and appreciation of the environment. Visual or aesthetic resource impacts are generally defined in terms of a project's physical characteristics and potential visibility and the extent to which its presence would substantially degrade the existing visual character and quality of the environment.

4.1.1 Existing Setting

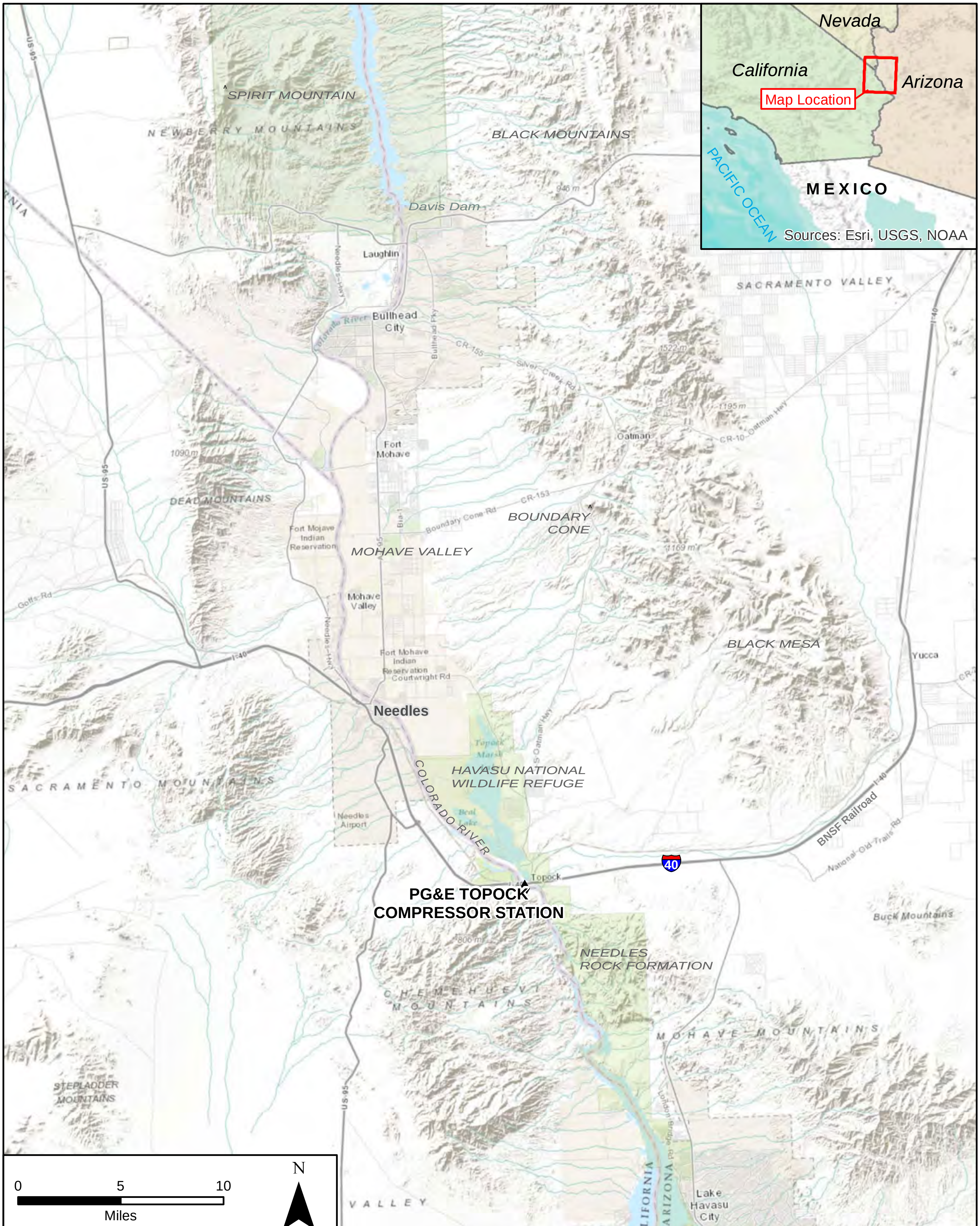
4.1.1.1 Regional and Local Landscape Context

Figure 4.1-1 shows the Project Site within a regional and local geographical context. **Figures 4.1-2a** through **4.1-2c** present a set of annotated panoramic photographs that provide an overview of the Project Site's visual context in terms of key features and landscape characteristics.

The Project Site is located on the eastern boundary of San Bernardino County, approximately 12 miles southeast of the desert community of Needles, California, and approximately 0.5 miles southwest of Topock, Arizona. The Project Site overlooks the Mojave Valley, a broad alluvial plain bisected by the meandering channel of the Colorado River between Davis Dam in the north and the Chemehuevi Mountains at its southern edge. Situated within the basin-and-range geologic province that extends across southeastern California, Nevada, and portions of northern Arizona, this area is characterized by sparsely vegetated undulating terraces incised by numerous arroyos and isolated mountainous outcrops along its margins.

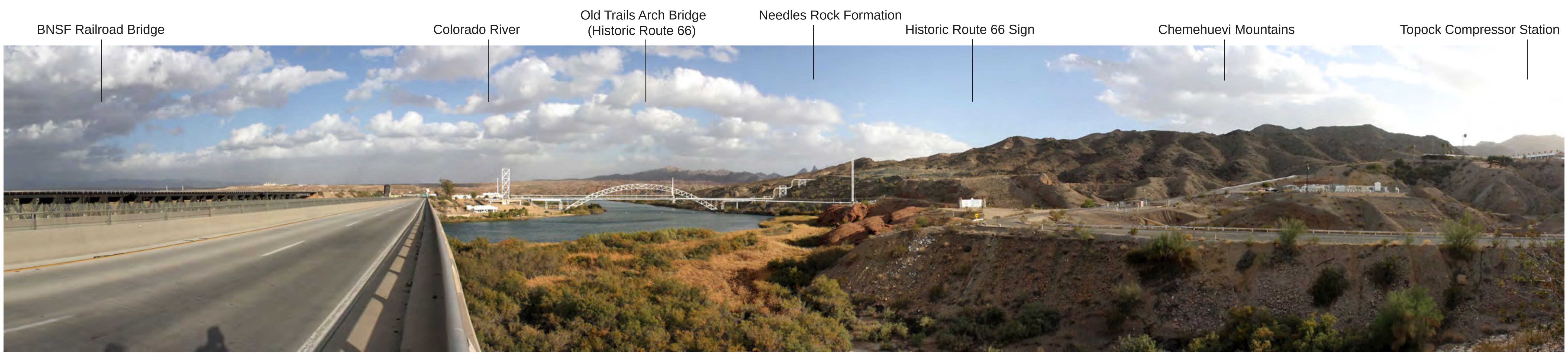
Much of the landscape within the region consists of undeveloped land with little visible infrastructure other than local roadways, many of them unpaved. Concentrated areas of residential and commercial development are located in and around Laughlin and Bullhead City in the northern part of the valley, primarily along Arizona State Route 95, which aligns with the east bank of the Colorado River. Farther south, residential and commercial development gives way to areas of agricultural development with scattered residences around the communities of Mohave Valley and Needles.

The Project Site lies within a larger area of traditional religious and cultural significance to several Native American Tribes inhabiting the region. The area is considered a cultural landscape and has been identified as a traditional cultural place (TCP) (see Section 4.4, "Cultural Resources," for detailed discussion of the Topock TCP). The Topock TCP plays a central role in the beliefs and practices of those Native American Tribes who ascribe significance to this area and is a crucial element to contemporary Tribal identity and traditional and spiritual values.



Topock Soil Investigation Project EIR Map Creation Date: 1/28/2014 Background Source: ESRI Topographic	**Regional Landscape Context**	***Figure 4.1-1***	ESA ENVIRONMENTAL VISION

Panoramic View from Ridge on Chemehuevi Mountains (VP 15)



Panoramic View from Interstate 40 eastbound at Colorado River (VP 3)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-2a
Panoramic Landscape Views

040314

Panoramic View from Interstate 40 eastbound at Bat Cave Wash (VP 2)

Panoramic View from the Topock Maze Locus C (VP 7)

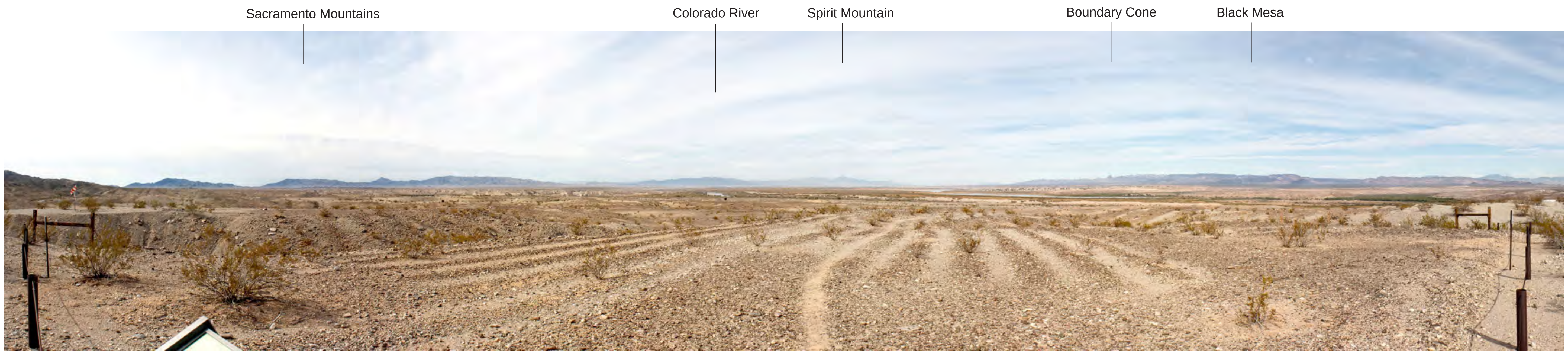
Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

040314

Figure 4.1-2b

Panoramic Landscape Views



Panoramic View from the Topock Maze (Locus A at Interpretive Sign) looking north (VP 9-10)

Panoramic View from the Topock Maze (Locus A at Interpretive Sign) looking south (VP 9-10)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

040314

Figure 4.1-2c
Panoramic Landscape Views

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Prominent landmarks that are culturally significant and integral to the Topock TCP are visible from many vantage points within the valley and adjacent foothills. These include the Needles pinnacles at the southern edge of the valley, Boundary Cone to the east, and Spirit Mountain, which rises from the desert floor to over 5,000 feet to dominate the northwestern horizon. Among the larger and better-known cultural resources near the Project Site is an expansive desert geoglyph known as the Topock Maze. Prominent historic-era features, several of which intrude upon the maze, include segments of historic U.S. Route 66, the National Trails Highway, and the right-of-way of the former Atlantic and Pacific/Atchison, Topeka and Santa Fe Railroad (currently operated by the Burlington Northern Santa Fe Railway [BNSF]). Section 4.4, “Cultural Resources,” of this document provides a more detailed discussion of the broad spectrum of archaeological and historical resources present near the Project Site.

In the northern part of the valley, the Colorado River is largely constrained by engineered levees with sparsely vegetated banks. South of Needles, natural-appearing floodplain becomes more prevalent, characterized by shifting sand dunes and associated riparian vegetation, which includes native species as well as extensive stands of nonnative tamarisk (salt cedar). Topock Marsh, extending northeast of the Project Site from the east bank of the river, is a prominent visual feature in the landscape. A part of the Havasu National Wildlife Refuge that extends south along the river to the base of the Needles formation, this area attracts a variety of recreational visitors. These include boaters, seasonal visitors to riverside attractions such as Pirate Cove Resort, off-road vehicle users, and individuals attracted to the diverse desert scenery and areas of unique cultural and historical interest.

4.1.1.2 Project Site Setting

The Project Site occupies approximately 128.5 acres in and around the PG&E Topock Compressor Station (Station) located west of the Colorado River. The predominant land use in the area consists of undeveloped public land interspersed with concentrated areas of developed infrastructure. In addition to the Station facilities, a major gas utility and transportation corridor that includes natural gas transmission pipelines, the BNSF rail line, and Interstate 40 (I-40) bisects the Project Site. Additional developed land uses within or near the Project Site include the National Trails Highway, the former Route 66, and various unnamed access roads. A former gravel quarry lies approximately 1,500 feet southwest of the Station. Approximately 3,000 feet west of the Station are evaporation ponds associated with the facility, and an interim remedial measures groundwater treatment plant and numerous groundwater well clusters are located nearby.

Open space near the Station is characterized primarily by sparsely vegetated eroded alluvial deposits and steep, rocky slopes. The dark-colored rocks of the Chemehuevi Mountains, rising to over 2,700 feet a short distance to the south, form the primary backdrop to the Project Site when viewed from the heavily traveled highway corridor, particularly on its eastern approach to the river. The area is bisected by several steep-sided ephemeral streams, including Bat Cave Wash and several unnamed arroyos that flow north to the confluence of the Colorado River.

The Topock area and adjacent lands along the Colorado River are the ancestral home to a number of Native American Tribes, including the Cahuilla, Chemehuevi, Cocopah, Colorado River, Halchidoma, Havasupai, Hualapai, Maricopa, Fort Mojave, Quechan, Serrano, and Yavapai peoples. Six of these Native American Tribes, the Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes (CRIT), Fort Mojave Indian Tribe (FMIT), the Fort-Yuma Quechan Indian Tribe, and the Hualapai Indian Tribe, have actively participated in the Topock project and are referred to as "Interested Tribes." Each of the Interested Tribes has been, and continues to be, economically and culturally reliant on the Colorado River and all are historically and spiritually rooted in the Colorado River region. Although each Interested Tribe has its own history and belief system tied to the region and the river, the Interested Tribes share an interest in the health and welfare of all people, the land, wildlife, things above and below ground, and natural resources. As indicated in the *Topock Compressor Station Tribal Cultural Values Assessment*, several of the Interested Tribes feel that:

> Plants, animals, minerals, artifacts, rock arrangements, view-sheds, the Colorado River, and many other tangible and intangible elements are interwoven into the very fabric of tribal cultures. Topock, in being such a significant religious and spiritual "place," involves a dynamic understanding of traditions, religion, ceremonies, oral histories, and a plethora of other social-communal aspects, that is difficult for non-tribal entities to grasp with its many different layers of existence (McDowell et al. 2013).

Figures 4.1-2a through 4.1-2c present several panoramic views of the regional and local setting. Annotations above each of these photographs indicate the location of key visible natural and built landscape features. Figure 4.1-2a shows two contrasting views of the landscape from locations in the vicinity of the Project Site. The top image is an elevated view from a ridgetop south of the Project Site. In this open view of the Mojave Valley, built features such as the existing Station and nearby transportation infrastructure, while visible, are dwarfed by large-scale natural features such as the surrounding peaks, arroyos, and the Colorado River, which become defining elements in the visual character of the landscape. In the bottom view from the I-40 highway bridge at the Colorado River, constructed elements and disturbed topography present a greater degree of visual contrast with the surrounding natural terrain and appear as more prominent features in the landscape.

Figure 4.1-2b shows two panoramic views near Bat Cave Wash, which defines the western boundary of the Project Site and where close to half of proposed Project-related soil sampling activity would be located. The upper view of I-40 looking toward the Colorado River shows the constraining effect of natural and engineered topography on public views in the immediate vicinity of the Project Site. The bottom panorama offers views of heavily disturbed terrain and some built elements juxtaposed with open views of the natural and cultural features from this slightly elevated perspective.

Figure 4.1-2c is a 360-degree view of the Mojave Valley and surrounding peaks from Topock Maze Locus A. The viewshed of this cultural landscape is integral to the landscape's connection to Tribal history and culture. To some of the Interested Tribes, the scale of the viewshed extends far beyond any lines-of-sight associated specifically with the Topock Maze. Although some of the Interested Tribes are concerned about visual disturbances in and around the immediate area of the Topock Maze and physical intrusions on the current cultural and spiritual use of the area by

Tribal members, some Interested Tribes also share a broader concern involving the visual intrusion on a much larger scale. Many of the prominent natural landform features that are visible from the Topock area, including Spirit Mountain, Boundary Cone, and the Needles (Avi Kwa Ame, Avi Vas Qui, and Huqueamp-Avi, respectively, to the Mojave; Wikame, Wi Veskwiya, and Wi kwiđ-kwiđ, respectively, to the Hualapai), are sacred to some Interested Tribes and play a significant role in their history and cultural traditions, which are generally rich in both detail and mythical occurrences commonly associated with identifiable places and landmarks. Mojave stories and songs, for example, recount journeys and the transformation of mythical persons into animals or landforms. Sensitive viewsheds also include those of the river, the mountains, the valley, and other features of the landscape, which create a context for spiritual experiences.

Furthermore, from the perspective of the Interested Tribes, important views are not limited to a view(s) in a particular direction(s), but also in the direction of an "area situated along an important spiritual alignment between two features that are located on either side of the area" (FMIT 2013). For example, on a visit to the Project Site on October 28, 2013, Nora McDowell, FMIT Topock Project Manager, expressed that the viewshed is the natural physicality of the land itself, and represents a collective power that enables a discussion of how important the landscape is. The viewshed is as, if not more, important than the actual physical land itself, and since the entire viewshed is connected and contiguous, it should be considered as a whole.

4.1.1.3 Project Viewshed

Defining the Project Viewshed

A project viewshed is defined as the general area from which a project would be visible or could be seen. For purposes of describing a project's visual setting and assessing potential visual impacts, the viewshed or "seen area" can be broken down into distance zones of foreground, middleground, and background. The foreground is defined as the zone within 0.25 miles to 0.5 miles from the viewer. The middleground can be defined as a zone that extends from the foreground up to 3 to 5 miles from the viewer, and the background extends from about 3 to 5 miles to infinity (Smardon et al. 1986; USDA 1995).

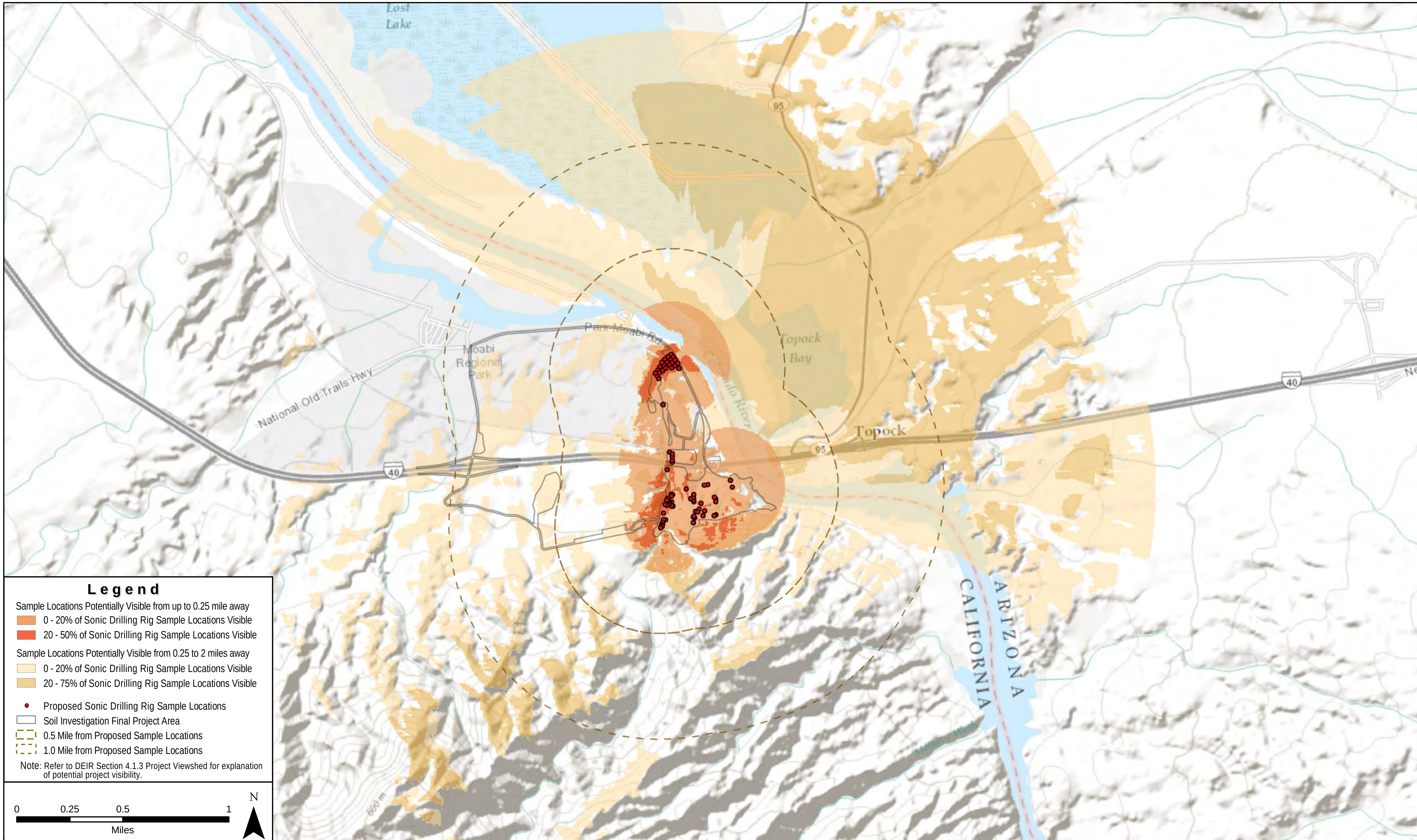
In the desert areas such as in the vicinity of the proposed Project, landscape detail is typically most noticeable and objects generally appear most prominent when seen in the foreground. At middleground viewing distances, the texture of landscape features such as of rock outcropping surfaces and vegetation, as well as built elements may be noticeable but are increasingly unrecognizable. In the background, visible detail is limited to landscape patterns and visual contrasts.

As described in detail in Chapter 3, "Project Description," and illustrated in Figure 3-2, the proposed soil investigation activities involve the temporary introduction of equipment used to collect soil samples and to conduct geophysical investigations, bench scale tests, and pilot studies if required, as well as infrastructure associated with equipment staging and mobilization and work exclusion zones. Project elements used for soil investigation activities that would be potentially visible within the Project viewshed would include a sonic or hollow-stem drilling rig, a hydrovac truck, a backhoe, an excavator, individuals using small hand implements, and infrastructure associated with potential pilot studies (wells, infiltration galleries, equipment storage trailer or container). These elements would range in size from approximately 5 to 6 feet tall (the height of individuals using hand tools) up to 37 feet tall (the approximate height of the tallest sonic drilling rig). Given the scale and potential visibility of the proposed sampling equipment, this analysis is primarily focused on foreground viewing distances, although consideration is also given to the potential effects on middleground and background views.

Generalized Viewshed Maps

A set of topographic viewshed maps have been prepared to depict the generalized areas from which proposed soil sampling activities would potentially be visible at foreground distances (up to 0.25 miles) and middleground distances (from 0.25 miles to 2 miles away). In addition, a set of composite maps depicting the potential visibility of all soil sampling activities has been prepared that includes foreground viewing distances and middleground viewing distances extended to 5 miles. The viewshed maps were prepared using computer-assisted modeling techniques and are presented as **Figures 4.1-3a** through **4.1-3f**. Figures 4.1-3a through 4.1-3d show potential viewsheds for sampling activities by type of sampling equipment, while Figures 4.1-3e and 4.1-3f are composite maps of the proposed sampling activities at distances of up to 2 miles and 5 miles, respectively. The maps are based on digital topographic and Project design data; a description of the technical methods and assumptions employed to create the viewshed map figures follows below.

Each map depicts the location of proposed Project sampling sites as red dots. These dots represent the locations where sampling activities are anticipated to occur over the course of the projected field investigation phase of the Project. (Note that a contingency of up to 25 percent additional sampling locations is contemplated as part of this draft environmental impact report (DEIR) which could increase the level of activity in some portions of the Project area. However, as described in the Project Description Section 3.5.2.1, the sample collection methods and equipment, the areas to be sampled, and access considerations would be the same.) Actual visibility of sampling activities within the viewshed maps shown in Figures 4.1-3a through 4.1-3f would be generally limited to one location at any given time, based on the availability of equipment and personnel outlined in Chapter 3, "Project Description." In each map, the area from which proposed sampling locations would potentially be visible is shown in shades of orange and beige, indicating potential visibility of sampling locations within a 0.25-mile radius and within a 2-mile radius, respectively. The figures include a lighter and darker shade of each color to correspondingly denote areas from which fewer or more sampling locations potentially could be seen. Additionally, the figures include a set of radius lines to show a 0.5-mile and 1-mile distance from the Project Site. It should be noted that the areas depicted in these maps include a broad range in visibility within the



Topock Soil Investigation
Project EIR

Map Creation Date: 1/20/2014 Background Source: ESRI 2014

Generalized Viewshed Map - Sonic Drilling Rig Sample Locations

Figure 4.1-3a

ESA

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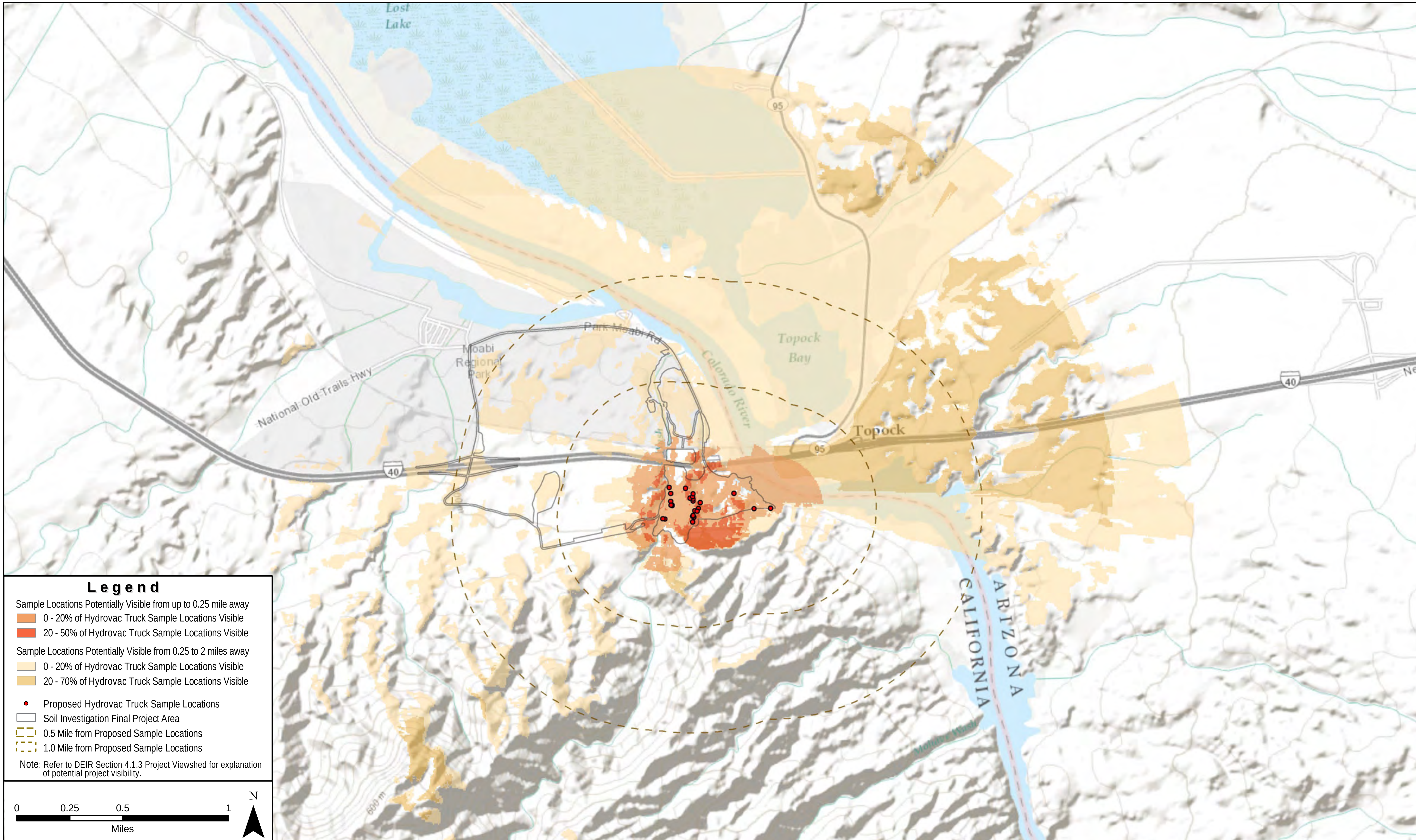

Legend

Sample Locations Potentially Visible from up to 0.25 mile away
- 0 - 20% of Hydrovac Truck Sample Locations Visible
- 20 - 50% of Hydrovac Truck Sample Locations Visible

Sample Locations Potentially Visible from 0.25 to 2 miles away
- 0 - 20% of Hydrovac Truck Sample Locations Visible
- 20 - 70% of Hydrovac Truck Sample Locations Visible

- Proposed Hydrovac Truck Sample Locations
- Soil Investigation Final Project Area
- 0.5 Mile from Proposed Sample Locations
- 1.0 Mile from Proposed Sample Locations

Note: Refer to DEIR Section 4.1.3 Project Viewshed for explanation of potential project visibility.

0 0.25 0.5 1
Miles
N

Topock Soil Investigation
Project EIR

Map Creation Date: 1/20/2014 Background Source: ESRI 2014

Generalized Viewshed Map - Hydrovac Truck Sample Locations

Figure 4.1-3b

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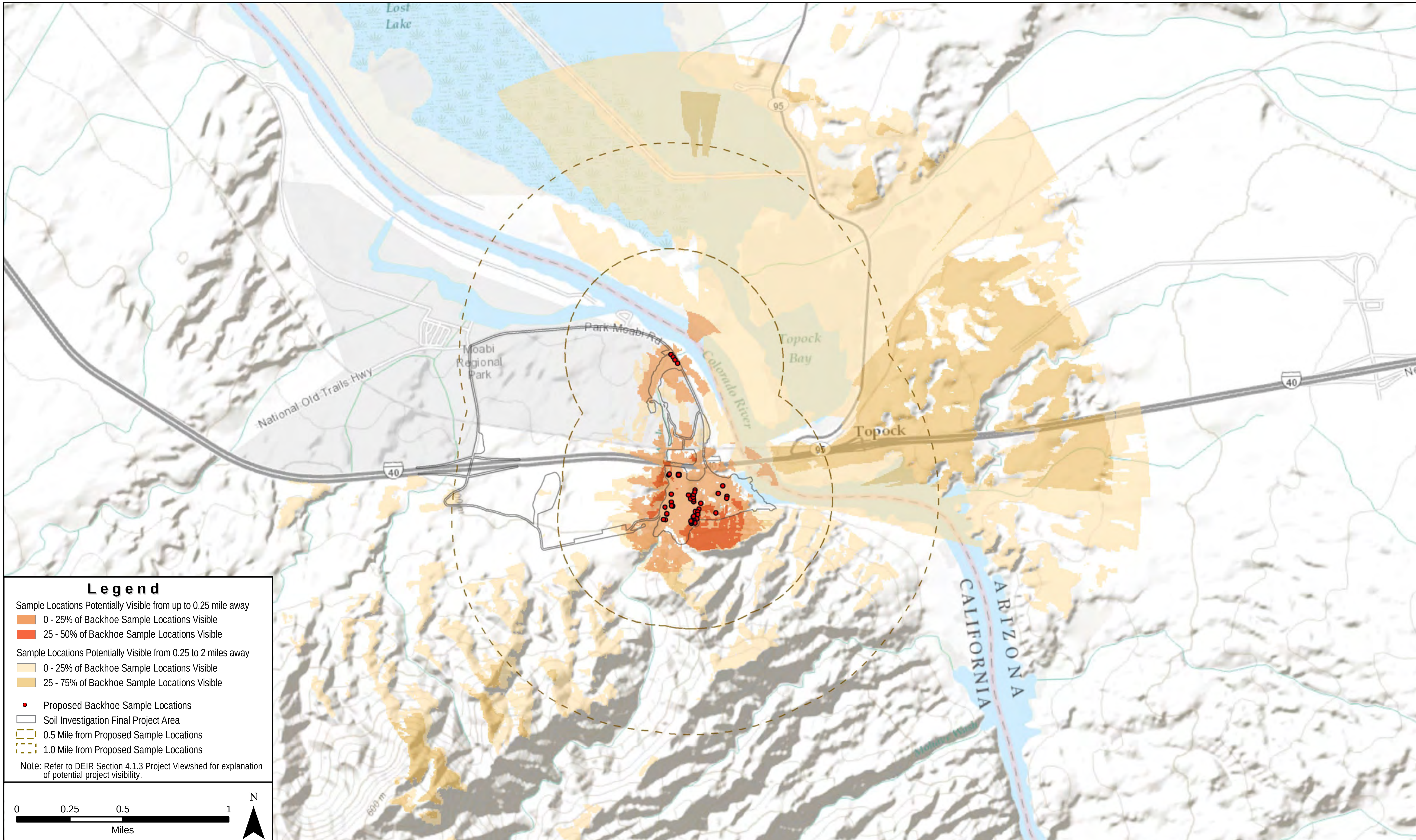

Legend

Sample Locations Potentially Visible from up to 0.25 mile away
- 0 - 25% of Backhoe Sample Locations Visible
- 25 - 50% of Backhoe Sample Locations Visible

Sample Locations Potentially Visible from 0.25 to 2 miles away
- 0 - 25% of Backhoe Sample Locations Visible
- 25 - 75% of Backhoe Sample Locations Visible

- Proposed Backhoe Sample Locations
- Soil Investigation Final Project Area
- 0.5 Mile from Proposed Sample Locations
- 1.0 Mile from Proposed Sample Locations

Note: Refer to DEIR Section 4.1.3 Project Viewshed for explanation of potential project visibility.

0 0.25 0.5 1
Miles

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Topock Soil Investigation
Project EIR

Map Creation Date: 1/20/2014 Background Source: ESRI 2014

Generalized Viewshed Map - Backhoe Sample Locations

Figure 4.1-3c

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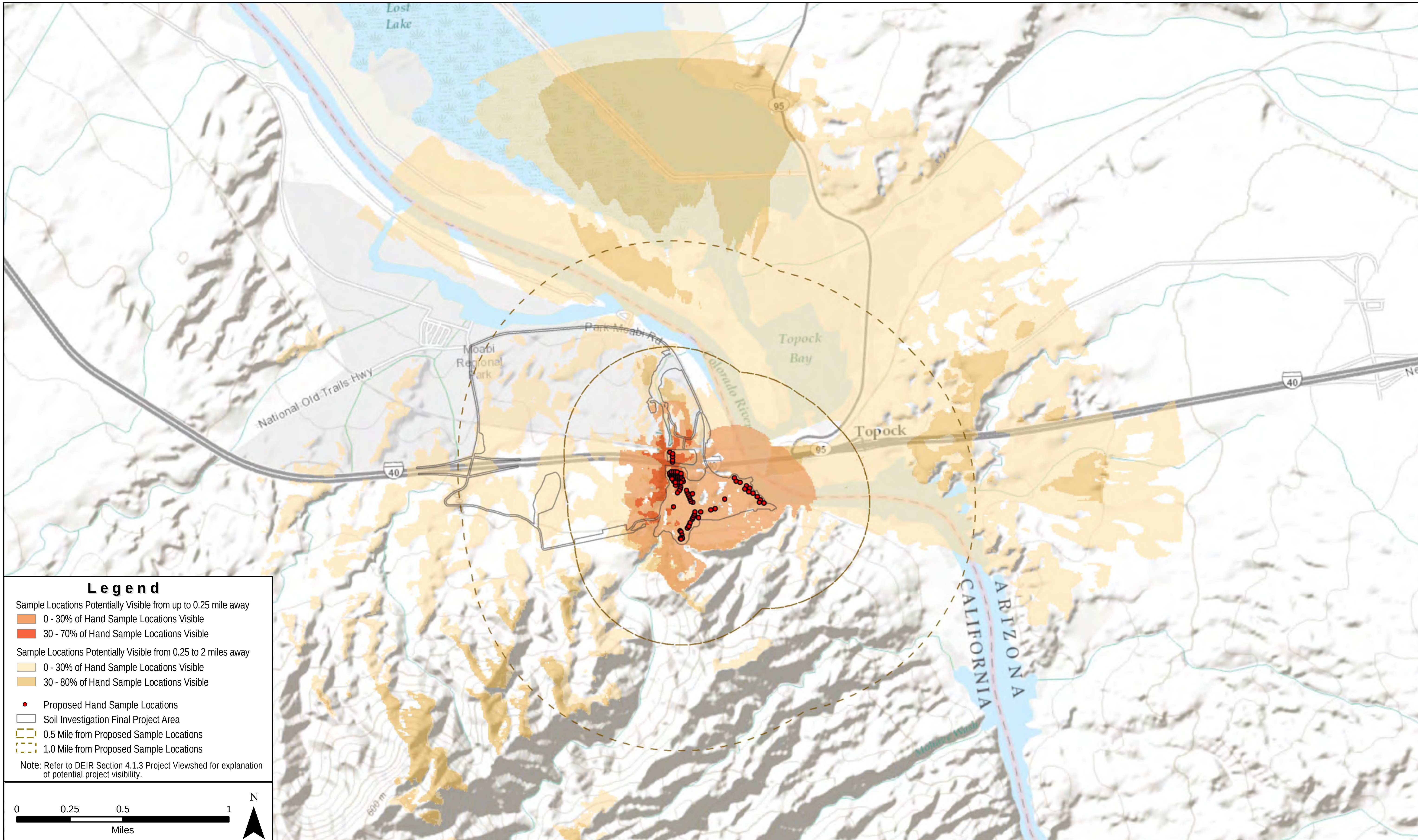

Topock Soil Investigation
Project EIR

Map Creation Date: 1/20/2014 Background Source: ESRI 2014

Generalized Viewshed Map - Hand Sample Locations

Figure 4.1-3d

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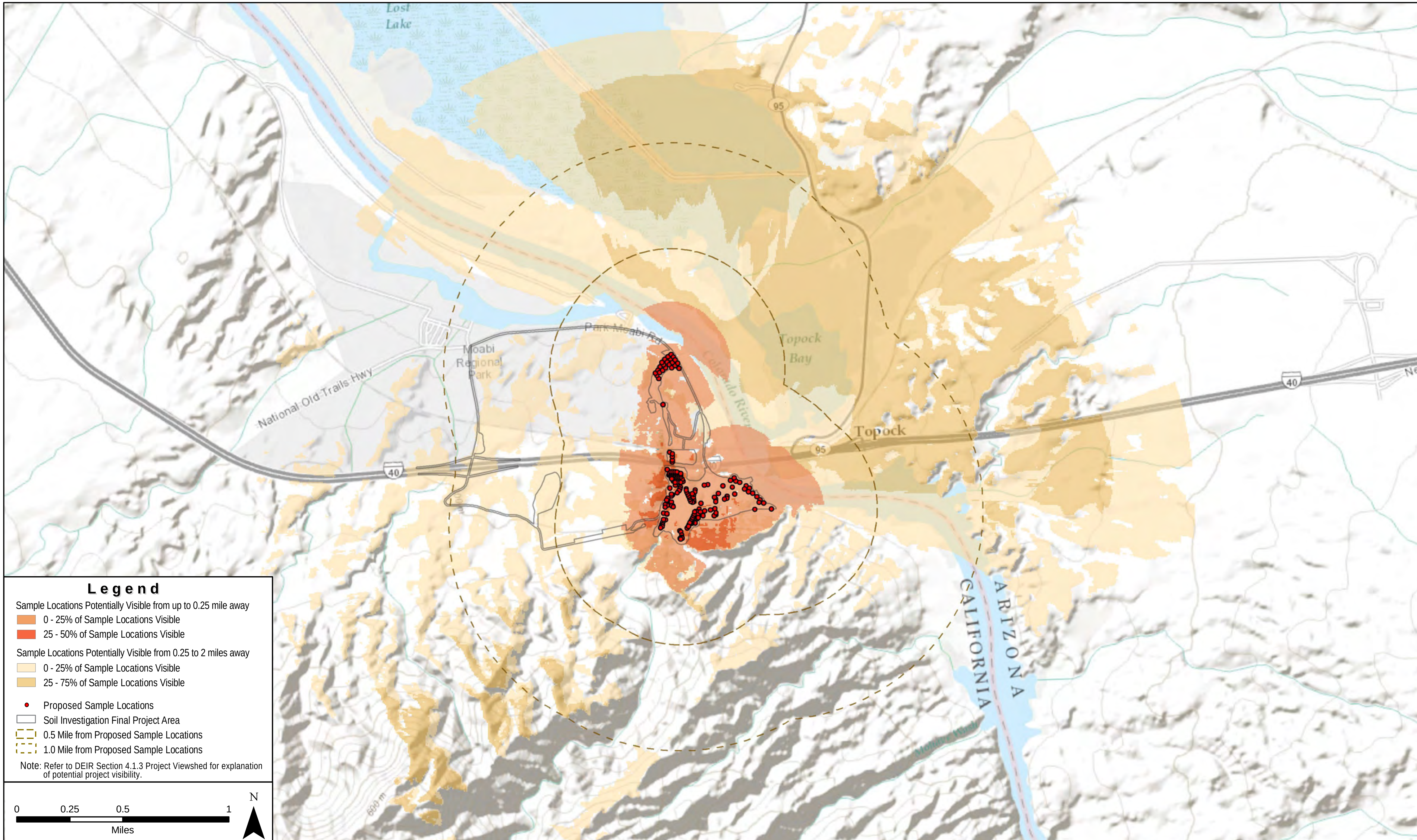

Topock Soil Investigation
Project EIR

Map Creation Date: 1/20/2014 Background Source: ESRI 2014

Generalized Viewshed Map - Composite of Sample Locations

Figure 4.1-3e

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ENVIRONMENTAL VISION

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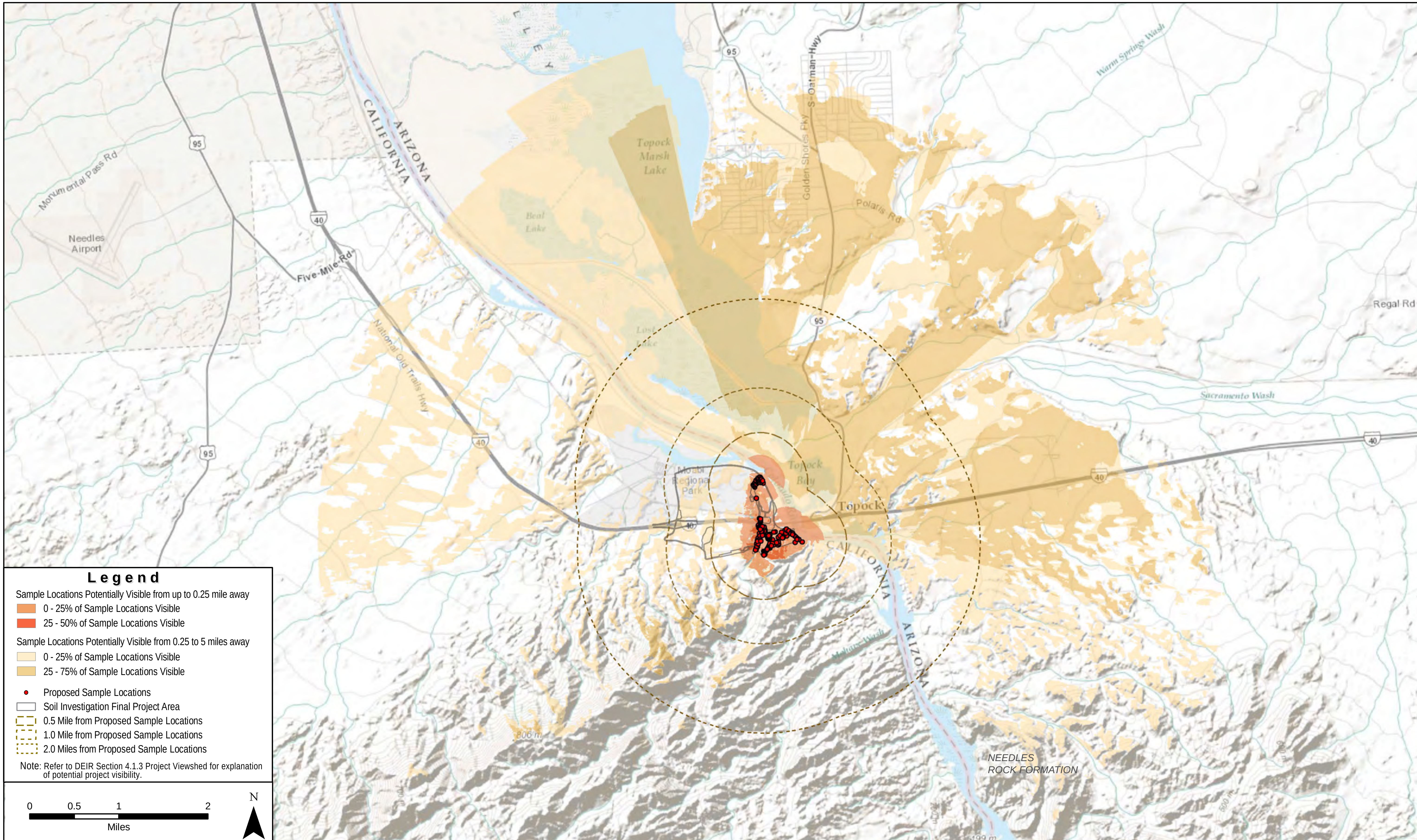

Topock Soil Investigation
Project EIR

Map Creation Date: 1/20/2014 Background Source: ESRI 2014

Generalized 5-Mile Viewshed Map - Composite of Sample Locations

Figure 4.1-3f

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ENVIRONMENTAL VISION

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potential viewshed area. In reality, the area where the highest number of sample locations are potentially visible may comprise a relatively small proportion of the generalized area depicted within a particular colored overlay.

The viewshed maps were produced using ArcMap 10.2 computer software and a 3D topographic-based computation from Project data, and digital elevation model (DEM) data from the U.S. Geological Survey (USGS) National Elevation Dataset (NED). The 1/3 Arc second NED elevation data have a horizontal resolution of approximately 10 meters. The ArcMap viewshed calculations used a 5-foot observer height on the ground and height assumptions for the proposed sampling equipment as follows: sonic or hollow-stem drilling rig (20 feet), hydrovac truck (10 feet), backhoe (8 feet), excavator (8 feet), and hand sampling (5 feet). The equipment visibility is less than the maximum height because only the narrow upper portion of a rig may be visible from some locations. In cases where the sampling locations may include multiple sample types, the viewshed calculation included all potential sampling types.

Sonic or Hollow-Stem Drilling Rig Viewshed Map (Figure 4.1-3a)

Potential visibility of proposed sonic or hollow-stem drilling rig activity is depicted in Figure 4.1-3a. Areas from which drilling rig activity could be seen within a 0.25-mile viewing distance include nearby locations such as upper and lower Bat Cave Wash, the wash perimeter including Locus A of the Topock Maze, foothills immediately south of the Station, portions of I-40 and the National Trails Highway, and the Colorado River near its confluence with Topock Marsh. Fewer than a quarter of the proposed drilling rig sampling locations potentially could be visible from the majority of this viewshed area, whereas somewhat fewer than half of the total potentially could be seen from the immediate vicinity of the wash as well as from isolated foothill locations south of the Project Site.

Beyond 0.25 miles, the potential viewshed extends across the river to include the southern entrance of Topock Marsh and foothills east of the marsh and north and south of the I-40/BNSF corridor. It also includes isolated mountain ridges within the Chemehuevi Mountains and foothills west of the Project Site. Up to three-quarters of the proposed drilling rig sample locations could be potentially visible at this distance, primarily from locations northeast of the Project Site.

Hydrovac Truck Viewshed Map (Figure 4.1-3b)

Potential visibility for proposed hydrovac truck sampling activity is depicted in Figure 4.1-3b. Fewer than one-half of the proposed hydrovac sampling locations would be potentially visible from areas within 0.25 miles of the activity. These include portions of upper Bat Cave Wash, elevated locations south and west of the Station, a portion of I-40 where it crosses the Colorado River, and river locations just south of the I-40 highway bridge.

Farther away, from distances up to 2 miles, as many as 70 percent of the hydrovac sampling locations would be potentially visible, primarily from the hilly terrain east of the Project Site along both sides of I-40. From a more extensive area north of the Project Site that includes Topock Marsh and Moabi Regional Park, as well as isolated ridgetops in the Chemehuevi Mountains to the west, fewer than one-quarter of the hydrovac sample locations could be visible.

Backhoe Viewshed Map (Figure 4.1-3c)

Potential visibility for proposed backhoe (excavator) activity is depicted in Figure 4.1-3c. Up to approximately half of the proposed backhoe locations would be potentially visible within 0.25 mile of the activity. From more distant areas, up to 2 miles away, as many as three quarters of the backhoe sample locations would be visible.

Both the near and more distant viewsheds depicted for the backhoe sample sites are roughly similar to those depicted for hydrovac sample locations, with the addition of an area within and adjacent to lower Bat Cave Wash where proposed backhoe sample locations would be located. As such, fewer than one-quarter of the backhoe sample locations would be potentially visible from areas north and west of the Project Site.

Hand Sample Viewshed Map (Figure 4.1-3d)

Potential visibility for proposed hand soil sampling activity is depicted in Figure 4.1-3d. Within 0.25 mile of the activity, up to three-quarters of hand sample locations would be potentially visible from limited elevated locations immediately west of upper Bat Cave Wash (including a small area of Locus A of the Topock Maze) and elevated locations just north of I-40. Fewer than one-third of hand sampling locations could be potentially visible from a somewhat greater area of the maze, foothills south and east of the Station, and river and floodplain locations just east of the Station when viewed from within 0.25 mile of the activity.

Within 2 miles, up to three-quarters of the proposed hand sample locations could be potentially visible, primarily from the Topock Marsh and isolated foothill and ridgetop locations southwest and east of the Project Site. Less than one-third of the hand sample locations could be potentially visible from a considerably larger portion of the area within 2 miles, extending from the Colorado River to foothill and river locations west, north, and east of the Project Site.

Composite Viewshed Maps (Figures 4.1-3e and 4.1-3f)

Figure 4.1-3e includes a composite of the generalized viewshed maps shown in Figures 4.1-3a through 4.1-3d. This figure depicts areas of potential visibility for the four types of sample activity proposed by the Project. The figure shows that up to one-half of the sample locations could be potentially visible from a relatively small area immediately west of upper Bat Cave Wash and from foothill locations southeast of the Station. Fewer than one-quarter of sample locations could be potentially visible from other nearby locations that include a 0.75-mile stretch of I-40, as well as areas potentially accessed by the public north and south of I-40 and south and east of the Station. As many as nearly three-quarters of the sample locations could be potentially visible from within 2 miles of Project locations that includes a portion of Topock Marsh and the hilly terrain to the northeast, east, and southeast of the marsh, as well as isolated ridges in the Chemehuevi Mountains southwest of the Project Site. From the majority of the area within 2 miles of Project locations, however, fewer than one-quarter of the sample locations could be potentially visible.

Figure 4.1-3f is a second composite map that depicts areas of potential visibility for the four types of sample activity proposed by the Project within a viewshed radius of up to 5 miles. As in the previous viewshed depictions, the area from which the greatest number of Project sample locations would be potentially visible follows the contours of the Colorado River floodplain and alluvial deposits northeast of the Project Site. In addition, at the 5-mile viewing distance, some areas of residential development within the community of Topock/Golden Shores northeast of the Project Site would be within the viewshed, with between one-quarter and one-half of Project sample locations potentially visible.

Summary of Viewshed Map Findings

The generalized viewshed maps described above indicate that the elements of the proposed Project could be potentially visible to the public from some nearby locations along public roadways (primarily I-40). In addition, Project sampling activity could potentially be seen from portions of Havasu National Wildlife Refuge, including limited stretches of the Colorado River and Topock Marsh, as well as isolated portions of publicly accessible land within the Chemehuevi Mountains and foothills. Some activity could be potentially visible from Fort Mojave Tribal reservation land within lower Bat Cave Wash as well as private land situated adjacent to the I-40 highway bridge on the east bank of the Colorado River. Potential visibility of Project sampling activity from residential areas is limited to portions of the community of Topock/Golden Shores, which is located more than 3 miles from the Project Site.

While these generalized viewshed maps show areas where Project activity could be potentially visible, in many cases mitigating factors such as the presence of vegetation screening would minimize their actual visibility. Especially in the particular case of views northeast of the Project Site, intervening vegetation would partially or completely block views of the Project Site, especially in areas east of the Colorado River within low-lying locations of the river floodplain where dense riparian vegetation such as salt cedar (*Tamarix spp.*) is abundant. In other cases, for example along the I-40 corridor, built elements and graded roadside berms restrict views of the surrounding landscape. In addition, while the maps show the generalized pattern of Project visibility, they do not distinguish how much of the sampling activity in question may be visible from a given location within the viewshed. This applies particularly to the locations where the sonic drilling rig would be used, since in a number of instances only the top-most portion of the drilling mast may actually be visible. Moreover, Project activities that the viewshed maps indicate as being potentially visible may not be perceptible to a casual observer, especially when considering more distant views. This is particularly true in the case of sampling locations that involve use of hand tools. This activity is unlikely to be visible to the unaided eye at distances beyond one-quarter of a mile. Photographs, visual simulations, and detailed description and analysis of representative views of Project locations and Project elements that illustrate these mitigating factors can be found in Section 4.1.3.3, "Impact Analysis."

4.1.1.4 Potentially Affected Viewers

Accepted visual assessment methods, including those adopted by federal agencies, establish sensitivity levels as a measure of public concern for changes to scenic quality (FHWA 1988). Viewer sensitivity, typically divided into high, moderate, and low categories, is among the criteria employed for evaluating visual impacts and their degree of significance. The factors considered in assigning a sensitivity level include viewer activity, view duration, viewing distance, adjacent land use, and special management or planning designation. Research on the subject suggests that certain activities tend to heighten viewer awareness of visual and scenic resources, while other activities tend to be distracting. For example, recreational activities tend to favor attention to scenery while working at a construction site does not. In general, the degree of visual impact tends to be more substantial where the sensitivity of affected viewers is highest.

Potentially affected viewers in the Project Site include members of Native American Tribes with ties to the area, motorists on I-40 and adjacent roadways and train passengers, recreational users of surrounding public open space and entertainment facilities, and local residents. It should be noted that the existing Station and infrastructure associated with the ongoing Groundwater Remediation Project are established elements visible from various vantage points within the landscape setting.

Tribal Groups

Tribal members are the first identified viewer group as several Interested Tribes have significant cultural ties to the area. Tribal uses of the area include group ceremonial activities, education, and individual visits (Sullivan 2013). Group activities typically occur several times during the year for a duration of an hour or more per occurrence. Educational activities typically occur relatively infrequently, lasting for several hours at a time. Individual visits occur on a regular, but infrequent, basis. Tribal views of the Project Site based on these typical activities range from short to moderate in duration. Many Tribal users, however, are intimately familiar with the views and overall viewshed associated with the cultural landscape and would be sensitive to visual changes in the natural landscape. Viewer sensitivity is therefore considered high.

Motorists and Train Passengers

Motorists are the second viewer group identified. Most numerous are those traveling on I-40, which constitutes the primary east-west transportation corridor within the region and is a conduit for a large volume of traffic moving from population centers of Southern California to the Southwest and beyond. Also included in this group are motorists traveling on Topock Oatman Highway between the community of Topock and the I-40 corridor, and the Park Moabi Entrance Road/National Trails Highway. Motorists include both local and regional travelers who are familiar with the visual setting and travelers, especially those on I-40, using the roadway on a less regular basis. Roadway views of the Project Site are typically brief in duration, while in many instances views are screened by intervening topography. Viewer sensitivity is considered low to moderate.

In addition to motorists, passengers on the daily Amtrak train that runs between Los Angeles and Chicago have a brief-duration view of the Project Site. Depending on the direction of travel, passengers would have fleeting views of Project activity in Bat Cave Wash adjacent to the rail corridor.

Recreationalists

The third viewer group consists of recreational users, a group that is important to the region's economy. These include boaters on the Colorado River and surrounding wetlands; visitors to Moabi Regional Park, including the Pirate Cove recreation facility; users of Topock riverside boat launch facilities; and people accessing U.S. Bureau of Land Management (BLM) and other public land adjacent to the Project Site. Total duration of recreational views ranges from short to moderate, while viewer sensitivity is low to high, depending on viewers' expectations of experiencing a naturalistic landscape setting.

Residents

Residents are a fourth viewer group. Residential views are typically longer in duration and the sensitivity of this group is generally considered moderate to high. With the exception of a few residential structures situated directly across the river from the Station below the I-40 highway bridge, no residences are located in proximity to the proposed Project activity. Furthermore, Project activities would not be visible from the closest residences at the Topock/Golden Shores community, which lie more than 3 miles away.

4.1.1.5 Visual Character and Representative Views of Project Site

Figure 4.1-4 shows the location and orientation of key representative viewpoints. **Figures 4.1-5a** through **4.1-5l** present a set of 23 photographs depicting existing visual conditions from these viewpoints. The photographs depict views both toward the Project Site, which convey a general sense of the visual landscape character found in the Project Site vicinity, as well as photographs illustrating representative views from within the Project Site.

Views Toward the Project Site

Roadway Views (Photographs 1 through 6)

Photographs 1 through 3 portray motorists' views toward the Project Site from points along eastbound I-40. The photographs represent a visual sequence as motorists travel eastward to where the highway crosses the Colorado River.

Photograph 1 shows the highway as it descends toward the river. Foreground views of the embankments on either side of the highway frame the view toward a gas pipeline bridge support tower at the river. Roadside topography constrains views of much of the surrounding landscape.

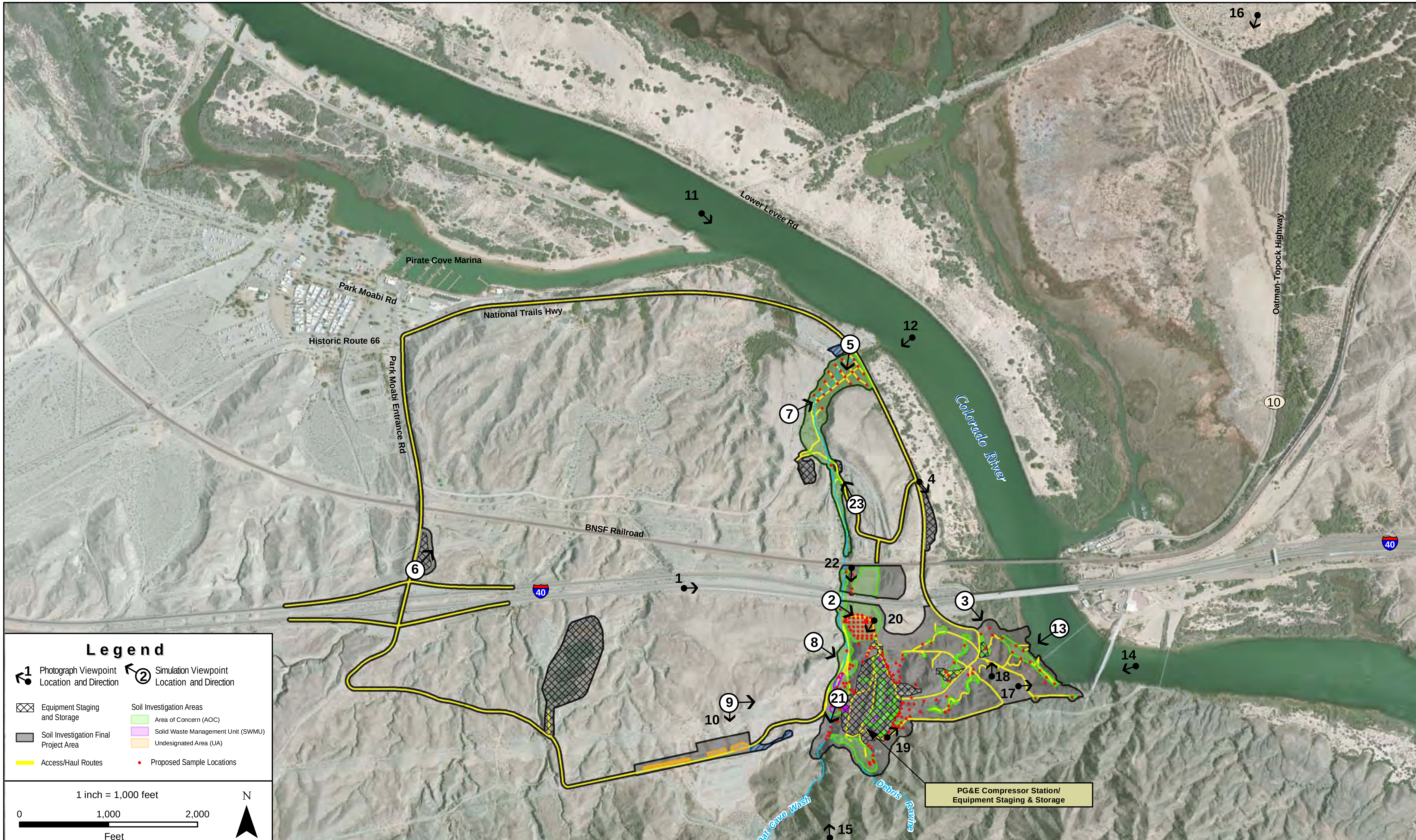
Photograph 2 shows a foreground view of upper Bat Cave Wash, which emerges from the Chemehuevi Mountains southwest of the Station and runs along its western perimeter before crossing under the highway at this location. A heavily eroded and sparsely vegetated embankment overlooking the wash, and an unpaved maintenance road leading to the Station, partially visible on the upper right, dominate the foreground view. Storage tanks, utility poles, and auxiliary Station components line the embankment and an unpaved maintenance road. As in the previous view, topography largely hinders open views of the landscape. (See also Figure 4.1-2b for a panoramic view from the same location.) Typical highway speeds at this location limit the duration of motorists' views.

Photograph 3 is a motorist's view of the Colorado River looking to the southeast. Dense riparian vegetation lines the river floodplain in the foreground, above which is a steeply graded embankment of the National Trails Highway near its terminus at the Station entrance, visible on the far right. Spanning the river are several gas pipelines, one of them supported by the former highway bridge for the National Trails Highway and Historic Route 66, its arched structure just visible above the river in the middle distance. A portion of the Needles rock formation protrudes on the distant horizon. (See also Figure 4.1-2a for a panoramic view from the same location.)

Photographs 4 through 6 represent views of the Project Site from several locations along Park Moabi Entrance Road/National Trails Highway. This roadway has access from I-40 and serves as the primary approach to the Station and the Project Site. In addition, it serves as a primary point of access for residents of a nearby mobile home park, as well as for recreational visitors to boat launch facilities, the Pirate Cove waterside theme park, Historic Route 66 relics, and portions of the Topock Maze. Because of lower vehicle speeds, motorists' views here are typically longer in duration compared to views from I-40.

Photograph 4 is a view seen by motorists traveling south on the National Trails Highway along the river floodplain. Views of the river itself are obscured by dense stands of vegetation. Views toward the rugged, sparsely vegetated Chemehuevi Mountains and the scenic Needles rock formation, partially seen in the background in the left side of this view, are interrupted by BNSF and I-40 highway bridges. An unpaved access road visible in the foreground leads to several monitoring facilities relating to the ongoing Groundwater Remediation Project.

Photograph 5 is a motorists' view looking southwest near the confluence of Bat Cave Wash with the Colorado River. A dense grove of salt cedar, also referred to as Tamarisk (*Tamarix spp*.) fills the foreground. The dark outline of the Chemehuevi Mountains looms on the horizon above the arid margins of the wash, and a portion of the existing Interim Measure 3 (IM-3) treatment facility is visible beyond the grove. Photograph 6 shows a broad gravel turnout at the junction of Park Moabi Entrance Road and I-40. This view encompasses an expansive view of the southern Mojave Valley, with dramatic natural scenery juxtaposed with a variety of built features. Foreground views include several large storage tanks, utility poles, and miscellaneous signage at the far edge of the graded turnout. Graded embankments along the BNSF line bisect the broad expanse of desert chaparral visible in the middleground. Beyond are views of Colorado River floodplain, Topock Marsh, the community of Golden Shores, and peaks of the Black Mesa formation, including Boundary Cone.



Topock Soil Investigation
Project EIR

Basemap By Parus Consulting, Inc.
Map Creation Date: 10/10/2013 Background Source: ESRI Bing Maps Aerial

022114

Photograph Viewpoint Locations

Figure 4.1-4

ESA

PARUS CONSULTING, INC.
ENVIRONMENTAL VISION

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1. Interstate 40 eastbound looking east

2. Interstate 40 eastbound at Bat Cave Wash looking southeast *

* Selected Simulation View
Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

020314

Topock Soil Investigation Project EIR . 120112

Figure 4.1-5a
Key Representative Photographs

3. Interstate 40 eastbound at Colorado River looking southeast toward the Needles *

4. National Trails Highway looking southeast toward the Needles

* Selected Simulation View
Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-5b
Key Representative Photographs

5. National Trails Highway/Historic Route 66 looking southwest toward Bat Cave Wash *

6. Park Moabi Entrance Road at Interstate 40 looking northeast toward the Colorado River *

* Selected Simulation View
Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-5c
Key Representative Photographs

7. Topock Maze (Locus C) looking northeast toward Bat Cave Wash and the Colorado River *

8. Topock Maze (Locus A) looking southeast toward Topock Compressor Station *

* Selected Simulation View
Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-5d
Key Representative Photographs

9. Topock Maze (Locus A at Interpretive Sign) looking east toward Topock Compressor Station *

10. Topock Maze (Locus A at Interpretive Sign) looking south toward Chemehuevi Mountains

* Selected Simulation View
Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-5e
Key Representative Photographs

020314

11. Colorado River at Pirate Cove looking southeast toward the Needles


12. Colorado River looking southwest toward Bat Cave Wash

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Soil Investigation Project EIR . 120112

Figure 4.1-5f

Key Representative Photographs

020314

13. Colorado River looking west toward Topock Compressor Station *

14. Colorado River looking southwest toward Topock Compressor Station

* Selected Simulation View
Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Soil Investigation Project EIR . 120112

Figure 4.1-5g
Key Representative Photographs

020314

15. Ridge on Chemehuevi Mountains looking north toward Colorado River and Project Site

16. Ridge near Highway 10 looking south toward Colorado River and Project Site

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-5h
Key Representative Photographs

17. Eastern Project Site looking east along Colorado River

18. Eastern Project Site looking north toward I-40

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-5i
Key Representative Photographs

19. Southern Project Site Access Road looking northeast toward Colorado River

20. Western Project Site Access Road near I-40 looking southwest toward Bat Cave Wash

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-5j
Key Representative Photographs

21. Upper Bat Cave Wash at Project Site looking south *

22. Project Site between Railroad and I-40 looking south

* Selected Simulation View
Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-5k
Key Representative Photographs

23. Lower Bat Cave Wash at Project Site looking northwest *

* Selected Simulation View
Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-5l
Key Representative Photographs

Foreground Views from Publicly Accessible Land (Photographs 7 through 10)

Photographs 7 through 10 are representative views looking out from two components of the Topock Maze. Locus C of the maze, located north of the I-40/BNSF transportation corridor, is accessible to pedestrians from the National Trails Highway and attracts individuals seeking to experience the maze, such as Tribal users, as well as those interested in the relic elements associated with Historic Route 66 and the National Trails Highway that are found in the immediate vicinity. A much larger manifestation of the maze (Locus A) is located south of I-40 adjacent to the Station. Visitors to this area include Tribal users for whom the Topock TCP, including the Project Site, represents a spiritual area, as well as non-Tribal visitors traveling through the region. Views in these areas are potentially of comparatively long duration as a result of access to multiple vantage points and unobstructed vistas of surrounding natural scenery.

Photograph 7 is a view from the eastern perimeter of Locus C of the maze looking northeast. Overlooking the confluence of lower Bat Cave Wash and the Colorado River, this view affords open views of the river floodplain and distant peaks. Dense stands of riparian vegetation lining the wash and Topock Marsh, visible beyond the river, are interrupted by sparsely vegetated alluvial deposits in both the foreground and middle distance. A number of built elements intrude on this view, including power lines and the paved surface of the National Trails Highway in the foreground and an industrial facility that can be seen beyond Topock Marsh.

Photograph 8 overlooks upper Bat Cave Wash and the Station, providing a view from the northeastern perimeter of Topock Maze Locus A looking southeast. A view of the Chemehuevi Mountains and a portion of the Needles rock formation frames the heavily graded and otherwise disturbed terrain associated with Station operations and ongoing groundwater remediation activities.

Photograph 9 is a view from the southeastern perimeter of Locus A of the maze looking east. Portions of a perimeter fence that enclose part of the maze can be seen in the immediate foreground. Expansive views of the surrounding landscape are available from this location. Unlike the view shown in Photograph 8, intervening topography hinders views of Bat Cave Wash and obscures all but a small portion of the Station rooftop.

Photograph 10 is a view from the same location looking south toward the flank of the Chemehuevi Mountains. A roadway and parking area, partially visible beyond the foreground vegetation, provides access to this area from I-40. A nearby BLM interpretive sign (not visible in this view) offers contextual information about the maze to visitors. (See also Figure 4.1-2c for a panoramic view from the same location.)

River Views (Photographs 11 through 14)

Photographs 11 through 14 are views toward proposed Project locations from the perspective of boaters on the Colorado River. The Havasu National Wildlife Refuge, the Needles rock formation, and Topock Gorge constitute popular boating destinations from this location. Elements of the landscape potentially can be seen at relatively close range given the maneuverability of watercraft generally used on the river. Because of restricted speeds imposed on watercraft in the vicinity of the numerous bridges in the vicinity, views of the Project Site from the river potentially can be of medium duration.

Photograph 11 is a view from a point mid-channel on the Colorado River and looks toward the Project Site north of the river entrance to the Pirate Cove Resort and Marina. Dense riparian vegetation typical of that found in many parts of the wildlife refuge lines the river bank, while the more sparsely vegetated graded road embankment of the National Trails Highway can be seen above the floodplain. A view of the Needles formation appears prominently on the far horizon.

Photograph 12 is a view of the west bank of the river where Bat Cave Wash passes under the National Trails Highway through a narrow brick culvert to join the Colorado River. Aquatic vegetation emerging from the shallow alluvium marks the mouth of the wash and extends downriver against a backdrop of riparian shrubs and small trees that populate the sandy shoreline in the foreground. The Chemehuevi Mountains loom prominently in the background. Because of limited sight lines from the river, little of the intervening landscape can be seen from this location.

Photograph 13 shows the west bank of the river south of the I-40 highway bridge and represents a water’s edge view of the Station, perched on a rocky terrace above the densely vegetated river shoreline, with the Chemehuevi Mountains partly visible beyond. The Historic Route 66 highway sign and auxiliary components of the highway facility can be seen just below the Station. As in the previous view, sight lines from river are somewhat constrained.

Photograph 14 is a boater’s view toward the Project Site at the point where the Colorado River veers east at the base of the Chemehuevi Mountains. The orientation of this view along the river channel allows a somewhat more expansive visibility of the surrounding terrain compared to the previous viewpoints. The dominant element in this view is a gas pipeline suspended across the river from the arched bridge structure and stepping up the steep terrain above the south bank of the river. A second gas pipeline is visible beyond the bridge, as is a portion of the I-40 highway bridge. The Station is partially visible on the horizon.

Distant Views (Photographs 15 and 16)

Photographs 15 and 16 depict the Project Site from two elevated vantage points identified during the Tribal input process. Because the proposed Project lies within a landscape context of traditional religious and cultural significance to several Interested Tribes in the area, these viewpoints are intended to situate the Project Site within a broader visual perspective that is considered particularly sensitive from the perspective of Tribal members.

Photograph 15 looks north across the length of the Mojave Valley from a steep ridge above the Station within the Chemehuevi Mountains. This view includes a large portion of the Project Site located in and around the Station and Bat Cave Wash. From this elevated perspective, built structures and graded or otherwise disturbed topography associated with the Station and nearby transportation infrastructure in the foreground and middle ground are seen in juxtaposition with the more distant views of the Colorado River, Topock Marsh, and surrounding mountains. In this view, landscape elements that Tribal representatives have identified as significant include the meandering channel of the Colorado River running the length of the valley, Spirit Mountain and Boundary Cone (both visible on the far horizon), and the Topock Maze adjacent to the Project Site west and northwest of the Station. (See panoramic views in Figures 4.1-2a through 4.1-2c for specific call-outs identifying these elements.) A portion of land belonging to the FMIT adjacent to the IM-3 facility north of I-40 can also be seen from this location.

Photograph 16 is a view looking southwest from a ridgeline overlooking the Colorado River floodplain approximately 2 miles from the Project Site. The Station together with the BNSF and I-40 highway bridges are visible in the middle distance against the backdrop of the Chemehuevi Mountains and a portion of the Needles formation on the distant horizon. From this vantage point, the scale of the surrounding mountains and the broad view of the vegetated river floodplain in the foreground dwarf the built elements in the landscape.

Views from the Project Site

Photographs 17 through 23 represent views looking out from key vantage points within the Project Site.

Photograph 17 is a view of the Project Site looking east from a location adjacent to the Station entrance. This low ridgetop perspective captures views of Black Mesa as well as more distant peaks on the eastern horizon. Foreground views focus on the curving river channel and vegetated shoreline; these are bisected by visually contrasting built elements that include the unpaved access road with its steeply graded embankment, gas pipelines, and bridge structures spanning the river.

Photograph 18 is a view to the north from the same ridgeline as in the previous photograph. It looks toward the I-40 and BNSF bridges and the vegetated floodplain of the Colorado River. The National Trails Highway emerges from sparsely vegetated foothills, crossing under I-40 before terminating at the Station entry gate. The Route 66 highway sign can be seen in the foreground near the intersection of the National Trails Highway and the unpaved roadbed of Historic Route 66 immediately below the viewpoint location. Spirit Mountain, looming over the far horizon, becomes a dominant background element from this perspective.

Photograph 19 looks to the northeast from the Project Site along the southeastern perimeter of the Station. Although the Mojave Valley and Black Mesa are partly visible in the background, open views are largely constrained by surrounding topography from this location. Disturbed terrain and a number of built elements associated with the Station are visible in the immediate foreground. Station offices, desert fan palms, and the Station perimeter fence above the roadway stand out prominently on the near horizon.

Photograph 20 is a view from the Project Site overlooking the broad alluvial terraces bordering upper Bat Cave Wash. The dark outline of the Chemehuevi Mountains can be seen in the background. A portion of an unpaved access road leading from Bat Cave Wash to the northern perimeter of the Station is visible in the foreground, below which infrastructure associated with the ongoing Groundwater Remediation Project can be seen. Wood boundary posts and a section of wire fencing marking the eastern perimeter of Topock Maze Locus A line the near horizon on the right side of this view.

Photograph 21 is a view from the Project Site looking south along upper Bat Cave Wash where it emerges from the rocky terrain of the Chemehuevi Mountains. A section of pipeline protrudes from the eroded alluvium along the edge of the wash and crosses over a gravel roadway lining the floor of the channel. The fenced perimeter of the Station along with storage buildings and infrastructure associated with the Groundwater Remediation Project can be seen above the wash to the left.

Photograph 22 looks to the south from a location in the Project Site situated between the BNSF line and I-40. This area is characterized by disturbed terrain associated with the highway corridor and railroad right-of-way. Views of highway traffic are mostly obscured by intervening topography. Infrastructure associated with the Station is visible against the dark backdrop of the Chemehuevi Mountains on the opposite side of the highway atop a graded terrace.

Photograph 23 is a view looking northwest from the immediate vicinity of the Project Site within Bat Cave Wash north of I-40 and the BNSF line. This location represents a perspective of the Project Site as seen from a parcel of land owned by the FMIT. The sparsely vegetated terrain appears highly disturbed due to naturally occurring hydrological events as well as grading and road building activities associated with the IM-3 facility seen in the foreground. The eastern perimeter of Topock Maze Locus C is situated just beyond the upper edge of the wash on the left middle horizon. A view of Spirit Mountain on the far horizon is available from this slightly elevated perspective above the floor of the wash.

4.1.2 Regulatory Background

The Project Site is located in unincorporated San Bernardino County. As shown in Figure 3-7 (Land Ownership) in Chapter 3, “Project Description,” the lands adjoining the PG&E parcel are owned and/or managed by a number of government agencies and private entities. These include lands owned by the FMIT; the Havasu National Wildlife Refuge, which is managed by the U.S. Fish and Wildlife Service (USFWS); lands managed by the U.S. Department of the Interior (DOI) (including the BLM] and Bureau of Reclamation); land leased by the California Department of Transportation (Caltrans); the BNSF line; and privately owned lands. The following discussion reviews federal, state, and local regulations and policies relevant to the analysis of the proposed Project’s visual impacts.

4.1.2.1 Federal

Bureau of Land Management

A portion of the Project Site lies on BLM land as well as San Bernardino County leased property managed by the BLM and administered by the Needles Field Office.

The Federal Land Policy and Management Act of 1976 establishes a policy for the United States to manage public lands in a manner that will protect the quality of scenic values (43 U.S.C. 1701(a)(8)). To this end, the BLM has developed the Visual Resource Management (VRM) system to ensure that the scenic values of public lands are considered before allowing uses that may have negative visual impacts. Under this system, BLM-administered lands are inventoried, analyzed, and assigned visual ratings or management classes. Class designations are derived from an analysis of scenic quality (rated by land form, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modification), a determination of viewer sensitivity levels (sensitivity of people to changes in the landscape), and distance zones. Management classes describe the different degrees of modification allowed to the basic elements of the landscape (form, line, color, texture). Management classes and their goals are listed in **Table 4.1-1**.

TABLE 4.1-1
BLM MANAGEMENT CLASSES AND GOALS

Management Class	Goals
Class I	To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II	To retain the existing character of the landscape. The level of change to the characteristic landscape should be low.
Class III	To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.
Class IV	To provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

SOURCE: U.S. Department of the Interior 2007

As a special designation, the Chemehuevi Mountain Wilderness, which lies approximately 0.4 miles south of the Project Site, has a Class I designation. The other BLM lands in the vicinity of the Project are primarily designated as Class III (DOI 2013 and DOI 2007). Class III guidelines allow for moderate change to landscape character. Management actions may attract attention but should not dominate the view of the casual observer (DOI 2007:118).

Fort Mojave Indian Reservation

The FMIT Reservation is located outside the Project Site along the Colorado River in an area covering nearly 42,000 acres in Arizona, California, and Nevada. The southernmost boundary of the FMIT Reservation is located approximately 1 mile north of the Station. The FMIT has a general plan and maintains a planning department. The general plan is focused on land use policy and does not specifically address visual quality or aesthetics (Fort Mojave Indian Tribe Planning Department 2013). Section 4.4, “Project Description,” includes additional information on cultural landscape and FMIT concerns regarding the Project.

In addition, the FMIT own land that is part of the Project Site north of I-40. The FMIT-owned land is located on land transferred under the 2006 Settlement Agreement between PG&E and the FMIT. Transfer of title of this property in the Project Site to the FMIT occurred in October 2009. The FMIT ownership of the property is subject to a blanket easement over the property to PG&E for remediation-related purposes. The Settlement Agreement precludes the FMIT from transferring title of the property into trust with the federal government for the life of the easement.

U.S. Fish and Wildlife Service

A portion of the Project Site lies in the Havasu National Wildlife Refuge. The Lower Colorado River National Wildlife Refuges Comprehensive Plan describes policies for this area. The plan includes a general description of the importance of managing long-term aesthetic resources but no specific policies that apply to the Project Site and surrounding area (USFWS 1994:158).

U.S. Department of Transportation, Federal Highway Administration

Route 66 is a National Scenic Byway and All-American Road in Arizona; however, it is not designated as such in California. The federal Scenic Byways Program prohibits billboards and has provisions to control other signage along designated scenic byways (U.S. Department of Transportation 2013).

4.1.2.2 State of California

California's Scenic Highway Program was created by the state legislature in 1963. Its purpose is to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. The State Scenic Highway System includes highways that are either eligible for designation as scenic highways or have been designated as such. The status of a state scenic highway changes from "eligible" to "officially designated" when the local jurisdiction adopts a scenic corridor protection program, applies to Caltrans for scenic highway approval, and receives the designation from Caltrans. A city or county may propose adding routes with outstanding scenic elements to the list of eligible highways. However, state legislation is required for designation.

The Project would not be visible from State Route 38, the closest Designated State Scenic Highway, which is located in San Bernardino County more than 100 miles away. The Project Site is visible from places along I-40, an Eligible State Scenic Highway.

4.1.2.3 Local

County of San Bernardino 2007 General Plan

The Open Space Element and the Conservation Element of the County of San Bernardino 2007 General Plan (County General Plan) contains provisions regarding preserving aesthetic resources, specifically scenic routes. Historic Route 66 and I-40, which both traverse the Project Site, are listed as County scenic routes. Relevant goals and policies include the following:

GOAL OS 4: The County will preserve and protect cultural resources throughout the County, including parks, areas of regional significance, and scenic, cultural and historic sites that contribute to a distinctive visual experience for visitors and quality of life for County residents.

GOAL OS 5: The County will maintain and enhance the visual character of scenic routes in the County.

- **Policy OS 5.2:** Define the scenic corridor on either side of the designated route, measured from the outside edge of the right-of-way, trail, or path. Development along scenic corridors would be required to demonstrate through visual analysis that proposed components are compatible with the scenic qualities present.

- **Policy OS 5.3:** The County desires to retain the scenic character of visually important roadways throughout the County. A "scenic route" is a roadway that has scenic vistas and other scenic and aesthetic qualities that over time have been found to add beauty to the County. Therefore, the County designates the following routes as scenic highways and applies all applicable policies to development on these routes:

  f. Historic Route 66 (National Trails Highway or Main Street) from Oro Grande northeast and east to the Arizona state line, excepting those areas with incorporated cities.

  g. Interstate 40 from Ludlow northeast to Needles.

The Project Site is located in the Desert Region of the County. The following provisions of the Conservation Element pertain to aesthetic resources in this region:

GOAL D/CO 1: Preserve the unique environmental features and natural resources of the Desert Region, including native wildlife, vegetation, water and scenic vistas.

- **Policy D/CO 1.2:** Require future land development practices to be compatible with the existing topography and scenic vistas, and protect the natural vegetation.

Mohave County (Arizona) General Plan

The Mohave County (Arizona) General Plan designates the Oatman-Topock Highway, located approximately 0.5 miles west of the Project Site, as a Scenic Route (Mohave County 2005:53). Policies applicable to Scenic Routes focus on preserving scenic vistas and enhancing aesthetic value of scenic routes.

4.1.3 Environmental Impacts

4.1.3.1 Impact Methodology

The following analysis is based on site visits; review of technical data, including proposed Project maps and drawings provided by the California Department of Toxic Substances Control (DTSC); aerial and ground-level photographs of the Project Site; local planning documents; and computer-generated visual simulations. Field observations were conducted in October 2013 to document existing visual conditions in the Project Site and to identify potentially affected sensitive viewing locations. The identified potentially sensitive viewing locations include the following:

- Locations along designated and eligible scenic roadways;
- Recognized scenic vista points;
- Locations within public recreation areas from which the Project features would be visible; and
- Publicly accessible locations where visible Project-related changes could be particularly noticeable.

In addition, consideration in this analysis was given to places that were identified as visually sensitive by Interested Tribes during the Native American scoping process (see Section 4.4.1.7 “Native American Scoping”).

The analysis uses the questions set forth in Appendix G of the CEQA Guidelines for evaluation of aesthetic impacts. This analysis systematically documents the visual setting and evaluates visual changes associated with the proposed Project as described in Chapter 3, “Project Description.” To document the extent of potential Project visibility, computer-generated viewshed maps have been produced to show the general area from which the Project is potentially visible. Additionally, to convey a sense of existing visual conditions, the set of 23 photographs shown in Figures 4.1-5a through 4.1-5l portray representative public views within the Project Site. As depicted in these photographs, public views of the Project Site currently include Station facilities. These existing conditions constitute the baseline from which visual impacts are evaluated.

This visual analysis employs assessment methods based in part on U.S. Department of Transportation (DOT) Federal Highway Administration (FHWA) and other accepted visual analysis techniques as summarized by Smardon, et al. (1986). Consistent with FHWA methods, the impact analysis describes changes to existing visual resources and assesses probable viewer responses to such changes. This assessment evaluates representative views from which the proposed Project would be visible to the public. To document the visual change that would occur, visual simulations show the proposed Project from key representative public viewpoints. The visual impact assessment is based on evaluation of the changes to the existing visual resources that would result from implementation of the proposed soil investigation activities. These changes were assessed, in part, by evaluating the “after” views provided by the computer-generated visual simulations and comparing them to the existing visual environment.

In addition, consideration has been given in this analysis to the larger viewshed through the incorporation of panoramic views, 360-degree views, and images that depict views both toward the Project Site, which convey a general sense of the visual landscape character found in the Project Site vicinity, as well as photographs illustrating representative views from within the Project Site looking out. This approach was proposed by the FMIT and has been used to support the analysis of the viewshed and its important relationship as a contributing element to the Topock TCP (see Section 4.4, “Cultural Resources,” for additional information).

Technical methods employed for producing computer-generated viewshed maps and visual simulations are discussed under Section 4.1.1, “Existing Setting,” in sub-Sections 4.1.1.3, “Project Viewshed,” and 4.1.3.3, “Impact Analysis,” respectively.

4.1.3.2 Thresholds of Significance

To determine the significance of the anticipated visual changes, the Project’s effects were evaluated according to criteria provided in Appendix G of the CEQA Guidelines. These criteria indicate that a project would have a significant effect on the environment if it would:

- Have a substantial adverse effect on a scenic vista;

- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

Factors considered in applying these criteria to determine significance include the extent of proposed Project visibility from residential areas, public open space, and designated scenic routes; the extent of change in the landscape's composition and character; the degree to which the various Project elements would contrast with or be integrated into the existing landscape; and the number and sensitivity of viewers. Pertinent public policies and places identified as visually sensitive during the consultation process with Tribal representatives were considered as well.

4.1.3.3 Impact Analysis

As described in Section 4.1.1.3, "Project Viewshed," the generalized viewshed maps (Figures 4.1-3a through 4.1-3f) indicate that, from the majority of the surrounding publicly accessible area, fewer than one-quarter of the proposed soil investigation locations would be potentially visible . From some more limited locations, as many as three-quarters of the soil investigation locations would potentially be visible; however, as noted previously, both vegetative screening and viewing distance would affect whether the Project activities would be noticeable. In addition, at any point in time, only a small number of the sites would have any visible equipment or activity, with activity at each soil investigation location taking place for only a short period of time during the anticipated Project schedule. As previously noted, a contingency of up to 25 percent additional sampling locations is contemplated as part of this DEIR, which could increase the level of activity in some portions of the Project area. However, as described in Chapter 3, "Project Description," Section 3.5.2.1, the sample-collection methods and equipment, the areas to be sampled, and access considerations would be the same.

A set of 10 "before" and "after" visual simulations of Project elements, shown in **Figures 4.1-6a** through **4.1-15b,** illustrates potential visual effects of Project-related changes on key public views. A number of Project soil investigation areas depicted in the simulation photographs include multiple sampling locations with more than one type of equipment used to collect soil samples, depending on site characteristics, access, and sampling objectives. Depiction of soil investigation activities in the simulation photographs represents those activities most likely to have a visual impact on key public views. For example, the excavator shown in the Viewpoint 2 simulation (**Figure 4.1-6b**) would represent the most visible component of sampling activity seen from this viewpoint, which would also include sampling using hand tools.

The simulation views are a subset of the 23 photographs presented in Figures 4.1-5a through 4.1-5L. Project simulation viewpoints were determined following an evaluation of locations where Project activity would most likely be visible to the public. The simulations were produced using digital photography and computer-modeling and rendering techniques and are based on Project information included in Chapter 3, "Project Description." The location of each simulation view is depicted in Figure 4.1-4. **Table 4.1-2** summarizes the visual simulations according to the location of each view, the type of view, the approximate viewing distance to the nearest visible proposed Project element, and the Project-related visual effect.

TABLE 4.1-2
SUMMARY OF VISUAL EFFECTS AT KEY VIEWPOINTS

Viewpoint Number: View Location* (Figure Number)	Type of View	Visible Project Element	Distance to Project Element (approximate)	Project-Related Visual Effect
2: Eastbound I-40 toward Bat Cave Wash (Figure 4.1-6b)	Key Public Roadway Corridor	Excavator	425 feet	Represents a minor incremental change to existing disturbed landscape that would be temporary; short duration view barely noticeable at typical highway speeds.
3: Eastbound I-40 looking south (Figure 4.1- 7b)	Key Public Roadway Corridor	Sonic Drilling Rig Hydrovac Truck	1,600 feet 585 feet	Represents an incremental and temporary change that, although noticeable, would not substantially alter the overall character of the landscape setting, given the presence of existing utility structures and components.
5: National Trails Highway/Historic Route 66 southbound (Figure 4.1-8b)	Public Roadway Corridor	Sonic Drilling Rig with Vegetation Clearing	275 feet	Represents an incremental visual change that would be temporary. The change may be noticeable to some viewers, but given the viewing angle, it would not substantially alter the overall visual character of the setting.
6: Park Moabi Entrance Road (Figure 4.1- 9b)	Key Access Road to Public Recreation Area	Staging Area	90 feet to nearest truck	Represents a temporary incremental change. Although the change would be noticeable, it would not substantially alter the overall character of the landscape setting, given the presence of existing utility structures.
7: Topock Maze (Locus C) (Figure 4.1-10b)	Publicly Accessible Land with Sensitive Cultural Component	Sonic Drilling Rig with Vegetation Clearing	325 feet	Represents a temporary incremental visual change that may be noticeable to some viewers; given the orientation of the viewers to the Project activity, however, it would not obstruct distant views or substantially change the overall visual character of the setting
8: Topock Maze (Locus A) (Figure 4.1- 11b)	Publicly Accessible Land with Sensitive Cultural Component	Sonic Drilling Rig Hydrovac Truck	780 feet 400 feet	Represents a temporary incremental visual change that would be relatively minor within an existing disturbed landscape and as such would not substantially degrade the existing visual character of the Project Site.
8: Topock Maze (Locus A) (Figure 4.1-11c)	Publicly Accessible Land with Sensitive Cultural Component	Sonic Drilling Rig Hydrovac Truck Excavator and Trailer	780 feet 400 feet 450 feet	Represents a temporary incremental visual change that would be relatively minor within an existing disturbed landscape and as such would not substantially degrade the existing visual character of the Project Site.
9: Topock Maze (Locus A Interpretive Sign) (Figure 4.1-12b)	Publicly Accessible Land with Sensitive Cultural Component	Sonic Drilling Rig	1,800 feet	Represents a temporary minor incremental visual change that, given the viewing distance and absorptive quality of the backdrop, would not substantially change the overall visual character of the setting.

TABLE 4.1-2
SUMMARY OF VISUAL EFFECTS AT KEY VIEWPOINTS

Viewpoint Number: View Location* (Figure Number)	Type of View	Visible Project Element	Distance to Project Element (approximate)	Project-Related Visual Effect
13: Colorado River looking southwest (Figure 4.1-13b)	Key Recreation Corridor	Sonic Drilling Rig	760 feet	Represents minor incremental temporary additions to the existing visual environment that would not significantly alter the existing landscape character.
		Excavator	1,000 feet	
		Hand Sampling with Boat Access	Boat: 330 feet; Hand sampling: 350 feet	
21: Upper Bat Cave Wash (Figure 4.1-14b)	Publicly Accessible Land	Sonic Drilling Rig	265 feet	Change may be noticeable to some viewers; however, the temporary incremental change would not substantially alter the overall visual character of the setting, given the presence of existing utility structures.
23: Lower Bat Cave Wash (Figure 4.1-15b)	Publicly Accessible Land with Sensitive Cultural Component	Sonic Drilling Rig	600 feet	Although the change would be somewhat noticeable, given the presence of existing structures and implements associated with the IM-3 facility, the temporary incremental change would not substantially alter the overall character of the landscape setting.
		Staging Area with Hydrovac Truck	660 feet	

* Refer to Figure 4.1-4 for viewpoint locations and Figures 4.1-5a through 4.1-5l for photographs.

Figures 4.1-6 through 4.1-15, illustrate potential visual effects of Project related changes on key public views. As described in detail later in this section, the proposed Project would not obstruct views of distant landscape features including the Needles Rock formation, Spirit Mountain, or Boundary Cone. The Project would not involve substantial grading or permanent vegetation removal. Project activities would however require trimming, pruning, or clearing of some vegetation in limited areas. Figures 4.1-8b and 4.1-10b demonstrate that the visual effects of proposed vegetation trimming or pruning would represent an incremental change that would not substantially alter the composition or character of existing landscape views. Moreover, as previously described, because impacts to resources associated with individual soil investigation locations are anticipated to be temporary, the visual effect would be further reduced. In light of the above characteristics and because it would not involve installation of permanent infrastructure, the Project would not result in any long-term permanent adverse effects on public views.

Existing View from Interstate 40 eastbound at Bat Cave Wash looking southeast (VP 2)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-6a

Existing View from eastbound I-40 at Bat Cave Wash

Visual Simulation of the Proposed Project (VP 2)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Soil Investigation Project EIR . 120112

Figure 4.1-6b

Visual Simulation of the Project from eastbound I-40 at Bat Cave Wash

020514

Existing View from Interstate 40 eastbound at Colorado River looking southeast toward the Needles (VP 3)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-7a
Existing View from eastbound I-40 at Colorado River

020514

Visual Simulation of the Proposed Project (VP 3)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-7b

Visual Simulation of the Project from eastbound I-40 at Colorado River

Existing View from National Trails Highway/Historic Route 66 looking southwest toward Bat Cave Wash (VP 5)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-8a

Existing View from National Trails Highway/Historic Route 66

Visual Simulation of the Proposed Project (VP 5)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Soil Investigation Project EIR . 120112

Figure 4.1-8b

Visual Simulation of the Project from National Trails Highway/Historic Route 66

040214

Existing View from Park Moabi Entrance Road at Interstate 40 looking northeast toward the Colorado River (VP 6)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-9a

Existing View from Park Moabi Entrance Road

Visual Simulation of the Proposed Project (VP 6)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-9b
Visual Simulation of the Project from Park Moabi Entrance Road

Existing View from Topock Maze (Locus C) looking northeast toward Bat Cave Wash and the Colorado River (VP 7)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-10a
Existing View from Topock Maze (Locus C)

020514

Visual Simulation of the Proposed Project (VP 7)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-10b

Visual Simulation of the Project from Topock Maze (Locus C)

Existing View from Topock Maze (Locus A) looking southeast toward Topock Compressor Station (VP 8)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Soil Investigation Project EIR . 120112

Figure 4.1-11a

Existing View from Topock Maze (Locus A)

020514

Visual Simulation of the Proposed Project (VP 8)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-11b
Visual Simulation of the Project from Topock Maze (Locus A)

Visual Simulation of the Proposed Project with Pilot Study (VP 8)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-11c

Visual Simulation of the Project with Pilot Study from Topock Maze (Locus A)

041414

Existing View from Topock Maze (Locus A at Interpretive Sign) looking east toward Topock Compressor Station (VP 9)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-12a

Existing View from Topock Maze (Locus A at Interpretive Sign)

Visual Simulation of the Proposed Project (VP 9)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Soil Investigation Project EIR . 120112

Figure 4.1-12b

Visual Simulation of the Project from Topock Maze (Locus A at Interpretive Sign)

020514

Existing View from Colorado River looking west toward Topock Compressor Station (VP 13)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-13a
Existing View from the Colorado River

Visual Simulation of the Proposed Project (VP 13)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-13b

Visual Simulation of the Project from the Colorado River

Existing View from Upper Bat Cave Wash at Project Site looking south (VP 21)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-14a
Existing View from Upper Bat Cave Wash

Visual Simulation of the Proposed Project (VP 21)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-14b

Visual Simulation of the Project from Upper Bat Cave Wash

Existing View from Lower Bat Cave Wash at Project Site looking northwest (VP 23)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-15a
Existing View from Lower Bat Cave Wash

Visual Simulation of the Proposed Project (VP 23)

Refer to Figure 4.1-4 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Soil Investigation Project EIR . 120112

Figure 4.1-15b

Visual Simulation of the Project from Lower Bat Cave Wash

Scenic Vistas

For purposes of this evaluation, a scenic vista is defined as a distant public view along or through an opening or corridor that is recognized and valued for its scenic quality. A substantial adverse effect on a scenic vista is defined as circumstances in which construction or operational activities would introduce permanent dominant visual elements that, based on the landscape sensitivity level, would result in noticeable to very noticeable changes in the visual character of a vista viewshed that do not blend and are not in keeping or are incompatible with the existing visual environment. These changes can be viewed by sensitive receptors (e.g., Tribal members, recreationists) from public viewing areas.

Because it is a focal point for recreational visitors as well as because of its cultural sensitivity, the open landscape view from Topock Maze Locus A at the interpretive sign is considered a scenic vista. From this location, panoramic views of distant mountains and the alluvial terraces bordering the Mojave Valley are present, with much of the Station facility obscured by intervening vegetation and topography. Figure 4.1-12b shows a temporary sonic drilling rig seen from a distance of approximately 1,800 feet. As discussed in detail below in the discussion of visual character, a comparison of the existing view (Figure 4.1-12a) and the visual simulation (Figure 4.1-12b) demonstrates that the Project would not obstruct distant views of important landscape features, nor would it substantially alter the existing landscape character or composition as currently seen from this location, given the viewing distance and absorptive quality of the backdrop. Therefore, the Project would not substantially affect views from Topock Maze Locus A at the interpretive sign. Consideration of the viewshed and its important relationship as a contributing element to the Topock TCP can be found in Chapter 4.4 “Cultural Resources” (Section 4.4.3.3).

IMPACT AES-1	**Substantial Adverse Effects on Scenic Vistas.** *The proposed Project would not have a substantial adverse effect on a scenic vista. This impact would be **less than significant**. No mitigation would be required.*

Scenic Resources Related to a Scenic Highway

As outlined in Section 4.1.2, “Regulatory Background,” the proposed Project would not be visible from a Designated State Scenic Highway. The Project would be seen from places along I-40, an Eligible State Scenic Highway. Motorists traveling along I-40 would have close-range, brief-duration views of the Project. However, as demonstrated in the visual simulations shown in Figures 4.1-6b and 4.1-7b and as described in detail in the following discussion of visual character, the Project would not substantially affect the existing landscape character as seen from I-40, an Eligible State Scenic Highway corridor.

IMPACT AES-2	**Substantial Damage to Scenic Resources within a State Scenic Highway.** *The proposed Project would not substantially damage scenic resources, including trees, rock outcroppings, or historic buildings, within a state scenic highway. This impact would be **less than significant**. No mitigation would be required.*

Visual Character and Quality

As discussed, the Project would not substantially alter the existing visual quality or character of the site and its surroundings. For purposes of this analysis, "substantially alter the existing visual quality or character" is defined as circumstances in which construction or operational activities would introduce permanent dominant visual elements that, based on the landscape sensitivity level, would result in noticeable to very noticeable changes that do not blend and are not in keeping or are incompatible with the existing visual environment. These changes could be viewed by sensitive receptors (e.g., Tribal members, recreationists) from public viewing areas. Changes to visual quality and character could involve one or more of the following components:

- Substantially alter existing viewsheds, including changing existing terrain, vegetative cover, or other natural or built features and introducing incompatible visual elements;
- Substantially alter the existing visual quality of a site and/or the region or eliminate visual resources; and
- Substantially obstruct or permanently reduce visually important features.

Project-related visual impacts would result from the presence of equipment, materials, and work crews at a number of soil investigation locations in and around the Station. The activities proposed as part of the soil investigation will be temporary in nature and limited in duration. When proposed soil investigation activities have been completed, all Project equipment and materials will be removed from the work area. If the area is not paved, the area will be raked/brushed to remove tire tracks. Permanent removal of vegetation is not expected at any work areas. Pruning, trimming, or clearing of some vegetation may be needed to access some sites and clear around investigation areas; however, roots will be left in place to allow for regrowth of vegetation, as outlined in Chapter 3, "Project Description." The potential visual contrast between disturbed areas and the surrounding landscape would be minimal.

To varying degrees, Project activities could be noticeable to Tribal groups using the area for ceremonial activities, education, and individual visitation; motorists on I-40 and several local roadways including National Trails Highway/Historic Route 66; and users of public recreation areas surrounding the Project Site. Because of their short-term and temporary nature, however, these activities would not substantially degrade the existing visual character of the Project Site, its surroundings, or the larger viewshed within which they exist. In addition, in many cases soil investigation activities would occur in or near locations where ongoing groundwater remediation activity and Station operations and maintenance activity are currently taking place, and/or where the existing landscape is substantially disturbed. In this regard, as demonstrated in the set of visual simulations and described in detail below, the Project's visual impacts would be incremental and would not introduce qualitative change to the existing landscape. Consideration of the viewshed and its important relationship as a contributing element to the Topock TCP can be found in Chapter 4.4, "Cultural Resources" (Section 4.4.3.3).

Eastbound I-40 View toward Upper Bat Cave Wash

Figures 4.1- 6a and 4.1-6b respectively show an existing view and visual simulation of proposed Project activities on part of the Station next to Bat Cave Wash. Much of the proposed soil sampling in this location would consist of excavation using hand tools, with a backhoe or excavator used for a limited number of excavations around the perimeter of this graded slope. In the Figure 4.1-6b simulation view, a backhoe with several operators and Project attendants can be seen along an existing unpaved access road. The scale and form of the backhoe does not appear markedly different from existing visible elements associated with the Station facility, which include a variety of storage containers and assorted machinery as well as service vehicles ranging from semi-trucks to all-terrain motorized carts. The color of the proposed backhoe affords only a subtle contrast when seen against sparsely vegetated terrain above the roadway. A comparison between the existing view and the visual simulation demonstrates that the change to the existing visual environment resulting from the temporary introduction of this equipment would be scarcely noticeable to passing motorists traveling at typical highway speeds, and thus the effect would not substantially alter the roadway view.

Eastbound I-40 View toward Colorado River and Needles Rock Formation

Figures 4.1-7a and 4.1-7b show a view seen by eastbound motorists on I-40 on the approach to the highway bridge crossing the Colorado River. The light-colored National Trails Highway and the Historic Route 66 sign along with the vegetated bank of the river dominate the foreground in the existing view, while the river, gas pipeline infrastructure, and glimpses of the Needles rock formation can be seen in the distance.

In the Figure 4.1-7b simulation view, a truck-mounted sonic drilling rig, partially obstructing the Route 66 sign, can be seen on the roadway shoulder in the foreground. More than a quarter mile away, a hydrovac truck is barely visible along the existing access road leading to the arched pipeline bridge. The light color and relatively compact scale of the hydrovac truck help it to blend in with the surrounding pipeline bridge infrastructure. The color and scale of the sonic drilling rig are a noticeable new element when comparing “before” and “after” images, and potentially represent an incremental change to the existing visual character of the landscape. However, because the Project activity would occur at a location adjacent to the primary roadway entrance to the Station, where a variety of service vehicles of similar appearance pass by this location regularly, the visual impact of this change is diminished and would be considered minor. Although some disturbance would occur, the potential visual contrast between disturbed areas and the surrounding landscape would be minor and temporary as described previously. In addition, passing motorists on I-40 would experience this view for only a short time, and the placement of the drilling rig in this location would be temporary. For these reasons, this Project element would not substantially alter the existing visual character and landscape composition of this view.

National Trails Highway/Historic Route 66 Southbound View toward Lower Bat Cave Wash

Figure 4.1-8a, a view of a tamarisk grove, shows the character of lower Bat Cave Wash where it meets the Colorado River as seen by motorists along the National Trails Highway as well as by people on foot who may access public land visible above the wash to the right. Comprising two species of salt cedar (*Tamarix spp.*) that thrive in the seasonally inundated lower reaches of the wash, the grove consists of undulating canopies of varying texture and density, with the tallest specimens visible in the foreground near the confluence of the wash with the Colorado River. The Figure 4.1-8b simulation shows a track-mounted sonic drilling rig along with two crew members in the midst of the tree grove. This simulation shows one of approximately 23 sampling locations and changes to the existing vegetation in the area, which would consist of canopy trimming, pruning or clearing of up to 2 acres of vegetation to facilitate access by the drilling rig. Because of the multiple sampling locations in this area, the visibility of the drilling rig would vary depending on the height and density of the existing vegetation within the grove and the extent of clearing required for access, with only the top-most portion evident in some locations.

This roadside viewpoint offers a somewhat elevated perspective. The view looking down and across the tree grove tends to accentuate the appearance of vegetation density. . A comparison of the existing view and simulation shows that, despite the Project-related decrease in vegetation coverage, the resulting visual impact would not substantially alter the existing landscape character. In addition, because the view from this location includes a portion of the existing IM-3 facility, such as a vehicle staging area, unpaved access roadways, and utility poles lining the edge of the wash, the introduction of the drilling rig along with temporary access routes can be considered an incremental change and therefore would not significantly degrade the existing visual character of the landscape at this location.

Park Moabi Entrance Road Northeast View toward Colorado River

Figures 4.1-9a and 4.1-9b represent a foreground view at a broad roadside turnout overlooking the southern Mojave Valley and the Colorado River as seen by motorists exiting I-40 at the Park Moabi Entrance Road. Storage tanks, utility poles, and miscellaneous signage can be seen at the far side of the turnout, beyond which the BNSF line is visible. On the far side of the river, parts of Topock Marsh and the community of Golden Shores are visible, framed by distant peaks.

The Figure 4.1-9b simulation shows a staging area for Project equipment and vehicles in the turnout. Besides serving as a temporary daytime parking area for some Project personnel for the duration of the Project, during the mobilization phase and periodically during the field sampling phase of the Project, heavy equipment that would include drilling rigs and support trucks could also potentially be located here. In addition, equipment and material associated with Project activities, including drill components, sample borings, and drilling implements, could be stored at this location for up to 5 months, both in the open and within closed storage containers.

Comparison of the “before” (Figure 4.1-9a) and “after” (Figure 4.1-9b) images shows that the introduction of storage structures and equipment associated with Project field investigation activities would result in an incremental visual change to the existing foreground view in this location. Because public access may be restricted to a significant part of the turnout for the duration of the Project, potential use of this location as a public view point/informal parking area could be affected, although this would be temporary. However, given the presence of existing utility structures on a previously disturbed area, the temporary presence of the proposed staging area would not substantially alter the existing landscape character seen from this location.

Topock Maze (Locus C) View Northeast toward Lower Bat Cave Wash

Figure 4.1-10a shows an existing view of lower Bat Cave Wash from the alluvial terrace lining its western perimeter, and affords a foreground perspective of the tamarisk (salt cedar) grove seen at close range in Figure 4.1-8a; however, more distant views of the Colorado River floodplain are seen from this location. On the right, a light-colored facility is prominent against the darker mountainous backdrop. Compared to the Figure 4.1-8a view, the tamarisk grove seen from this location is smaller in size and less dense, with natural openings in the canopy reflecting drier upstream soil conditions.

The Figure 4.1-10b simulation shows a track-mounted sonic drilling rig along with temporary access corridors. This vantage point is a more elevated perspective compared with that of the Figure 4.1-8b simulation. This elevated vantage point diminishes the perceived scale of the Project elements, despite comparatively similar viewpoint distances. Because the predominant orientation of anticipated vegetation trimming, pruning, and clearing for proposed access corridors is primarily perpendicular to the viewer's orientation from this perspective, the change in tree cover is not particularly noticeable when the existing view and visual simulation are compared. Additionally, natural revegetation would further reduce potential visual contrast between disturbed areas and the surrounding landscape. Although the drilling rig is relatively noticeable in this view, it is expected that the taller tamarisk canopies would provide considerable visual screening in the wetter, denser portion of the grove nearer the river, where the majority of sampling locations would be situated. (For details on sampling locations, refer to Figure 3-3 in Chapter 3, "Project Description.") As a result, soil investigation activities in this location would not substantially alter the existing landscape character or significantly affect views from adjacent publicly accessible locations.

Topock Maze (Locus A) View Southeast toward the Station

Figure 4.1-11a shows the existing view looking toward the Station from a sensitive viewing area accessible to the public and considered sensitive by Tribal members. Unobstructed foreground views of the Station facility and built elements around upper Bat Cave Wash are seen from this location.

The Figure 4.1-11b visual simulation shows Project activity occurring simultaneously at two locations. A truck-mounted sonic drilling rig with accompanying crew members is partially silhouetted against the sky amid existing facility infrastructure adjacent to the northeastern edge of the Station's fenced perimeter. Closer to this vantage point, a hydrovac truck and accompanying crew members are visible at the edge an existing access roadway connecting the Station facility with upper Bat Cave Wash. Both locations are situated in active work zones associated with the Station operations and maintenance as well as interim groundwater-monitoring activities. In addition, the bottom of Bat Cave Wash visible in the photograph is potentially a location for pilot studies of soil flushing and soil stabilization remediation measures that, if needed, could involve temporary installation and operation of infiltration galleries following soil sampling activities as described in Chapter 3, "Project Description."

Figure 4.1-11c shows installation of such a pilot test area to the right of the hydrovac truck visible in the previous figure. A backhoe excavator along with work crew members is shown digging infiltration trenches, which will be buried to a depth of up to 2 feet and located within an area of approximately 35 feet by 115 feet. A storage container/trailer for equipment is also shown in this photograph. After installation, a network of six 4-inch diameter recovery wells will be the primary visible component of the pilot study, which is anticipated to remain in place for approximately 4 months.

This viewpoint is situated within a public recreation area and represents a location with cultural sensitivity; however, the visual simulation demonstrates that soil sampling and, if needed, a pilot study in this location would introduce incremental change comparable in height and character to the existing built elements in the landscape and as such would not substantially degrade the existing visual character of the Project Site.

Topock Maze Interpretive Sign Looking East

The Figure 4.1-12a viewpoint is situated at the southeast corner of Topock Maze Locus A. Unlike the previous view, this location offers relatively open views of the surrounding desert landscape, including panoramic views of distant mountains and the alluvial terraces bordering the Mojave Valley, with much of the Station facility obscured by intervening vegetation and topography. The presence of a BLM interpretive sign, together with nearby roadway and parking, makes this location a key public access point for visitors to the Maze..

The Figure 4.1-12b visual simulation shows the sonic drilling rig near the center of this view. The drilling rig is the same vehicle depicted in the previous simulation; however, as seen from this viewing location, all but the top half of the vertical arm of the rig is obscured by intervening terrain. Moreover, when viewed against the dark-colored desert terrain in the background, the green color of the drilling rig mast blends in with more visible light-colored terrain, further reducing its visual contrast and visibility in comparison to existing built elements in this view, which include the Station rooftop seen in white on the right. At this location, the Project would represent a temporary minor incremental visual change that, given the viewing distance and absorptive quality of the backdrop, would not substantially change the overall visual character of the setting.

Colorado River View Southwest toward Station

Figure 4.1-13a shows an existing view from the Colorado River looking toward the west bank of the river along a key recreation corridor that attracts visitors to the southern portion of the Havasu Wildlife Preserve and the nearby scenic Needles rock formation, which is visible downriver. This represents the closest view from the river that boaters would have of the Project Site. Along with the Historic Route 66 sign, a number of built features associated with the existing Station are prominent, including Station buildings and visible auxiliary infrastructure such as roadway embankments, storage tanks, utility poles, and communication equipment.

Figure 4.1-13b simulation shows sampling activity in three separate locations. Within the densely vegetated floodplain visible in the foreground, access considerations would restrict sampling operations to hand equipment and necessitate transport by boat due to semi-inundated Project Site conditions. On the left, two individuals engaged in sampling operations within the floodplain are partly visible in the dense shoreline vegetation, along with a small motorized boat at the water’s edge. The flat-bottomed craft shown in the simulation is typical of vessels used for access to the shallow river shoreline and is not unlike recreational boats seen along the river. Perched on a rocky terrace above the shoreline and partially obscured by vegetation and topography is a truck-mounted sonic drilling rig, seen against the sparsely vegetated graded slope below the Station facility. A portion of its mast is silhouetted against the sky. To the left of the Historic Route 66 highway sign just below the paved entry road, an excavator is largely hidden by intervening topography, with only the arm and top of the cab evident from this perspective. Because the existing visual environment includes prominent built elements, the introduction of Project elements in this location would represent minor incremental additions that would not substantially alter the composition or character of the existing landscape.

Upper Bat Cave Wash View South from within Project Site

Figure 4.1-14a shows an existing view toward the Project Site from upper Bat Cave Wash. In this location, a large amount of material deposited during a prior storm event would make access to sampling locations difficult using conventional truck-mounted equipment. The Figure 4.1-14b simulation shows a track-mounted drilling rig that differs somewhat in appearance from the truck-mounted equipment depicted in earlier simulations, in that the overall height is somewhat lower (24 feet versus 37 feet) and the rig would require no support vehicles. In addition, its white appearance is distinctive, making it potentially more or less visible depending on the backdrop conditions against which it is seen within the Project Site; these conditions would vary according to the location and the angle of view. In the Figure 4.1-14b view, the rig is seen primarily against light-colored alluvium deposited on the floor of the wash, and while it is noticeable, it does not contrast markedly with the terrain. Although the rig could appear more noticeable when viewed against the darker rocky terrain above the wash, the Project would represent an incremental change to the existing landscape setting dominated by the existing pipeline crossing the ravine, and thus would not substantially alter the existing view.

Lower Bat Cave Wash View Northwest from within Project Site

Figure 4.1-15a shows an existing view within lower Bat Cave Wash, looking northwest from a parcel of land within the Project Site owned by the FMIT. Highly disturbed terrain associated with ongoing groundwater remediation activity as well as natural hydrologic events dominate the foreground, while distant views of the peaks surrounding the northern Mojave Valley, including the culturally significant Spirit Mountain, are discernible on the distant horizon.

The Figure 4.1-15b visual simulation shows two Project-related elements within Bat Cave Wash. On the left side of this view, vehicles and equipment associated with the proposed Project have been incorporated within the confines of an existing staging and storage area situated on the graded terrace adjacent to the IM-3 facility. The elements include the addition of two hydrovac trucks and a red storage container. Below the staging area and partially obscured by vegetation, a truck-mounted sonic drilling rig and support vehicle can be seen along the existing roadway. A comparison of the Figure 4.1-15a existing view and the Figure 4.1-15b visual simulation shows that the drilling rig is similar in scale and form to the existing utility poles lining the channel and partly visible against the distant horizon. Within the staging area, the new Project elements appear within the context of and are dominated somewhat by existing equipment adjacent to the IM-3 shed, while in form and color they resemble some of the other existing elements seen at this location. Given the presence of existing facilities, the introduction of Project elements in this location would represent a minor incremental change to the existing setting that would not substantially affect the character of the existing landscape.

IMPACT AES-3 **Substantial Degradation of Existing Visual Character or Quality.** *The proposed Project would introduce incremental change comparable in height and character to the existing built elements in the landscape and as such would not substantially degrade the existing visual character of the Project Site. This impact would be* ***less than significant****. No mitigation would be required.*

Light and Glare

The Project would not create a new source of substantial light or glare that would adversely affect day or nighttime public views in the area. For purposes of this analysis, an adverse effect on day or nighttime public views is defined as circumstances in which construction or operational activities would introduce dominant visual elements that could affect light or glare in the study area and involve one or more of the following:

- Substantially increase light and glare in the project vicinity; and
- Substantially increase the backscatter of light into the nighttime sky.

Soil investigation activities would be limited to daylight hours to minimize the need for lighting and to conserve energy to the extent feasible. Sampling equipment would generally have nonreflective surfaces, which would minimize potential glare. Given these Project characteristics, the Project's short-term, temporary activities would not create a new source of substantial light or glare that would affect day or nighttime views in the area.

IMPACT AES-4 **Substantial Light and Glare.** *The proposed Project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. This impact would be* ***less than significant****. No mitigation would be required.*

Consistency with Plans and Policies Protecting Visual Resources

The proposed Project would be consistent with the visual management goals for the area identified in the BLM Lake Havasu Resource Management Plan (DOI 2007). As demonstrated in the Figure 4.1-9b visual simulation that portrays a temporary Project staging area on BLM land, the Project would be seen within the context of a disturbed landscape that includes existing roadway and utility structures. The incremental change would not substantially change the landscape character. Because of this and the temporary nature of proposed Project activity, the Project would conform to VRM management designations.

The proposed Project would not affect long-term management of visual resources and therefore would not conflict with the Lower Colorado River National Wildlife Refuges Comprehensive Plan, which includes a general description of the importance of managing long-term aesthetic resources but no specific policies that would apply to the Project (USFWS 1994).

The proposed Project would involve temporary incremental visual change that would be visible from places along Historic Route 66 and I-40 listed in the County General Plan (2007) as county scenic routes; however, as demonstrated in the Figures 4.1-6b, 4.1-7b (I-40), and 4.1-8B (Historic Route 66) visual simulations and as described in detail in Section 4.1.3.3, "Impact Analysis," the

Project would not substantially degrade the landscape character of views seen from these County scenic roadways. Therefore, the Project would conform to the plan's policies. The proposed Project would not substantially alter existing natural landscape features of the Desert Region including vegetation, water, and scenic vistas. As demonstrated in the visual simulation figures and described in Section 4.1.3.3, Impact Analysis, the Project would conform to the plan's policies regarding aesthetic resources.

Given the viewing distance, the proposed temporary activity associated with the Project would not be particularly noticeable from the Oatman-Topock Highway, a Mojave County scenic road. Therefore, the Project would conform to the Mohave County (Arizona) General Plan.

IMPACT AES-5 **Consistency with Plans and Policies.** *The proposed Project would not conflict with plans and policies protecting visual resources. This impact would be* ***less than significant****. No mitigation would be required.*

4.2 Air Quality

This section describes the existing air quality conditions at the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Soil Investigation Project (Project) Site and vicinity; summarizes applicable federal, state, and local regulations and policies; and analyzes the potential air quality impacts of the proposed Project. The methods of analysis for construction- and operation-related emissions of criteria air pollutants and precursors, toxic air contaminants (TACs), and odors are consistent with the Mojave Desert Air Quality Management District (MDAQMD) recommendations.

4.2.1 Existing Setting

4.2.1.1 Climate and Meteorology

The primary factors that determine air quality are the locations of air pollutant sources and the amounts of pollutants emitted. Meteorological and topographical conditions, however, also are important. Factors such as wind speed and direction, and air temperature gradients interact with physical landscape features to determine the movement and dispersal of criteria air pollutants (see "Criteria Pollutants" section below). The Project Site is located within the Mojave Desert Air Basin (MDAB), which comprises the eastern portion of Kern County, the northeastern portion of Los Angeles County, all of San Bernardino County, and the eastern portion of Riverside County.

Prevailing winds in the MDAB are out of the west and southwest, due to the proximity of the MDAB to coastal and central regions and the blocking nature of the Sierra Nevada Mountains to the north; air masses pushed onshore in Southern California by differential heating are channeled through the MDAB.

During the summer the MDAB is generally influenced by a Pacific subtropical high cell that sits off the coast, inhibiting cloud formation and encouraging daytime solar heating. The MDAB is rarely influenced by cold air masses moving south from Canada and Alaska, as these frontal systems are weak and diffuse by the time they reach the desert. Most desert moisture arrives from infrequent warm, moist, and unstable air masses from the south. The MDAB averages between three and seven inches of precipitation per year (from 16 to 30 days with at least 0.01 inches of precipitation). The MDAB is classified as a dry-hot desert climate, with portions classified as dry-very hot desert, to indicate at least three months have maximum average temperatures over 100.4 ºF (MDAQMD 2011).

4.2.1.2 Criteria Pollutants

These pollutants are called "criteria" air pollutants because standards have been established for each of them to meet specific public health and welfare criteria set forth in the Federal Clean Air Act (FCAA). California has adopted more stringent ambient air quality standards for the criteria air pollutants (referred to as State Ambient Air Quality Standards, or state standards) than national standards and has adopted air quality standards for some pollutants for which there is no corresponding national standard.

Existing Criteria Pollutant Air Quality

The closest MDAQMD monitoring stations are located over 100 miles to the southwest of the Project Site. **Table 4.2-1** summarizes the air quality data from this monitoring station for the most recent 3 years, 2010 through 2012. Both the California Air Resources Board (ARB) and the U.S. Environmental Protection Agency (USEPA) use monitoring data to designate areas according to attainment status for criteria air pollutants published by the agencies. The purpose of these designations is to identify areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are "nonattainment," "attainment," and "unclassified." The nonattainment designation refers to an area that does not meet the national primary or secondary ambient air quality standard for the pollutant. The attainment designation refers to an area that meets the national primary or secondary ambient air quality standard for the pollutant. The unclassified designation is used for an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of the nonattainment designation, called "nonattainment-transitional." The nonattainment-transitional designation is given to nonattainment areas that are improving and nearing attainment. The most recent attainment designations with respect to San Bernardino County are shown in Table 4.2-3 (see the "Regulatory Setting" section below) for each criteria air pollutant.

TABLE 4.2-1
AIR QUALITY DATA SUMMARY (2010–2012) FOR THE PROJECT SITE VICINITY

	Monitoring Data by Year		
Pollutant	**2010**	**2011**	**2012**
Ozone – Joshua Tree National Monument Station			
Highest 1-Hour Average (ppm)[b]	**0.119**	**0.121**	**0.109**
Days Over State Standard (0.09 ppm)[a]	19	21	16
Highest 8-Hour Average (ppm)[b]	**0.106**	**0.105**	**0.097**
Days Over National Standard (0.075 ppm)[a]	53	56	48
Days Over State Standard (0.07 ppm)[a]	90	90	72
Particulate Matter (PM10) – Lucerne Valley Middle School Station			
Highest 24-Hour Average – State/National (μg/m^3)[b]	38.0/43.0	31.0/33.0	27.0/30.0
Estimated Days Over National Standard (150 μg/m^3)[a,c]	0	NA	0
Estimated Days Over State Standard (50 μg/m^3)[a,c]	0	NA	NA
State Annual Average (State Standard 20 μg/m^3)[a,b]	13.4	NA	NA
Particulate Matter (PM2.5) – Big Bear City Station			
Highest 24-Hour Average (μg/m3)[b] – National Measurement	35.4	30.7	**36.4**
Estimated Days Over National Standard (35 μg/m^3)[a,c]	NA	0	NA
State Annual Average (12 μg/m3)[b]	NA	NA	NA

a Generally, state standards and national standards are not to be exceeded more than once per year.
b ppm = parts per million; μg/m^3 = micrograms per cubic meter.
c PM10 and PM2.5 is not measured every day of the year. Number of estimated days over the standard is based on 365 days per year.

NA = Not Available.

NOTE: Values in **Bold** exceed the respective air quality standard.

SOURCE: California Air Resources Board (ARB) 2014.

Ozone

Short-term exposure to ozone can irritate the eyes and cause constriction of the airways. Besides causing shortness of breath, ozone can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

Ozone, the main component of photochemical smog, is primarily a summer and fall pollution problem. Ozone is not emitted directly into the air but is formed through a complex series of chemical reactions involving other compounds that are directly emitted. These directly emitted pollutants (also known as ozone precursors) include reactive organic gases (ROG) and nitrogen oxides (NO_x). The time period required for ozone formation allows the reacting compounds to spread over a large area, producing a regional pollution problem. Ozone problems are the cumulative result of regional development patterns rather than the result of a few significant emission sources. Once formed, ozone remains in the atmosphere for one or two days. Ozone is then eliminated through chemical reaction with plants (reacts with chemicals on the leaves of plants), rainout (attaches to water droplets as they fall to Earth), and washout (is absorbed by water molecules in clouds and later falls to earth with rain).

San Bernardino County is designated moderate nonattainment for the state 1-hour ozone standard, nonattainment for the state 8-hour standard, and unclassified/attainment for the national 8-hour ozone standard.

Carbon Monoxide

Ambient carbon monoxide (CO) concentrations normally are considered a local effect and typically correspond closely to the spatial and temporal distributions of vehicular traffic. Wind speed and atmospheric mixing also influence CO concentrations. Under inversion conditions, CO concentrations may be distributed more uniformly over an area that may extend some distance from vehicular sources. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia, as well as for fetuses.

CO concentrations have declined dramatically in California due to existing controls and programs, and most areas of the state have no problem meeting the state and federal standards for CO. CO measurements and modeling were important in the early 1980s, when CO levels were regularly exceeded throughout California. In more recent years, CO measurements and modeling have not been a priority in most California air districts due to the retirement of older polluting vehicles, less emissions from new vehicles, and improvements in fuels. The clear success in reducing CO levels is evident in the first paragraph of the executive summary of the *2004 Revision to the California State Implementation Plan for Carbon Monoxide Updated Maintenance Plan for Ten Federal Planning Areas* (ARB 2004), shown below:

> "The dramatic reduction in carbon monoxide (CO) levels across California is one of the biggest success stories in air pollution control. Air Resources Board (ARB or Board) requirements for cleaner vehicles, equipment and fuels have cut peak CO levels in half since 1980, despite growth. All areas of the State designated as non-attainment for the federal

> 8-hour CO standard in 1991 now attain the standard, including the Los Angeles urbanized area. Even the Calexico area of Imperial County on the congested Mexican border had no violations of the federal CO standard in 2003. Only the South Coast and Calexico continue to violate the more protective State 8-hour CO standard, with declining levels beginning to approach that standard."

San Bernardino County is designated unclassified/attainment for the national and state CO standards.

Suspended Particulate Matter (PM10 and PM2.5)

PM10 and PM2.5 consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively (a micron is one-millionth of a meter). PM10 and PM2.5 represent fractions of particulate matter that can be inhaled into the airways and lungs and can cause adverse health effects. Some sources of particulate matter, such as wood burning in fireplaces which produces ash, demolition, and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility. Large dust particles (diameter greater than 10 microns) settle out rapidly and are easily filtered by human breathing passages. This large dust is of more concern as a soiling nuisance rather than a health hazard. The remaining fraction, PM10 and PM2.5, are a health concern particularly at levels above the federal and state ambient air quality standards. PM2.5 (including diesel exhaust particles) is thought to have greater effects on health because these particles are so small and, thus, are able to penetrate to the deepest parts of the lungs. Scientific studies have suggested links between fine particulate matter and numerous health problems, including asthma, bronchitis, and acute and chronic respiratory symptoms such as shortness of breath and painful breathing. Recent studies have shown an association between morbidity and mortality and daily concentrations of particulate matter in the air. Children are more susceptible to the health risks of PM10 and PM2.5 because their immune and respiratory systems are still developing.

Mortality studies since the 1990s have shown a statistically significant direct association between mortality (premature death) and daily concentrations of particulate matter in the air. Despite important gaps in scientific knowledge and continued reasons for some skepticism, a comprehensive evaluation of the research findings provides persuasive evidence that exposure to fine particulate air pollution has adverse effects on cardiopulmonary health (Dockery and Pope 2006). The ARB has estimated that achieving the ambient air quality standards for PM10 could reduce premature mortality rates by 6,500 cases per year (ARB 2002).

San Bernardino County is designated moderate nonattainment for the national PM10 standard and nonattainment for the state PM10 standard. The County is designated unclassified/attainment for the national and state PM2.5 standards.

Nitrogen Dioxide

Nitrogen dioxide (NO_2) is a reddish-brown gas that is a by-product of combustion processes. Automobiles and industrial operations are the main sources of NO_2. Aside from its contribution to ozone formation, NO_2 can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as a coloring component of a brown cloud on high pollution days, especially in conjunction with high ozone levels.

San Bernardino County is designated unclassified/attainment for the national and state NO_2 standards.

Sulfur Dioxide

Sulfur dioxide (SO_2) is a combustion product of sulfur or sulfur-containing fuels such as coal and diesel. SO_2 is also a precursor to the formation of atmospheric sulfate particulate matter and contributes to potential atmospheric sulfuric acid formation that could precipitate downwind as acid rain. The maximum SO_2 concentrations recorded in the Project Site and surrounding area are well below federal and state standards. San Bernardino County is designated unclassified/attainment for the national and state SO_2 standards.

Lead

Ambient lead concentrations meet both the federal and state standards at the Project Site. Lead has a range of adverse neurotoxic health effects, and was formerly released into the atmosphere primarily via leaded gasoline products. The phase-out of leaded gasoline in California resulted in dramatically reduced levels of atmospheric lead. The proposed Project would not introduce any new sources of lead emissions; consequently, lead emissions are not required to be quantified and are not further evaluated in this analysis.

San Bernardino County is designated unclassified/attainment for the national and state lead standards.

4.2.1.3 Non-Criteria Air Pollutants

Toxic Air Contaminants

Non-criteria air pollutants, or TACs, are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources, including gasoline stations, automobiles, diesel engines, dry cleaners, industrial operations, and painting operations. TACs are regulated separately from the criteria air pollutants at both federal and state levels. At the federal level, these airborne substances are referred to as Hazardous Air Pollutants (HAPs). The state list of TACs identifies 243 substances and the federal list of HAPs identifies 189 substances.

Diesel particulate matter (DPM) is the most complex of diesel emissions. Diesel particulates, as defined by most emission standards, includes both solids and liquid material that condenses during the dilution process of cooling exhaust gases. The basic fractions of DPM are elemental carbon, heavy hydrocarbons derived from the fuel and lubricating oil, and hydrated sulfuric acid derived from the fuel sulfur. DPM contains a large portion of the polycyclic aromatic hydrocarbons (PAH) found in diesel exhaust. Diesel particulates include small nuclei mode particles of diameters below 0.04µm (micrometer) and their agglomerates of diameters up to 1µm. Ambient exposures to diesel particulates in California are significant fractions of total TAC exposure levels in the state.

Naturally occurring asbestos may be found in at least 44 of California's 58 counties. Asbestos is the name for a group of naturally occurring silicate minerals. Exposure to asbestos may result in inhalation or ingestion of asbestos fibers, which over time may result in damage to the lungs or membranes that cover the lungs, leading to illness or even death. According to the *General Location Guide for Ultramafic Rocks in California—Areas More Likely to Contain Naturally Occurring Asbestos* (Department of Conservation 2000), the Project Site is not located in areas that are more likely to contain naturally occurring asbestos.

Odorous Emissions

Odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). The ability to detect odors varies considerably among the population and overall is quite subjective. People may have different reactions to the same odor. An odor that is offensive to one person may be perfectly acceptable to another (e.g., coffee roaster). An unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. Known as odor fatigue, a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity. The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors. Odor impacts should be considered for any proposed new odor sources located near existing receptors, as well as any new sensitive receptors located near existing odor sources. Generally, increasing the distance between the receptor and the odor source will mitigate odor impacts.

4.2.1.4 Sensitive Air Quality Receptors

Some receptors are considered more sensitive than others to air pollutants. Reasons for greater sensitivity include pre-existing health problems, proximity to emissions source, or duration of exposure to air pollutants. Schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because children, elderly people, and the infirm are more susceptible to respiratory infections and other air quality-related health problems than the general public. Residential areas are also sensitive to poor air quality because people usually stay home for extended periods of time. Sensitive air quality receptors nearest to the Project Site are residences located 685 feet east (single home across the Colorado River and south of Interstate 40), 1,090 feet east (several homes across the Colorado River and north of Interstate 40), and 2,450 feet northwest (cluster of mobile homes in Moabi Regional Park and Pirate Cove Resort, which allows for short-term residents for a period of up to 5 months in a given year) of the soil investigation area (see Figure 4.7-1).

4.2.2 Regulatory Background

The Project Site is located in the Mojave Desert approximately 12 miles southeast of the city of Needles, California, 4 miles south of Golden Shores, Arizona, and 1 mile southeast of the Moabi Regional Park in California. Air quality at the Project Site is regulated by the USEPA, ARB, MDAQMD, and San Bernardino County (County). Each of these agencies develops rules, regulations, policies, and/or goals to comply with applicable legislation. Although USEPA regulations may not be superseded, both state and local regulations may be more stringent. Applicable regulations associated with criteria air pollutant, TAC, and odor emissions are described separately below.

4.2.2.1 Criteria Air Pollutants

Federal Plans, Policies, Regulations, and Laws

USEPA has been charged with implementing national air quality programs. USEPA's air quality mandates are drawn primarily from the FCAA, which was enacted in 1970. The most recent major amendments made by Congress were in 1990.

The FCAA required the USEPA to establish national ambient air quality standards (NAAQS). As shown in **Table 4.2-2**, the USEPA has established NAAQS for ozone, CO, NO_2, SO_2, PM10, PM2.5, and lead. Table 4.2-2 lists the NAAQS and as provides a brief discussion of the related health effects and principal sources for each criteria air pollutant. **Table 4.2-3** presents current attainment statuses for the Project Site portion of the MDAB.

The FCAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The Federal Clean Air Act Amendments of 1990 (FCAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIPs are modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins, as reported by their jurisdictional agencies. The USEPA must review all SIPs to determine whether they conform to the mandates of the FCAA and its amendments, and to determine whether implementing them will achieve air quality goals. If the USEPA determines that a SIP is inadequate, a federal implementation plan that imposes additional control measures may be prepared for the nonattainment area. Failure to submit an approvable SIP or to implement the plan within the mandated time frame may cause sanctions to be applied to transportation funding and stationary air pollution sources in the air basin.

State of California

The ARB is responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required ARB to establish California ambient air quality standards (CAAQS) (Table 4.2-2). ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

TABLE 4.2-2
STATE AND NATIONAL CRITERIA AIR POLLUTANT STANDARDS, EFFECTS, AND SOURCES

Pollutant	Averaging Time	State Standard	National Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone	1 hour 8 hours	0.09 ppm 0.07 ppm	--- 0.075 ppm	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when reactive organic gases (ROG) and nitrogen oxides (NO_X) react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial/ industrial mobile equipment.
Carbon Monoxide	1 hour 8 hours	20 ppm 9.0 ppm	35 ppm 9 ppm	Classified as a chemical asphyxiant, carbon monoxide interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
Nitrogen Dioxide	1 hour Annual Avg.	0.18 ppm 0.030 ppm	100 ppb 0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum-refining operations, industrial sources, aircraft, ships, and railroads.
Sulfur Dioxide	1 hour 3 hours 24 hours Annual Avg.	0.25 ppm --- 0.04 ppm ---	75 ppb 0.5 ppm 0.14 ppm 0.03 ppm	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
Respirable Particulate Matter (PM10)	24 hours Annual Avg.	50 ug/m^3 20 ug/m^3	150 ug/m^3 ---	May irritate eyes and respiratory tract, decreases lung capacity, may cause cancer and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
Fine Particulate Matter (PM2.5)	24 hours Annual Avg.	--- 12 ug/m^3	35 ug/m^3 12 ug/m^3	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning. Also, formed from photochemical reactions of other pollutants, including NO_X, sulfur oxides, and organics.
Lead	Monthly Ave. Quarterly	1.5 ug/m^3 ---	--- 1.5 ug/m^3	Disturbs gastrointestinal system and causes anemia, kidney disease, and neuromuscular and neurological dysfunction.	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
Hydrogen Sulfide	1 hour	0.03 ppm	No National Standard	Nuisance odor (rotten egg smell), headache and breathing difficulties (higher concentrations).	Geothermal power plants, petroleum production and refining.
Sulfates	24 hours	25 ug/m^3	No National Standard	Breathing difficulties, aggravates asthma, reduces visibility.	Produced by the reaction in the air of SO_2.
Visibility-Reducing Particles	8 hours	Extinction of 0.23/km; visibility of 10 miles or more	No National Standard	Reduces visibility, reduces airport safety, lowers real estate value, and discourages tourism.	See PM2.5.

ppm = parts per million; ug/m^3 = micrograms per cubic meter.
The US EPA lowered the federal primary PM2.5 annual standard from 15 ug/m^3 to 12 ug/m^3 on December 14, 2012.

SOURCE: California Air Resources Board (ARB) 2009, 2012a.

TABLE 4.2-3
MDAB ATTAINMENT STATUS

	Designation/Classification	
Pollutant	**Federal Standards**	**State Standards**
Ozone – one hour	No Federal Standard	Nonattainment/Moderate
Ozone – eight hours	Unclassified/Attainment	Nonattainment
PM10	Nonattainment/Moderate	Nonattainment
PM2.5	Unclassified/Attainment	Unclassified
CO	Unclassified/Attainment	Attainment
Nitrogen Dioxide	Unclassified/Attainment	Attainment
Sulfur Dioxide	Unclassified	Attainment
Lead	Unclassified/Attainment	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Vinyl Chloride	No Federal Standard	Attainment
Visibility-Reducing Particles	No Federal Standard	Unclassified

SOURCE: California Air Resources Board (ARB) 2012b.

The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and areawide emission sources, and provides districts with the authority to regulate indirect sources. Among ARB's other responsibilities are overseeing local air districts' compliance with California and federal laws, approving local air quality plans, submitting SIPs to the USEPA, monitoring air quality, determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

Mojave Desert Air Quality Management District

MDAQMD attains and maintains air quality conditions for the desert portion of San Bernardino County and the far eastern end of Riverside County through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean-air strategy of MDAQMD includes preparing plans and programs for the attainment of ambient air quality standards, adopting and enforcing the rules and regulations concerning sources of air pollution, and issuing permits for stationary sources of air pollution. MDAQMD also inspects stationary sources of air pollution, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by the FCAA, FCAAA, and CCAA. Air quality plans applicable to the proposed Project are discussed below and summarized in **Table 4.2-4**.

TABLE 4.2-4
SUMMARY OF MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT AIR QUALITY PLANS

Pollutant	Plan Title	Date	Status
Ozone	*2004 Ozone Attainment Plan* (State and Federal)	April 26, 2004	Adopted by MDAQMD and ARB on April 26, 2004
	Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)	June 9, 2008	Adopted by MDAQMD and ARB on June 9, 2008
Nitrogen dioxide (NO_X) and volatile organic compounds (VOC)	*1991 Air Quality Attainment Plan*	August 26, 1991	Adopted by MDAQMD and ARB on August 26, 1991
	Reasonable Further Progress Rate-of-Progress Plan	October 26, 1994	Adopted by MDAQMD and ARB on October 26, 1994
	Post 1996 Attainment Demonstration and Reasonable Further Progress Plan	October 26, 1994	Adopted by MDAQMD and ARB on October 26, 1994
	Triennial Revision to the 1991 Air Quality Attainment Plan	January 22, 1996	Adopted by MDAQMD and ARB on January 22, 1996
Respirable and fine particulate matter (PM10 and PM2.5)	*Mojave Desert Planning Area Federal Particulate Matter Attainment Plan*	July 25, 1995	Adopted by MDAQMD and ARB on July 25, 1995

ARB = California Air Resources Board; MDAQMD = Mojave Desert Air Quality Management District.

SOURCE: MDAQMD 2011.

MDAQMD submitted the *1991 Air Quality Attainment Plan* (AQAP) in compliance with the requirements set forth in the CCAA, which specifically addressed the nonattainment status for ozone and, to a lesser extent, CO and PM10.

The CCAA also requires a triennial assessment of the extent of air quality improvements and emission reductions achieved through the use of control measures. As part of the assessment, the attainment plan must be reviewed and, if necessary, revised to correct for deficiencies in progress and to incorporate new data or projections. The requirement of the CCAA for a first triennial progress report and revision of the 1991 AQAP was fulfilled with the preparation and adoption of the triennial *Revision to the 1991 Air Quality Attainment Plan* in 1996.

Portions of San Bernardino County not including the Project Site are part of a Federal Ozone Air Quality Maintenance Area. As a nonattainment area, the region is also required to submit rate-of-progress milestone evaluations in accordance with the FCAAA. Milestone reports were prepared for 1994 and 1996, and most recently in 2008 for the 8-hour ozone standard. These milestone reports include compliance demonstrations that the requirements have been met for the MDAQMD. The AQAPs and reports present comprehensive strategies to reduce emissions of ROG, NOx, and PM10 from stationary, area, mobile, and indirect sources. Such strategies include adopting rules and regulations; enhancing California Environmental Quality Act (CEQA) participation; implementing a new and modified indirect-source review program; adopting local air quality plans; and implementing control measures for stationary, mobile, and indirect sources.

The following MDAQMD rules and regulations also pertain to the Project Site:

- **Rule 201–202: Permits to Construct.** A person shall not build, erect, install, alter or replace any equipment, the use of which may cause the issuance of air contaminants or the use of which may eliminate, reduce or control the issuance of air contaminants without first obtaining written authorization for such construction from the Air Pollution Control Officer (APCO). A permit to construct shall remain in effect until the permit to operate the equipment for which the application was filed is granted or denied, or the application is canceled.

- **Rule 403: Fugitive Dust.** The developer or contractor is required to control dust emissions from earthmoving activities or any other construction activity to prevent airborne dust from leaving the project site.

- **Rule 404: Particulate Matter—Concentration.** A person shall not discharge into the atmosphere from any source, particulate matter except liquid sulfur compounds, in excess of the concentration at standard conditions included in the rule.

- **Rule 462: Organic Liquid Loading.** The purpose of this rule is to limit the emissions of VOC and TACs (such as benzene) from Organic Liquid Loading (any organic liquid, including gasoline), and in conjunction with Rules 461 and 463, limit the emissions from the storage, transfer, and dispensing of organic liquids.

County of San Bernardino 2007 General Plan

The adopted *County of San Bernardino 2007 General Plan* includes the following applicable goals, objectives, and policies from the Conservation Element (San Bernardino County 2007):

GOAL CO 4: The County will ensure good air quality for its residents, businesses, and visitors to reduce impacts on human health and the economy.

- **Policy CO 4.1:** Because developments can add to the wind hazard (due to increased dust, the removal of wind breaks, and other factors), the County will require either as mitigation measures in the appropriate environmental analysis required by the County for the development proposal or as conditions of approval if no environmental document is required, that developments in areas identified as susceptible to wind hazards to address site-specific analysis of:

  a. Grading restrictions and/or controls on the basis of soil types, topography or season.

  b. Landscaping methods, plant varieties, and scheduling to maximize successful revegetation.

  c. Dust-control measures during grading.

- **Policy CO 4.2:** Coordinate air quality improvement technologies with the South Coast Air Quality Management District and the MDAQMD to improve air quality through reductions in pollutants from the region.

4.2.2.2 Toxic Air Contaminants

Air quality regulations also address TACs (or, federally, HAPs). In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may not be expected to occur. The USEPA and ARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of control technologies to limit emissions. These statutes and regulations, in conjunction with additional rules set forth by MDAQMD, establish the regulatory framework for TACs.

Federal Hazardous Air Pollutant Programs

The USEPA has programs for identifying and regulating HAPs. Title III of the FCAAA directed USEPA to promulgate national emissions standards for HAPs (NESHAP). The NESHAP for major sources of HAPs may differ from those for area sources. Major sources are defined as stationary sources with potential to emit more than 10 tons per year of any HAP or more than 25 tons per year of any combination of HAPs; all other sources are considered area sources.

The FCAAA called on USEPA to issue emissions standards in two phases. In the first phase (1992–2000), USEPA developed technology-based emissions standards designed to reduce emissions as much as feasible. These standards are generally referred to as requiring maximum available control technology. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001–2008), USEPA was required to issue health risk–based emissions standards where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The FCAAA also required USEPA to issue vehicle or fuel standards containing reasonable requirements that control toxic emissions of, at a minimum, benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 of the FCAAA required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

State of California

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807 [Chapter 1047, Statutes of 1983]) and the Air Toxics Hot Spots Information and Assessment Act (AB 2588 [Chapter 1252, Statutes of 1987]). AB 1807 sets forth a formal procedure for ARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before ARB can designate a substance as a TAC. To date, ARB has identified more than 21 TACs and adopted USEPA's list of HAPs as TACs. Most recently, particulate matter emissions from diesel PM was added to the ARB list of TACs.

Once a TAC is identified, ARB then adopts an airborne toxics control measure for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate best available control technology (BACT) to minimize emissions; for example, the airborne toxics control measure limits truck idling to 5 minutes (Title 13, Section 2485 of the California Code of Regulations [CCR]).

The Air Toxics Hot Spots Information and Assessment Act requires that existing facilities that emit toxic substances above a specified level prepare an inventory of toxic emissions, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

ARB has adopted control measures for diesel PM and more stringent emissions standards for various on-road mobile sources of emissions, including transit buses and off-road diesel equipment (e.g., tractors, generators). Recent and future milestones include the low-sulfur diesel fuel requirement and tighter emissions standards for heavy-duty diesel trucks (2007) and off-road diesel equipment (2011) nationwide. Over time, replacing older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1,3-butadiene, diesel PM) have been reduced significantly over the last decade and will be reduced further in California through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of ARB's Risk Reduction Plan, diesel PM concentrations were expected to be reduced by 75% by 2010 and are projected to be reduced by 85% in 2020 from the estimated year-2000 level. Adopted regulations are also expected to continue to reduce formaldehyde emissions from cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

In addition, the *Air Quality and Land Use Handbook: A Community Health Perspective* (handbook) provides guidance on land use compatibility with sources of TACs (ARB 2005). The handbook is not a law or adopted policy but offers advisory recommendations for the siting of sensitive receptors near uses associated with TACs, such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, dry cleaners, gasoline stations, and industrial facilities, to help keep children and other sensitive populations out of harm's way.

Mojave Desert Air Quality Management District

At the local level, air pollution control or management districts may adopt and enforce ARB control measures. Under MDAQMD Rule 1300 (New Source Review) and Rule 1200 (Federal Operating Permit), all sources that possess the potential to emit TACs must obtain permits from MDAQMD. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new-source review standards and air toxics control measures. MDAQMD limits emissions and public exposure to TACs through a number of programs. MDAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors.

4.2.2.3 Odors

MDAQMD's Rule 402 (Nuisance) addresses odor exposure at the Project Site. MDAQMD recommends that odor impacts be addressed in a qualitative manner. Such an analysis shall determine if the proposed Project results in excessive nuisance odors, as defined under the CCR, Health and Safety Code Section 41700, air quality public nuisance.

4.2.3 Environmental Impacts

4.2.3.1 Impact Methodology

The proposed Project consists of short-term soil investigation activities and, as such, would not include sources of long-term air pollutants. For short-term soil collection activities, emissions were calculated by using California Emissions Estimator Model (CalEEMod) version 2013.2.2. CalEEMod is a computer program that can be used to estimate anticipated emissions associated with land development projects in California. CalEEMod has separate databases for specific counties and air districts. The San Bernardino County database was used for the proposed Project. During Project implementation (short-term), the Project would result in dust emissions and exhaust from on-road vehicles and off-road equipment.

4.2.3.2 Thresholds of Significance

Based on CEQA Guidelines Appendix G, the Project would have a significant effect on air quality if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any nonattainment pollutant (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

The MDAQMD has established the following thresholds for criteria pollutants (MDAQMD 2011), which were applied to the proposed Project:

- VOC or ROG 25 tpy or 137 pounds per day (ppd)
- NO_x 25 tpy or 137 ppd
- PM10 15 tpy or 82 ppd
- PM2.5 15 tpy or 82 ppd
- CO 100 tpy or 548 ppd
- SO_x 25 tpy or 137 ppd

Hydrogen sulfide (H_2S) and lead were not quantified for the Project because the Project does not include sources of these pollutants. Regarding potential lead in the soil that could be emitted by ground disturbance, the Project would result in minimal ground disturbance and would comply with MDAQMD Rules regarding fugitive dust control, which would also control any fugitive lead.

In regard to TACs, any project with the potential to expose sensitive receptors to substantial levels of TACs (such as DPM) would be deemed to have a potentially significant impact. Substantial levels of TACs are those resulting in a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (HI) greater than or equal to 1.

The proposed Project would not conflict with or obstruct implementation of the applicable air quality plan. According to the MDAQMD, a project is deemed to not exceed this threshold, and hence not be significant, if it is consistent with the existing land use plan (MDAQMD 2011). Since the Project would only include short-term soil investigation activities and no long-term operations, there is no potential that it would conflict with the land use plan and, therefore, the Project would not conflict with or obstruct implementation of the applicable air quality plan and this impact is not discussed further.

The proposed Project would not create objectionable odors affecting a substantial number of people. As a general matter, the types of land use development that pose potential odor problems include wastewater treatment plants, refineries, landfills, composting facilities, and transfer stations. No such uses would occupy the Project Site. The proposed Project consists of short-term soil investigation activities and, as such, would not include sources of odor. The Project Site locations are remote with few receptors in proximity. Therefore, the Project would not create objectionable odors that would affect a substantial number of people and this impact is not discussed further.

4.2.3.3 Impact Analysis

Criteria Air Pollutants

Short-term emissions from the Project would arise from (1) earth-moving activities; (2) dust entrainment from travel by equipment, trucks, and employee vehicles, especially on unpaved surfaces; and (3) exhaust from equipment, trucks, and employee vehicles. As described in Chapter 3, "Project Description," soil investigation activities would involve the use of a drill rig, hydrovac truck, and back hoe or excavator. Vegetation trimming, pruning, or clearing within the mouth of Bat Cave Wash would involve a loader, excavator, wood chipper, and chainsaw. On-road mobile sources of air pollutants would include support haul trucks (i.e., supply import and waste export from the active sites) and worker vehicles. Active field investigation activities are expected to occur over a period of nine months in the year 2015, with a potential extension of up to three months for contingency sampling. As described in Chapter 3, "Project Description," subsequent activities including the potential bench scale tests, pilot studies, and geotechnical evaluations to support the Soil CMS/FS, and the potential plant and biota sampling activities to support ecological risk assessment, would be undertaken after the completion of the soil sampling activities in late 2016 and are anticipated to last from 13 to 27 months, depending on need for each activity and ability for each activity to be implemented concurrently. Potential emissions from all of these activities are included in the quantitative assessment below.

PM10 and PM2.5 emissions would vary greatly from day to day depending on the level of activity, equipment being operated, silt content of the soil, and prevailing weather. Larger-diameter dust particles (i.e., greater than 30 microns) generally fall out of the atmosphere within several hundred feet of construction sites, and represent more of a soiling nuisance than a health hazard. Smaller-diameter particles (e.g., PM10 and PM2.5) are associated with adverse health effects and generally remain airborne until removed from the atmosphere by moisture. Construction equipment and construction-worker commute vehicles and haul trucks would also generate criteria air pollutant emissions. Criteria pollutant emissions of ROG and NO_x from these emissions sources would incrementally add to regional atmospheric loading of ozone precursors during the implementation period. Project-related emissions were modeled using CalEEMod and are depicted below in **Table 4.2-5** and are included in **Appendix C** of this draft environmental report (DEIR).

TABLE 4.2-5
UNMITIGATED EMISSION ESTIMATES[a]

Analysis	ROG	NO_x	PM10	PM2.5	CO	SO_x
Annual Emissions (tons/year)						
Year 2015	0.6	6.2	5.9	0.8	5.7	0.0
Year 2016	0.0	0.3	0.2	0.0	0.2	0.0
Year 2017	0.1	0.7	0.5	0.1	0.5	0.0
Year 2018	0.0	0.1	0.1	0.0	0.1	0.0
MDAQMD Annual Thresholds (tons/year)	25	25	15	15	100	25
Significant (Yes or No)?	No	No	No	No	No	No
Daily Emissions (pounds/day)						
Year 2015	4.4	47.4	49.4	6.8	42.2	0.1
Year 2016	0.9	11.7	6.9	1.0	7.0	0.0
Year 2017	0.4	5.2	5.7	0.7	4.1	0.0
Year 2018	0.3	4.4	3.9	0.5	3.3	0.0
MDAQMD Daily Thresholds (pounds/day)	137	137	82	82	548	137
Significant (Yes or No)?	No	No	No	No	No	No

[a] Project-related emissions estimates were made using CalEEMod. Soil investigation activities were assumed to occur in the year 2015, including contingency sampling. Bench tests, pilot studies, geotechnical evaluations, and biota sampling were assumed to begin late-2016 and occur over a period of 17 months, with some activity overlap. For daily emissions, the greater value for summer or winter outputs was used. See Appendix C of this DEIR for model outputs and additional assumptions.

The MDAQMD thresholds are established to determine what level of emissions would potentially violate an air quality standard or contribute substantially to an existing or projected air quality violation. As depicted in Table 4.2-5, the estimated emissions from soil investigation activities, bench tests, pilot studies, geotechnical evaluations, and plant and biota sampling would not exceed the MDAQMD daily or annual thresholds of significance. As such, the proposed Project would not violate an air quality standard.

In regards to cumulative emissions, no single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Since the proposed Project would result in a minimal increase of criteria pollutant emissions during the temporary soil investigation activities, would comply with all applicable MDAQMD Rules and Regulations, and would not result in long-term emissions, the proposed Project would not be considered cumulatively considerable and would result in less than significant cumulative impacts on the air quality environment.

IMPACT AIR-1	**Potential to generate emissions of criteria air pollutants.** *The proposed Project would not exceed the Mojave Desert Air Quality Management District daily or annual thresholds of significance. The proposed Project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation, nor result in a cumulatively considerable net increase of any nonattainment pollutant. This impact would be* ***less than significant****. No mitigation would be required.*

Carbon Monoxide Hotspots and Toxic Air Contaminants

CO is a localized pollutant of concern. As noted above, in Table 4.2-5, maximum unmitigated CO emissions for soil investigation activities were estimated at 47 pounds per day and 6 tons per year using CalEEMod modeling, far below the MDAQMD daily or annual thresholds of significance. Moreover, due to the distance between soil investigation activities and sensitive receptors (about 685 feet from nearest residence), Project implementation would not emit CO in quantities that could pose health concerns.

Implementation of the Project would result in short-term diesel exhaust emissions, which are TACs, from on-site heavy-duty equipment. The Project would generate DPM emissions from the use of off-road diesel equipment required for the temporary and intermittent soil investigation activities. Exposure of sensitive receptors is the primary factor used to determine health risk. Exposure is a function of the concentration of a substance or substances in the environment and the extent of exposure that person has with the substance. A longer exposure period would result in a higher exposure level. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment, health risk assessments, which determine the exposure of sensitive receptors to toxic emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the Project. The duration of the proposed Project would only constitute a small percentage of the total 70-year exposure period. Furthermore, the use of diesel-powered construction equipment would be temporary and episodic in that sampling at each site would occur for a limited period of time (daylight hours for up to 1 to 2 weeks). Moreover, there are no permanent sensitive receptors in close proximity to any of the Project Sites. Upon completion of soil investigation activities, emissions of any TACs from Project-related activities would cease to occur. Therefore, with respect to TACs (such as DPM), the Project would not have the potential to expose sensitive receptors to substantial levels that would be deemed to have a potentially significant impact (substantial levels of TACs are those resulting in a cancer risk greater than or equal to 10 in a million and/or an HI greater than or equal to 1).

IMPACT AIR-2 **Potential to expose sensitive receptors to substantial pollutant concentrations**. *The proposed Project would not emit carbon monoxide in quantities that would pose health effects. The duration of proposed soil investigation activities would constitute a small percentage of the total 70-year sensitive receptor exposure period for toxic air contaminants. The proposed Project would not expose sensitive receptors to substantial pollutant concentrations. This impact would be* ***less than significant.*** *No mitigation would be required.*

4.3 Biological Resources

This section provides a discussion of terrestrial and aquatic biological resources at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Soil Investigation Project (Project) Site and surrounding areas; describes the applicable federal, state, regional, and local regulations and policies related to biological resources; and analyzes the potential temporary, short-term, and long-term impacts of the proposed Project on terrestrial and aquatic biological resources.

The information presented in this section is based on the results of biological studies conducted in support of the Project between 2004 and 2013. The information reviewed includes documents that discuss biological resources in the region, including the *Programmatic Biological Assessment for Pacific Gas and Electric Topock Compressor Station Remedial and Investigative Actions* (PBA) (CH2M HILL 2007a, included as **Appendix D-1** to this draft environmental impact report [DEIR]), numerous baseline biological reports as cited below, and annual survey reports for presence or absence of the southwestern willow flycatcher (*Empidonax traillii extimus*) and desert tortoise (*Gopherus agassizii*) (CH2M HILL 2004a-e; 2005a; GANDA 2005a, 2005b, 2006a, 2006b, 2007, 2008a, 2008b, 2009a, 2009b, 2010, 2012; and WSA 2013), as well as Yuma clapper rail (*Rallus longirostris yumanensis*) and California black rail (*Laterallus jamaicensis coturniculus*) (KBS 2012), among others.

4.3.1 Existing Setting

4.3.1.1 Project Setting

The Project Site is located at the boundary of two desert systems: Mojave and Colorado. The terrain at the Project Site includes sparsely vegetated desert, unvegetated desert pavement, numerous shallow to deep ephemeral washes, and gently rolling hills. The base of the Chemehuevi Mountains is located at the southeastern edge of the Project Site. The elevation within the Project Site ranges from roughly 400 to 600 feet above mean sea level (amsl). Industrial development occurs throughout the Project Site and includes the PG&E Topock Compressor Station (Station), the Interim Measure 3 (IM-3) Treatment Facility, paved and unpaved access roads, four evaporation ponds, a rock quarry, two water tanks, historic U.S. Highway ("Route") 66, numerous groundwater wells, and six natural gas pipelines that run partially above and partially below ground. Interstate 40 (I-40) and the Burlington Northern Santa Fe Railway (BNSF) cross the Project Site in an east-west direction.

The Colorado River borders the eastern portion of the Project Site. West of the Colorado River, the topography is abrupt, rising from around 450 feet amsl at the river to over 1,200 feet amsl within 1 mile to the south and southwest. Slopes encountered west of the Colorado River reflect a series of ancient river terraces (CH2M HILL 2007a:4-1-4-3, included as Appendix D-1 to this DEIR).

Lower Colorado River

Starting in the 1930s, federal actions in the region consisted of the construction of several dams, including the Hoover Dam and Parker Dam. Construction of the Hoover Dam, located 108 miles upstream of Topock, was completed in 1936. Completion of the Parker Dam, located 42 miles downstream of Topock, occurred in 1938. The changes that resulted from dam construction to the natural river flows substantially altered available fish habitats and reduced the river's ability to meander and create or destroy backwaters and marshes. Alleviating the threat of floods also allowed for conversion of riparian areas to agricultural uses.

The accumulation of sediment in the river channel from Topock to Needles increased rapidly after the completion of Parker Dam. By 1944, the aggradation of the river channel caused elevated groundwater levels and flooding in low-lying areas. In response to this condition, the U.S. Bureau of Reclamation (BOR) conducted dredging of the river channel to maintain channel geometry. According to Metzger and Loeltz (1973) (as cited in CH2M HILL 2013), the substantial dredging and channel improvement work in Mohave Valley was completed by July 1960. As part of the channel improvements conducted by BOR, riprap embankments were added to stabilize the shoreline on the Arizona side, immediately east and northeast of the Station. Historical aerial photographs for the Project Site (CH2M HILL 2013) provide information on the general time frames and locations of dredging, as evidenced by the extensive sand dune areas present in the historical photographs on both the western and eastern shorelines of the Colorado River (CH2M HILL 2009:Appendix A1). BOR's damming and channelization of the Colorado River have substantially altered aquatic, marsh, and riparian habitats associated with the river. As part of the mitigation for the various river control projects, BOR has agreed to improve backwater and marsh areas, including enhancing areas such as the Topock Marsh (CH2M HILL 2007a:3-25).The portion of the Colorado River that is adjacent to the Project Site is approximately 700 to 900 feet wide and 8 to 15 feet deep. The adjacent Colorado River floodplain averages about 500 feet in width but narrows at the Topock Gorge, which is approximately 4 miles south of the Project Site (CH2M HILL 2007a:3-2).

Topock Marsh

The 4,000-acre Topock Marsh is managed by the U.S. Fish and Wildlife Service (USFWS) as part of the Havasu National Wildlife Refuge (HNWR). The marsh was created as mitigation for prior impacts on the Colorado River and was developed within a historical river meander in 1966, when a dike outlet structure was constructed. Presently, the marsh represents more than 40 percent of the remaining backwaters of the Colorado River. The marsh serves as a critical resting place for migratory waterfowl and a home to resident songbirds, water birds, and other wildlife (USFWS 2008).

Water levels in the marsh are manipulated through closing and opening the gates at the South Dike outlet structure. Levels are increased during the early spring to benefit the nesting southwestern willow flycatcher and then slowly drawn down over the fall to maximize the availability of submerged aquatic vegetation for water birds (USFWS 2008).

4.3.1.2 General Biological Resources

Regional and local settings for terrestrial biological resources were developed primarily from existing documents, including information from *the Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) (Volumes 1 and 2)* (CH2M HILL

2007b, 2009) and the biological surveys conducted at the Project Site by CH2M HILL and Garcia and Associates (GANDA), who were contracted by PG&E to conduct various environmental services throughout the Project Site. Reconnaissance and targeted surveys conducted by CH2M HILL were primarily to facilitate implementation of the existing IM-3. The CH2M HILL and GANDA survey areas included lands in both California and Arizona. Before conducting surveys, CH2M HILL performed background research of databases, literature, and technical reports and consulted with the agencies or firms regarding federally listed species in the area, including the U.S. Bureau of Land Management (BLM), BOR, USFWS, California Department of Fish and Wildlife (CDFW),[1] Arizona Game and Fish Department, and Steven W. Carothers and Associates for guidance on listed species. Several sensitive biological resources were identified as potentially occurring in the Project Site, including wetlands, waters of the United States, waters of the state, and federally listed wildlife species.

Surveys for federally listed wildlife species potentially occurring within the Project Site were implemented following USFWS standard protocols and included surveys for the southwestern willow flycatcher and the desert tortoise (GANDA 2007, 2008a, 2008b, 2009a, 2009b, 2010, 2012). As directed by USFWS, surveys for Yuma clapper rail and fish species were not conducted as part of this Project so that there would not be a duplication of USFWS HNWR survey efforts for these species (CH2M HILL 2007a:5-1, included as Appendix D-1 to this DEIR). USFWS provided data from its annual clapper rail survey efforts to CH2M HILL for incorporation into the PBA and other project-related documents.

Biological resource surveys conducted on behalf of PG&E were performed within a 1,528-acre area originally delineated by the BLM to facilitate a cultural resources assessment for the Project. Since completion of the biological surveys, the Project Site boundaries have been revised based on updated information regarding the actual extent of the area needed for soil investigation activity.

As previously mentioned, information on general biological resources and special-status species was developed from the following existing documents and a reconnaissance-level survey:

- Final Biological Resources Investigations for Interim Measures No. 3: Topock Compressor Station Expanded Groundwater Extraction and Treatment System and addendums (CH2M HILL 2004a-e);
- Biological Resources Survey Report for the Area of Potential Effect (APE) Topock Compressor Station Expanded Groundwater Extraction and Treatment System (CH2M HILL 2005b);
- Final Programmatic Biological Assessment for Pacific Gas and Electric Topock Compressor Station Remedial and Investigative Actions (CH2M HILL 2007a, included as Appendix D-1 to this DEIR);

[1] The California Department of Fish and Game (CDFG) changed its name on January 1, 2013, to the California Department of Fish and Wildlife (CDFW). In this document, references to literature published by CDFW prior to January 1, 2013, are cited as "CDFG." The agency is otherwise referred to by its new name, CDFW.

- Southwestern Willow Flycatcher Presence/Absence Surveys for the PG&E Compressor Station Expanded Groundwater Extraction and Treatment System (GANDA 2005a, 2006a, 2007, 2008b, 2009a, 2010, 2012);
- 2012 Focused Survey Results for the Yuma Clapper Rail and the California Black Rail at the Pacific Gas and Electric Groundwater Remediation Project Site (KBS 2012);
- Desert Tortoise Presence/Absence Surveys for the PG&E Compressor Station Expanded Groundwater Extraction and Treatment System (CH2M HILL 2004a-e; GANDA 2005b, 2006b, 2008a, 2009b; WSA 2013);
- Topock Groundwater Remediation Project Floristic Survey Report (CH2M HILL and GANDA 2013a);
- Topock Groundwater Remediation Project Revised Floristic Survey Report (CH2M HILL and GANDA 2013b);
- USFWS species list for the HNWR (USFWS 2007 and 2008); and
- Wetlands and Waters of the United States, Delineation for the Topock Compressor Station Groundwater Remediation Project, San Bernardino County, California (Document ID: PGE20130822A) (CH2M HILL 2013, included as **Appendix D-2** to this DEIR).

Vegetation and Habitat

Terrestrial habitats within the Project Site are typical of Mojave Desert uplands, the dominant habitat within the Project Site being creosote bush (*Larrea tridentata*) scrub. Other terrestrial habitats within the Project Site include tamarisk (*Tamarix ramossissima; T. aphylla*) thicket, arrow weed (*Pluchea sericea*) thicket, blue palo verde (*Parkinsonia florida*) woodland, catclaw acacia (*Senegalia greggii*) thorn scrub, foothill palo verde (*Parkinsonia microphylla*) scrub, quailbush scrub, allscale (*Atriplex polycarpa*) scrub, and western honey mesquite (*Prosopis glandulosa* var. *torreyana*) bosque, as well as areas that have been landscaped and developed. **Table 4.3-1** lists the approximate acreages of each habitat type within the Project Site. These acreages were calculated through a Geographic Information System (GIS) analysis in which the Project Site boundaries were laid over the vegetation community data layer from the *Topock Groundwater Remediation Project Floristic Survey Report* (CH2M HILL and GANDA 2013). This original vegetation community data layer was delineated in the field by CH2M Hill to support the environmental analysis of the Groundwater Remediation Project. The acreages in Table 4.3-1 differ from those reported in the *Topock Groundwater Remediation Project Floristic Survey Report* (CH2M HILL and GANDA 2013) because the current Project Site is smaller than that of the Groundwater Remediation Project.

TABLE 4.3-1
HABITAT TYPES IN THE PROJECT SITE

Habitat Type	Approximate Acreage
Creosote Bush Scrub	68.9
Tamarisk Thicket	6.6
Arrow Weed Thicket	0.4
Blue Palo Verde Woodland	9.8
Catclaw Acacia Thorn Scrub	0.3
Foothill Palo Verde Scrub	1.5
Allscale Scrub	1.5
Western Honey Mesquite Bosque	0.3
Tamarisk Thicket/Mesquite Bosque	1.0
Tamarisk Thicket/Mesquite Bosque/Blue Palo Verde Woodland	0.1
Common Reed Marshes	2.6
Open Water	0.2
Landscaped	0.1
Developed	35.2
GRAND TOTAL	**128.5**

SOURCES: CH2M HILL and GANDA 2013ab; Parus 2014.

Creosote Bush Scrub

The most common and widespread plant community in the Project Site is creosote bush scrub. This vegetation type is characterized by widely spaced creosote bush with associated species such as white bursage (*Ambrosia dumosa*), white rhatany (*Krameria bicolor*), brittlebush (*Encelia farinosa*), beavertail cactus (*Opuntia basilaris* var. *basilaris*), and silver cholla (*Cylindropuntia echinocarpa*) (CH2M HILL and GANDA 2013ab). Creosote bush scrub occurs throughout the dissected alluvial terraces in the Project Site and comprises 68.9 acres of the Project Site (**Figures 4.3-1** through **4.3-1d**).

Tamarisk Thicket

Tamarisk thicket is found primarily along the low sandy terraces adjacent to the Colorado River and near the terminus of the larger ephemeral washes such as Bat Cave Wash (Figures 4.3-1 through 4.3-1d). Vegetation is characterized by open to dense stands of the non-native and invasive salt cedar and/or athel tamarisk. In many locations salt cedar or athel tamarisk occur as monotypic stands; in other areas associated trees and shrubs include western honey mesquite, screwbean mesquite, blue palo verde, and arrow weed. Herbaceous vegetation is absent within dense thickets of salt cedar and athel tamarisk, but scattered herbaceous species such as fanleaf crinklemat (*Tiquilia plicata*), Spanish needle (*Palafoxia arida*), and *Cryptantha* spp. are often present in the openings between the trees in some areas (CH2M HILL and GANDA 2013ab). Tamarisk thicket comprises 6.6 acres of the Project Site; tamarisk thicket/mesquite bosque comprises 1.0 acre of the Project Site; and tamarisk thicket/mesquite bosque/blue palo verde woodland comprises 0.1 acre of the Project Site (Figures 4.3-1 through 4.3-1d).

Arrow Weed Thicket

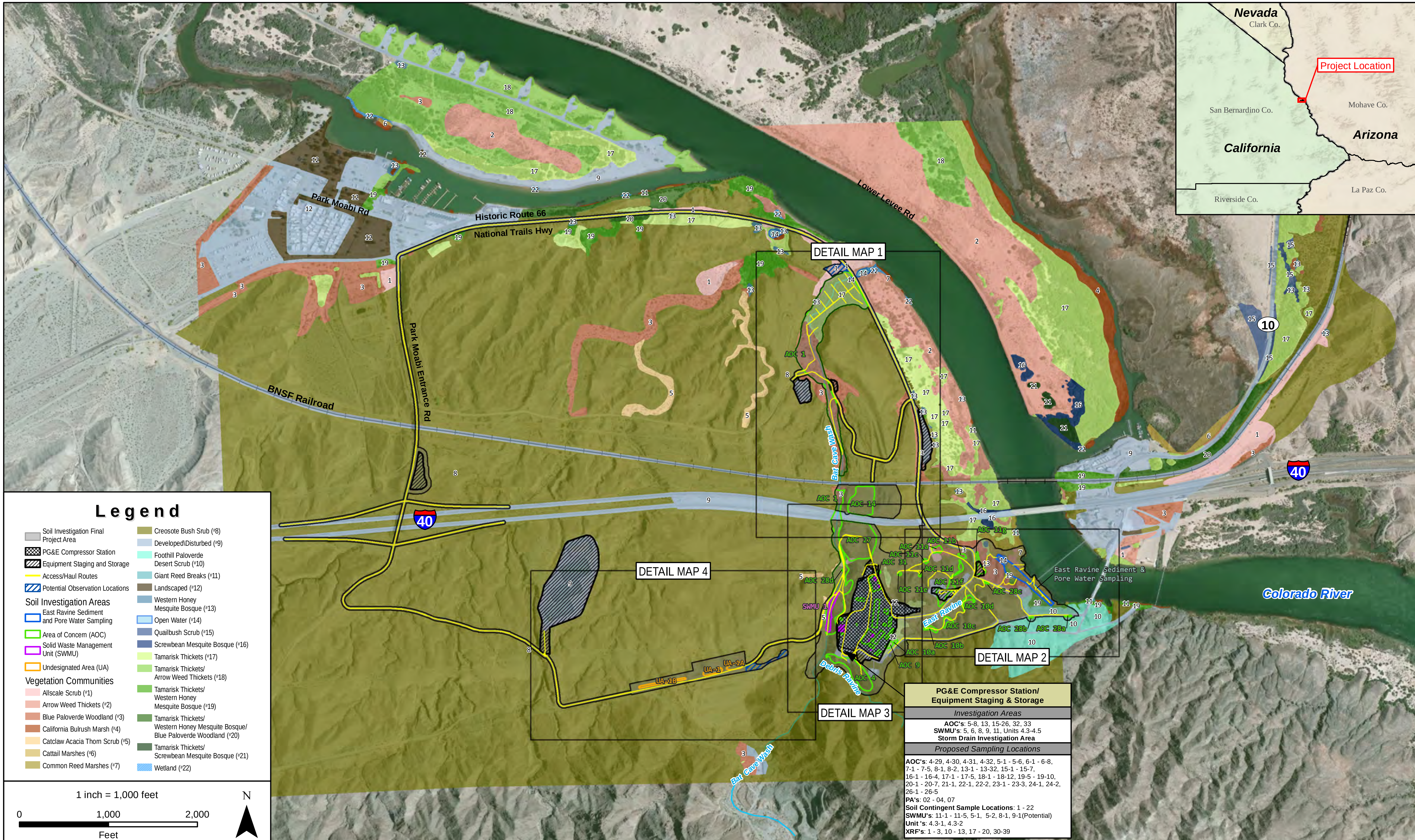
Arrow weed thicket is found on the low sandy terraces along the Colorado River (Figures 4.3-1 through 4.3-1d). Arrow weed is the sole dominant shrub species with individuals widely scattered or aggregated into dense, nearly impenetrable stands. It is most common along the western shore of the Colorado Rover between Bat Cave Wash and I-40, and often intermixes with tamarisk thickets and mesquite bosque. Associated species include salt cedar, smoke tree (*Psorothamnus spinosus*), western honey mesquite, brittlebush, and desert broom (*Baccharis sarothroides*). Scattered herbaceous vegetation in the more open areas includes fanleaf crinklemat, Spanish needle, *Cryptantha* spp., and Mediterranean grass (*Schismus barbatus*) (CH2M HILL and GANDA 2013ab). Arrow weed thicket comprises 0.4 acre of the Project Site (Figures 4.3-1 through 4.3-1d).

Blue Palo Verde Woodland

Blue palo verde woodland occurs along the edges and throughout the channel bottoms of the larger ephemeral washes in the dissected alluvial terraces south of the Colorado River (Figures 4.3-1 through 4.3-1d). Total vegetation cover is generally low, but species diversity is relatively high, especially in the larger washes, as compared to the other vegetation types in the Project Site. Blue palo verde is the dominant tree with scattered individuals of salt cedar, athel tamarisk, and smoke tree also present in some areas. Associated shrubs include catclaw acacia, Anderson’s desert thorn (*Lycium andersonii*), brittlebush, sweetbush (*Bebbia juncea* var. *aspera*), cheesebush (*Hymenoclea salsola*), climbing milkweed (*Funastrum hirtellum*), desert lavender (*Hyptis emoryi*), white bursage, white rhatany, and creosote bush. Common herbaceous species include small-seeded spurge (*Chamaesyce polycarpa*.), small-flowered California poppy (*Eschscholzia minutiflora*), Emory rock daisy (*Perityle emoryi*), Spanish needle, and Arizona lupine (*Lupinus arizonicus*) (CH2M HILL and GANDA 2013ab). Blue palo verde woodland comprises 9.8 acres of the Project Site (Figures 4.3-1 through 4.3-1d).

Catclaw Acacia Thorn Scrub

In the Project Site catclaw acacia thorn scrub is limited to the bottoms of moderate-sized ephemeral washes in the dissected terraces south of the National Trails Highway. This vegetation type is characterized by widely scattered shrubs dominated by catclaw acacia. Common associated species include Anderson’s desert thorn, brittlebush, sweetbush, cheesebush, desert lavender, white bursage, white rhatany, and creosote bush. Herbaceous species include small-seeded spurge, Arizona lupine, and Spanish needle (CH2M HILL and GANDA 2013ab). Catclaw acacia thorn scrub comprises 0.3 acre of the Project Site (Figures 4.3-1 through 4.3-1d).



Topock Soil Investigation
Project EIR
Created By Parus Consulting, Inc.
Map Creation Date: 06/18/2014 Background Source: ESRI Aerial

Soil Investigation Areas Vegetation Communities: Overview

Figure 4.3-1

ESA

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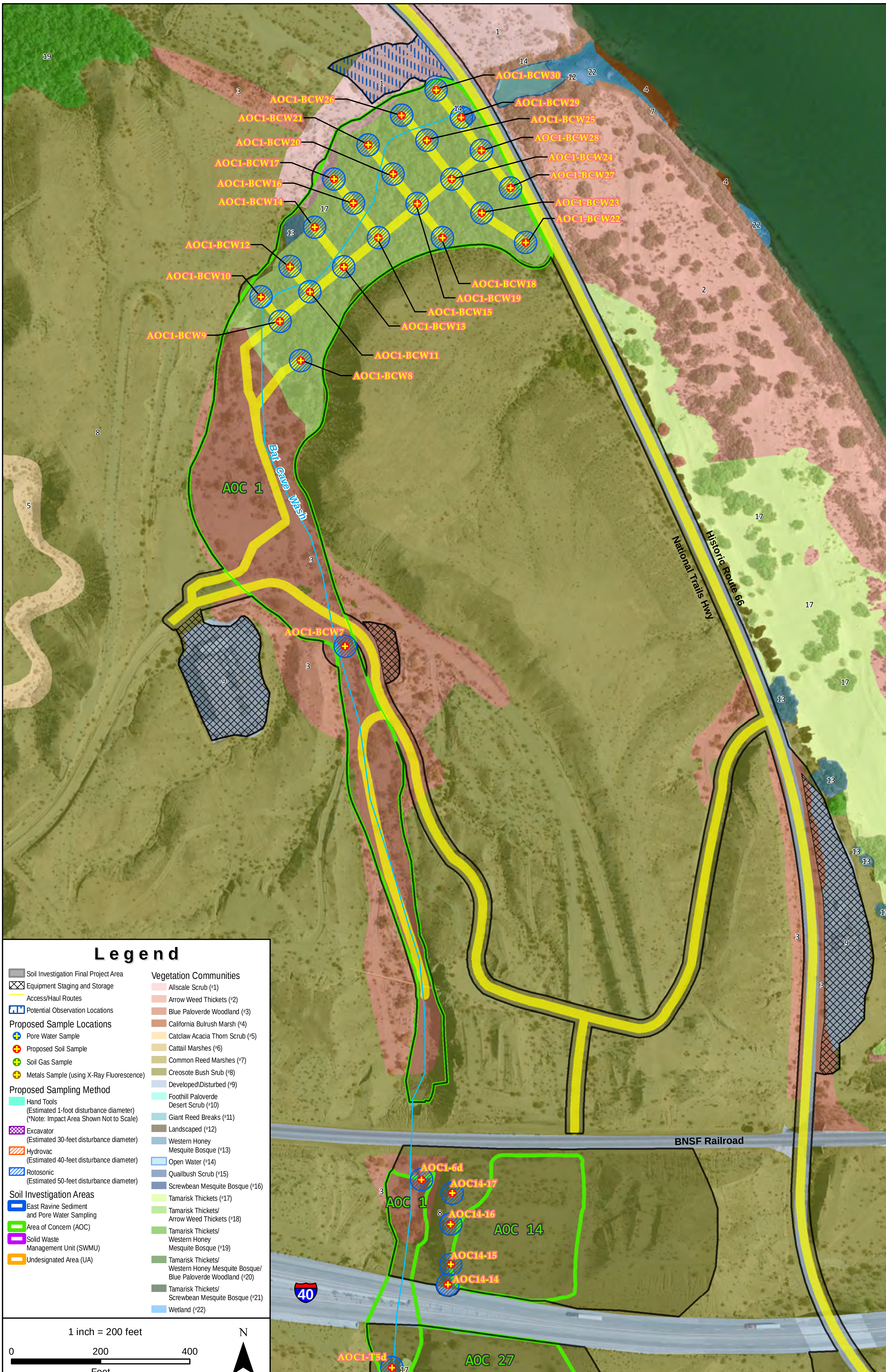

Topock Soil Investigation Project EIR
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Background Source: ESRI Aerial

Soil Investigation Areas Vegetation Communities: Detail Map 1

Figure 4.3-1a

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Topock Soil Investigation Project EIR

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Map Creation Date: 06/18/2014 Background Source: ESRI Aerial

Soil Investigation Areas Vegetation Communities: Detail Map 2

Figure 4.3-1b

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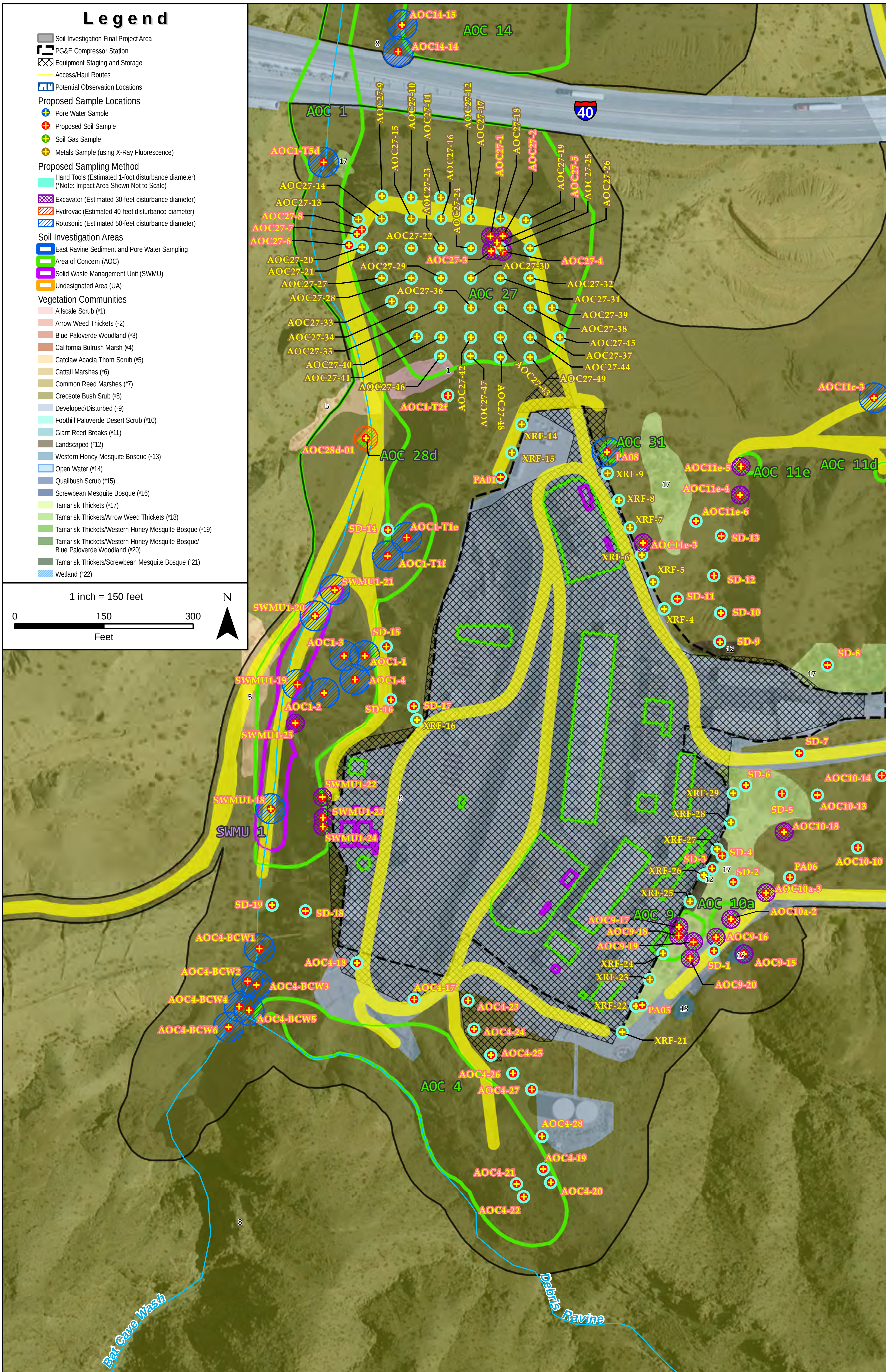
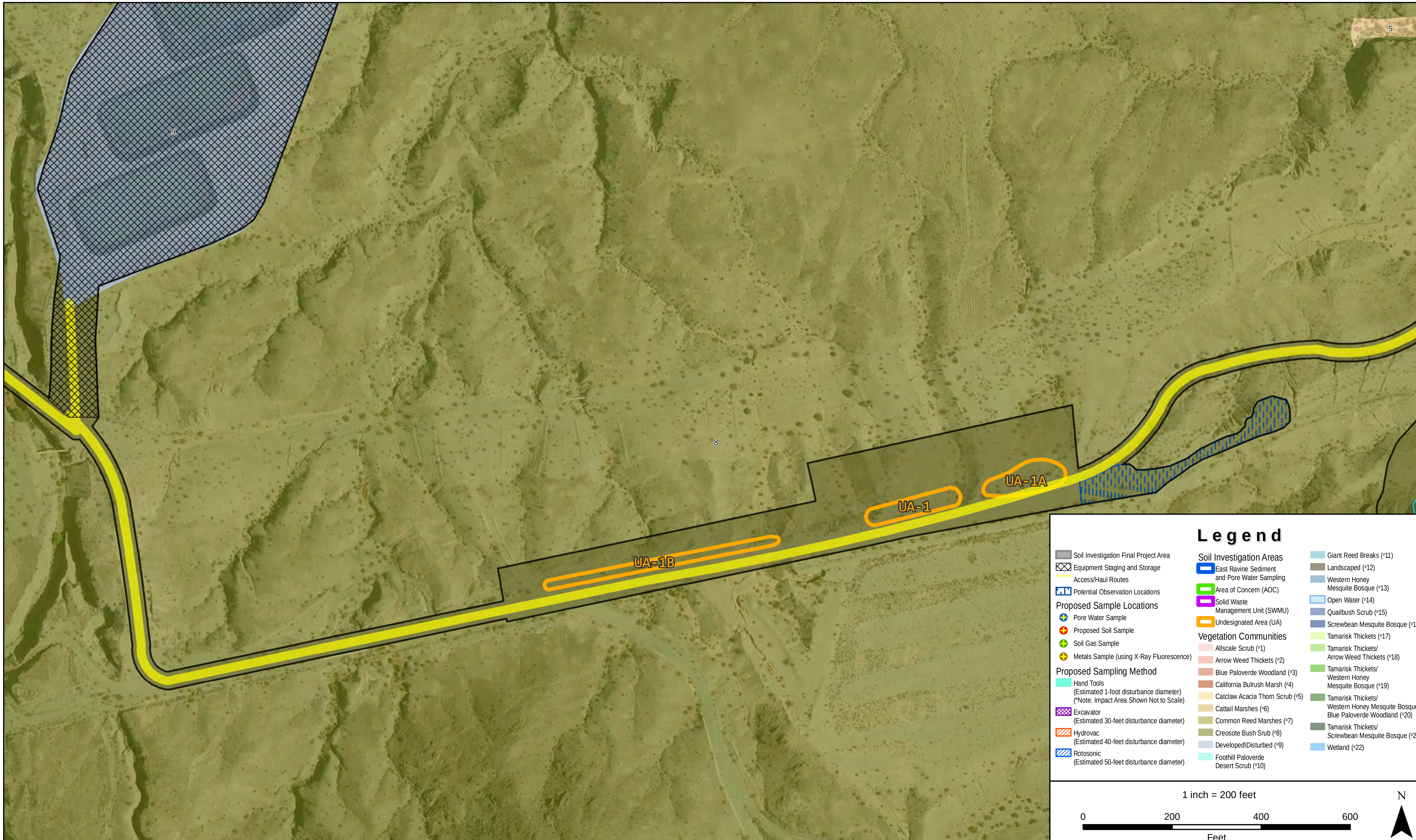


Topock Soil Investigation Project EIR Created By Parus Consulting, Inc. Map Creation Date: 06/18/2014 Background Source: ESRI Aerial	Soil Investigation Areas Vegetation Communities: Detail Map 3	*Figure 4.3-1c*	ESA PARUS CONSULTING, INC.



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Soil Investigation Areas Vegetation Communities: Detail Map 4

Figure 4.3-1d

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Foothill Palo Verde Scrub

Foothill palo verde scrub is restricted to a small area east of the compressor station along the slopes of the Chemehuevi Mountains (Figures 4.3-1 through 4.3-1d). Vegetation in this area is characterized by scattered foothill palo verde. Associated species in this area include creosote bush, pygmy-cedar (*Peucephyllum schottii*), brittlebush, white rhatany, beavertail cactus, buckhorn cholla (*Cylindropuntia acanthocarpa*), California barrel cactus (*Ferocactus cylindraceus* var. *cylindraceus*), and inflated desert trumpet (*Eriogonum inflatum* var. *inflatum*) (CH2M HILL and GANDA 2013ab). Foothill palo verde scrub comprises 1.5 acres of the Project Site (Figures 4.3-1 through 4.3-1d).

Allscale Scrub

Allscale scrub is dominated by cattle saltbush (*Atriplex polycarpa*) and is the most common alkaline tolerant shrubland alliance in the Project Site. In the Project Site, allscale scrub is most common along the National Trails Highway (CH2M HILL and GANDA 2013ab). Allscale scrub comprises 1.5 acres of the Project Site (Figures 4.3-1 through 4.3-1d).

Western Honey Mesquite Bosque

Western honey mesquite bosque is mostly found on the low sandy terraces along the Colorado River, where it occurs intermixed with tamarisk thickets (Figures 4.3-1 through 4.3-1d) (CH2M HILL and GANDA 2013ab). Western honey mesquite bosque comprises 0.3 acre of the Project Site (Figures 4.3-1 through 4.3-1d).

Common Reed Marshes

Along the Colorado River and its inlets are patches of wetlands with various marsh plants forming adjacent but somewhat drier common reed (*Phragmites australis*) marshes. The common reed marshes are concentrated and most extensive along the edges of the low terraces next to the Colorado River south of I-40. It is likely that the common reed species in the Project Site is an invasive, non-indigenous form of *Phragmites australis* (CH2M HILL and GANDA 2013ab). Common reed marsh comprises 2.6 acres of the Project Site (Figures 4.3-1 through 4.3-1d).

Open Water

Open water includes the unvegetated, fully inundated portions of the Colorado River that fall within the boundaries of the Project Site (Figures 4.3-1 through 4.3-1d). Open water comprises 0.2 acre of the Project Site.

Landscaped Areas

Landscaped areas include those areas planted with non-native, ornamental species within or near developed areas. Common species found within the vegetation community include Mexican fan palm (*Washingtonia robusta*) and oleander (*Nerium oleander*) (CH2M HILL and GANDA 2013ab). Landscaped areas comprise 0.1 acre of the Project Site (Figures 4.3-1 through 4.3-1d).

Developed Areas

Developed areas within the Project Site include I-40, BNSF, dirt access roads, and the facilities and infrastructure associated with the Station (CH2M HILL; GANDA 2013ab). Developed areas comprise 35.2 acres of the Project Site (Figures 4.3-1 through 4.3-1d).

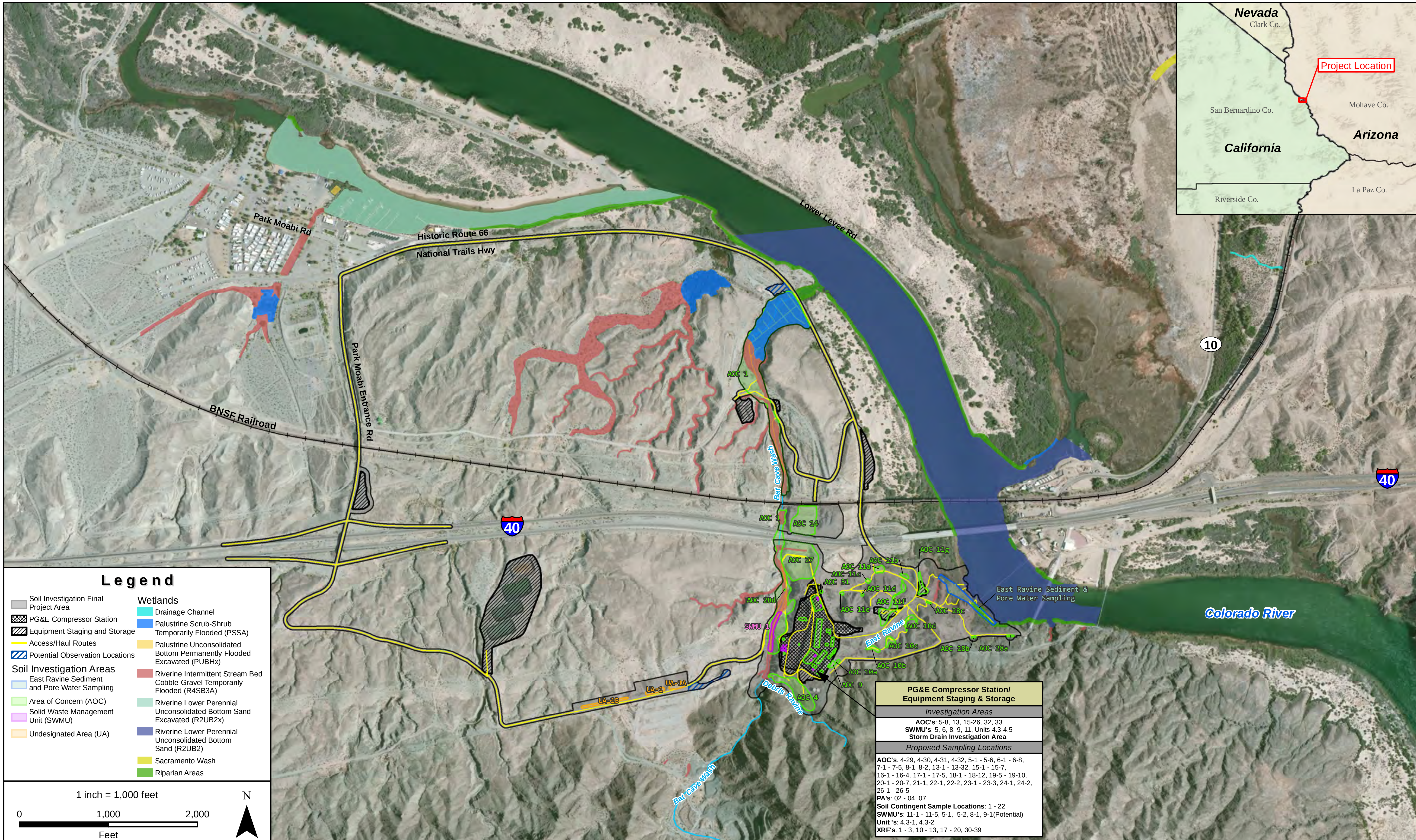
4.3.1.3 Jurisdictional Resources

CH2M Hill wetland ecologists conducted wetland delineations within the Project Site in February and December 2012. The results of the delineations are included as Appendix D-2 to this DEIR and are summarized in the following pages.

Several jurisdictional wetlands and other waters under the jurisdiction of the U.S. Army Corps of Engineers (USACE), CDFW, and the Regional Water Quality Control Board (RWQCB) were identified along the Colorado River (**Figure 4.3-2**) and throughout the Project Site. Jurisdictional wetlands identified during the delineation include scrub-shrub wetlands associated with ephemeral washes (PSSA); palustrine emergent, permanently flooded wetlands (PEMH); and palustrine emergent, seasonally flooded wetlands (PEMC). Other waters identified during the delineation include non-wetland riverine features such as the Colorado River itself and the ephemeral desert drainages that traverse the Project Site (CH2M Hill 2013).

It is assumed that the resources mapped within the Project Site in Figure 4.3-2 are considered jurisdictional under Section 404 of the Clean Water Act (CWA) and therefore also qualify for jurisdiction under Section 401 of the CWA administered by the RWQCB, and Section 1600 of the California Fish and Game Code administered by CDFW (CH2M Hill 2013). **Table 4.3-2** lists the acreages for resources that would be subject to state and/or federal jurisdiction. These acreages were calculated through a GIS analysis in which the Project Site boundaries were laid over the jurisdictional resources data layer from the *Wetlands and Waters of the United States, Delineation for the Topock Compressor Station Groundwater Remediation Project, San Bernardino County, California* (CH2M HILL 2013). This original jurisdictional data layer was delineated in the field by CH2M Hill to support the environmental analysis of the Groundwater Remediation Project. The acreages in Table 4.3-2 differ from those reported in the *Wetlands and Waters of the United States, Delineation Report* (CH2M HILL 2013) because the current Project Site is smaller than that of the Groundwater Remediation Project.

As previously discussed, wetland vegetation within the Project Site consists primarily of common reed. Several of these wetland patches are located at the confluence of Bat Cave Wash and below the I-40 overcrossing. A number of intermittent drainages mapped on-site were found to connect to the Colorado River (Figure 4.3-2). Near their confluence with the Colorado River, these drainages include tamarisk, catclaw acacia, honey mesquite, and screwbean mesquite.



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Soil Investigation Project Site: Wetlands

Figure 4.3-2

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TABLE 4.3-2 JURISDICTIONAL (USACE/CDFW/RWQCB) RESOURCES IN THE PROJECT SITE	
Jurisdictional Habitat	**Approximate Acreage**
Palustrine scrub-shrub wetlands associated with ephemeral washes (PSSA)	4.9
Palustrine emergent, permanently flooded wetlands (PEMH)	0.6
Palustrine emergent, seasonally flooded wetlands (PEMC)	1.3
Ephemeral washes	6.6
Colorado River (R2UB2)	0.2
Riparian habitat	0.4
GRAND TOTAL	**14.0**
SOURCE: CH2M HILL 2013; Parus 2014.	

4.3.1.4 Wildlife

The diversity and abundance of wildlife species encountered are influenced by the proximity of the Project Site to the creosote-dominated desert and the Topock Marsh, a large wetland with abundant wildlife (GANDA 2012). Avian species commonly associated with the river include American coot (*Fulica americana*), mallard (*Anas platyrhynchos*), pied-billed grebe (*Podilymbus podiceps*), great egret (*Casmerodius albus*), great blue heron (*Ardea herodias*), northern rough-winged swallow (*Stegidopteryx serripennis*), and belted kingfisher (*Ceryle alcyon*). Other avian species found in the upland areas include red-tailed hawk (*Buteo jamencensis*), Gambel’s quail (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), white-winged dove (*Zenaida asiatica*), common raven (*Corvus corax*), song sparrow (*Melospiza melodia*), Canyon wren (*Catherpes mexicanus*), brewer’s blackbird (*Euphagus cyanocephalus*), great-tailed grackle (*Quiscalus mexicanus*), turkey vulture (*Cathartes aura*), greater roadrunner (*Geococcyx californianus*), lesser nighthawk (*Chordeiles acutipennis*), rock dove (*Columba livia*), verdin (*Auriparus flaviceps*), and black-tailed gnatcatcher (*Polioptila melanura*) (AECOM 2011; GANDA 2012).

Observations during the 2012 avian surveys also included detections of Yuma clapper rail (*Rallus longirostris yumanensis*), Arizona Bell’s vireo (*Vireo bellii arizonae*), brownheaded cowbird (*Molothrus ater*), and a great blue heron nest (GANDA 2012).

Mammals that may occur in or near the Project Site include deer mouse (*Peromyscus maniculatus*), Merriam kangaroo rat (*Dipodomys merriami*), whitetail antelope squirrel (*Ammospermophilus leucurus*), desert woodrat (*Neotoma lepida*), California ground squirrel (*Spermophilus beecheyi*), desert cottontail (*Sylvilagus audubonii*), Audubon’s cottontail (*Sylvilagus audubonii*), black-tailed hare (*Lepus californicus*), coyote (*Canis latrans*), desert kit fox (*Vulpes macrotis*), American badger (*Taxidea taxus*), bobcat (*Lynx rufus*), striped skunk (*Mephitis mephitis*), beaver (*Castor canadensis*), raccoon (*Procyon lotor*), burro (*Equus asinus*), and bighorn sheep (*Ovis canadensis nelsoni*) (AECOM 2011; GANDA 2012).

Reptiles that may occur in the area include chuckwalla (*Sauromalus obesus*), side-blotched lizard (*Uta stansburiana*), western whiptail lizard (*Cnemidophorus tigris*), zebra-tailed lizard (*Callisaurus draconoides*), desert iguana (*Dipsosaurus dorsalis*), coachwhip (*Masticophis flagellum*), gopher snake (*Pituophis melanoleucus*), and western diamondback rattlesnake (*Crotalus atrox*) (AECOM 2011; GANDA 2012).

4.3.1.5 Aquatic Wildlife

The Colorado River flows southeast between California and Arizona and provides the primary aquatic habitat within the Project Site. The aquatic habitat of the Colorado River supports several game fish species, including striped bass (*Morone saxatillis*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), white crappie (*Pomoxis annularis*), flathead catfish (*Pylodictis olivaris*), and channel catfish (*Ictalurus punctatus*) (AECOM 2011). During an instream habitat typing survey conducted in 2012, it was noted that isolated pockets of gravel, cobble, or sandy substrates with minimal current scour occur along the western banks of the Colorado River that could be used as spawning habitat or possibly as larval rearing areas for many fish species (although less likely for rearing, due to the dominant fast flows and relatively small size of these sites). Some of these pocket areas, in back eddies and the lee of outcrops, were observed to have active fish nests. For these small-sized potential spawning areas, the more sandy areas to the north near Bat Cave Wash had the least favorable habitat potential. The small areas of potential cobble/gravel spawning or rearing habitat observed in the south included areas of favorable water depth (1 to 2 m) for spawning (CH2M HILL 2012).

4.3.1.6 Sensitive Biological Resources

Special-Status Species

For purposes of this evaluation, “special-status” species are plants and animals that are legally protected or otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations, including:

- Plant and wildlife species that are listed under the federal Endangered Species Act (ESA) and/or the California Endangered Species Act (CESA) as rare, threatened, or endangered;
- Plant and wildlife species considered candidates for listing or proposed for listing;
- Wildlife species identified by CDFW as fully protected and/or species of special concern;
- Plants considered by the California Native Plant Society (CNPS) to be rare, threatened, or endangered (i.e., CNPS California Rare Plant Rank [CRPR] Lists 1A, 1B, and 2 species are recognized by the CDFW as potentially qualifying for listing, and therefore California Department of Toxic Substances Control (DTSC) considers these species as sensitive for purposes of this DEIR); and
- Plants and animals covered by the Lower Colorado River Multi-Species Conservation Program (LCR MSCP).

CDFW applies the term “California Species of Special Concern” to animals that are not listed under ESA or CESA but that are nonetheless declining at a rate that could result in listing, or that historically existed in low numbers and currently face known threats to their persistence. Both USFWS and CDFW use CNPS designations when they consider formal species protection under ESA and CESA.

The California Natural Diversity Database (CNDDB) (2013), CNPS (2013), and targeted species surveys conducted by CH2M HILL and GANDA from 2004 to 2013 were used as the primary sources to identify previously reported occurrences of special-status species in the Project vicinity (**Figures 4.3-3** and **4.3-4** through **4.3-4c**). Species identified by the LCR MSCP (BOR 2004a: Table 1-2, page 1-10) as having potentially suitable habitat within this reach of the Colorado River were also included in the species list. Topographic quadrangles included in the CNDDB query were Needles NW, Needles NE, Needles, Needles SW, Whale Mountain, Topock, Chemehuevi Peak, and Castle Rock. Although the CNDDB is a useful tool for tracking occurrences of special-status species, it contains only those records that have been reported to CDFW. Therefore, special-status species that have not been reported to the CNDDB may occur at the Project Site.

Thirty-three special-status fish and wildlife species, one insect, and eight special-status plant species were evaluated for their potential to occur in the Project Site (CH2M HILL 2004a-e; 2005a; GANDA 2005a, 2005b, 2006a, 2006b, 2007, 2008a, 2008b, 2009a, 2009b, 2010, 2012; WSA 2013; CH2M HILL & GANDA 2013ab; CNDDB 2013; CNPS 2013). The regulatory status and habitat association are summarized for each species in **Table 4.3-3**.

Four of the eight plant species were either observed in or near the Project Site or determined to have potential to occur in the Project Site, and are further discussed below. The remaining four plant species included in Table 4.3-3 are not addressed further in this section because the Project Site does not support the habitats in which they occur or the Project is outside of the elevation range for the species.

Sixteen of the 33 fish and wildlife species were determined to have potential to occur in the Project Site during at least part of the year, and are further discussed below. The remaining 17 animal species and the one insect included in Table 4.3-3 are not addressed further in this section because the Project Site either does not support the habitats in which they occur or is outside of the species' range.

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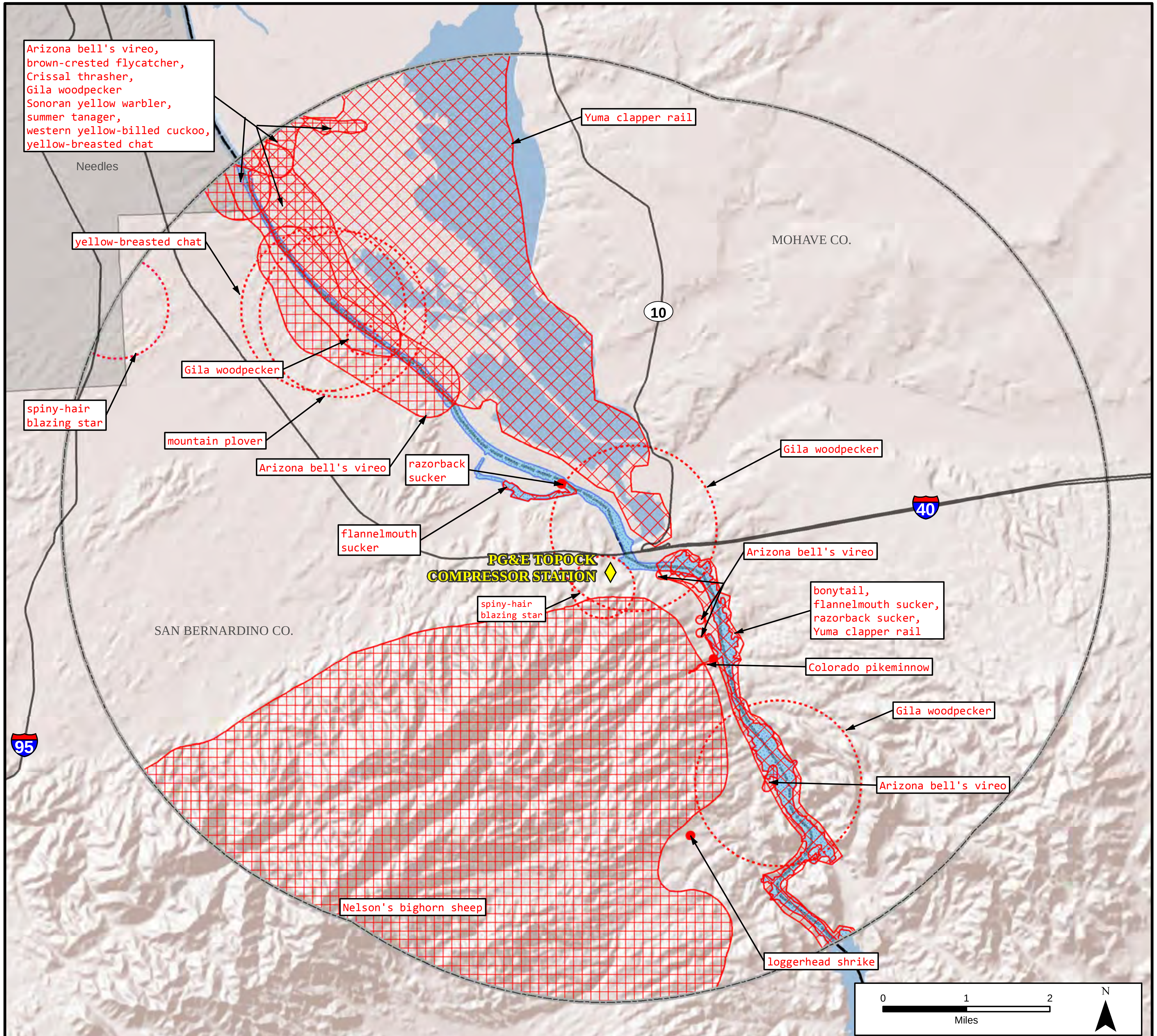

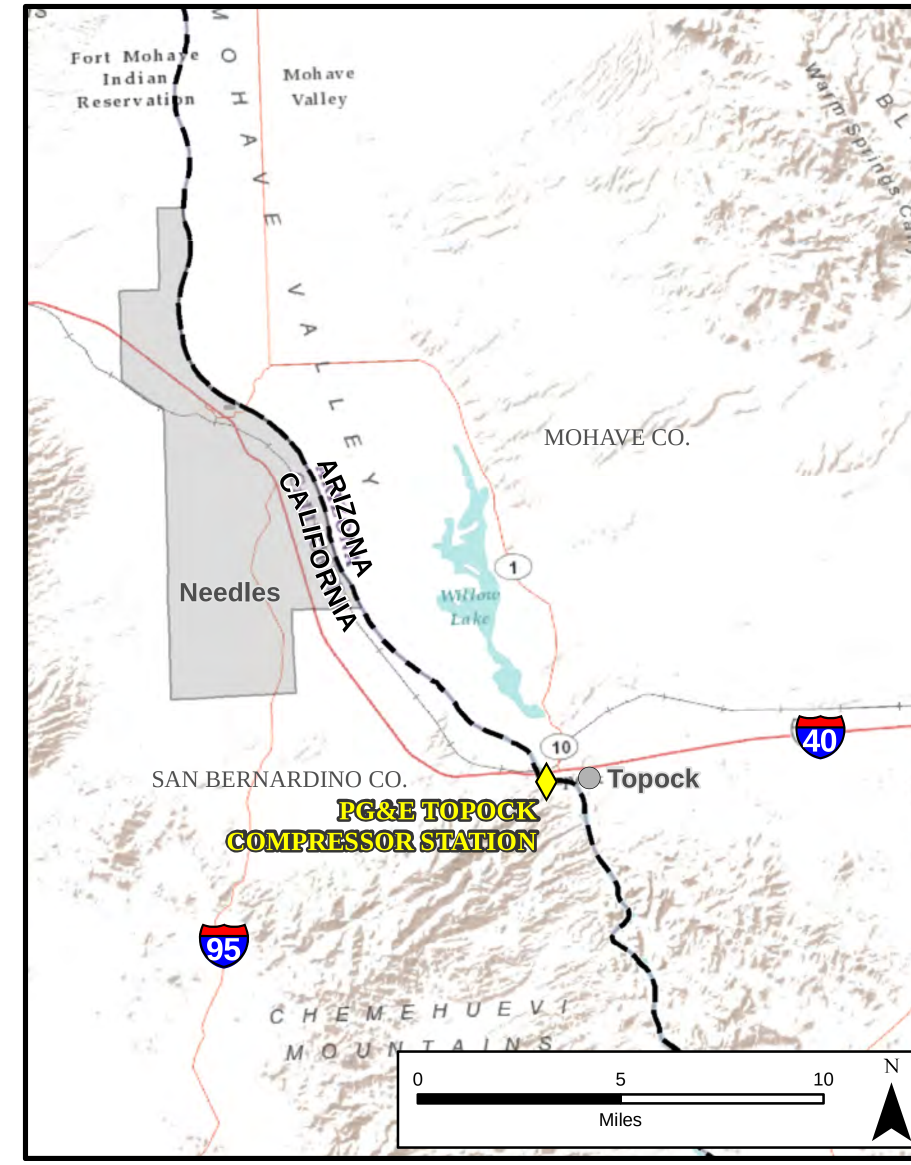

Legend

Project Area 5 Mile Buffer

State Boundary

City Boundary

Special Status Species

Animal- Accuracy Class 1

Animal- Accuracy Class 2

Animal- Accuracy Class 3

Animal- Accuracy Class 4

Critical Habitat for Bonytail Chub

CNDDB Accuracy Class Information

Class 1: *Reported occurrence is a point; location considered accurate to within the minimum mappable unit of 80 meters.*

Class 2: *Reported location is an area with defined boundaries.*

Class 3: *Reported location is a non-specific area; buffer added to represent degree of uncertainty in reported location.*

Class 4: *Reported location considered accurate within the radius shown.*

Soil Investigation Areas: *Known Locations of Special-Status Species*

Figure 4.3-3

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Topock Soils Study Project EIR

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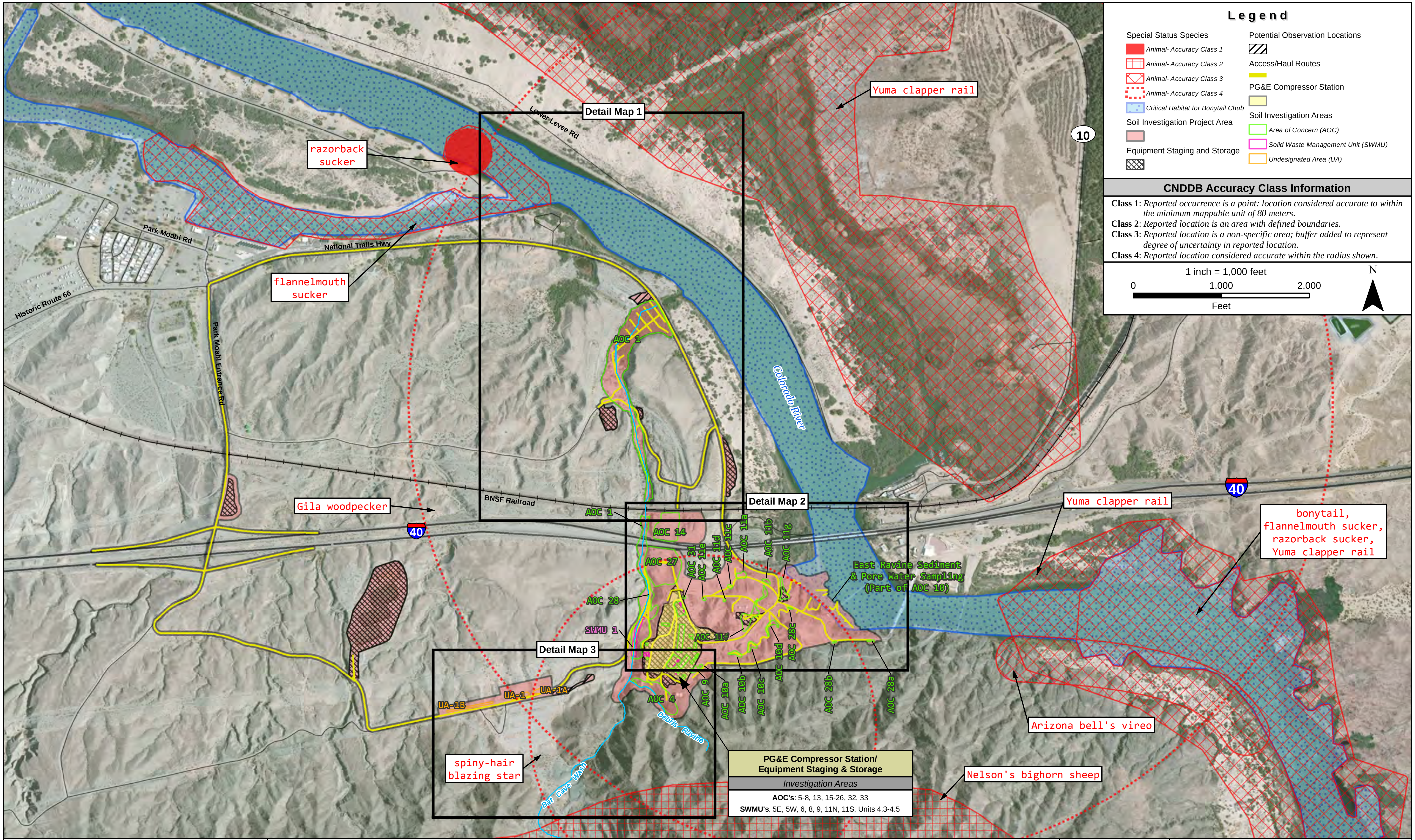
Map Creation Date: 06/18/2014

Sources:

Background: ESRI Shaded Relief, ESRI Topographic

Data: CNDDB 2013; USFWS Critical Habitat 2012



Topock Soils Study Project EIR

Sources: ESRI Aerial; CNDDB 2013; USFWS Critical Habitat 2012
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Soil Investigation Areas Special-Status Species: *Overview*

Figure 4.3-4

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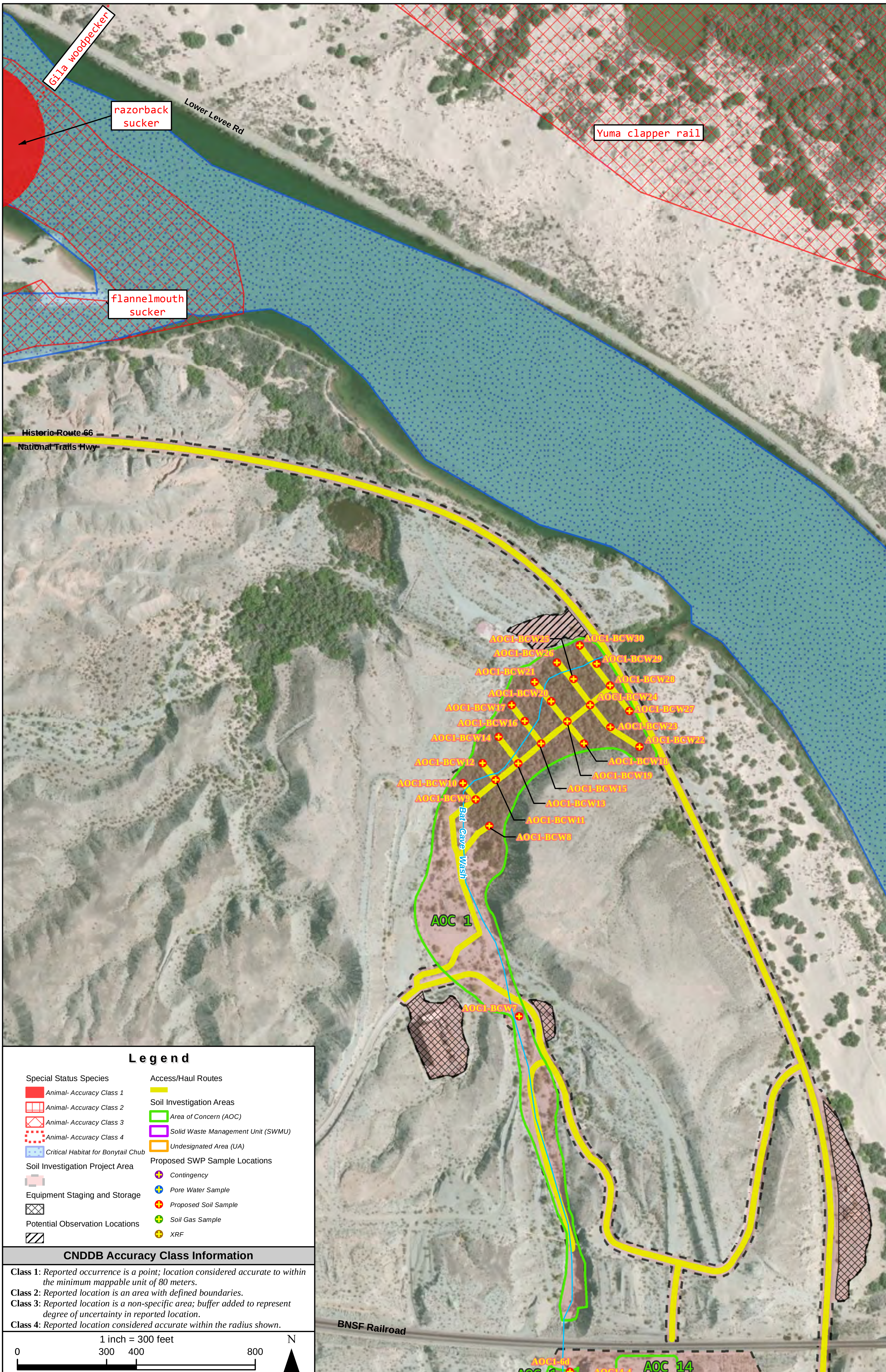

Topock Soils Study
Project EIR

Sources: ESRI Aerial; CNDDB 2013; USFWS 2012
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Map Creation Date: 06/18/2014

Soil Investigation Areas Special-Status Species: *Detail Map 1*

Figure 4.3-4a

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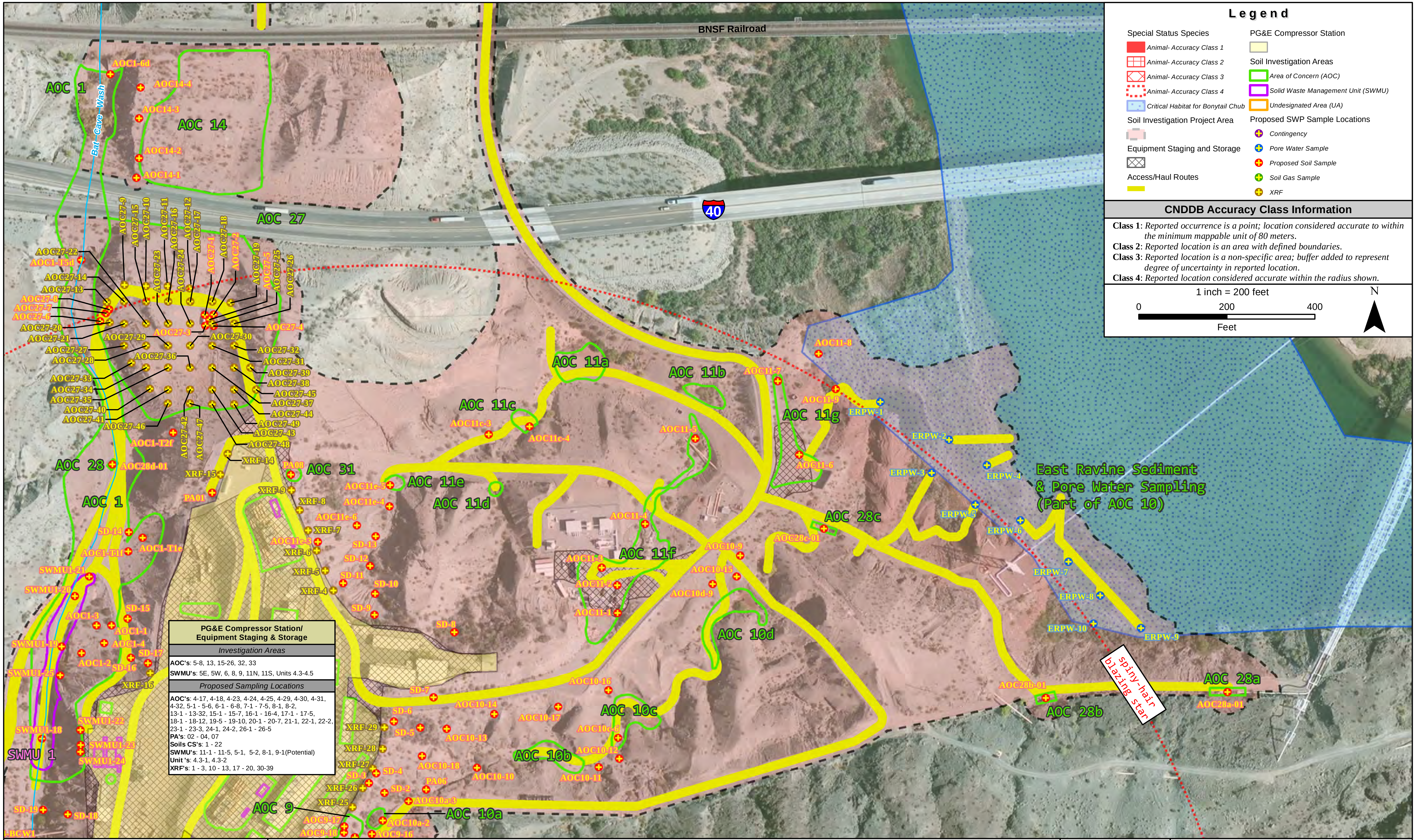

Topock Soils Study Project EIR
Sources: ESRI Aerial; CNDDB 2013; USFWS Critical Habitat 2012
Created By Parus Consulting, Inc.
Map Creation Date: 06/18/2014

Soil Investigation Areas Special-Status Species: *Detail Map 2*

Figure 4.3-4b

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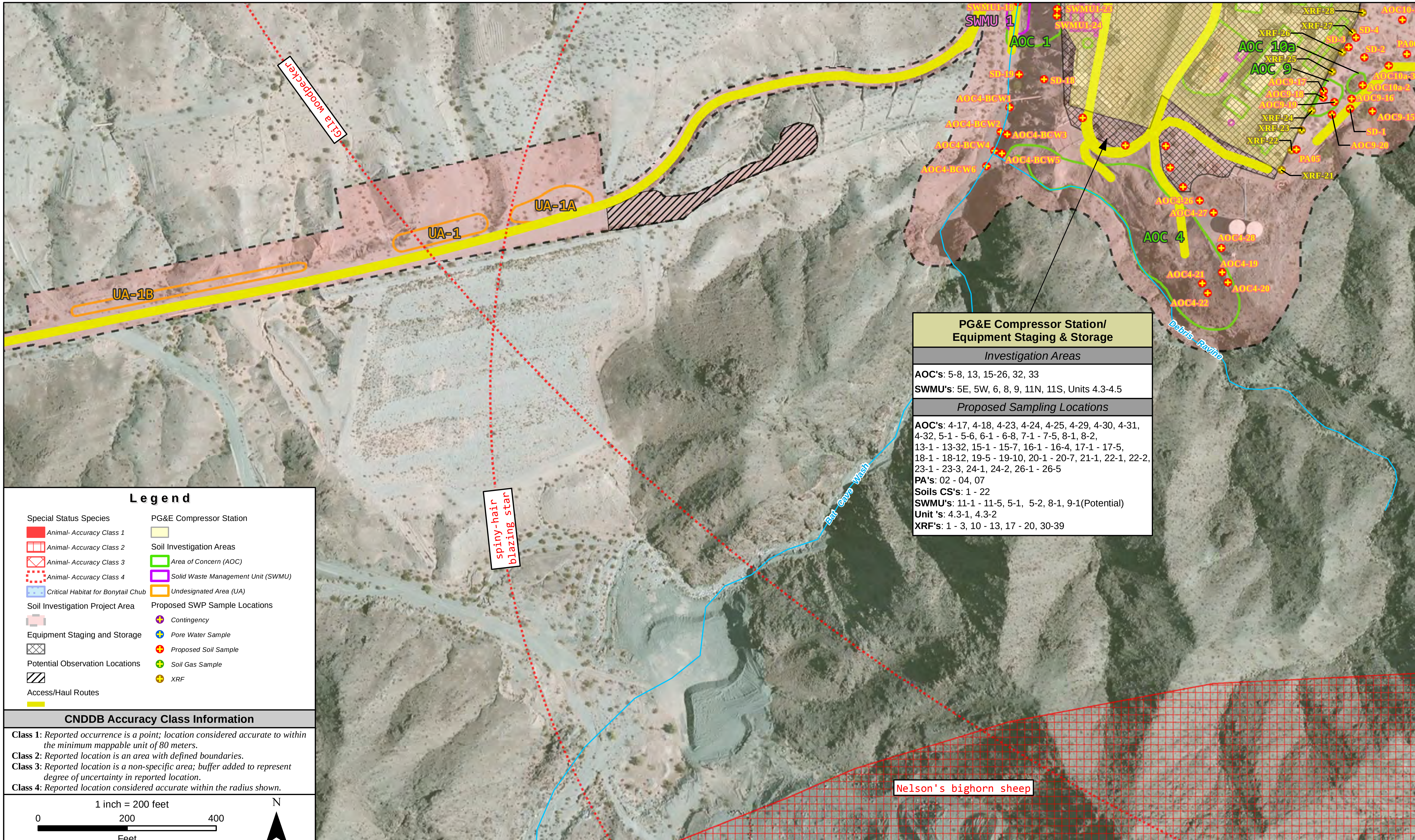

Topock Soils Study Project EIR

Sources: ESRI Aerial; CNDDB 2013; USFWS Critical Habitat 2012
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Soil Investigation Areas Special-Status Species: *Detail Map 3*

Figure 4.3-4c

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TABLE 4.3-3
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT SITE

Species	Status[1]	Habitat	Potential for Occurrence[2]
Plants			
Small-flowered androstephium *Androstephium breviflorum*	CRPR 2.2	Perennial bulbiferous herb that occurs in Mojavean desert scrub; widely scattered in stabilized to semi-stabilized sandy areas in valleys from 220 – 800 meters in elevation. Blooms from March - April.	**Could occur**; although small-flowered androstephium is considered a special-status plant in California (CRPR List 2.2), this plant was found only during the 2012 floristic survey in Arizona (east side of the Oatman-Topock Highway, north of the BNSF railroad tracks), where it is not considered a special-status plant (CH2M HILL and GANDA 2013ab). Though suitable habitat is present within the current Project Site, the species was not observed during the various biological surveys referenced in this document.
Gravel milk-vetch *Astragalus sabulonum*	CRPR 2.2	Annual/perennial herb that occurs in desert dunes, Mojavean Desert scrub and Sonoran Desert scrub in sandy sometimes gravelly soils. Can be found in flats, washes or roadsides from 60 to 930 meters in elevation. Blooms from February–June.	**Could occur**; although gravel milk-vetch is considered a special-status plant in California (CRPR List 2.2), this plant was found only during the 2012 floristic survey in Arizona, where it is not considered a special-status plant (CH2M HILL and GANDA 2013ab). Though suitable habitat is present within the current Project Site, the species was not observed during the various biological surveys referenced in this document.
Emory's crucifixion-thorn *Castela emoryi*	CRPR 2.3	Perennial deciduous shrub that occurs in Mojavean desert scrub, playas, and Sonoran desert scrub from 90 to 670 meters in elevation. Blooming period range is April–September.	**Unlikely to occur**; the species was not observed within the Project Site during the various biological surveys referenced in this document, including the 2012 floristic survey. The nearest record occurs near Chemehuevi Wash 19 miles southeast of Topock (CH2M HILL & GANDA 2011).
Mousetail suncup *Chylismia arenaria* ssp. *arenaria*	CRPR 2.2	Perennial herb found in Mojave desert scrub on rocky slopes and canyon walls; may also be found in washes from 70 to 915 meters in elevation. Blooming period range is January–May.	**Present**. Four individuals found along the steep, nearly vertical rocky slopes in or near Bat Cave Wash during the 2012 floristic survey (CH2M HILL and GANDA 2013ab).
Glandular ditaxis *Ditaxis claryana*	CRPR 2.2	Perennial herb typically found in Mojavean desert scrub and Sonoran desert scrub from 0 to 465 meters in elevation. Blooming period range is October–March.	**Unlikely to occur**; though suitable habitat exists, the species was not observed during the various biological surveys referenced in this document, including the 2012 floristic survey (CH2M HILL & GANDA 2011).
Spiny-hair blazing star *Mentzelia tricuspis*	CRPR 2.1	Annual herb found along sandy, gravelly slopes and washes within Mojavean desert scrub. Occurs from 150 – 1280 meters in elevation and blooms between March and May.	**Could occur**; although spiny-haired blazing star is considered a special-status plant in California (CRPR List 2.1), this plant was found only during the 2012 floristic survey in Arizona (below the BNSF railroad tracks), where it is not considered a special-status plant (CH2M HILL and GANDA 2013ab). Though suitable habitat is present within the current Project Site, the species was not observed during the various biological surveys referenced in this document.

TABLE 4.3-3
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT SITE

Species	Status[1]	Habitat	Potential for Occurrence[2]
Arizona pholistoma *Pholistoma auritum* var. *arizonicum*	CRPR 2.3	Annual herb found within Mojavean desert scrub from 275 to 835 meters in elevation. Blooming period occurs in March.	**Unlikely to occur**; though suitable habitat is present, the species was not observed during the various biological surveys referenced in this document and the nearest known occurrence is 15 miles northwest of the Project Site in the Dead Mountains (CH2M HILL & GANDA 2011).
Narrow-leaved psorothamnus *Psorothamnus fremontii* var. *attenuatus*	CRPR 2.3	Perennial shrub found in Sonoran desert scrub on granitic or volcanic soils. Occurs from 335 to 915 meters in elevation and blooms in April.	**Unlikely to occur**; though suitable habitat is present, the species was not observed during the various biological surveys referenced in this document. Furthermore the species is only known to occur in the Whipple Mountains approximately 30 miles south of Project Site (CH2M HILL & GANDA 2011).
Invertebrates			
MacNeill's sootywing skipper *Hesperopsis gracielae*	LCR MSCP	This small skipper is found along the Colorado River. Only known larval host plant is the quail bush (*Atriplex lentiformus*), which occurs along the subriparian edge of the river. Nectar plants include honey mesquite, alfalfa, and tamarisk.	**Could occur**; its host plant, the quail bush, occurs in low densities within the Site and nectaring sources are present along the Colorado River. No CNDDB occurrences have been recorded near the Project Site (CNDDB 2013). The nearest record in California was documented near Blythe (BOR 1996: Chapter 4, Table 15).
Fish			
Colorado Pikeminnow *Ptychocheilus lucius*	Fed: E State: E	Historically widespread in the Colorado River; now native populations restricted to the upper basin.	**Unlikely to occur**; extirpated from Lower Colorado.
Bonytail chub *Gila elegans*	Fed: E State: E LCR MSCP	Within the lower Colorado River system, occupies reach from Davis Dam to Lake Havasu and artificial impoundments.	**Known to occur**; the Lower Colorado River supports the largest remaining population of bonytail chub. Has been documented near Park Moabi (CH2M HILL 2007a:5-24, included as Appendix D-1 to this DEIR).
Humpback chub *Gila cypha*	Fed: E LCR MSCP	Historically, inhabited canyons of the Colorado River and four tributaries: the Green, Yampa, White, and Little Colorado Rivers in canyons with swift currents and whitewater.	**Unlikely to occur**; river alterations have dwindled the populations to a handful of sites, none of which are in the Lower Colorado River.
Razorback sucker *Xyrauchen texanus*	Fed: E State: E/FP LCR MSCP	A variety of riverine habitat types from mainstem channels to slow backwaters of medium and large streams, sometimes around cover elements. In impoundments prefers depths of 1 meter or more over sand, mud, or gravel substrates.	**Known to occur**; documented occurrences at Park Moabi Lagoon and Topock Marina; documented near Needles in Colorado River (CNDDB 2013).
Flannelmouth sucker *Catostomus latipinnis*	LCR MSCP	Uses backwaters for juvenile rearing and main channel habitats for spawning and adult rearing.	**Known to occur**; river and backwaters provide habitat. CNDDB records indicated flannelmouth sucker in the lagoon at Park Moabi (CNDDB 2013).

TABLE 4.3-3
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT SITE

Species	Status[1]	Habitat	Potential for Occurrence[2]
Reptiles			
Desert tortoise *Gopherus agassizii*	Fed: T LCR MSCP	The desert tortoise is widely distributed throughout the Mojave, Sonoran, and Colorado Deserts. The Mojave population of desert tortoise prefers open valleys containing creosote bush scrub, avoiding steep rocky sites. The species also requires friable soils for burrow and nest construction.	**Could occur**; the Project Site contains marginal habitat, and targeted surveys conducted 2004–2013 have not encountered a live desert tortoise (CH2M HILL 2004:5-3, GANDA 2008a:4, 2009b).
Flat-tailed horned lizard *Phrynosoma mcalli*	State: CSC LCR MSCP	This lizard is restricted to areas of fine sand and sparse vegetation in desert scrub, wash, succulent shrub, and alkali scrub and is probably most abundant in areas of creosote bush.	**Unlikely to occur**; the Project Site contains marginally suitable but highly fragmented/disturbed habitat with little suitable soil substrate. No CNDDB accounts for this species within 25 miles of Project Site (CNDDB 2013).
Amphibians			
Colorado River (Sonoran) toad *Bufo alvarius*	State: CSC LCR MSCP	Prefers damp areas near permanent springs or human-made watering holes, but may be found in arid grasslands and woodlands.	**Unlikely to occur**; this species is likely extirpated in California (CNDDB 2013).
Lowland leopard frog *Rana yavapaiensis*	LCR MSCP	This species inhabits slackwater aquatic habitats dominated by bulrushes, cattails, and riparian grasses near or under an overstory of Fremont's cottonwoods and willows.	**Unlikely to occur**; this species is presumed extirpated in California (CNDDB 2013).
Birds			
Burrowing owl *Athene cunicularia*	State: CSC	Burrow sites in open, dry annual or perennial grasslands, deserts, and scrublands with low-growing vegetation and burrowing mammal populations.	**Unlikely to occur**; the Project Site provides little suitable nesting habitat or suitable burrows/burrowing species. Known to occur near Needles (CNDDB 2013).
Yuma clapper rail *Rallus longirostris yumanensis*	Fed: E LCR MSCP	Only along the Lower Colorado River (from Topock Marsh southward) and around the Salton Sea. It occupies heavily vegetated freshwater.	**Could occur**; the Project Site adjacent to the river (AOC 10) provides suitable foraging and nesting habitat on the California side. This species has been documented in the Topock Marsh and the Topock Gorge in Arizona; however, it has not been documented on the California side of the River (CNDDB 2013; GANDA 2009a:6, 2010, and 2012).

TABLE 4.3-3
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT SITE

Species	Status[1]	Habitat	Potential for Occurrence [2]
Southwestern willow flycatcher *Empidonax traillii extimus*	Fed: E LCR MSCP	Dense riparian habitats along streams, rivers, and other wetlands; breeds in stands of dense cottonwood, willow, and tamarisk thickets.	**Could occur**; the Project Site provides suitable nesting and foraging habitat within the large stands of salt cedar along the banks of the Colorado River. This species has been documented in riparian areas around the Project Site, primarily at Topock Marsh, and has been detected near Park Moabi Lagoon (GANDA 2009a: Figure 5, page 7, 2010, and 2012).
Western least bittern *Ixobrychus exilis hesperis*	State: CSC LCR MSCP	Freshwater marshes with dense vegetation.	**Could occur**; known to occur at Topock Marsh (BOR 2004a). Along the Lower Colorado River, documented occurrences are all in Arizona.
Yellow-breasted chat *Icteria virens*	State: CSC	Riparian areas with dense woody vegetation bordering open areas.	**Could occur**; known to occur near Needles and at Topock Marsh (CNDDB 2013).
California black rail *Laterallus jamaicensis corturniculus*	State: T and FP LCR MSCP	Habitat includes shallow freshwater and brackish marshes dominated by bulrush species.	**Could occur**; suitable foraging and nesting habitat occurs within the Topock Marsh and East Ravine (AOC 10), but no CNDDB records near area; documented at delta of Colorado River.
Elf owl *Micrathene whitneyi*	State: E LCR MSCP	Cottonwood willow riparian forests and other desert woodlands with snags.	**Unlikely to occur**; no suitable habitat occurs on-site. The cottonwood forests of Topock Marsh in Arizona provide the closest suitable habitat. Nearest record occurs north of Needles and south in the HNWR (CNDDB 2013).
Gilded flicker *Colaptes chrysoides*	State: E LCR MSCP	Cottonwood riparian forests, orchards, landscape trees, and mesquite stands are used for foraging, but are strongly associated with saguaros for nesting.	**Unlikely to occur**; no suitable nesting habitat occurs on-site. The cottonwood forests of Topock Marsh in Arizona provide the closest suitable foraging habitat. Nearest CNDDB record 50 river miles south.
Gila woodpecker *Melanerpes uropygialis*	State E LCR MSCP	Mature cottonwood riparian forests and mesquite groves with snags and large trees for nesting.	**Unlikely to occur**; documented near Needles, but Project Site provides little suitable nesting habitat and low-quality foraging habitat.
Summer tanager *Piranga rubra*	State: CSC	Strongly associated with cottonwood-willow forests.	**Unlikely to occur**; Project Site provides little suitable nesting habitat and low-quality foraging habitat. Documented near Needles (CNDDB 2013).
Vermilion flycatcher *Pyrocephalus rubinus*	State: CSC LCR MSCP	Nests in cottonwood or other large desert riparian trees. Forages in riparian, irrigated fields, pastures, or other open mesic sites.	**Unlikely to occur**; suitable habitat does not occur in the Project Site. Foraging habitat present along river but Project Site provides little suitable nesting habitat. Historic documentation near Needles (CNDDB 2013).
Brown-crested flycatcher *Myiarchus tyrannulus*	State: CSC	Occur in riparian woodland or forest dominated by cottonwoods and willows, usually in a climax stage; along the Colorado River, has also bred in residential areas with tall, planted trees. The presence of woodpeckers or other cavity-excavating species is important.	**Unlikely to occur**; suitable habitat does not occur in the Project Site, though foraging habitat does. Documented within HNWR near Needles (CNDDB 2013).

TABLE 4.3-3
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT SITE

Species	Status[1]	Habitat	Potential for Occurrence[2]
Crissal thrasher *Toxostoma crissale*	State: CSC	Nests within desert riparian and wash habitats.	**Could occur**; documented along river on Arizona side near Needles and within HNWR (CNDDB 2013; GANDA 2008b:B-1, 2009, 2010, 2012), but Project Site provides little suitable nesting habitat.
Arizona Bell's vireo *Vireo bellii arizonae*	State: E LCR MSCP	Associated with willow thickets with baccharis.	**Could occur**; documented in Arizona near Needles and the Topock Marsh (CNDDB 2013; GANDA 2008b:5-1, 2009, 2010, 2012), but Project Site provides little suitable nesting habitat.
Sonoran yellow warbler *Dendroica petechia sonorana*	State: CSC LCR MSCP	Historically nests in riparian forests associated with open water but along the LCR; tamarisk is a habitat component.	**Could occur**; documented along river near Needles (CNDDB 2013), but Project Site provides little suitable nesting habitat.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	State: E Fed: C LCR MSCP	Riparian forest nester in flood bottoms of larger river systems. Requires multistory habitat for foraging.	**Could occur**; documented within the Topock Marsh, but the Project Site provides little suitable nesting and foraging habitat (CNDDB 2013; GANDA 2009a:6, 2010, and 2012).
Mountain plover *Charadrius montanus*	CSC	Winter in southern California and Arizona and inhabits sparsely covered chenopod scrub and valley and foothill grassland habitats.	**Unlikely to occur**; suitable habitat does not occur in the Project Site.
Loggerhead shrike *Lanius ludovicianus*	CSC	Nests in a variety of habitats, including broad-leaved upland forest, desert washes, Joshua tree woodland, Mojavean desert scrub, pinon and juniper woodlands, riparian woodland, and Sonoran desert scrub.	**Likely to occur**; the species was observed within the vicinity of the Project during several of the focused wildlife surveys (GANDA 2009ab, 2007). Potentially suitable habitat is available in the Project Site. Historic CNDDB record approximately 3 miles southeast of the Project Site (CNDDB 2013).
Mammals			
Pallid bat *Antrozous pallidus*	State: CSC	Occurs in a variety of sites; most common in open dry habitats. Roosts in undisturbed rocky sites.	**Could occur**; potentially suitable habitat available in the Project Site. Historic CNDDB record near Needles (CNDDB 2013).
Ring-tailed cat *Bassariscus astutus*	State: FP	Suitable habitat for ringtails consists of a mixture of forest and shrub land in close association with rocky areas or riparian habitats.	**Present.** An individual was observed within the Topock Station on October 25, 2007. A second ring-tailed cat sighting was made at the Station a few years later. No other ring-tailed cat sightings have been reported in the Project Site before or after these dates.
Colorado River cotton rat *Sigmodon arizonae plenus*	State: CSC LCR MSCP	Occupies narrow band of grassy, riparian, and cultivated vegetation along banks of Colorado River.	**Unlikely to occur**; little suitable habitat in area only documented CNDDB record is near Parker, more than 50 miles downriver (CNDDB 2013).
Pale Townsend's big-eared bat *Corynorhinus townsendii pallescens*	State: CSC LCR MSCP	Variety of habitats, including oak savanna, riparian, and grassland; roosts in mines, caves, and buildings.	**Unlikely to occur**; suitable foraging habitat present but marginally suitable roosting habitat present. No CNDDB records in area. Documented near Lake Mead and near Blythe (BOR 2008:316).

TABLE 4.3-3
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT SITE

Species	Status[1]	Habitat	Potential for Occurrence[2]
California leaf-nosed bat *Macrotus californicus*	State: CSC LCR MSCP	Habitat includes temperate deserts. Does not migrate or hibernate but finds warm daytime roosts in caves, mines, or buildings. Generally forages only 2 hours at night.	**Unlikely to occur**; foraging habitat exists; however, few suitable roosting sites in the vicinity. Recorded in a mine near Lake Havasu (CNDDB 2013).
Southwestern river otter *Lontra canadensis sonora*	CSC	Habitat occurs within the Colorado River basin in flowing waters and riparian woodland.	**Unlikely to occur**; suitable habitat does not occur in the Project Site.
Nelson's bighorn sheep *Ovis canadensis nelsoni*	FP within the Western Mojave Plan	Lambing habitat occurs within the steep montane habitats, and foraging habitat extends to the lower elevation scrub vegetation communities. Commonly utilized habitats include alpine, alpine dwarf scrub, chaparral, chenopod scrub, Great Basin scrub, Mojavean desert scrub, montane dwarf scrub, pinon and juniper woodlands, riparian woodland, and Sonoran desert scrub.	**Could occur**; suitable lambing habitat occurs in the mountains south of the Project Site, but not within the Project Site. Suitable foraging and movement habitat extends from the foothills of the mountains down into the floodplain and upland areas of the Project Site.

[1] **Legal Status Definitions**
U.S. Fish and Wildlife Service (USFWS) Federal Listing Categories
E = Endangered (legally protected)
T = Threatened (legally protected)
C = Candidate proposed for listing (legally protected)
California Department of Fish and Wildlife (CDFW) State Listing Categories
E = Endangered (legally protected)
T = Threatened (legally protected)
FP = Fully Protected (legally protected, no take allowed)
CSC = California Species of Concern (no formal protection)

California Native Plant Society's Rare Plant Rank (CRPR) Categories
2 = Plant species considered rare or endangered in California but more common elsewhere (but not legally protected under the federal and California Endangered Species Acts
0.1- Seriously threatened in California (over 80 percent of occurrences threatened/high degree and immediacy of threat)
0.2 - Fairly threatened in California (20-80 percent occurrences threatened/moderate degree and immediacy of threat)
0.3 - Not very threatened in California (<20 percent of occurrences threatened/low degree and immediacy of threat or no current threats known)

Lower Colorado River Multi-Species Conservation Program (LCR MSCP) species covered under the plan.

[2] **Potential for Occurrence Definitions**
Unlikely to occur: Potentially suitable habitat present, but species unlikely to be present in the Project Site because of current status of the species and very restricted distribution.
Could occur: Suitable habitat is available in the Project Site; however, there are few or no other indicators that the species might be present.
Likely to occur: Habitat conditions, behavior of the species, known occurrences in the Project vicinity, or other factors indicate a relatively high likelihood that the species would occur in the Project Site.
Known to occur: The species, or evidence of its presence, was observed in the Project Site during reconnaissance-level surveys or was reported by others.
Sources: CNDDB 2013, CNPS 2013, BOR 2004a.

Special-Status Plants

Small-Flowered Androstephium

Small-flowered androstephium (*Androstephium breviflorum*) is a special-status plant that was discovered during the 2012 floristic surveys for the Topock Groundwater Remediation Project. In California, the CNPS lists small-flowered androstephium as a CRPR 2.2 species. CRPR list 2 plants are considered to be rare in California, but are more common elsewhere in their distribution. This perennial bulbiferous herb can be found in Mojavean desert scrub, widely scattered in stabilized to semi-stabilized sandy areas in valleys from 220 to 800 meters in elevation. It blooms between March and April. This plant was found only during the 2012 floristic survey in Arizona (east side of the Oatman-Topock Highway, north of the BNSF railroad tracks), where it is not considered a special-status plant (CH2M HILL and GANDA 2013ab). Though suitable habitat is present within the current Project Site, the species was not observed during the various biological surveys referenced in this document.

Gravel Milk-Vetch

Gravel milk-vetch (*Astragalus sabulonum*) is a special-status plant that was discovered during the 2012 floristic surveys for the Topock Groundwater Remediation Project. In California, the CNPS lists spiny-haired blazing star as a CRPR 2.2 species. CRPR list 2 plants are considered to be rare in California, but are more common elsewhere in their distribution. This annual/perennial herb can be found in desert dunes, Mojavean Desert scrub, and Sonoran Desert scrub in sandy sometimes gravelly soils. It can be found in flats, washes, or roadsides from 60-930 meters in elevation and blooms from February through June. Though suitable habitat is present within the current Project Site, the species was not observed during the various biological surveys referenced in this document.

Spiny-Haired Blazing Star

Spiny-haired blazing star (*Mentzelia tricuspis*) is a special-status plant that was discovered during the 2012 floristic surveys for the Topock Groundwater Remediation Project. In California, the CNPS lists spiny-haired blazing star as a CRPR 2.3 species. CRPR list 2 plants are considered to be rare in California, but are more common elsewhere in their distribution. This annual herb can be found along sandy, gravelly slopes and washes within Mojavean desert scrub. It occurs from 150 to 1,280 meters in elevation and blooms between March and May. While suitable habitat for the species occurs within the washes of the current Project Site, the species was found only in Arizona, where it has no special status (CH2M HILL and GANDA 2013ab). No spiny-haired blazing stars were found within the current Project Site during the various biological surveys referenced in this document.

Mousetail Suncup

Mousetail suncup (*Chylismia arenaria* ssp. *arenaria*) is a CRPR list 2.2 species. This plant has been characterized as an annual or perennial herb (Baldwin et al. 2012), but in the Project Site it appears to be mostly perennial. The species was found at three locations above Bat Cave Wash within the current Project Site during the 2012 floristic surveys for the Topock Groundwater Remediation Project. The largest observed population consists of approximately nine plants, whereas, the other populations consist of single individuals. This species was also observed outside of the Project Site in the railroad right-of-way (ROW), approximately 500 feet west of Area of Concern (AOC 1).

Special-Status Invertebrates

MacNeill's Sootywing Skipper

MacNeill's sootywing (*Hesperopsis gracielae*) is a small (wingspread 23 mm) skipper with dark brown-and-black mottled wings. MacNeill's sootywing is covered under the LCR MSCP but has no other legal designations. Skippers are butterflies with widely-spaced antennae that are usually hooked. MacNeill's sootywing is found along the Colorado River and is known to only occur in those areas that support large, dense stands of its larval host plant, the quail bush (*Atriplex lentiformis*), which occurs along the sub-riparian edge of the river. Once they hatch from the eggs oviposited by the adult skippers on the host plant, the larvae feed on the host plant until they are ready to pupate and transform into adults. As adults, MacNeill's sootywings require nectaring sources from other plants besides quail bush, including heliotrope (*Heliotropium* sp.), honey mesquite, alfalfa (*Medicago sativa*), and tamarisk. The species could occur along the banks of the Colorado River near East Ravine as its host plant, quail bush, occurs in low densities along with abundant nectaring sources (CH2M HILL & GANDA 2013). No CNDDB occurrences have been recorded near the Project Site (CNDDB 2013) and the species was not observed during the various biological surveys. The nearest record in California was documented near Blythe (BOR 1996: Chapter 4, Table 15).

Special-Status Wildlife

Southwestern Willow Flycatcher

The southwestern willow flycatcher is a federally listed and state-listed endangered species and is a covered species in the LCR MSCP. Several factors have caused the decline in its population. Extensive areas of suitable riparian habitat have been lost due to river regulation and channelization, agricultural and urban development, mining, road construction, and overgrazing, resulting in the displacement of native riparian vegetation and allowing invasive tamarisk to grow (CH2M HILL 2007a:5-2, included as Appendix D-1 to this DEIR). Additionally, habitat fragmentation is thought to increase nest parasitism from the cowbird (*Molothrus ater*). Despite the invasion of tamarisk, southwestern willow flycatcher nesting has been documented in tamarisk stands along the Colorado River (USFWS 2002a:13).

Management units and designated critical habitat for the southwestern willow flycatcher along the Colorado River is broken into segments, and the Hoover to Parker Management Unit includes the Project Site. The segment from Davis Dam to Parker Dam (including the HNWR) was identified as having features essential to the southwestern willow flycatcher and proposed as critical habitat. Six breeding sites are known from this segment, with the largest at Topock Marsh having 34 territories in 2004. As a result of the completion of the LCR MSCP, USFWS management of HNWR for riparian habitat, and implementation of southwestern willow flycatcher management plans by the Chemehuevi and Fort Mohave Indian Tribe, this entire river segment was excluded from critical habitat designation. The closest designated critical habitat is located 50 miles east at Big Sandy River in Arizona.

GANDA has surveyed the Project Site annually for the presence of the southwestern willow flycatcher, following USFWS survey protocols, since 2005 (CH2M HILL 2005a, GANDA 2007, 2008b, 2009a, 2010, and 2012). In 2005, numerous fixed survey points were established at six sites (covering 80 acres), using USFWS protocols. These survey points encompass all potentially suitable habitats, namely tamarisk or other riparian thickets adjacent to open water, on both sides of the river. The largest site and the majority of the points are in the HNWR in Arizona, all of which lie beyond the Project Site in areas deemed to have the best potential for detecting the birds. The other six sites are located in California: one under I-40 and the railroad, one at the confluence of Bat Cave Wash and the Colorado River, and two at isolated wetlands and two sites in the Moabi Regional Park. Twelve call points were eliminated in 2008 because of vegetation (tamarisk) removal at Moabi Regional Park (GANDA 2008b:4-1).

In 2005, 2007, 2008, 2009, and 2012, biologists detected the bird, primarily by song, in various locations, but primarily in Arizona. No detections were made during the 2006 and 2010 surveys. All detections have been determined to be migratory or transient birds and no nests, or nesting activity, have been observed (GANDA 2009a:8). The first round of surveys in 2008 produced five southwestern willow flycatcher detections. Subsequent surveys did not detect the bird during the rest of the survey season (GANDA 2008b:5-1). Surveys conducted in 2009 detected one pair of southwestern willow flycatchers. It was determined that this detection was most likely of a transient pair because there were no additional detections during subsequent surveys. In 2010, two transient individuals were detected, one near the mouth of Bat Cave Wash and one in Arizona within the HNWR. Had these southwestern willow flycatchers been breeding in the area, additional detections would have been made during subsequent surveys as the pair of birds would have established a territory and proceeded with the nesting cycle (GANDA 2009a:8). Nesting territories do occur within the general area; documented nesting activities have been reported along the northeastern portion of Topock Marsh. This area supported 34 territories in 2004 and all nest locations are documented within tamarisk thickets (BOR 2008:28). The discerning feature between Topock Marsh territories and the Project Site is the lack of open water among large expanses of riparian habitat. The Project Site, while having tamarisk thickets, does so along a relatively narrow band of the floodplain, particularly near AOC 1 and AOC 10.

Mojave Desert Tortoise

The desert tortoise is a federally listed and state-listed threatened species and is a covered species in the LCR MSCP. The Project Site does not include designated critical habitat, and the nearest is located in the Chemehuevi Valley, 9 miles west of the Project Site. The decline in the desert tortoise population is primarily caused by habitat loss, degradation, and fragmentation resulting from increased human population and urbanization. The increase in urbanization, collection of tortoises for pets, overgrazing, landfills, predation, highway mortality, vandalism, agriculture, fire, drought, and off-road vehicle use all have contributed to the decline of the tortoise in the wild. Another major cause of the tortoise decline in the western Mojave Desert was the introduction of an upper-respiratory tract disease into many of the wild populations (USFWS 1994a:i).

From 2004 through 2009, PG&E contracted with CH2M HILL and GANDA to perform USFWS protocol presence/absence surveys for the desert tortoise. Although the USFWS revised the desert tortoise survey protocol starting with the 2009 survey season, projects conducting repeated surveys that were initiated prior to 2009 were allowed to use the older protocols. No live desert tortoises were detected in the survey area; however, one desert tortoise carcass and four sets of highly deteriorated bone shell fragments were discovered during these surveys. None of these remains were discovered in proximity to the Project Site. The nearest occurrences include one set of deteriorated plastron fragments which were discovered approximately 500 feet west of AOC 11 in 2009, and a set of shell bone fragments which were discovered approximately 500 feet east of Bat Cave Wash (AOC 1) in 2004. Two sets of highly deteriorated bone shell fragments were located in ephemeral drainages, indicating that they may have washed in from outside the survey area during a rainstorm. This interpretation is based on the location of the finds, surrounding topography, and lack of any other sign of desert tortoise in the survey area (GANDA 2009b:6-9).

One set of remains discovered in 2004 was not rediscovered during the 2009 surveys, but all other previously discovered remains were found. The remains discovered since 2004 were all old, disarticulated, and weathered. GANDA estimated that the bones had been exposed (i.e., out on the ground) for at least 10 years, probably much longer, and that the remains predate the degraded habitat conditions currently observed on the survey area (GANDA 2009b:9). The desert tortoise carcass and four sets of highly deteriorated bone shell fragments may indicate historical use of the area; however, no live desert tortoises, scats, tracks, or other evidence of recent use was observed (CH2M HILL 2005b:9, 2007a:5-10, 5-11; GANDA 2008a:5, 2009b: 7-8). Limited burrows with entrances large enough to accommodate a desert tortoise were also observed during surveys. However, these burrows had no typical indicators of desert tortoise use and were likely created by burrowing mammal species (GANDA 2009b:7-8). The annual protocol level surveys conducted by GANDA between 2005 and 2009 indicated that the Project Site was not being actively used by desert tortoise. Historic use was identified, however, with the discovery of multiple desert tortoise bone shell fragments.

Based on the survey results, desert tortoises were concluded to be absent in the Project Site (CH2M HILL 2007a:5-11, included as Appendix D-1 to this DEIR, and GANDA 2009b:9-10). Despite the absence of live tortoise observations, there is a possibility that desert tortoises could enter the area from the west. However, the habitat on-site was deemed to be of poor quality, lacking annual vegetation for foraging and burrows for shelter. Other conditions contribute to poor habitat quality, such as steep rocky slopes and drainages, the Chemehuevi Mountains, and the Project Site being highly fragmented by pipeline corridors, unpaved roads, I-40, U.S. Highway 95, the railroad, and the Station (GANDA 2009b:9; CH2M HILL 2007a:5-13, included as Appendix D-1 to this DEIR).

Yuma Clapper Rail

The Yuma clapper rail is federally listed as endangered and state-listed as threatened and fully protected. It also is covered under the LCR MSCP. Critical habitat has not been designated for this species, but the HNWR is considered an important population area for the Yuma clapper rail

(USFWS 2006:8-9). Yuma clapper rails prefer dense stands of emergent vegetation found in marsh habitats. Much of the decline of the species can be attributed to altered seasonal flow regimes and lost marsh habitat caused by the construction of dams and dredging on the Lower Colorado River. Additionally, mosquito-abatement programs and erosion-control efforts have reduced nesting habitat. Recent studies are also looking at selenium contamination as a potential cause of reduced reproductive success (USFWS 2006:11).

Most available habitat in the Project Site occurs in isolated patches scattered along the western shore of the Colorado River from Bat Cave Wash (AOC 1) south to East Ravine (AOC 10). Suitable habitat most notably occurs within the emergent wetland habitat near and within AOC 10. Before construction of the dams along the Lower Colorado River, few emergent wetlands occurred along the river because of spring high flows and flood events (BOR 2008:13). However, marsh habitats benefit from flushing events because those events reduce the buildup of dead plant materials, preventing the eventual conversion of the marsh to dry land. Dam-controlled rivers require active management to maintain the marshes in place of the natural cycle of river flows. Other threats to the species have included increased development along the Lower Colorado River near occupied habitats (USFWS 2006:6).

Several “call stations” have been surveyed annually for Yuma clapper rail by the USFWS along the South Dike (near the Topock Marina), which is located within the HNWR on the Arizona side of the river. Call stations or call points are fixed locations that are generally revisited annually to take a census of a particular species. In past years, this species has been detected south of the new South Dike and north of the Topock Marina (USFWS 2005:45). In 2005, seven Yuma clapper rails were detected along the South Dike transect in areas of dense emergent vegetation.

Additionally, several Yuma clapper rails were detected on the Arizona side of the Colorado River during the 2008, 2009, 2010, and 2012 southwestern willow flycatcher surveys. No reports of rails had been documented on the California side of the Colorado River near the Project Site through 2013 (CH2M HILL 2007a:5-15, included as Appendix D-1 to this DEIR; KBS 2013).

Other Special-Status Avian Species

Several bird species identified in Table 4.3-3 have the potential to nest in or adjacent to the Project Site. Species associated with riparian and other wetland habitats, such as the western least bittern (*Ixobrychus exilis hesperis*) and California black rail (*Laterallus jamaicensis corturniculus*), are most likely to nest in emergent wetlands along the Colorado River and Topock Marsh (Figures 4.3-1 - 4.3-1d). California black rail protocol surveys were conducted between March and May 2012 in areas near the Station. No California black rails were detected in the Project Site (KBS 2012).

Other birds, such as the Arizona Bell’s vireo (*Vireo bellii arizonae*), Sonoran yellow warbler (*Dendroica petechia sonorana*), yellow-breasted chat (*Icteria virens*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), and crissal thrasher (*Toxostoma crissale*), could nest in remnant riparian woodland and suitable trees outside the Project Site but within the HNWR. Loggerhead shrike (*Lanius ludovicianus*) could nest within the larger shrubs and trees on or near the Project Site.

Both California black rail and western least bittern have the potential to occur on the Arizona side of the Colorado River and near AOC 10, in areas of emergent wetland and freshwater marsh habitats containing dense cattails and bulrush stands. Their habitats are similar to that of the Yuma clapper rail, although the California black rail may prefer shallower marshy habitats. No California black rails have been detected during surveys and the CNDDB reports no occurrences of this rail within the Project Site; however, literature suggests that the species may occur within the HNWR (BOR 2008:137-138; CH2M HILL 2013) in Arizona. CNDDB records indicate western least bitterns occurring in the Topock Marsh, where they are suspected to nest (BOR 2008:127-128) and along the river north of the Project Site (CNDDB 2013).

The Arizona Bell's vireo has a limited distribution in California, occurring along the lower Colorado River. The species occurs primarily throughout Arizona, Utah, Nevada, and Sonora, Mexico. Early to mid-successional riparian habitat is typically used for nesting by the Bell's vireo because it supports the dense shrub cover required for nest concealment, as well as a structurally diverse canopy for foraging. Arizona Bell's vireos have been detected within the Topock Marsh in CNDDB records. Additionally, they have been detected during the Project-related surveys for southwestern willow flycatcher in Arizona; however, none were detected near the Project Site. Nesting was not confirmed but is possible due to the consistent detections throughout the breeding season (GANDA 2008b:5-1, 5-2, 2009a, 2010, 2012).

Sonoran yellow warblers typically nest in willow thickets with cottonwood overstory, and yellow-breasted chats typically nest in riparian habitats with a dense shrub layer. Yellow warblers are relatively uncommon along the Lower Colorado River and were once thought to have been extirpated as a breeder along the river. Recent breeding bird surveys have detected Sonoran yellow warblers at Topock Marsh; however, none have been detected near the Project Site (BOR 2008:226).

In desert areas of California, the yellow-breasted chat requires dense riparian thickets of willows, cottonwood, arrow weed, and tamarisk associated with rivers, swampy ground, and the borders of small ponds. Once thought to be a common breeder along the Colorado River, the yellow-breasted chat is now uncommon, like most other riparian-dependent species. Little documentation exists related to its breeding within the HNWR, but chats are documented in the CNDDB near Needles.

Western yellow-billed cuckoos are thought to require structurally complex riparian vegetation with tall trees and a dense woody vegetative understory (RHJV 2004:57). They breed in large blocks of riparian vegetation, particularly woodlands populated by cottonwoods and willows. Four sites within the HNWR were monitored for cuckoos in 2006 and 2007. Cuckoos were detected at three of the sites but were not confirmed as breeding in the HNWR (Johnson et al. 2008:17). Additionally, the 2008, 2009, and 2010 southwestern willow flycatcher surveys detected cuckoos in the HNWR, indicating this species might also find foraging habitat in the riparian areas of AOC 1 and AOC 10, although nesting habitat does not exist in the Project Site.

The Project Site is within the westernmost extent of the range of the crissal thrasher. This species is present in most riparian woodlands, favoring those areas with sandy soils. Honey mesquite habitats support the largest populations throughout the year, and the bird is rarely found far away from dense cover, nesting usually in mesquite trees but also in tamarisk and quail bush (BOR 1996: Chapter 4, Section z). The Project Site provides marginally suitable habitat in California, particularly in the tamarisk thickets of Bat Cave Wash (AOC 1) and East Ravine (AOC 10). The species was documented north of the Project Site, along the river, during the southwestern willow flycatcher surveys of 2007, 2008, and 2009 (CNDDB 2013, GANDA 2007, 2008b, 2009a:B-1, 2010, 2012).

Loggerhead shrikes require open land with lookout perches for hunting, preferring areas with short vegetation such as pastures, lawns, and freshly-plowed fields throughout most of Mexico and the southern half of the United States. They nest in dense, brushy vegetation, either in hedgerows or isolated trees, adjacent to open foraging grounds. Shrikes will use a variety of vegetation communities, including broadleaved upland forest, desert washes, Joshua tree woodland, Mojavean desert scrub, pinon and juniper woodlands, riparian woodland, and Sonoran desert scrub. The species was observed within the vicinity of the Project Site during several of the focused wildlife surveys (GANDA 2009ab, 2007).

Special-Status Mammal Species

An individual ring-tailed cat (*Bassariscus astutus*) was observed within the Station on October 25, 2007. A second ring-tailed cat sighting was made at the Station a few years later (PG&E 2014). No other ring-tailed cat sightings have been reported at the Project Site before or after these dates. The ring-tailed cat is a Fully Protected species in California. Fully Protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation for the protection of livestock. The ring-tailed cat is a slender procyonid with a tail that is often as long as the body. Body length ranges between 12 and 16 inches and the tail ranges between 12 and 17 inches. These nocturnal animals are primarily carnivorous, feeding mainly on rodents (woodrats and mice) and rabbits. Ring-tailed cats also feed on birds and eggs, reptiles, invertebrates, fruits, nuts, and some carrion (Taylor 1954, Trapp 1978). Ring-tailed cats forage on the ground, among rocks, and in trees. They are non-migratory and are active yearlong. Home range in California is estimated to vary from 44 to 515 hectares (Grinnell et al. 1937). Suitable habitat for ring-tailed cats consists of a mixture of forest and shrubland in close association with rocky areas or riparian habitats. They take cover in hollow trees, logs, snags, and cavities in talus and other rocky areas and recesses, and they nest in rock recesses, hollow trees, logs, snags, abandoned burrows, and woodrat nests. Young are often born in May and June (Walker et al. 1968), with one litter per year and an average of 3 young (range 1 to 5) per litter. The gestation period is from 40 to 50 days and females may drive males away 3 to 4 days before giving birth. Ring-tailed cats are usually not found more than 0.6 mile from permanent water.

One species of special-status bat has been documented near the Project Site. The pallid bat is a widely distributed species generally occurring in lower elevation sites, most often in dry rocky habitats. Little is known and scant documentation exists regarding the pallid bat within the Lower Colorado River. Bat surveys were not conducted as part of the Project and no documented surveys have been conducted in the HNWR. The river and the Topock Marsh could provide suitable foraging habitat for a number of migratory and resident bat species, and the rocks of Topock Gorge to the south of the Project Site may provide limited roost sites.

Nelson's bighorn sheep have a potential to occur in the Project Site. Bighorn sheep prefer visually open habitat that is steep and rocky in mountainous terrain above the desert floor. They use their eyesight as the primary sense for detecting predators at sufficient distances to ensure adequate time to reach safe terrain. Males and females will also often occupy different habitats outside the breeding season. Females tend to choose steep, safe areas for bearing and initial rearing of lambs, while males occupy much flatter areas during the lamb-rearing season (BLM 2013). Nelson's bighorn sheep and signs thereof (tracks, scat, etc.) were not observed within or near the Project Site during the various biological surveys; however, according to the CNDDB (2013), Nelson's bighorn sheep have been documented in the mountains south of the Project Site (Figures 4.3-3, 4.3-4 and 4.3-4c). The species may use the foothill portions of the Project Site for foraging and movement, but no lambing habitat occurs within the Project Site.

Special-Status Aquatic Species

Bonytail Chub

The bonytail chub is federally listed and state-listed as endangered and is covered under the LCR MSCP. Critical habitat in relation to the Project Site includes the Colorado River and the 100-year floodplain (Figures 4.3-3 and 4.3-4 through 4.3-4b), from Parker Dam to the northern boundary of the HNWR just south of Needles. The single major factor contributing to the decline of bonytail and other large-river fishes has been the construction of mainstem dams and the resultant cool tailwaters and reservoir habitats that replaced once-warm, riverine environments (USFWS 2002b:18-21, 2005:50).

The bonytail chub was once widely distributed throughout the Colorado River and its main tributaries. This species is found only in isolated populations through the historic range and in the lower basin, as well as in Lake Mohave, with possible individuals between Parker Dam and Davis Dam (USFWS 2005:50-51). The trend for the bonytail chub is for a continued rangewide decrease in wild populations caused by a lack of sufficient recruitment of young adults, along with the loss of old adults to natural mortality. The primary limiting factor for the bonytail chub appears to be nonnative fish predation of the early life stages (USFWS 2005:50-51). Extinction of this fish in the wild throughout its historic range is being forestalled by the stocking of subadult fish into the Upper Colorado River Basin and Lake Mohave and Lake Havasu in the Lower Colorado River (USFWS 2005:50-51). These stockings are intended to create populations of young adults that may be expected to persist for 40 to 50 years. The Lower Colorado River supports the largest remaining populations of bonytail chub. The populations consist primarily of subadults (CH2M HILL 2007a:5-23, 5-24; included as Appendix D-1 to this DEIR). The CNDDB and the PBA indicate reports of bonytail chub occurring in the river adjacent to the Project Site (Figures 4.3-3 and 4.3-4 through 4.3-4b).

Razorback Sucker

The razorback sucker is federally listed and state-listed as endangered, as well as state fully protected, and is covered under the LCR MSCP. As with the bonytail chub, dam construction and subsequent habitat degradation have led to the substantial decline of the razorback sucker. The trend for the razorback sucker is for a continued rangewide decrease in wild populations caused by a lack of sufficient recruitment of young adults, along with the loss of old adults to natural mortality. The primary limiting factor for the razorback sucker appears to be nonnative fish predation of the early life stages (USFWS 2005:56).

The razorback sucker is endemic to large rivers of the Colorado River Basin, from Wyoming to Mexico. Present distribution of natural populations is limited to Lake Mohave, Green River Basin, and the Upper Colorado River Basin. Presently, natural adult populations exist only in Lake Mohave, Lake Mead, and Lake Havasu. This species uses a variety of habitat types, from mainstem channels to slow backwaters of medium and large streams and rivers, sometimes around cover. In impoundments, they prefer depths of 1 meter or more over sand, mud, or gravel substrates (CH2M HILL 2007a:5-19, included as Appendix D-1 to this DEIR).

The Lower Colorado River supports the largest remaining populations of razorback sucker. The populations consist primarily of subadults as a result of the stocking efforts directed at forestalling extinction. In 2005, razorback suckers were documented near Needles. In 2006, 236 suckers were captured and released at that spawning site (CH2M HILL 2007a:56, included as Appendix D-1 to this DEIR). This species has been documented just downriver of the Project Site (CNDDB 2013) (see Figures 4.3-3, 4.3-4, and 4.3-4a).

Flannelmouth Sucker

The flannelmouth sucker is covered under the LCR MSCP but has no other legal designations. The flannelmouth sucker is native to the Colorado River system and was once considered extirpated from the Lower Colorado River; they were reintroduced in the late 1970s (Moyle 2002:179). Flannelmouth suckers are benthic (bottom-dwelling) fish that primarily eat algae, although invertebrates and many types of plant matter are also consumed. The flannelmouth sucker inhabits larger streams and rivers in all habitat types, including riffles, runs, eddies, and backwaters. The species spawns in streams over gravelly areas during spring and early summer. The CNDDB indicates flannelmouth suckers occurring in the Park Moabi Lagoon (CNDDB 2013) near the Project Site.

Sensitive Habitats

Sensitive habitats are those of special concern to resource agencies or that are afforded specific consideration through California Environmental Quality Act (CEQA), Section 1602 of the California Fish and Game Code, or Section 404 of the CWA, as discussed in Section 4.3.2, “Regulatory Background.”

A wetland delineation was completed in 2013 by CH2M Hill. The Colorado River is considered waters of the United States and subject to regulation under CWA Section 404. Other waters of the United States may also include ephemeral drainages if they are connected to waters of the United States (Colorado River), as shown in Figure 4.3-2. Other permanently or seasonally wet habitats, such as those described in Section 4.3.1.3, would qualify as wetlands subject to Section 404 regulation. All of these aquatic habitats are also anticipated to qualify as waters of the state and regulation under the Porter-Cologne Water Quality Control Act. In addition, waterways and associated riparian habitats are likely subject to regulation under Section 1600 et seq. of the California Fish and Game Code.

Other habitats considered sensitive by CDFW include those identified as “rare and worthy of consideration” in natural communities recognized by the CNDDB. These sensitive communities provide essential habitat to special-status species that are often restricted in distribution or decreasing throughout their range. Wetsern honey mesquite bosque is the only vegetation community within the Project Site that is considered sensitive by CDFW. It has a Global Rank of G3 and a State Rank of S2.1, meaning that this community is considered highly imperiled, as measured by rarity, trends, and threats (CNDDB 2013).

4.3.2 Regulatory Background

Biological resources in California are protected and/or regulated by a variety of federal and state laws and policies. Key regulatory and conservation planning issues applicable to the proposed Project are discussed below.

4.3.2.1 Federal

Federal Endangered Species Act

Pursuant to the ESA, generally, USFWS has regulatory authority over federally listed species. Under the ESA, a permit is required for any federal action that may result in “take” of a listed species. Section 9 of the ESA defines “take” as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Under federal regulations, take is further defined to include the modification or degradation of habitat where such activity results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

Section 7 of the ESA outlines procedures for federal interagency cooperation to protect and conserve federally listed species and designated critical habitat. Critical habitat identifies specific areas that have the physical and biological features essential to the conservation of a listed species and that may require special management considerations or protection. Section 7(a)(2) requires federal agencies to consult with USFWS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroying or adversely modifying designated critical habitat.

For projects where federal action is not involved and take of a listed species may occur, the project proponent may seek an incidental take permit under Section 10(a) of the ESA. Section 10(a) of ESA allows USFWS to permit the incidental take of listed species if such take is accompanied by a habitat conservation plan that ensures minimizing and mitigation of impacts associated with the take.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements domestically a series of international treaties that provide for migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds; the act provides that it shall be unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird" (16 USC 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA includes almost all bird species that are native to the United States. Permits for take of nongame migratory birds can be issued only for specific activities, such as scientific collection, rehabilitation, propagation, education, taxidermy, and protection of human health and safety and personal property.

Clean Water Act, Section 404

Section 404 of the CWA requires project proponents to obtain a permit from USACE before performing any activity that involves any discharge of dredged or fill material into waters of the United States. Waters of the United States include navigable waters of the United States, interstate waters, all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Many surface waters and wetlands in California meet the criteria for waters of the United States.

Clean Water Act, Section 402

CWA Section 402 regulates construction-related stormwater discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program, which is administered by the U.S. Environmental Protection Agency (USEPA). In California, the State Water Resources Control Board is authorized by USEPA to oversee the NPDES program through the RWQCB, in this case, the Colorado River (Region 7) RWQCB.

Clean Water Act, Section 401

CWA Section 401(a)(1) specifies that any applicant for a federal license or permit to conduct any activity that may result in any discharge into navigable waters shall provide the federal licensing or permitting agency with a certification that any such discharge will not violate state water quality standards. The RWQCBs administer the Section 401 program with the intent of prescribing measures for projects that are necessary to avoid, minimize, and mitigate adverse effects on water quality and ecosystems.

Rivers and Harbors Appropriations Act, Section 10

Section 10 of the Rivers and Harbors Appropriations Act of 1899 relates to the protection of navigable water in the United States and regulates any construction affecting navigable waters and any obstruction, excavation, or filling. Section 10 requires permits for all structures, such as riprap, and activities, such as dredging, in navigable waters of the United States. Navigable waters are defined as those subject to the ebb and flow of the tide and susceptible to use in their natural condition or by reasonable improvements as means to transport interstate or foreign commerce. USACE grants or denies permits based on the effects on navigation. Most activities covered under this act are also covered under Section 404 of the CWA. All activities involving navigable waters of the United States require a Section 10 permit. Projects must obtain approval of plans for construction, dumping, and dredging. Agencies involved in the coordination of the Rivers and Harbors Appropriations Act include the U.S. Coast Guard, USACE, USEPA, and state and local agencies.

Federal Land Management Policy Act

Congress established the Federal Land Management Policy Act of 1976 to direct federal agencies to manage public lands in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values and that, where appropriate, will preserve and protect certain public lands in their natural condition, provide food and habitat for fish and wildlife and domestic animals, and provide for outdoor recreation and human occupancy and use.

U.S. Bureau of Land Management Resource Management Plan

The Arizona BLM Lake Havasu Field Office administers portions of land adjacent to the Project Site. *The BLM Lake Havasu Resource Management Plan* (BLM 2007), which covers a portion of the Project Site, guides management of public lands and their resource values for multiple uses and sustained yield to ensure they are utilized in a manner that will best meet the present and future needs of the public. As required by the Federal Land Management Policy Act and current BLM policy, BLM established management directions for the balanced use of such renewable and nonrenewable resources as rangeland, wildlife, wilderness, recreation, cultural resources, and other natural, scenic, scientific, and historical values within the planning area.

U.S. Fish and Wildlife Service National Refuge System—Havasu National Wildlife Refuge

Established in 1941 with the signing of Executive Order 8647 by President Franklin D. Roosevelt, the HNWR encompasses 37,515 acres in California and Arizona. The majority of the HNWR is located in Arizona.

The overarching goal of the USFWS Refuge System is to conserve a diversity of fish, wildlife, plants, and their habitats for the benefit of current and future generations. By fulfilling this goal, the Refuge System can maintain the biological integrity, diversity, and environmental health of each refuge with a focus on native species and can contribute to the conservation, and, where appropriate, restoration of representative ecosystems and ecological processes in the United States. A variety of management plans are developed for refuges, which include habitat management plans, comprehensive conservations plans, and annual habitat management plans. These plans focus on maintaining the refuge system for the conservation of migratory birds, anadromous and inter-jurisdictional fish, and marine mammals. The HNWR is primarily managed to maintain and enhance riparian and wetland habitat (USFWS 1994b:30) adjacent to the Colorado River. Refuges are also managed for recreation and public interaction. Refuges have regulations that limit or define the amount of recreation use in the refuge. Pertaining to the HNWR, regulations focus primarily on the types and timing of particular recreation uses. The

Lower Colorado River National Wildlife Refuges Comprehensive Management Plan for HNWR offers guidance for managing habitat, fish, wildlife, and special-status species. The plan also delineates sensitive and important habitats, or areas of substantial biodiversity into Special Project and Protection Areas (USFWS 1994b).

4.3.2.2 State of California

California Endangered Species Act

Pursuant to CESA, a permit from CDFW is required for projects that could result in take of a plant or animal species that is state-listed as threatened or endangered. CESA defines "take" as an activity that would directly or indirectly kill an individual of a species. Authorization for take of state-listed species can be obtained through a California Fish and Wildlife Code Section 2080.1 consistency determination or a Section 2081 incidental take permit.

California Fish and Wildlife Code—Fully Protected Species

Protection of fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the California Fish and Wildlife Code. These statutes prohibit take or possession of fully protected species and do not provide for authorization of incidental take of fully protected species. CDFW has informed nonfederal agencies and private parties that their actions must avoid take of any fully protected species.

California Fish and Wildlife Code Section 1602—Streambed Alteration

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by CDFW under Section 1602 of the California Fish and Wildlife Code. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do the following without first notifying CDFW:

- Substantially divert or obstruct the natural flow of, or substantially change or use any material from, the bed, channel, or bank of any river, stream, or lake; or
- Deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

"Stream" is defined as a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation. CDFW's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A CDFW streambed alteration agreement must be obtained for any project that would result in an impact on a river, stream, or lake.

California Fish and Wildlife Code Sections 3503 and 3503.5—Protection of Bird Nests and Raptors

Section 3503 of the California Fish and Wildlife Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders Falconiformes and Strigiformes), including their nests or eggs. Typical violations of these codes include destruction of active nests resulting from removal of vegetation in which the nests are located. Violation of Section 3503.5 could also include failure of active raptor nests resulting from disturbance of nesting pairs by nearby soil investigation activities. This statute does not provide for the issuance of any type of incidental take permit.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, waters of the state fall under the jurisdiction of the appropriate RWQCB. The RWQCB must prepare and periodically update water quality control plans (basin plans). Each basin establishes numerical or narrative water quality objectives to protect established beneficial uses, which include wildlife, fisheries, and their habitats. Projects that affect wetlands or waters of the state must meet discharge requirements of the RWQCB, which may be issued in addition to a water quality certification or waiver under Section 401 of the CWA.

4.3.2.3 Local

Lower Colorado River Multi-Species Conservation Program

Implemented in 2005, the LCR MSCP is intended to balance the use of water resources in the Lower Basin of the Colorado River with the conservation of native species in compliance with the ESA. The LCR MSCP outlines a 50-year effort to conserve 26 federally listed and state-listed candidate and sensitive species along the Lower Colorado River, including birds, fish, small mammals, bats, reptiles, amphibians, insects, and plants. The program area covers more than 400 miles of the Lower Colorado River from Lake Mead to the southernmost border with Mexico, and includes Lakes Mead, Mohave, and Havasu, as well as the historic 100-year floodplain along the main stem of the Lower Colorado River. The LCR MSCP provides ESA compliance for current and future operations, including water diversions and hydroelectric power generation in this area.

The MSCP outlines general and species-specific measures to conserve species and their habitats. Primary components of the plan include native fish augmentation, species research, species and ecosystem monitoring, conservation area development, protection of existing habitat, and adaptive management.

Critical to the Lower Colorado River system are the unique habitats that support a huge number of resident and migratory species. Native riparian habitat has declined from historical acreage because of factors such as dam construction, river channelization, conversion to irrigated agriculture, urbanization, wildfire, and invasive species. In most areas along the Lower Colorado River, overbank flooding that native plant species need to reproduce no longer occurs. The LCR MSCP requires the creation and management of more than 8,100 acres of riparian, marsh, and backwater habitat for the targeted species, including 5,940 acres of cottonwood/willow, 1,320 acres of honey mesquite, 512 acres of marsh, and 360 acres of backwaters.

County of San Bernardino 2007 General Plan

The *County of San Bernardino 2007 General Plan* outlines conservation and regulatory guidelines for natural resources. The Conservation Element of the plan provides direction regarding the conservation, development, and utilization of the San Bernardino County's natural resources. Its objective is to prevent wasteful exploitation, destruction, and neglect of resources. Sensitive biological features are floral or faunal species of rare and/or endangered status, depleted or declining species, and species and habitat types of unique or limited distribution, including alkali wet meadows, pebble plains, limestone substrate, walnut woodland, Joshua tree woodland, perennial springs, and riparian woodlands. The Conservation Element is oriented primarily toward natural resources (San Bernardino County 2007:V-1).

The Conservation Element includes regions within the County. The Project falls within the desert region habitat of the Conservation Element, covering roughly 93 percent of the County land area (San Bernardino County 2007:V-5).

Goals and policies of the conservation element include programs incorporating resource agencies and nonprofit conservation groups, as well as the application of technological tools such as Geographic Information Systems to assist in coordinating and implementing the conservation of sensitive biological features.

Pertinent goals and policies include:

GOAL CO 1: The County will maintain to the greatest extent possible natural resources that contribute to the quality of life within the County.

GOAL CO 2: The County will maintain and enhance biological diversity and healthy ecosystems throughout the County.

- **Policy CO 2.1:** The County will coordinate with state and federal agencies and departments to ensure that their programs to preserve rare and endangered species and protect areas of special habitat value, as well as conserve populations and habitats of commonly occurring species, are reflected in reviews and approvals of development programs.

GOAL D/CO 1: Preserve the unique environmental features and natural resources of the Desert Region, including native wildlife, vegetation, water and scenic vistas.

4.3.3 Environmental Impacts

4.3.3.1 Impact Methodology

Analysis of impacts on biological resources, including terrestrial and aquatic resources, was based on consideration of Project activities and the anticipated footprint of areas potentially disturbed, existing habitat conditions at the Project Site, the known or presumed occurrence of special-status species at or near the Project Site, and coordination with the regulatory agencies (such as CDFW, USFWS, and USACE).

Impacts to vegetation communities and jurisdictional resources were quantified through a GIS analysis in which the proposed Project activities were laid over the vegetation community data layer from the *Topock Groundwater Remediation Project Floristic Survey Report* (CH2M HILL and GANDA 2013) and the jurisdictional resources data layer from the *Wetlands and Waters of the United States, Delineation for the Topock Compressor Station Groundwater Remediation Project, San Bernardino County, California* (CH2M HILL 2013). These original data layers were delineated in the field by CH2M Hill to support the environmental analysis of the Groundwater Remediation Project.

In terms of the Project activities considered, the Soil Work Plan (included as Appendix A to this DEIR) proposes soil sampling at a total of 292 locations with at least 876 individual samples (see Figures 3.2 through 3.6). Each work area was assigned an estimated impact area which included the required work zone needed for successful execution of the Project. Specific locations and number of samples collected at each location may vary based on access considerations, the results of field screening, and field observations. Further, because of unforeseen circumstances or data gaps, additional samples/sampling locations may be necessary. As part of this DEIR, therefore, a contingency of up to 25 percent additional sampling locations (i.e., up to 73 locations) is analyzed. These locations could occur anywhere within the Project Site, but would be conducted in the same manner as described in the Project Description (Chapter 3) and below in Section 4.3.3.3. In addition, the analysis considers the potential for impacts associated with bench scale tests, pilot studies, geotechnical evaluations, plant or other biota sampling, and related work area restoration activities that may be implemented as part of the Project (see Sections 3.5.3, 3.5.4, 3.5.5 and 3.5.6) if determined necessary.

Impacts to sensitive species were assessed in much the same way; through a GIS-based analysis comparing the locations of the various Project work areas with the species locations and their associated habitats.

4.3.3.2 Thresholds of Significance

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the CEQA Guidelines. The proposed Project would cause a significant impact on biological resources if it would:

- have a substantial adverse effect on waters, riparian, or sensitive habitat protected by federal or state regulations, including federal wetlands (as defined by Section 404 of the CWA), riparian habitats, or other sensitive natural community identified in any local or regional plans, policies, or regulations, or by CDFW or USFWS;
- have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS;
- interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

- have the potential to substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife species to drop below self-sustaining levels, reduce the number or restrict the range of a rare or endangered plant or animal; or
- conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, other approved local, regional, or state habitat conservation plans, or other local policies or ordinances protecting biological resources.

4.3.3.3 Impact Analysis

Sensitive Natural Communities

No natural communities or habitats identified as sensitive by local or regional plans, policies, or regulations, or by CDFW or USFWS exist on the Project Site; therefore, no impacts are anticipated to occur.

Wetlands and Riparian Habitats

Soil Sampling

The Soil Work Plan (included as Appendix A to this DEIR) proposes soil sampling at a total of 292 locations with at least 876 individual samples (see Figures 3.2 through 3.6). A contingency of up to 25 percent additional sampling locations (i.e., up to 73 locations) is also analyzed. These locations could occur anywhere within the Project Site, but would be conducted in the same manner as described in the Project Description (Chapter 3) and would avoid known sensitive biological resources.

Some of the soil sampling activities are anticipated to occur in areas that qualify for USACE jurisdiction and are protected under Sections 401 and 404 of the CWA. Likewise, those areas that qualify for USACE jurisdiction also qualify for CDFW jurisdiction under Section 1600 of the Fish and Game Code. These impacting Project activities include the proposed soil sample locations within desert washes such as Bat Cave Wash (AOC 1), and the riparian habitats around the pore water sampling sites within or near East Ravine (AOC 10).

Impacts to jurisdictional resources as a result of soil samplings are anticipated to be temporary because of the following: (1) only pruning, trimming, or clearing of vegetation is proposed to access some of the sites and clear around the sample area; (2) as described in the Soil Work Plan, some of the salt cedar will be cut off at the base, but the roots of all vegetation will be left in place to allow for natural, rapid regrowth of vegetation; (3) complete removal of vegetation is not expected at any work areas; and (4) once soil sampling is complete, all Project equipment and materials will be removed from the work area and, if the area is not paved, the area will be raked/brushed to remove tire tracks. Because only trimming, pruning, or clearing may be needed to access some of the sites and clear around the sample areas, revegetation is expected to occur within one to two growing seasons. Standard well and boring decommissioning procedures required by San Bernardino County and the California Department of Water Resources (DWR) (DWR 1991) would be followed for the decommissioning of all borings (Section 3.5.2.12). After sampling has been completed, boreholes would be grouted from the total depth to within 6 to

12 inches of the ground surface with a bentonite-cement grout installed continuously in one operation to effectively seal the hole. Native soil would be used to fill the top 6 to 12 inches.

Bench Scale Tests

Impacts to jurisdictional resources as a result of bench scale tests are anticipated to be less than significant as only three to five 5-gallon buckets of soil are to be removed by hand at three different locations of soil contamination, which will be determined by the results of soil sampling and sample analysis (as described in Chapter 3, "Project Description").

In Situ Soil Flushing and Soil Stabilization/Chemical Fixation Pilot Studies

As described in Chapter 3, "Project Description," there are currently no pilot studies planned; however, plausible areas where soil flushing and soil stabilization/chemical fixation pilot studies could potentially impact jurisdictional resources include Solid Waste Management Unit (SWMU) 1/AOC 1 – Bat Cave Wash. A plausible dimension of the pilot test area would be approximately 35 feet by 115 feet (0.1 acre) of temporary impact area. For the purposes of this DEIR, PG&E expects that pilot studies associated with SWMU 1/AOC 1would be located in the bottom of the Bat Cave Wash, in an area that is generally devoid of vegetation. All impacts are anticipated to be temporary (9 months) and once pilot studies are complete, infiltration galleries will be removed and backfilled with native material and the pilot test area will be raked to reflect its original condition. Impacts to jurisdictional resources as a result of in situ soil flushing and soil stabilization/chemical fixation pilot studies would be less than significant.

Geotechnical Evaluations

As described in Chapter 3, "Project Description," it is anticipated that up to three geotechnical evaluations will be undertaken within or near AOCs that have steep slopes and where remediation is determined necessary. AOCs within or near significant slopes that also occur within or near jurisdictional resources include: SWMU 1/AOC 1 (Bat Cave Wash), AOC 4, and AOC 10d. Geotechnical borings would be drilled using a hollow-stem auger drill. Soil samples would be collected using the standard penetration test and modified California ring samplers for index properties, strength, and compaction characteristics. As described above for soil sampling, all impacts from geotechnical evaluations are anticipated to be temporary and once geotechnical evaluations are complete, all equipment will be removed, exploratory boreholes will be decommissioned and backfilled with native material, and the geotechnical evaluation area will be raked to reflect its original condition. Impacts to jurisdictional resources as a result of geotechnical evaluations would be less than significant.

Plant or other Biota Sampling

Impacts to jurisdictional resources as a result of plant or other biota sampling are anticipated to be less than significant. As described in the Project Description (Chapter 3), the tissue sampling methods recommended would not require use of motorized equipment or removal of riparian vegetation or soil. Plant tissue samples would be collected using less invasive methods, for example by hand pruning without sacrificing individual plants. Tissue would be collected from as few plants as practical to provide a representative sample of diet concentrations in that specific sampling location. Tissue collection would focus on leafy vegetation rather than more intrusive seed collection, as allowed by study objectives. Pit traps for invertebrate sampling could be set where soil from a location is pushed aside to create a shallow pit (approximately 1 foot square by 1 foot deep) using a hand auger, shovel, or trowel. Once sampling is completed, the traps would be removed and soil would be pushed back to cover the shallow pits.

Table 4.3-4 lists the estimated temporary impact acreages for each habitat type within the Project Site. **Table 4.3-5** lists the estimated temporary impact acreages to those areas that qualify for USACE/CDFW jurisdiction.

Invasive Species Recruitment

Invasive species recruitment within sensitive habitats may occur as a result of soil disturbance and tracking of seeds on vehicle tires and equipment associated with Project activities. Invasive species can out-compete native ones and severely degrade the quality of jurisdictional resources and habitat used by both common and special-status species. Implementation of the proposed Project could result in the disturbance to vegetation, constituting riparian habitat and other jurisdictional resources, and the potential for habitat degradation through the recruitment of invasive species. Because these areas are already dominated by aggressive, quick-growing invasive species (e.g., salt cedar), however, impacts to sensitive habitats as a result of high invasive species recruitment would be less than significant.

TABLE 4.3-4
ESTIMATED TEMPORARY IMPACTS TO HABITAT TYPES WITHIN THE PROJECT SITE

Habitat Type	Estimated Temporary Impacts within the Project Site (Acres)
Creosote Bush Scrub	Up to 20 acres
Tamarisk Thicket	Up to 32 acres
Arrow Weed Thicket	Up to 1 acre
Blue Palo Verde Woodland	Up to 2 acres
Catclaw Acacia Thorn Scrub	Up to 1 acre
Foothill Palo Verde Scrub	Up to 1 acre
Allscale Scrub	Up to 1 acre
Western Honey Mesquite Bosque	Up to 1 acre
Tamarisk Thicket/Mesquite Bosque	Up to 1 acre
Tamarisk Thicket/Mesquite Bosque/Blue Palo Verde Woodland	Up to 1 acre
Common Reed Marshes	Up to 1 acre
Landscaped	Up to 1 acre
Developed	Up to 11 acres
Total Estimated Acres	**Up to 74 acres**

SOURCES: CH2M HILL and GANDA 2013ab; Parus 2014.

TABLE 4.3-5
ESTIMATED TEMPORARY IMPACTS TO USACE/CDFW HABITATS WITHIN THE PROJECT SITE

Jurisdictional Habitat	Estimated Temporary Impacts within the Project Site (Acres)
Palustrine scrub-shrub wetlands associated with ephemeral washes (PSSA)	Up to 9 acres
Palustrine emergent, permanently flooded wetlands (PEMH)	Up to 1 acre
Palustrine emergent, seasonally flooded wetlands (PEMC)	Up to 2 acres
Ephemeral washes	Up to 11 acres
Colorado River (R2UB2)	Up to 1 acre
Riparian habitat	Up to 1 acre
Total Estimated Acres	**Up to 25 acres**

SOURCES: CH2M HILL and GANDA 2013ab; Parus 2014.

Regulatory Requirements and Avoidance Measures

On February 12, 2013, PG&E consulted with Mr. Gerardo Salas of USACE Los Angeles District in Los Angeles regarding the application of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 121(e)(1) permit exemption to the Topock remediation project. Under the CERCLA regulations, administered here by the U.S. Department of the Interior (DOI), PG&E would not be required to apply for or obtain federal, state, or local permits for impacts to jurisdictional wetlands and waters as long as the Project actions are implemented in compliance with the substantive elements of Section 404 of the Clean Water Act, as applicable. Through email correspondence between Mr. Salas and Environmental Science Associates on March 4, 2013, it was determined that in 2008, PG&E was cleared for CERCLA exemption per Nationwide Permit (NWP) 38. During a meeting between USACE and PG&E in February 2013, the USACE confirmed that consistent with NWP 38 and the USACE's 5-year NWP update in the spring of 2012, activities undertaken entirely on a CERCLA site by authority of CERCLA as approved or required by EPA are not required to obtain permits under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act. Therefore, neither a 404 permit nor a 401 permit would be required for the proposed Project and no further USACE action is required (USACE 2013).

On December 11, 2012, PG&E consulted with CDFW District Regional Manager and his staff at the Blythe, California, office regarding the substantive requirements of the CDFW Section 1602 and the application of the CERCLA 121(e)(1) permit exemption to the Topock remediation project. On February 21, 2013, CDFW staff from the Blythe office conducted a field review of the Project. On March 6, 2013, the CDFW issued a letter to PG&E confirming that CERCLA 121(e)(1) applies to response actions conducted on-site at Topock, specifically to soil and groundwater investigation activities and to remedial actions at the Project Site (CDFW 2013). As a result, no Lake or Streambed Alteration Agreement is required by CDFW. However, PG&E must still comply with avoidance and minimization measures (AMMs) attached to the March 6, 2013, letter and any additional mitigation measures in this DEIR. The AMMs that apply to the proposed Project are summarized below (note that one additional AMM was included in the CDFW letter that does not apply to the Soil Investigation Project; therefore, the numbering below does not exactly correspond with the original letter).

1. Formal environmental training will be provided for all on-site personnel prior to soil investigation activities. This training will include biological, environmental laws, and guidelines.
2. If required for species or habitat protection, a biological monitor will be on-site during all ground-disturbing activities.
3. No direct or indirect impacts shall occur to any State or federally listed threatened, endangered, or candidate species. Any and all impacts to these species are strictly prohibited and are punishable by Federal and State laws. If threatened, endangered or candidate species occur within the proposed work area or could be impacted by the proposed Project, PG&E shall obtain the required State and Federal threatened and endangered species permits or comply with the substantive requirements of such laws, pursuant to CERCLA Section 121(e)(1).
4. No discharges to the CDFW Jurisdictional Washes or Colorado River shall occur without permits or compliance with the substantive requirements of applicable federal and state laws, pursuant to CERCLA Section 121 (e)(1).
5. Spoil sites shall not be located within the bed, bank, and channel of any watercourse, where spoil could be washed back into a stream, or where it will cover aquatic or riparian vegetation. Any materials placed in seasonally dry portions of a stream that could be washed downstream or could be deleterious to aquatic life shall be removed from the Project Site prior to inundation by high flows.
6. Structures and associated materials, including Project-related debris, not designed to withstand high seasonal flows shall be removed to areas above the high water mark before such flows occur.
7. All debris, bark, slash, sawdust, rubbish, silt, cement or concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances resulting from Project-related activities that could be hazardous to aquatic life or waters of the state, shall be prevented from contaminating the soil and/or entering the waters of the state and shall not be deposited within 150 feet of the high water mark, unless containerized. None of these materials shall be allowed to enter into or be placed within or where they may enter or be washed by rainfall or runoff into waters of the State. When soil investigation activities are completed, any excess materials or debris shall be removed from the work area.
8. Erosion control measures shall be implemented where necessary to reduce erosion and sedimentation in wetlands, waters of the United States, waters of the state, and habitat occupied by covered species and plant species when activities are the source of potential erosion impacts.

9. During soil investigation activities, the contractor shall not dump any litter or debris within the riparian/stream zone. All such debris and waste shall be removed daily and properly disposed of at an appropriate site.
10. PG&E shall comply with all litter and pollution laws. All contractors, subcontractors, and employees shall also obey these laws and it shall be the responsibility of PG&E to ensure compliance. The cleanup of all pollution spills shall begin immediately. PG&E shall notify CDFW immediately of any spills and shall consult with CDFW regarding cleanup procedures and requirements.
11. Spills and releases of materials shall be cleaned up immediately and thoroughly. Appropriate spill response equipment, including spill kits preloaded with absorbents in an over-pack drum (where feasible), will be provided at convenient locations throughout the Project Site. Spent absorbent material will be managed and disposed of in accordance with applicable regulations. In particular, absorbents used to clean spills of hazardous materials or waste will be managed as hazardous waste unless characterized as nonhazardous.
12. Trash and scrap receptacles shall be located throughout work areas, as necessary, to promote proper disposal of solid wastes. Receptacles shall be provided with lids or covers to prevent windblown litter.
13. Proper receptacles to dispose of hazardous wastes shall be provided at each work area.
14. Excess concrete will be collected and disposed of in designated concrete washout facilities.
15. Any sanitary and septic waste facilities provided during Project work will be located away from drainage courses and traffic areas. These facilities will be maintained regularly.
16. Staging/storage areas for equipment and materials shall be located outside of the Colorado River’s bed, bank, and channel. No equipment maintenance shall be done within 150 feet of the Colorado River channel where petroleum products or other pollutants from the equipment may enter these areas under any flow.
17. Stationary equipment such as motors, pumps, generators, and welders, located within or adjacent to the Colorado River, shall be positioned over drip pans.
18. Vehicles shall not be driven or equipment operated in water-covered portions of the Colorado River or in wetted areas (including but not limited to ponded, flowing, or wetland areas) or where riparian vegetation may be destroyed, except as necessary to complete authorized work as described under the plan.
19. Any equipment or vehicles driven and/or operated within or adjacent to the Colorado River shall be checked and maintained daily to prevent leaks of materials that, if introduced to water, could be deleterious to aquatic life, wildlife, or riparian and wetland habitat.
20. Project-related vehicle traffic and equipment storage shall be restricted to established roads, designated access roads, the working strip, storage areas, staging and parking areas, and other designated Project areas. All of these areas shall be clearly marked by posting signs.
21. All vehicles and equipment regularly entering and leaving work areas shall be cleaned to reduce material track-out.

22. Vehicles shall not exceed a speed limit of 15 mph in the ROWs or on unpaved roads within sensitive land-cover types.

23. All disturbed portions of the Colorado River shall be restored to as near original condition as possible, except as otherwise indicated to CDFW.

24. No vehicles shall be refueled within 100 feet of a wetland, stream, or other waterbody unless done within a constructed secondary containment area that includes, at a minimum, a perimeter berm and leakproof liner.

25. All equipment and vehicles will have federal- or state-approved spark arrestors. All vehicles will carry an approved fire extinguisher (or backpack pump filled with water) and a shovel.

26. The development of new access and ROW roads by PG&E and vegetation clearing and blading for temporary vehicle access shall be minimized.

27. Covered storage for materials, especially toxic or hazardous materials, shall be provided to prevent exposure of these materials to stormwater. Toxic or hazardous materials will be stored or transferred on impervious surfaces that will provide secondary containment for spills. Vehicles and equipment used for material delivery and storage, as well as all contractor vehicles, shall be parked in designated areas.

28. Trash dumping, firearms, open fires (such as barbecues) not required by the activity, hunting, and pets will be prohibited in work activity sites.

29. The perimeter of the work area shall be adequately flagged to prevent damage to adjacent riparian and wetland habitats. The upstream and downstream limits of the work area, including all areas of impact to existing desert riparian habitat and "Environmentally Sensitive Areas," shall be identified with flagging or brightly colored mesh fencing or some other means readily conveyed to the equipment operators. These limits will be identified by a supervisor familiar with the terms of these AMMs, prior to the beginning of activities, and will be confined to the minimal area needed to accomplish the proposed work.

30. No herbicides shall be used on vegetation unless specifically authorized, in writing, by CDFW.

31. PG&E assumes responsibility for the restoration of any wildlife habitat that may be impaired or damaged, either directly or incidental to the Project, as a result of failure to properly implement or complete the listed mitigative features or from activities that were not included in PG&E's Notification.

32. All Project resident engineers, Project engineers, Project inspectors, and contractors and sub-contractors shall be provided with a copy of the AMMs, and shall abide by the terms and conditions of the AMMs.

33. PG&E shall notify CDFW, in writing, at least 5 days prior to initiation of construction activities and at least 5 days prior to completion of soil investigation activities. The notification shall be sent to: Department of Fish and Wildlife, Colorado River Program, P.O. 2160, Blythe, California 92226; FAX No. (760) 922-5638.

IMPACT BR-1 **Substantial Adverse Effects on Waters, Riparian, or Sensitive Habitats Protected by Federal or State Regulations.** *Implementation of the proposed Project could result in disturbance and/or removal of riparian vegetation, wetlands and other waters of the United States under U.S. Army Corps of Engineers and California Department of Fish and Wildlife jurisdiction along the Colorado River; specifically within Bat Cave Wash and East Ravine. This impact would be* ***significant****.*

Mitigation Measure BR-1: No-net-loss of Wetland, Riparian or other Sensitive Habitat Function or Value

The Project shall be implemented to avoid effects to the habitat values and functions of identified jurisdictional areas (i.e., floodplain and riparian areas, wetlands, and waters of the United States and habitats designated by CDFW as sensitive, including ephemeral washes and western honey mesquite bosque). Before undertaking ground-disturbing activities within East Ravine and Bat Cave Wash, a qualified biologist shall coordinate with PG&E to ensure that the footprints of investigation activities, including drill pads, staging areas, and access routes, are designed to avoid disturbance to sensitive habitats to the extent feasible. Where complete avoidance is not feasible, Project activities shall be implemented to ensure no-net-loss of habitat value or function. The following avoidance measures shall be implemented when working in Bat Cave Wash and East Ravine:

a. No plants or vegetation shall be completely removed – only pruning, trimming, clearing, or similar approaches which allow the natural regrowth of the plant will be allowed;

b. Vegetation pruning, trimming, or clearing shall only occur to access investigation sites and clear around the sample areas where absolutely necessary;

c. The only vegetation to be cut off at the base (cleared rather than pruned or trimmed) will be salt cedar at the mouth of Bat Cave Wash. The roots of the salt cedar at the mouth of Bat Cave Wash will be left in place where possible to allow for natural, rapid regrowth of vegetation;

d. No more than 20 percent of the crown on all native trees, such as palo verde, shall be trimmed, and no main branches shall be trimmed. This is consistent with what is recommended by the International Society of Arboriculture (ISA 2011);

e. Complete removal of vegetation in any work area shall be prohibited; and

f. Project equipment and materials from work areas shall be completely removed and, if the area is not paved, it shall be raked/brushed to remove tire tracks.

A biological monitor shall be present for all vegetation trimming, pruning, and clearing to ensure the above measures are implemented and that vegetation is protected to the extent feasible.

Timing:	Specific impact identification and Project adjustments shall occur during Project planning and implementation.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance with input from the jurisdictional agencies.
Significance after Mitigation:	Avoidance of impacts to habitat function and value of wetlands, other waters of the U.S. and riparian habitat would occur through the reduction of vegetation removal and restoration as described in Mitigation Measure BR-1. Using these measures, revegetation is expected to occur naturally within one to two growing seasons ensuring a no-net-loss of habitat value or function within this timeframe. This would reduce impacts on sensitive habitats to a **less than significant** level.

Special-Status Species

Disturbance of Special-Status Plants

Mousetail suncup is the only special-status plant species that occurs within the Project Site. There are no Project activities planned in areas where Mousetail suncup is established as the species occupies steep vertical rock cliffs which are a highly unlikely site for soil sampling activities, bench scale tests, pilot studies, geotechnical evaluations and plant or other biota tissue sampling. As described in the Project Description (Chapter 3), no collection of special-status and culturally-sensitive plant species will be necessary for the tissue sampling activities. Therefore, this species is not anticipated to be impacted by Project activities.

IMPACT BR-2 **Impacts to Special-Status Plant Species.** *Implementation of the proposed Project would not affect special-status plants. Mousetail suncup is the only special-status plant species that was observed within the Project Site. However, there are no Project activities planned in areas where Mousetail suncup is established. For this reason, this impact would be* ***less than significant****. No mitigation would be required.*

For a discussion of impacts that may occur to indigenous plants of biological and cultural significance (identified in the Ethnobotany Survey Report included as **Appendix D-3** of this DEIR) and proposed mitigation measures, see Section 4.4, "Cultural Resources" (Section 4.4.3.3), specifically, Mitigation Measure CR-1e-4.

Disturbance of Special-Status Invertebrates

The Project Site provides suitable habitat containing the larval host plant (quail bush) and sufficient nectar-bearing sources for the MacNeill's sootywing skipper. Although not observed during the various biological surveys, the species could occur along the banks of the Colorado River near the outlet of the East Ravine. Impacts to the species are anticipated to be less than significant as only pore water sampling is proposed at this location. Impacts associated with the pore water sampling will be minimal as all work will be completed by hand and access to each pore water sampling site will be by boat or by foot. Therefore, this impact would be less than significant.

No impacts are anticipated to occur to special-status invertebrates as a result of bench scale tests, pilot studies, geotechnical evaluations, or plant or other biota tissue sampling. Invertebrate tissue sampling is not anticipated to impact MacNeill's sootywing skipper as the sampling is aimed at other ground-dwelling species subject to capture by pit fall trapping.

IMPACT BR-3 **Direct Disturbance of and Loss of Habitat for Special-Status Invertebrate Species.** *Implementation of the proposed Project could affect special status invertebrates, specifically the MacNeill's sootywing skipper, either directly or through habitat modifications. Impacts to MacNeill's sootywing skipper habitat at East Ravine would be minimal as all work will be completed by hand and access to each pore water sampling site would be by boat or by foot. This impact would be* ***less than significant****. No mitigation would be required.*

Disturbance of Special-Status Birds and Loss of Habitat

The Project Site provides foraging and/or nesting habitat for a variety of special-status bird species. Many of the special-status bird species listed in Table 4.3-3 have potential to nest in the Project Site, including the crissal thrasher, Sonoran yellow warbler, Arizona Bell's vireo, California black rail, Yuma clapper rail, western least bittern, and yellow-breasted chat. Soil sampling activities, bench scale tests, pilot studies, geotechnical evaluations and plant or other biota tissue sampling would result in temporary and short-term disturbance in the Project Site, which includes habitat for sensitive species. Clearing and drilling in upland areas could result in disturbance or loss of foraging and nesting habitat, and clearing of roads and staging areas could adversely affect other habitat areas. Because these Project-related effects would be temporary (see Section 3.5.8 of this DEIR) and limited (up to 74 acres) given the overall foraging habitat within the vicinity of the Project (i.e., expanses of desert scrub in all directions, riparian habitat in Topock Marsh and HWNR, etc.), this temporary loss of foraging habitat would not substantially affect any special-status birds. In addition, all of the proposed staging areas will be located in previously disturbed and existing operational areas to the extent feasible; thereby reducing impacts to nesting birds and their habitat.

Removal or disturbance of active nests and impacts to nesting habitat of both sensitive species and other common nesting birds could result during soil sampling activities, bench scale tests, pilot studies, geotechnical evaluations, and plant or other biota tissue sampling. Visual or noise disturbance of active nests could result in nest abandonment and loss for various special-status bird species. Loss of occupied habitat (including foraging and nesting habitat) and active nests of special-status birds could result in a substantial adverse effect on local populations of the affected species. While there are currently no regulations that identify noise thresholds for determining a significant impact on nesting birds, the USFWS has often used a noise level of 60 A-weighted decibels (dBA) at an energy-equivalent noise level (L_{eq}) (or ambient noise levels, whichever is loudest) at the outer edge of habitat for federally listed threatened or endangered species, as the point at which Project-related noise may affect a listed bird species.

Of particular note, Yuma clapper rails are known to inhabit portions of the Topock Marsh and Topock Gorge just north and east of the Project Site in Arizona (KBS 2012), and annual surveys conducted by USFWS biologists have indicated that both the Topock Marsh and the Topock Gorge support relatively steady populations (BOR 2008:9). Although no clapper rails have been detected near the Project Site during the most recent focused surveys conducted by Konecny Biological Services (KBS 2012), potentially suitable habitat occurs within the emergent freshwater marsh habitats scattered along the western shore of the Colorado River, most notably near the East Ravine (AOC 10). Yuma clapper rails within the vicinity of Topock Marsh may occupy this habitat in subsequent breeding seasons. Soil and water sampling activities and access road improvements could occur within 300 feet of marsh habitat. If it is determined that Yuma clapper rail occupy this habitat during subsequent surveys by USFWS or during soil investigation activities, direct and indirect effects could occur, such as habitat loss, stranding of active nests (usually built at edge of water), and increasing predation and nest failure. Project-related disturbance from traffic or noise during the rail's breeding season could cause rails to have nest failures and/or abandon nesting territories. Direct and indirect effects could also occur to the other special-status bird species, such as the Arizona Bell's vireo and California black rail, other species shown in Table 4.3-3, and the nests of species covered under the federal Migratory Bird Treaty Act through habitat loss, impacts to nests, and traffic noise potentially resulting in nest abandonment.

IMPACT BR-4 **Direct Disturbance of and Loss of Habitat for Special-Status Bird Species.** *While the proposed Project could result in the temporary loss of foraging habitat for these species, the loss of foraging habitat would not substantially affect any special-status birds due to the abundance of foraging habitat in the vicinity of the Project Site. Implementation of the proposed Project could affect the active nests of special-status birds. In addition, visual or noise disturbance of active nests could result in nest abandonment and loss of sensitive bird species. This impact would be* ***significant****.*

Mitigation Measure BR-4: Disturbance of Special-Status Birds. The following measures shall be implemented to avoid impacts to active nests and nesting birds and to ensure compliance with the Migratory Bird Treaty Act and California Fish and Game Code:

a. Where possible, vegetation trimming, pruning, or clearing and other activities shall be timed to avoid the nesting season for special-status bird species that may be present (March 15 through September 30).

b. If vegetation removal or other Project activities are necessary in vegetated areas between March 15 and September 30, focused surveys for active nests of special-status birds (including Arizona Bell's vireo, California black rail, Yuma clapper rails and other species identified in Table 4.3-3) shall be conducted no more than 72 hours before such activities begin. A qualified biologist shall conduct pre-investigation surveys to identify active nests that could be affected. The appropriate area to be surveyed and the timing of the survey may vary depending on the activity and species that could be affected and shall be determined by the qualified Project biologist. For the Yuma clapper rail, the pre-investigation surveys shall specifically identify habitat within 300 feet of investigation areas, in accordance with measures set forth in the Bird Avoidance and Minimization Plan (BIAMP) which was finalized on April 30, 2014 (CH2M HILL 2014).

c. The qualified Project biologist shall implement all of the avoidance and minimization measures that are outlined in the BIAMP (CH2M HILL 2014).

d. The biologist shall consult the BIAMP (CH2M HILL 2014) for required nesting bird avoidance buffers and requirements for the on-site biological monitor. Buffers vary depending on the species of bird, so the BIAMP (CH2M HILL 2014) should be consulted once a nest is identified.

Timing:	Before and during Project activities.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	Conducting pre-investigation surveys for special-status birds and nesting birds and developing and following avoidance and minimization measures (including establishing buffers for active nests) as described in Mitigation Measure BR-4 would reduce the impact on nesting special-status birds to a **less than significant** level.

Disturbance of Desert Tortoise and Loss of Habitat

Desert tortoises may have historically used the Project Site, but no evidence of current use has been documented during the protocol-level surveys conducted yearly since 2004 (CH2M HILL 2005b:9, 2007a:5-10, 5-11, 2010b; GANDA 2008a:5, 2009b:7-8). The PBA stated that although it is possible that the desert tortoise could enter the Project Site from the west, the quality of the present creosote scrub habitat is poor, typically lacking annual vegetation for foraging and burrows for shelter (CH2M HILL 2007a:5-11 to 5-12, included as Appendix D-1 to this DEIR). The Project Site is also highly fragmented by steep rocky slopes of the Chemehuevi Mountains, deep drainages, pipelines, roads, and rail lines. These conditions make permanent occupation of the survey area unlikely. Removal of upland habitat through clearing to access and drill boreholes, reoccupy previously disturbed staging areas, and improve roadways during implementation of the proposed Project could result in disturbance and loss of marginal desert tortoise habitat, but these effects would be relatively minor in terms of potential acres disturbed. However, since there is a slight potential for the desert tortoise to enter the Project Site, the species could be directly impacted by the implementation of the Project.

IMPACT BR-5 **Direct Disturbance of and Loss of Habitat for Desert Tortoise.** *Implementation of the proposed Project could affect desert tortoises, either directly or through habitat modifications. This impact would be* ***significant****.*

Mitigation Measure BR-5: Disturbance of Desert Tortoise and Loss of Habitat. Consistent with the PBA and the USFWS letter concurring with the PBA, the following measures shall be implemented:

a. Before any ground-disturbing Project activities begin, a qualified desert tortoise biologist (i.e., an experienced tortoise expert whom USFWS would be confident in the evaluation and survey for the presence of the desert tortoise under the PBA) shall identify potential desert tortoise habitat in areas that could be affected by the Project activities. The qualified biologist shall conduct a pre-investigation desert tortoise clearance survey prior to the start of investigative activities. They shall also conduct monitoring on a spot basis (1–2 days for a 2-week period) or as a result of a change in investigation boundaries or limits.

b. PG&E shall designate a field contact representative (FCR) who will be responsible for overseeing compliance with the mitigation measures. The FCR shall be trained by the qualified biologist and have authority to halt activities that are in violation of the mitigation measures/or pose a danger to listed species. The FCR will have a copy of the mitigation measures when work is being conducted on the site. The FCR may be a project manager, PG&E representative, or biologist.

c. Prior to Project activities and immediately prior to the initiation of ground disturbance, a qualified desert tortoise biologist shall conduct worker awareness training for all PG&E employees and the contractors involved with the proposed Project.

d. The FCR will be on-site during all Project activities. The qualified biologist will examine work areas for desert tortoises and their sign (i.e., burrows, scat, tracks, remains, and pallets), ensuring 100 percent coverage of the area, and clear each area of activity prior to work initiation. Any desert tortoise burrows and pallets outside of, but near, the project footprint shall be flagged at that time so that they may be avoided during work activities. At conclusion of work activities, all flagging shall be removed. Should any live tortoises be found during the clearance survey, or if a tortoise moves into the work area, all work shall stop immediately and the animal shall be left to move out of the work area on its own accord. Tortoises shall not be handled. Encounters with desert live desert tortoises shall be reported to BLM Lake Havasu biologists. Information to be reported will include for each individual: the location (narrative, vegetation type, and maps) and date of observation; general conditions and health; any apparent injuries and state of healing; and diagnostic markings.

e. All workers shall be required to check under their equipment or vehicle before it is moved. If a desert tortoise is encountered under vehicles or equipment, the vehicle shall not be moved until the animal has voluntarily moved to another location or to a safe distance from the parked vehicle.

Timing:	Before and during Project activities.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.

Significance after Mitigation: Conducting pre-investigation surveys for desert tortoises, conducting worker awareness training, and conducting biological monitoring as described in Mitigation Measure BR-5 would reduce the impact on the species to a **less than significant** level.

Disturbance of Ring-Tailed Cat and Loss of Habitat

An individual ring-tailed cat was observed within the Station on October 25, 2007. A second ring-tailed cat sighting was made at the Station a few years later. Removal of habitat through clearing to access and drill samples, reoccupy previously disturbed staging areas, and improve roadways during implementation of the proposed Project could result in disturbance and loss of habitat for ring-tailed cats, but these effects would be relatively minor in terms of the potential acres disturbed. However, since there is a potential for the ring-tailed cat to nest on the Project Site, the species could be directly impacted by the implementation of the Project. Impacts to the species could include injury or death through direct contact with Project equipment, through collapse or damage of an active or occupied nest, or indirectly through nest abandonment as a result of nearby Project-related disturbances.

IMPACT BR-6 **Disturbance of Ring-Tailed Cat and Loss of Habitat.** *Implementation of the proposed Project could affect ring-tailed cat, either directly or through habitat modifications. This impact would be **significant**.*

Mitigation Measure BR-6: Disturbance of Ring-Tailed Cat and Loss of Habitat. The following measures shall be implemented:

a. Pre-investigation surveys for ring-tailed cats will be conducted by a qualified biologist prior to the start of investigation activities. No activities that will result in disturbance to nests or ring-tailed cats will proceed prior to completion of the surveys. If no active nests are found, no further action is needed. If a ring-tailed cat nest is present, part b (below) will be implemented. The CDFW will also be notified of any active nests within the proposed disturbance zones.

b. Ring-tailed cats are fully protected under Fish and Game Code Section 4700, as described above. If an active ring-tailed cat nest is found, the Project shall be redesigned to avoid the loss of the site occupied by the nest if feasible. If the Project cannot be redesigned to avoid the nest, the CDFW will be contacted for their input. If approved by the CDFW, demolition of the nest site will commence outside of the breeding season (February 1 to August 30). If a non-breeding nest is found in a site scheduled to be removed, prior to disturbance, the CDFW will be notified to review and approve proposed procedures to ensure that no take occurs as a result of the action. Sites with nests that need to be removed will first be disturbed at dusk, just prior to removal that same evening, to allow ring-tailed cats to escape during the darker hours.

Timing: Before and during Project activities.

Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	Conducting pre-investigation surveys for ring-tailed cats and following avoidance and minimization measures as described in Mitigation Measure BR-6 would reduce the impact on the species to a **less than significant** level.

Aquatic Species

Project activities could result in increases in sediments, turbidity, and contaminants that could adversely affect fish and their habitat immediately adjacent to and downstream of the Project Site. Project activities conducted near the Colorado River, including drilling, clearing, grading, soil and water sampling and road improvements, would disturb soil that could enter water bodies and result in increased turbidity and sedimentation adjacent to and downstream of the disturbed areas.

The Project footprint would allow drilling and access routes near the river. Drilling and access road improvements would occur in Bat Cave Wash or other drainages, which could convey sediments or contaminants during a flash flood. Additionally, a pilot study for in- situ flushing and soil stabilization/ chemical fixation may be located in the bottom of the Bat Cave Wash, in an area that is generally devoid of vegetation. The pilot study would include the construction of either an infiltration gallery or injection well network for applying water. It should be noted, however, that there is an existing earthen dam across Bat Cave Wash and other barriers across East Ravine that should prevent any sediments detached by Project activities from reaching the aquatic habitats in the Colorado River.

Fish population levels and survival have been linked to levels of turbidity and siltation in a watershed. Prolonged exposure to high levels of suspended sediment could create a loss of visual capability in fish, leading to a reduction in feeding and growth rates; a thickening of the gill epithelia, potentially causing the loss of respiratory function; clogging and abrasion of gill filaments; and increases in stress levels, reducing the tolerance of fish to disease and toxicants.

Also, high levels of suspended sediments would cause the movement and redistribution of fish populations and could affect physical habitat. Once suspended sediment is deposited, it could reduce water depths in pools, decreasing the water’s physical carrying capacity for juvenile and adult fish. Increased sediment loading could also degrade food-producing habitat downstream of the Project Site. Sediment loading could interfere with photosynthesis of aquatic flora and displace aquatic fauna.

Avoidance is the most common fish response to increases in turbidity and sedimentation for most species. However, certain species, including the razorback sucker, have evolved in riverine conditions with naturally high turbidity levels and, as a result, may be attracted to naturally high turbidity. Fish will not occupy areas unsuitable for survival unless they have no other option. Some fish, such as bluegill and bass species, will not spawn in excessively turbid water. Therefore, soil investigation activities could cause fish habitat to become limited if high turbidity caused by Project-related erosion were to preclude a species from occupying habitat required for specific life stages.

In addition, the potential exists for contaminants such as fuels, oils, and other petroleum products used in soil sampling activities and geotechnical evaluations, as well as chemicals used in the in situ pilot studies to be introduced into the water system directly (groundwater) or through surface runoff. Contaminants may be toxic to fish or may alter oxygen diffusion rates and cause acute and chronic toxicity to aquatic organisms, thereby reducing growth and survival.

Sedimentation and increased turbidity or other contamination could degrade water quality and adversely affect fish habitat and fish populations in the Colorado River, and could result in fish mortality through stranding during soil investigation activities. However, as discussed in Section 4.6.3.1 of this DEIR, the Soil Work Plan describes and references Standard Operating Procedures (SOPs) and Best Management Practices (BMPs) that have been developed during the previous investigations. Among other things, the SOPs and BMPs will reduce potential impacts to hydrology and water quality during the Project activities (see Section 4.6, "Hydrology and Water Quality"). In addition, PG&E will meet the substantive provisions of the state Construction General Permit (CGP) in accordance with the CERCLA exemption (see Section 2.3), and prepare and implement an erosion control plan as part of the Project. These provisions will become Conditions of Approval for the Project if it is approved and would reduce the potential for increased sedimentation and turbidity and the release of contaminants during Project activities to a less than significant level.

IMPACT BR-7 **Fish Mortality, Interference with Spawning Habitat, and Other Adverse Aquatic Effects.** *Increased sedimentation and turbidity and the release of contaminants during Project activities could adversely affect fish habitat and movement in the Colorado River. This impact would be* ***less than significant****. No mitigation would be required.*

Regional and Local Plans

Regional and local plans include the LCR MSCP, *County of San Bernardino 2007 General Plan*, BLM *Lake Havasu Resource Management Plan*, and *Lower Colorado River National Wildlife Refuges Comprehensive Management Plan*.

The LCR MSCP focuses primarily on river flows including diversions, discharges, hydroelectric facilities, return flows, and water quality within the three states through which the river flows: Nevada, California, and Arizona. The Project would affect upland and potentially riparian habitat, but the overall scale of the proposed activities is small, given the landscape. Thus, the Project would likely have little effect on the attainment of the LCR MSCP goals and objectives, the conservation strategy of the LCR MSCP, or the viability of the covered species.

BLM's *Lake Havasu Land Management Plan* outlines guidance for managing habitat, fish, wildlife, and special-status species. The plan also requires BLM to protect water quality or other potentially harmful conditions for resident wildlife, fish, and human populations. The Project Site is located within an Area of Critical Environmental Concern (ACEC), designated the Beale Slough Riparian and Cultural ACEC. This area is designated to protect both cultural and natural resources. This large ACEC contains regional rare riparian resources and wildlife habitat at Beale Slough to the north of the Project Site (BLM 2007:106, Map 28), but the Project Site contains the cultural element of the ACEC. No conflicts with BLM's management plan are anticipated with implementation of the proposed Project. The proposed Project is not considered a prohibited activity and the Project activities would not degrade the biological resources element of the ACEC. Actions associated with cleanup of the contaminated soil would not conflict with management goals because these actions would reduce the potential for long-term adverse effects on sensitive resources.

The *Lower Colorado River National Wildlife Refuges Comprehensive Management Plan* for HNWR offers guidance for managing habitat, fish, wildlife, and special-status species and is similar to the BLM plan in the protection of resident wildlife and fish. The plan also delineates sensitive and important habitats, or areas of substantial biodiversity into Special Project and Protection Areas (USFWS 1994b). These areas have defined management goals and objectives assigned to them within the plan. USFWS lands in the Project Site are not delineated into Special Project/Protection Areas and therefore do not have more specific management goals. The Project would not conflict the overall management goals of the HNWR and would not be a prohibited activity under the plan. The proposed Project is intended to clean up contaminated soil that may be harmful to biological resources in the future. Although the physical implementation of Project activities (i.e., drilling and clearing) may not be compatible with the purposes of the refuge, reducing the potential for long-term harm from contaminated soil would be compatible and could be permitted.

The goals and policies for the *County of San Bernardino 2007 General Plan* are not in conflict with implementation of the Project. The proposed Project would not affect substantial areas of habitat and would not substantially diminish habitat values because the Project would have a small overall footprint and would not occur within pristine habitat. Because of the relatively small area affected, the area disturbed by the proposed Project would not substantially diminish habitat values.

IMPACT BR-8 **Consistency with Regional and Local Plans.** *Implementation of the proposed Project would not have substantial adverse effects on the viability of populations of species covered in the Lower Colorado River Multi-Species Conservation Program (LCR MSCP), the effectiveness of the LCR MSCP's conservation strategy, and attainment of the goals and objectives of the LCR MSCP. Additionally, the Project would not conflict with resource management goals of the USFWS, BLM, or DOI. This impact would be* ***less than significant****. No mitigation would be required.*

Wildlife Movement Corridors or Native Wildlife Nursery Sites

Wildlife movement corridors or linkages are a concern to local, state, and federal resource and conservation agencies because these corridors allow wildlife to move between adjoining open space areas that are becoming increasingly isolated as open space becomes increasingly fragmented from urbanization, rugged terrain, or changes in vegetation. However, corridors mitigate the effects of this fragmentation by (1) allowing wildlife to move between remaining habitats, thereby permitting depleted populations to be replenished and promoting genetic exchange; (2) providing escape routes from fire, predators, and human disturbances, thus reducing the risk of catastrophic events (such as fire or disease) on population or local species extinction; and (3) serving as travel routes for individual animals as they move within their home ranges in search of food, water, mates, and other needs (Noss 1983:704; Simberloff and Cox 1987:63-65).

Wildlife movement activities typically fall into one of three movement categories: (1) dispersal (e.g., juvenile animals from natal areas, or individuals extending range distributions); (2) seasonal migration; and (3) movements related to home range activities (foraging for food or water, defending territories, searching for mates, breeding areas, or cover). A wildlife corridor is defined as a piece of habitat, usually linear in nature that connects two or more habitat patches that would otherwise be fragmented or isolated from one another. Wildlife corridors are usually bounded by urban land areas or other areas unsuitable for wildlife. The corridor generally contains suitable cover, food, and/or water to support species and facilitate movement while in the corridor. Larger, landscape-level corridors (often referred to as “habitat or landscape linkages”) can provide both transitory and resident habitat for a variety of species.

Within the aquatic environment of the river, the Project would not interfere with the upstream and downstream movement of any fish or wildlife species. In the terrestrial setting, the Project would not adversely interfere with any wildlife movement through the Project Site, or through the region. Project components such as bore holes, improvements to access roads, and staging areas would leave little to no obstacles that would present a barrier to wildlife movement. The dispersed nature of the Project components would result in the Project Site retaining relatively large, contiguous, and intact areas of wildlife habitat within the Project Site, which would remain as viable areas for use by wildlife.

Native wildlife nursery sites are areas that a species specifically chooses for the purposes of breeding and/or rearing their offspring. These can include, but are not limited to, known breeding/nesting grounds for migratory birds, maternity roosting sites for bats (e.g., rock crevices, caves, large trees, bridges, and buildings), and spawning sites for fish species. The portion of the HNWR located north and east of the Project Site in Arizona, is the closest known nursery site for migratory birds and fish species (both common and special-status) to the Station (USFWS 2007 and 2008). The Project will not impact this portion of the HNWR. Buildings associated with the Station and bridges that occur within and adjacent to the Project Site (I-40 and the BNSF railroad) could support maternity roosting site for bats; however, impacts from the Project are not anticipated to affect these structures.

IMPACT BR-9 **Substantial Interference with Fish or Wildlife Movement Corridors or Native Wildlife Nursery Sites.** *Implementation of the proposed Project would not substantially interfere with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. This impact would be* ***less than significant****. No mitigation would be required.*

4.4 Cultural Resources

This chapter addresses the potentially significant adverse impacts of the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Soil Investigation Project (Project) to cultural resources in the Project vicinity in accordance with the significance criteria established in Appendix G of the California Environmental Quality Act (CEQA) Guidelines. This chapter is based primarily on information provided in *Cultural Resources Investigations for Interim Measures No. 3: Topock Compressor Station Expanded Groundwater Extraction and Treatment System* (Davy et al. 2004), *Archaeological and Historical Investigations Third Addendum: Survey of the Original and Expanded APE for Topock Compressor Station Site Vicinity* (McDougall and Horne 2007), and *Topock Remediation Project Additional Soils Investigation: Condition Assessments at Fourteen Archaeological and Historical Sites* (Hearth et al. 2013).

The categorical term "Cultural Resources" refers to remains and sites associated with human activities and includes: prehistoric and historic archaeological resources; architectural/built-environment resources; human remains; and places important to Native Americans and other ethnic groups, including elements or areas of the natural landscape which have traditional cultural significance. Under CEQA, paleontological resources, although not associated with past human activity, are analyzed with cultural resources. For the purposes of this analysis, cultural resources are categorized into the following groups: archaeological resources; historic-period built resources (including architectural/engineering resources); places important to Native Americans; and human remains. Paleontological resources are also addressed in this Cultural Resources chapter.

Archaeological resources are places that contain tangible remnants of past human activity. Archaeological resources may be either prehistoric (before European contact), ethnohistoric (Native American settlements occupied after the arrival of European settlers in California), or historic-period (after European contact and generally reflecting land uses introduced by Euro-Americans). The most frequently encountered prehistoric or historic Native American-associated archaeological sites are village settlements with residential areas and sometimes cemeteries; temporary camps where food and raw materials were collected; smaller, briefly occupied sites where tools were manufactured or repaired; and special-use areas like caves, rock shelters, and rock art sites. Historic-period archaeological sites may include foundations or features such as privies, corrals, and trash dumps.

Historic-period "built" resources include standing structures, infrastructure, transportation corridors, and landscapes of historic or aesthetic significance that are generally 50 years of age or older. Historic-period built resources are often associated with archaeological deposits of the same or similar age. In California, historic-period built resources considered for protection tend to focus on architectural sites dating from the Spanish Period (1529–1822) through World War II (WWII) (1939–1945). As Post WWII–era facilities become 50 years or older, they become eligible for protection. Some historic-period resources less than 50 years old may warrant protection despite their age if they meet criteria for exceptional significance.

Places and elements of the natural landscape of cultural importance to Native Americans, also referred to as ethnographic resources can include: sacred sites, archaeological resources, rock art, and the prominent topographical areas, features, habitats, plants, animals, and minerals that contemporary Native Americans value and consider essential for the preservation of their traditional values. Such resources may also constitute a Traditional Cultural Property (TCP) or cultural landscape. Generally, locations of cultural importance to Native Americans are difficult to define because traditional culture often prohibits Native Americans from sharing information about these locations with the public. Additional information on TCPs and cultural landscapes is provided in Section 4.4.1.5.

Human remains (inhumations and cremations) include burials both within and outside formal cemeteries, including: town cemeteries and burial grounds; family burial plots; church graveyards; military cemeteries; Native American burial mounds; and prehistoric and historic-period isolated grave sites. Native American groups in California practiced both inhumation and cremation, with inhumations either flexed (where the body is interred in a fetal position) or extended (where the body is laid flat on its back). Cremations were often placed in ceramic vessels (commonly referred to as *ollas*) and buried. Large burial mounds containing hundreds of individuals have been documented in California, although single or small-group burials are also common. After Spanish settlement, many missionized Native Americans were interred in mission cemeteries. Burial practices varied among immigrant groups to California. For example, many Chinese immigrants in the late 19th century observed Confucian doctrine, where remains were disinterred after a set period of time and returned to China. Historic-period burial sites range from large formal cemeteries to small family plots to isolated burials in remote areas.

Paleontology is a branch of geology that studies prehistoric life forms through the study of plant and animal fossils. Paleontological resources represent a limited, nonrenewable, and impact-sensitive scientific and educational resource. As defined in this section, paleontological resources are the fossilized remains or traces of multicellular invertebrate and vertebrate animals and multicellular plants, including their imprints. Fossil remains such as bones, teeth, shells, and leaves are found in the geologic deposits (rock formations) where they were originally buried. Paleontological resources include not only the actual fossil remains but also the collecting localities, and the geologic formations containing those localities.

4.4.1 Existing Setting

4.4.1.1 Archaeological Setting

This section is largely derived from the Cultural Resources section of the *Final Environmental Impact Report for the Topock Compressor Station Groundwater Remediation Project* (DTSC 2011), referred to as the Groundwater Final Environmental Impact Report (FEIR) or Groundwater Remediation Project.

The Project Site is located at the boundary between the Mojave Desert and the Sonoran Desert biotic zones, each of which has a somewhat distinct prehistory. Three broad prehistoric periods can be identified for the California deserts (Davy et al. 2004); these are discussed below.

Paleoindian, or Paleoarchaic

Archaeologists refer to the earliest established period of human occupation of the California deserts as the Paleoindian, or Paleoarchaic, period. In the Mojave Desert, the Lake Mojave complex (ca. 12,000 to 7,500 years “Before Present” [B.P.]) is the local manifestation of this broad cultural period (Davy et al. 2004). In California’s Sonoran Desert, Paleoindian-Paleoarchaic sites are often placed within the San Dieguito complex, which shares many characteristics with the Lake Mojave complex. Lake Mojave assemblages are marked by various artifact types, including long-stemmed and leaf-shaped projectile points and occasional fluted projectile points that may be related to the Clovis culture. Also present are flaked-stone crescents, domed scrapers, and heavy core tools. While Warren and Crabtree (1986) believe that ground stone artifacts are rare or absent in the complex, occasional milling tools have been found in Lake Mojave complex contexts (Grayson 1993). Some researchers have argued that certain intaglios, rock rings, and trails date as early as the San Dieguito complex in the Sonoran Desert (Hayden 1982), but these features are extremely difficult to date accurately.

Because sites of the Lake Mojave complex are often found in association with the shorelines of ancient lakes and outwash drainages, some researchers have argued that Lake Mojave people focused their subsistence pursuits on lacustrine (lake-related) resources; in contrast, other archaeologists suggest that grasslands suitable for the grazing of large game would have surrounded the lakes, and that these were the primary subsistence focus of Lake Mojave groups. Relatively few robust faunal assemblages (dense groups of animal bones) have been recovered from Lake Mojave sites, but investigations of Lake Mojave sites at Fort Irwin (DTSC 2011) and elsewhere provide some evidence for the exploitation of a broad range of fauna, including freshwater mollusks, fish, and large and small game animals. Hence, a relatively broad-spectrum subsistence strategy, rather than a narrow focus on large game or lacustrine resources, may be suggested.

To date, no scientifically verified evidence of Lake Mojave complex sites has been reported in the Topock area, but it is possible that such sites could be present on stable surfaces such as well-developed desert pavements. Additionally, archaeological sites associated with Lake Mojave complex sites could occur in depositional environments along the Colorado River floodplain but would be very deeply buried within Holocene alluvial sediments.

Archaic

The Archaic period (ca. 7,500 to 1,500 B.P.) in the California Desert was a time when humans were becoming increasingly adapted to a variety of local conditions. During this period, the lands in the southwest were transformed through natural processes into the deserts seen in the region today. Early Archaic people (7,500 to 6,800 B.P.) followed a highly mobile hunter-gatherer lifestyle, moving through various procurement grounds where subsistence resources were located (Davy et al. 2004). This largely nomadic existence led to a large sphere of interaction among native people.

Evidence indicates that the Middle Archaic period in this region, which began around 6,800 B.P. and lasted until 3,500 B.P., was substantially drier and more arid than in previous times (Grayson

1993). This period is contemporaneous with the Pinto period (Warren and Crabtree 1986). Pinto period sites contain the diagnostic Pinto projectile point type, as well as a conspicuous rarity of grinding tools, suggesting that seed processing was not common. Other tools common in the assemblages of Middle Archaic sites include Elko projectile point types, large and small leaf-shaped projectile points and knives, keeled scrapers, and well-made flake scrapers (Davy et al. 2004).

The Late Archaic period, which began around 3,500 B.P. and lasted until 1,500 B.P., shows evidence of a gradual cultural shift within the region. Settlement patterns during the Late Archaic period begin to show evidence of a more localized way of life, with evidence suggesting the increased importance of agriculture, wild-plant horticulture, and regional trade networks that spanned from the Pacific Coast to the interior southwest. Sites from this time period exhibit evidence of semi-permanent pit-houses, increased economic importance of seeds, and the introduction of the bow and arrow (Davy et al. 2004).

Archaic period sites could be present in the Project Site on stable surfaces such as well-developed desert pavements, or in depositional environments along the Colorado River floodplain. If present, materials associated with this time period could be deeply buried within Holocene alluvial sediments.

Late Prehistoric

During the Late Prehistoric period (1,500 B.P. to 150 B.P.), floodplain agriculture became firmly established along the lower Colorado River and pottery production was introduced. The term “Patayan” is typically used to describe the particular Late Prehistoric cultural manifestation that is found in the region of the Project Site (McGuire and Schiffer 1982). The Patayan period is typically divided into three main phases: Patayan I (1,500 to 1,000 B.P.), Patayan II (1,000 B.P. to 500 B.P.) and Patayan III (500 B.P. to historic times). Within these phases are two culturally distinct regions included in the Patayan period, the “Upland Patayan” and “Lowland Patayan.” Evidence suggests the Upland Patayan had contact with and influence from the Anasazi of the Colorado Plateau. Lowland Patayan sites also exhibit evidence of influence from the Hohokam of central southern Arizona. Sites along the Colorado River in proximity to the Project Site are considered Lowland Patayan.

The Patayan period is characterized by evidence of large-scale trade networks involving shells from the coast of California and ceramics from southeastern Nevada. Based on the presence of ceramics in many assemblages, it is believed that this period also marks the beginning of focused agriculture along this area of the Colorado River. Archaeological evidence in this region suggests a gradual evolution of agricultural behavior that likely began with wild-plant horticulture, transitioning through the seeding of untended plots to augment a hunting and gathering lifestyle, and eventually resulting in intensive agriculture with irrigation strategies and substantial dietary shifts. This shift is evidenced by increased use of storage pits, increased population, and domesticate varieties of plants, including corn, becoming more common in the assemblage over time (Davy et al. 2004).

Patayan sites near the Project Site have not typically produced clear evidence of subsistence history. However, one site identified by Geib and Keller in 2002 (Davy et al. 2004), Bighorn Cave, suggests a rich plant-based diet that complemented hunting and gathering expeditions. The earliest components of the Bighorn Cave site include agave parts, cactus stems, screwbean mesquite pods, juniper bark, and goosefoot or pigweed greens. Domesticated corn kernels, squash rinds, and a bean were also found, although in small quantities in the earliest components of the site (Davy et al. 2004).

Population increases during the Patayan II and III phases occurred in conjunction with increases in cultural complexity and differentiation, including the adoption of some ceramic decorative styles (recurved rims, stucco finishes) and the abandonment of others (incised decoration). Increased complexity and regional differentiation appears to be related to increases in migration of people from the Lake Cahuilla area sometime around 600 B.P., with ceramic traditions such as Colorado Buff, Palomas Buff, and Parker Buff found at Patayan sites and throughout the region (Davy et al. 2004).

Topock Maze

The Topock Maze (Maze) (CA-SBR-219) is an archaeological resource associated with the California Desert region. The Maze, as described by McDougall and Inoway (2005:1), is "a very large desert intaglio or geoglyph consisting of parallel windrows of dark, patinated desert pavement gravels 'raked' from the desert pavement surface, exposing the white-to-buff colored calcareous silts underlying the desert pavement between the windrows. This creates a maze-like scene of alternating dark rock lines separated by light-colored bands devoid of gravels." As documented archaeologically, the Maze comprises three distinct locations (or "loci"), designated as Loci A, B, and C (McDougall and Inoway 2005). Locus A is the largest (17.7 acres) and is west of the PG&E Topock Gas Compressor Station (Station), south of I-40. Locus B (9 acres) and Locus C (6 acres) are north of I-40 on the east and west sides of Bat Cave Wash, respectively. Locus A is the most pristine archaeological manifestation of the Maze, having the most well-preserved rows.

The Maze as understood and documented by archaeologists is limited to the physical manifestation or modifications visible on the landscape. For local Native American Tribes, however, the Maze represents only one, albeit an integral, component to a complex traditional cultural landscape of indescribable significance to the belief systems, values, and personal and group identity of Tribal people. Some Native American Tribes view the archaeological interpretation of the Maze (three distinct loci) as limited to that which meets definitions of value in the scientific community, whereas some Native American Tribes' value of the Maze includes both physical and intangible aspects, with the Maze extending to disturbed inter-locus areas, as well as surrounding lands, all of which are linked conceptually and spiritually to other landforms in the area as a single "whole."

The origin of the Maze has been disputed. Some support a Native American origin, while others have suggested that it is a byproduct of railroad construction, which occurred between 1888 and 1893. On the assumption that the Maze is of Native American origin, there is also little agreement as to its age or how it was created. The Maze holds religious, mythological, and ceremonial significance to some Native American Tribes who associate the Maze with the transition to the afterlife. The interpretive plaque at the southern boundary of Locus A refers to the Maze as a place where warriors "cleansed themselves" after battle before returning to their home villages (McDougall and Inoway 2005). According to the Mojave people, the Maze has always been there, and they disclaim that the Maze was built. Those who consider its origin related to the construction of the railroad typically cite a memo from a railroad engineer in 1891 that describes the collection of gravel into windrows by Mojave workers prior to the gravel being hauled and used to support a bridge caisson (Haenszel 1978; Musser-Lopez 2011). Photographic evidence of the bridge construction, interviews with railroad workers from that time, and statements from Needles residents present at the time of the bridge construction all suggest, however, that the Maze was present prior to bridge construction, even if portions of it were later collected for ballast or support material (DTSC 2011).

4.4.1.2 Ethnographic Setting

This section is largely derived from the Cultural Resources section of the Groundwater FEIR (DTSC 2011).

Several culturally distinct Native American Tribes have long-standing historical and cultural ties to the Project Site and the surrounding region. The following section contains ethnographic information regarding these cultural groups, including the Cahuilla, Chemehuevi, Cocopah, Halchidhoma, Havasupai, Hualapai, Maricopa, Mojave, Quechan, Serrano, and Yavapai peoples.

Cahuilla

Groups speaking the Cahuilla language occupied much of central-southern California from the inland valleys of western Riverside County, across the San Jacinto and Santa Rosa Mountains, throughout the Coachella Valley, and into the northern Colorado Desert (Bean 1978). The Cahuilla language is classified within the Takic family of the Uto-Aztecan stock, closely related to several other southern California languages such as Luiseno, Serrano, and Gabrielino. Ethnographers have divided the Cahuilla into three geographic units—the Mountain, Pass, and Desert Cahuilla. Of these groups, the Desert Cahuilla resided closest to Topock; their territory extended from the Coachella Valley into the Chuckwalla Valley west of the Colorado River. Earle (2009) documents historic-era Desert Cahuilla use and knowledge of sites on or adjacent to the Native American trail that later became the route of the Bradshaw Trail leading to the Colorado River corridor. The Cahuilla participated in alliance and exchange relationships with the Halchidhoma during the early historic period, activities that may have brought them periodically to the Topock vicinity.

The Desert Cahuilla subsistence economy focused on the gathering of wild plant foods from lowland environments, including mesquite, screwbean, cactus, and hard seeds (Bean 1978). Groups inhabiting settlements in the Coachella Valley in the 19th century often retained gathering areas in the Santa Rosa Mountains or in other upland environments, such as the northern Chocolate Mountains. At least by 1824, the Desert Cahuilla were practicing irrigation agriculture

(Bean 1978), producing foods similar to those grown by Yuman-speaking groups on the Colorado River, including maize, beans, squashes, pumpkins, melons, and wheat.

Cahuilla religious beliefs and practices include sacred songs and oral texts that tell of the creation of the world and place of the Cahuilla within that creation. These traditional sources also provide moral and ethical guidance. The Cahuilla creation narrative includes several key elements that are common amongst the Takic- and Yuman-speaking groups of southern California and eastern Arizona (Kroeber 1925). Public ceremonies were important components of Cahuilla culture and were held for a variety of occasions, including marriage, naming of children, male and female initiation, cremation of the dead, and the annual mourning ceremony.

Population estimates for pre-contact Cahuilla range from 3,600 to as high as 10,000 persons. Due to European diseases, such as smallpox, the Cahuilla population was decimated during the 19th century. However, unlike other Native American populations in southern California, the Cahuilla were able to retain their autonomy even after the arrival and increasing control of European explorers and the settling governments that followed. It was not until the late 19th century that the Cahuilla culture and its population began to be impacted by the pressure of European and, later, United States governing bodies (Bean 1978). Reservation lands were created for the Cahuilla beginning in the 1870s. Today there are nine Cahuilla reservations in California: Agua Caliente, Augustine, Cabazon, Cahuilla, Los Coyotes, Morongo, Ramona, Santa Rosa, and Torres-Martinez.

Chemehuevi

In addition to Yuman-speaking groups such as the Mojave, the lower Colorado River was also traditionally inhabited by the Numic-speaking Chemehuevi (a Mojave word that means “those that play with fish”) (Chemehuevi Indian Tribe 2013). The Chemehuevi name for themselves is Nuwu (The People). The Chemehuevi are considered to be the most southern sociopolitical division of the Southern Paiute, although a substantial amount of intercultural interaction occurred between the Chemehuevi and Mojave. Individual bands of Chemehuevi people traditionally inhabited a large range, containing areas in Nevada, California, and Arizona. Halmo (as quoted in DTSC 2011:4.4-5) described the range of the Chemehuevi as:

> …territory that extended in the north from roughly (east to west) Indian Springs through Ash Meadows in Nevada to the Funeral and Black Mountains immediately east of Death Valley; the western boundary encompassed the San Bernardino Mountains and Barstow, and extended from (north to south) Death Valley and the Panamint Range to the western flanks of the Avawatz Mountains, just east of Soda Lake south to the western flank of the Old Dad Mountains, near to or encompassing Cadiz Dry Lake, to the Big Maria and Little Maria Mountains, and to the area around Blythe, California. In the east, Chemehuevi territory included alluvial floodplain lands east of the Colorado River and up along the Bill Williams River and northward….

Through much of prehistory, the Chemehuevi were largely hunter-gatherers who traveled cyclically through a traditional range over the course of a year; however, at the time of contact with European explorers, many Chemehuevi practiced floodplain agriculture. Habitation styles varied depending on the band, with some bands inhabiting caves or protected canyons, while others lived in conical brush structures and wickiups, which are dome-shaped structures covered with grass or bark. In contrast with the rest of the Southern Paiute bands, the Chemehuevi would also sometimes build a modified version of a mud-covered house that was usually built without a front wall (Kelly and Fowler 1986). Settlements were typically close to horticultural fields and riverine areas, or near oases.

The earliest European explorers to come in contact with the Chemehuevi documented an irrigated horticultural system along the river. In areas where population densities were higher and villages were present, agriculture was employed as a subsistence technique. Plants typically raised in this manner included gourds, winter wheat, yellow maize, and grasses (Kelly and Fowler 1986). The collection of wild plants supplemented the Chemehuevi diet, including the collection of seeds, pine nuts, and acorns. Communal hunting parties generally hunted rabbits, antelope, and mountain sheep, with deer, bear, mountain lion, water fowl, small rodents, fish, lizards, and some insects rounding out the menu of Chemehuevi protein sources (Kelly and Fowler 1986).

Historical accounts suggest that the Chemehuevi belief systems include a form of shamanism where power was bestowed upon a person through dreams. A prospective shaman would be visited in his dream by one or more guardians—usually in animal form—who would teach them instructions, songs, and bestow upon them shamanistic power (Kelly and Fowler 1986). The songs passed on through dreams were, and remain, of great importance culturally and include the Funeral, Deer and Mountain Sheep, Bird, Salt, Quail, and Coyote songs. These songs are generally descriptions of travels, complete with place names, important landmarks, natural phenomena, and environmental conditions (including the animals present). The recitation of important songs is common at Chemehuevi cultural events even today, again reflecting the importance of Tribal history and Tribal territory in modern Chemehuevi culture.

The oral traditions of the Chemehuevi are similar to those of the other Southern Paiute bands, with the origin of the people located near Mount Charleston (near present-day Las Vegas). Coyote is a principal personality in the Chemehuevi oral tradition and is responsible for naming the animals, stealing fire for mankind, inventing agriculture, establishing customs, teaching mankind about archery, and passing down pottery making (Kelly and Fowler 1986). Chemehuevi stories reinforce the belief that all things are alive and possess a certain amount of power. Thus, interactions with the natural environment are typically accompanied by an explanation and thanks to the resource for benefiting mankind.

In 1853 the Chemehuevi lost their traditional lands to the United States Government. The Chemehuevi Valley Reservation was established in 1907. However, Tribal members were soon relocated to the Parker, Arizona, area and their status as a Tribe was taken away. In 1935, the United States Congress authorized as much acquisition of the reservation land as necessary for the Parker Dam Project, which resulted in the inundation of nearly 8,000 acres of reservation land (Chemehuevi Indian Tribe 2013). The Tribe was reinstated and recognized as the Chemehuevi Tribe in 1970. Today, the Chemehuevi Indian reservation comprises approximately 32,000 acres of trust land, including 30 miles of Colorado River frontage downstream of the Project Site. Chemehuevi descendents also reside on the Colorado River Indian Tribes (CRIT) Reservation and the Twentynine Palms Band of Mission Indians Reservation, as well as on several other reservations.

Cocopah

During the historic period, the Cocopah occupied the banks of the Hardy River in northern Baja California and the Colorado River south of the Quechan and other portions of the Colorado River delta (Alvares de Williams 1983). The Cocopah share linguistic and cultural traditions with the other lower Colorado River groups. This included flood horticulture generally similar to that practiced by their Quechan neighbors to the north, growing grains, beans, corn, and melons in the floodplains of the Colorado River. Agriculture was, and remains, important to Cocopah Tribal members. Like other lower Colorado River groups, the Cocopah travelled widely in pre-contact times across the desert and along the Colorado River corridor. They maintain a cultural interest in this traditional cultural area. During the late 18th and early 19th centuries, the Cocopah were traditional allies of the Maricopa of the middle Gila River and the Halchidhoma, who then occupied the river corridor in the vicinity of Blythe. This alliance and religious travel to Yuman sacred sites may have brought the Cocopah to the Topock vicinity on occasion.

When Don Juan de Oñate and Father Escobar sailed up the river in 1604, there were estimated to be about 6,000 to 7,000 Cocopah people living along the delta and the lower Colorado River (Cocopah 2013). Westward expansion and the discovery of gold in California in 1849 brought many American and European travelers and settlers through the area. Throughout the 19th and 20th centuries, the Cocopah Indian Tribe worked to maintain its social, religious, and cultural identity.

The 6,500-acre Cocopah Reservation was established in 1917 and is currently divided into three parcels: East, West, and North. Much of the reservation is agricultural land that is leased to non-Native American farmers. The reservation is located approximately 13 miles south of Yuma, Arizona near the community of Somerton, Arizona in Yuma County. Currently, about 1,000 Tribal members live and work on or near the reservation. In 1964, the Tribe founded its first constitution and established a Tribal Council (Cocopah 2013).

Halchidhoma/Maricopa

During the early historic period, the Yuman-speaking Halchidhoma occupied the banks of the Colorado River north of the Quechan (Kroeber 1925). They were closely linked culturally and politically with the Maricopa of the middle Gila River (Harwell and Kelly 1983). Spanish- and Mexican-era accounts, including statements by Halchidhoma and Maricopa themselves, tend to use the designations somewhat interchangeably. The Halchidhoma were thought of by other native groups as simply a division of the Maricopa located on the Colorado River. The subsistence and settlement practices, social organization, and general cultural characteristics of the Halchidhoma appear to have been very similar to those of other Lower Colorado River groups of Yuman speech.

The Halchidhoma were allies of the Maricopa to the east and of the Cahuilla to the west. During the late 18th and early 19th century, there was severe conflict between the Halchidhoma and

Mojave to their north and of the Quechan downriver. Around 1828, the Halchidhoma were defeated and survivors took refuge with their Maricopa allies and relatives primarily in central Arizona. As a result, very little ethnographic or ethnohistoric information is available on Halchidhoma utilization of southern California. However, it is likely that they periodically visited the Topock area during the times that they maintained villages along the river to the south.

Today, the Halchidhoma are part of the 52,600-acre, 9,000-member Salt River Pima-Maricopa Indian community, located near Phoenix, Arizona. The reservation consists of Akimel O'Odham (Pima) and Xalychidom Piipaash (Maricopa) peoples (Salt River 2013).

Havasupai

The Havasupai are another Upland Yuman-speaking group, closely related to the Hualapai and Yavapai. The traditional territory of the Havasupai includes an area south of the Colorado River in the Grand Canyon area, extending to Bill Williams Mountain and the San Francisco Peaks. The territory extends laterally from the Aubrey Cliffs in the west to the Little Colorado River in the east (Schwartz 1983). The Havasupai are closely tied linguistically and culturally with the nearby Hualapai, and relations with the Hualapai have been generally friendly. There is some evidence to suggest that relations between the Havasupai and Hopi were also friendly, although relations with Yavapai and Navajo were reportedly antagonistic up until the mid-19th century. Havasupai trade networks extended to the Hopi, Hualapai, Navajo, and Mojave areas surrounding the Havasupai traditional range, with buckskins, basketry, and foodstuffs traded to these tribes in return for cotton goods, horses, jewelry, and hides (Schwartz 1983).

The Havasupai had a relatively set annual subsistence cycle, with agriculture in the low-lying Cataract Canyon area occupying most of the warmer months, and hunting on the surrounding plateau occurring in the cooler months of autumn and winter. Corn, beans, and squash were raised in the irrigated agricultural fields of the low-lying canyons, with other crops, including peaches, figs, and apricots, becoming more common in historic times. Subsistence during the winter months on the surrounding plateau included deer, antelope, and rabbits, as well as the collection of plant materials, including pinon nuts and mescal (Schwartz 1983).

In a manner similar to other Yuman-speaking tribes in the region, the Havasupai place great importance on dreams and dreaming. It is through dreams that important songs and power were transmitted to shamans. Dreams can have malevolent or healing qualities, depending on their nature. Upon death, it is believed that the spirit will travel to a land of the dead in the sky but can reappear as ghosts and cause illness or death. The primary ceremony held every year, the round dance, was in conjunction with harvest time and was meant to secure prosperity and rain. Neighboring Hualapai, Hopi, and Navajo were typically invited to this ceremony (Schwartz 1983).

The Havasupai reservation is located east of the Hualapai Reservation, in northern Arizona, directly south of the Grand Canyon and west of the Kaibab National Forest. Established in 1882, the Havasupai Reservation originally consisted of 518 acres in Havasu Canyon. However, in 1975, the United States Congress returned 185,000 acres of the Grand Canyon to the Havasupai (Biggs 2013). The Havasupai Tribe currently has about 650 members.

Hualapai

Like the Mojave, the Hualapai, or "Hwal'bay," speak a Yuman language. The word "Hualapai" means "People of the Tall Pines" (HDCR 2010). The Hualapai once inhabited a large area of northwestern Arizona and continue to have cultural interest in the area. According to McGuire (1983), the canyons of the Colorado River formed the northern border of their traditional area, while the Black Mountains formed its western boundary. The southern boundary of their traditional area is near the Bill Williams and Santa Maria Rivers, with the eastern border generally running across the Coconino Plateau to Cataract Creek Canyon.

Throughout much of prehistory, the Hualapai were hunter-gatherers, organized socially by families and camps into larger "subtribes" and tribes (McGuire 1983). For much of the year, families would live together in small camps that numbered approximately 25 persons. Wickiups and caves or other rock shelters were common habitation sites in early prehistory, although ramada-like structures became more common for summer use. Semi-permanent winter homes made of arrowwood and covered with juniper bark were common in the early 20th century; however, little evidence suggests that this building style has much antiquity.

While the area of northwestern Arizona is arid, it is relatively diverse biologically. This variation provided the Hualapai an adequate foundation for a hunter-gatherer lifestyle that was fairly consistent in its seasonal pattern. The spring would start with the gathering and processing of mescal and agave in the canyons and foothills, with summer bringing a move to the valley floor in search of stick-leaf, which was an important carbohydrate source. Cactus, prickly pear, saguaro, barrel cactus, and yucca were collected during the summer as well, with plant collecting shifting toward nuts, juniper berries, piñon cones, and sumac berries in the autumn. Hualapai men would typically hunt rabbits, rodents, mule deer, bighorn sheep, and pronghorn antelope over the year. Oral histories suggest that the Hualapai created irrigation networks and diversion dams to seasonally flood nearby fields. In addition to their reliance on wild foods, the Hualapai grew squash, maize, beans, watermelons, and wheat on irrigated plots. Today, ranching and recreational enterprises are economically important.

Like the Chemehuevi, Coyote plays a primary role in the traditions of the Hualapai, which also includes Coyote's older brother (*Matvila*) and younger brother (*Turcupa*). A fourth entity, *Kathat Kanave*, "Told the Coyote" is also present in the mythology, but is not necessarily considered a character, but a designation of the type of story being told and its place in time (McGuire 1983).

According to an origin story recorded by Ewing (1961), Kathat Kanave and Coyote were instructed by the Great Spirit to cut large bundles of canes from the western bank of the Colorado River. At night, the Great Spirit created people from the canes, but, being interrupted by an excited Coyote, only a few people were created. Kathat Kanave then took the people to Meriwhitica Canyon and instructed them in irrigation techniques, hunting, and food gathering. Eventually, the Yavapai were forced by Kathat Kanave to move to the southeast, Mojaves to the west, Southern Paiute to the north, and the Navajos, Hopis, and Havasupais to the south, with the Hualapai remaining at the canyon.

Contact with Europeans and Americans led to social, political, and territorial changes for the Hualapai. Having engaged in military conflicts with Americans in the 1860s, the Hualapai and the United States Government signed a peace agreement in 1868 (HDCR 2010). In 1871, the Hualapai were relocated to Fort Beale, near present-day Kingman, Arizona. In 1874, the United States Government forcibly removed the Hualapai from their traditional lands and relocated them to the Colorado River lowlands near La Paz. The Hualapai remember this long, arduous journey as the "Trail of Tears." The Hualapai Tribal Reservation was created in 1883 and occupies a large area in three northern Arizona counties. Peach Springs, the Tribal capital, is 50 miles east of Kingman on Historic Route 66. Today, approximately 2,300 Hualapai live both on and off of the reservation and belong to 1 of 14 different Hualapai bands (HDCR 2010).

Mojave

The Mojave, or Aha Makav, are a Yuman-speaking people whose pre-contact territory included both riverine and inland areas, according to the ethnographic literature. The Mojave riverine settlement area was mainly north of the Bill Williams River up to the present Nevada border. This main area of Mojave occupation extended on both sides of the lower Colorado River from south of Davis Dam to Topock (Stewart 1983). At one time, however, they also occupied Cottonwood Island, farther to the north, and the Chemehuevi and Colorado valleys to the south (Stewart 1969). The historical record indicates that the Mojave were encountered by the Juan de Oñate Spanish expedition as far south as the present CRIT Reservation in 1604 (Stewart 1969) and that they intermittently controlled areas as far south as Palo Verde valley. Sherer (1965) describes their settlement area thus:

> Their river holdings stretched from Black Canyon, where the tall pillars of First House of Mutavilya loomed above the river, past Avi Kwa Ame or Spirit Mountain, the center of spiritual things, to the Quechan Valley, where the lands of the Native Americans began. Translated into present landmarks, their lands began in the north at Hoover Dam and ended about one hundred miles below Parker Dam. Their Tribal name was *Aha Macav*, means the people who live along the water (the river).

In addition to the Mojave occupation of the river, there are ethnographic accounts and archaeological evidence that groups of Mojave also occupied interior regions in both California and Arizona for extended periods of time. Habitation patterns and types at the time of contact with European explorers typically consisted of flat-topped shade structures during the summer months and low, rectangular, sand-covered structures during the winter months. The roofs were typically covered with arrow weed thatch, upon which a thick layer of muddy sand was created for insulation (Kroeber 1925).

Subsistence for the Mojave was dependent partially on agriculture, with crops such as maize, tepary beans, pumpkins, and melons forming the foundation of their diet. Maize was by far the most principal of all the crops, however, with a family typically clearing between 1 and 2 acres. Silt deposited by river overflows fertilized the fields, while women did most of the planting and cultivation (Stewart 1983). Wild plant gathering augmented agriculture production, with women gathering cactus, wild seeds, and screwbean. Fish was the most important protein source for the

Mojave, with dip nets, drag nets, traps, and large basketlike scoops used to catch fish out of the river. Agriculture remains an important income source for the Mojave on the Fort Mojave Indian Tribe (FMIT) and CRIT Reservations.

Traditional Mojave religion places special emphasis on the experience of and interpretation of dreams, with dreams affecting nearly all facets of life and behavior. Stewart (1983:65) states:

> Mohave religion featured an unusual conception of dreaming, which was in fact a pivotal concept in their culture as a whole, permeating almost every phase of Mohave thought and endeavor. All special talents and skills, and all noteworthy successes in life, whether in warfare, lovemaking, gambling, or as a shaman, were believed to be dependent upon proper dreaming.

Alfred Kroeber (1925:754) noted that Mojave interviewed in the early 20th century explained that dreams were often experienced in close connection with Tribal history and mythological traditions. Many Mojave comments gathered during the Groundwater Remediation Project and the current draft environmental impact report (DEIR) processes demonstrate that there is still a very strong tie with Tribal history in the sense that the relationship between dreams and history is seen as a key aspect of Tribal identity. Theodora Kroeber (1959:193–194) stated that:

> There is the further peculiarity in Mohave-Yuman narratives that the stories and songs are first dreamed, and it is the dreamer who then sings and tells his dream, and in this way his listeners learn the songs and at least parts of the narrative.… It is reserved to these Colorado River peoples to dream their entire literary corpus. To them, dreaming is moving back in time and in understanding to the beginnings of things when gods walked the new earth. They participate in the events and feelings and beliefs of those days by way of the dream, so that even the creation of the world may become part of the dreamer’s own experience…
>
> It is possible—it has been done—to pinpoint on a modern geodetic map of the Colorado River area of California and Arizona the villages, the scenes of wars, the mountains, the passes, the springs, and the desert washes which are named and described in such a dreamed myth, even to tracing in detail the routes of long migrations made in mythical times…
>
> This accuracy, this lingering and savoring of place and event in story is, of course, something the Mohave like to do today next best to actually travelling to familiar but distant places within their own land…

Oral traditions of the Mojave people are generally rich with detail, with mythical occurrences commonly associated with identifiable places and landmarks. Mojave stories typically recount journeys and/or the transformation of mythical persons into animals or landmarks. Many stories are part of traditional song cycles, and the landmarks identified in the stories include those within traditional Mojave territory as well as places in the surrounding region (Kroeber 1925). This strong identification with the landscape of traditional Mojave territory continues today.

Additionally, Mojave tradition involves the naming of clans. Clan names were given by Mutavilya, the Creator, based on aspects of the natural world, including (but not limited to) the sun, rain, small birds, the coyote, prickly pear cactus, and the frog (Sherer 1965). According to oral tradition, each clan went in different directions from Avi kwame (Spirit Mountain) after receiving its name. Each clan has a song commemorating the journey and various encounters experienced during that journey. Modern Mojave consultants indicate that three somewhat distinct geographic groupings of clans were recognized: a northern group in the Davis Dam vicinity, a middle group in the Mojave Valley, and a southern group south of Needles.

The Mojave successfully resisted Spanish attempts at colonization and maintained traditional lifeways and political systems until the U.S. military gained control of the area in the 1850s. Subsequently, many Tribal members relocated to an area south of Parker in 1859. Additional Mojave settled there when the CRIT Reservation was founded in 1865. Many Mojave, however, remained in Mojave Valley. The FMIT Reservation was founded in 1870 and currently has over 1,100 members. The FMIT Reservation is located along the Colorado River and covers nearly 42,000 acres in Arizona, California, and Nevada (FMIT 2013a). The CRIT Reservation includes almost 300,000 acres of land in both California and Arizona, and is centered on the Colorado River. This reservation includes business interests focusing on agriculture, a casino, outdoor recreation, and light industry (CRIT 2013). The CRIT Reservation has about 3,500 Mojave, Chemehuevi, Hopi, and Navajo members. Although the four combined groups are united within the CRIT Reservation and act as a single geopolitical unit, each Tribe continues to maintain and observe its individual traditions, distinct religion, and unique cultural character.

Quechan

At the time the first Spanish missions were established, the Quechan occupied the lower Colorado River corridor up and downstream of the Gila River confluence near Yuma. Their settlements ranged from just south of the international border to as far north as Palo Verde Valley; beyond this core territory, they travelled widely both up and down the river corridor from the delta to southern Nevada and east and west from the Phoenix basin to the Pacific Coast. This long-distance travel was facilitated by a regional trail system, portions of which have may have passed near the Topock area (Johnson 2001). The Quechan language is a member of the Yuman linguistic family, closely related to Mojave and Cocopah, and numerous native speakers continue to reside on the Fort Yuma Reservation.

Like other lower Colorado River groups, the Quechan practiced flood-based agriculture, and agriculture remains important economically to the Quechan Tribe. Maize, tepary beans, squash, pumpkins, and melons were staple crops**.** This farming system depended upon the annual flooding of the Colorado River to provide new soil nutrients and particularly moisture to make river bottom planting possible. Anthropologists generally conclude that agricultural production provided less than 50 percent of the diet (Bee 1983). Thus, fishing and the gathering of wild plant foods, especially mesquite and screwbean, were also very important in the subsistence economy.

For the Quechan, like other lower Colorado River groups, individual dreaming to seek guidance in life and spiritually based power was a principal aspect of religious belief and practice (Forde

1931; Kroeber 1925). This included learning sacred songs about events that occurred at the time of the creation of the world through dreaming. Singing these songs was, and remains, a principal avenue of religious expression. The dreaming experience meant that sacred places could be visited, and the sacred landscape traversed, through dreaming rather than through conventional travel, although physical travel along trails to sacred places was also an important aspect of the religious experience. Travel on key Native American trails continues to be a cultural practice today to commemorate and experience traditional culture. The geography of sacred places related to the sacred song cycles of Yuman groups is a major cultural feature of the lower Colorado River region. Alfred Kroeber (1925) collected large quantities of information on places mentioned in Mojave song cycles, from as far afield as the Pacific Ocean, the Tehachapi Mountains, the Gulf of California, Tucson, and southern Nevada. Modern Quechan have stated that a similar geography of sacred places is important in their culture, but place names have not been compiled to the same extent.

The Fort Yuma-Quechan Reservation was established in 1884. The reservation is located near Yuma, Arizona, and includes 45,000 acres of land in Yuma County, Arizona, and in Imperial County, California. Approximately 2,475 members are currently enrolled in the Fort Yuma-Quechan Reservation (ITCA 2013).

Serrano

The Serrano are a group whose language belongs to the Takic branch of the Uto-Aztecan stock, like the Cahuilla, and they shared many cultural traits with the Cahuilla. Serrano territory included the slopes and upland areas of the San Bernardino Mountains, parts of the San Bernardino Valley, and the desert region east of the San Bernardino Mountains to Twentynine Palms (Bean and Smith 1978). From there, the Serrano carried on exchange relations with the Halchidhoma by way of Pinto Basin and Rice Valley. A number of Serrano clan communities were located along the Mojave River from its headwaters to the sinks of the Mojave near Baker. Unlike the mountain groups, Serrano groups along the Mojave River were friends and allies of the Mojave of the Colorado River.

Like the Desert Cahuilla, Desert Serrano readily harvested mesquite. Given the absence of desert agave in Serrano territory, various species of yucca were harvested instead, though still in a manner similar to how the Cahuilla used agave. Serrano villages on the Mojave River did not have direct local access to piñon and acorns but were able to procure them either through exchange or through visits to mountain area clans that had direct access to these resources. The Mojave River Serrano clan communities formed part of a long-distance exchange route that moved Olivella shell and other beads to the east, and textiles and other goods to the west, between Oraibi in northeastern Arizona and the Santa Barbara Channel. The Mojave also played a key role in this long-distance trade to the Pacific.

Despite early European and Spanish contact in 1771, the Serrano remained relatively autonomous until the period between 1819 and 1834, when most of the western Serrano were forcibly removed and placed into missions (Bean and Smith 1978). Today, there are two sovereign nations that claim a Serrano heritage: the federally recognized San Manuel Band of Serrano Mission

Indians, and the federally recognized Morongo Band of Mission Indians, whose members represent Serrano, Cahuilla, and Cupeño cultures.

Yavapai

The Yavapai are a group whose language is classified as Upland Yuman, which is related closely to the languages of the Hualapai and the Havasupai. The Yavapai are typically arranged into four general subtribe groups: Tolkapaya, Yavepe, Wipukpaya, and Kewevkapaya. The Yavapai occupied much of what is now central and west-central Arizona. The Tolkapaya subtribe occupied an area in the mid 19th century that ranged approximately 30 miles north of the Bill Williams River, near the Colorado River, to present-day Yuma. As such, parts of the Yavapai traditional territory include portions of the Havasu National Wildlife Refuge and areas immediately to the west and southwest of Topock (Khera and Mariella 1983). Yavapai historically had a number of hostile encounters with their neighbors to the north and south, including the Hualapai, Havasupai, Papago, Pima, and Maricopa. However, relations were generally peaceful with neighboring Navajo and Hopi Tribes, with whom they exchanged mescal and buckskin for blankets and jewelry. Relations with neighboring Quechan, Mojave, and Cocopah were reportedly peaceful as well, with some evidence that members of the Tolkapaya subtribe joined the Cocopah Tribe in the mid-1800s and that agreements were made with the Quechan to share land and resources along the Colorado River (Khera and Mariella 1983).

Subsistence practices of the Yavapai generally followed the seasonal ripening of different plant foods, with bands migrating throughout their local territory as food became available throughout the year. Important plant materials collected for subsistence included nuts, seeds, and berries, as well as the fruit of the banana yucca. These crops were typically more plentiful in higher elevations and during the autumn months, with leafy greens collected in the spring and desert fruits collected in the summer. Agave was collected throughout the year and provided a dietary staple. Small-scale agriculture also supplemented the Yavapai diet, primarily including corn, beans, squash, and tobacco, although historical evidence suggests that intertribal warfare made sedentary agricultural activities difficult for some bands (Khera and Mariella 1983).

The homeland of the Yavapai is centered on the Sedona Red Rock and Verde Valley area in Arizona. The Yavapai believe that all human beings were sent forth from the Red Rock Mountains to the rest of the world, with the Yavapai remaining in the immediate region. Like other Yuman-speaking groups, spiritual leaders can gain knowledge, power, and songs through sleeping in sacred places (such as caves). Prayer is a central concept for the Yavapai religion, with those offering a prayer regularly drawing a cross, square, or diamond on the ground to indicate the four cardinal directions while the person positions oneself in the middle of the figure. Ritual and prayer may include the use of certain pollens, musical instruments, eagle features, and colored beads. Sweat lodge ceremonies are commonly held to provide opportunities for purification (Khera and Mariella 1983).

As with other tribes, the westward expansion of the United States and the discovery of gold brought many changes to the Yavapai in the mid-19th century. In 1871, the United States Government forced the Yavapai to move onto the Rio Verde Reservation, and again in 1875 to the San Carlos Apache Reservation. Many Yavapai died of malnutrition and disease during this time. In the 1880s and 1890s, some Yavapai were able to return to the Prescott, Arizona, area (BLM 2012).

There are three modern-day reservations with Yavapai membership, the Yavapai-Prescott Indian Tribe, the Yavapai-Apache Nation, and the Fort McDowell Reservation, all of which are located in central and northern Arizona. The Yavapai-Prescott Indian Reservation is 1,395 acres in size and is located near Prescott, Arizona. The Yavapai-Prescott Indian Tribe has 159 members (Yavapai-Prescott 2013). The Yavapai-Apache Nation is located in the Verde Valley in Arizona and has more than 2,300 enrolled Tribal members from both the Yavapai and Apache cultures (Yavapai-Apache Nation 2013). The Fort McDowell Reservation has over 900 members living both on and off of the reservation, which is located on 40 square miles in Maricopa County, Arizona (Fort McDowell Yavapai Nation 2013).

4.4.1.3 Historical Setting

This section is largely derived from the Cultural Resources section of the Groundwater FEIR (DTSC 2011).

The most significant trends and events of the historic era (starting around 1800 A.D.) in the Project Site had mainly to do with the development of the Topock crossing area of the Colorado River as a major transportation corridor. Today, the Project Site funnels railroad traffic across the Burlington Northern Santa Fe Railway (BNSF) bridge, truck and automobile traffic across the I-40 bridge, and natural gas through large interstate pipelines, including the pipelines that cross the river on the Old Trails Arch Bridge. The latter was, originally, the first automobile bridge across the Colorado River in this region.

Surveys conducted in the Project Site for the first railroad crossing over the Colorado River resulted in the selection of an area near present-day Needles, which was initially established to serve as a primary depot for the Atlantic and Pacific (A&P) railroads as trains moved across the desert. The initial bridge was destroyed in 1890 and the crossing was moved to the Red Rock Bridge, at present-day Topock, which was one of the first steel bridges and the longest cantilever bridge in the Americas. Early automobile traffic typically ferried across the Colorado River in the Topock area, but ferrying proved unreliable, depending on river flows, and a new bridge—Old Trails Arch Bridge—was constructed in 1916 to create a more reliable crossing. This bridge later served as the primary crossing for the National Old Trails Road, and later Route 66. Railroad realignments in the area resulted in the creation of a new bridge. Route 66 was routed across the Red Rock Bridge, while Old Trails Arch Bridge was adopted for use as a natural gas pipeline bridge, which it remains today. By the 1970s, the Red Rock Bridge was dismantled and Route 66 in the Project Site was relinquished by the California Department of Transportation.

During the operation of Route 66, the town of Needles remained an important stopping place for westbound travelers as they moved across the Mojave Desert, serving as one of the closest places to purchase fuel, water, and food before journeying across California. Route 66 itself began as the favored route of an influential citizen of Tulsa, Oklahoma, named Cyrus Avery. He promoted a route between Chicago and Los Angeles that passed through St. Louis, Tulsa, Oklahoma City, Amarillo, Santa Fe, Albuquerque, Flagstaff, Barstow, and San Bernardino. The route was eventually approved by a committee of state and federal transportation officials in 1926, and U.S. Route 66 was born. While the roadway was barely more than a collection of local, county, and state routes (most of them in poor condition), marketing efforts by Avery promoted the route as “The Main Street of America” and the route received increasing use and fame. Throughout the 1920s and 1930s, passenger automobile and trucking traffic started to grow, as the average family could afford an automobile and expanded distribution networks became cheaper for farmers to support (Davy et al. 2004).

Despite being neither one of the earliest nor one of the longest American highways, Historic Route 66 is arguably the most famous highway route in the United States, inspiring songs and television shows and featured prominently in John Steinbeck’s novel *The Grapes of Wrath*. Historic Route 66 exemplifies a number of highly significant historical themes having to do with the development of the United States during the first three-quarters of the 20th century. These include the expanding role of the federal government in transportation and other realms; the rise of the trucking industry; the penetration of the mass market by automotive technology and the massive changes in the American culture and lifestyle that the automobile brought; public works labor during the Depression; the migration of poor southern farmers to California during the Dust Bowl years and their return home; and prewar, wartime, and postwar mass migration to the Sun Belt, to name just a few. The Route 66 Study Act of 1990 (PL 101-400, 101st Congress) states, “Route 66 has become a symbol of the American people’s heritage of travel and their legacy of seeking a better life….” By the 1960s, Route 66 began to show signs of age and was eventually decommissioned in 1986 (Davy et al. 2004).

In the years following WWII, California experienced tremendous growth in industry, transportation, agriculture, and housing, with the demand for energy increasing exponentially. PG&E, originally formed in 1905, responded to this demand by building hydro plants, steam plants, and thousands of miles of transmission line and gas pipeline (PG&E 2014). The Station, constructed in 1951, was the largest of the three original compressor stations constructed in the 1950s as part of PG&E’s natural gas transportation and distribution system. Additional structures were added to the Station complex throughout the decade of the 1950s (Smallwood 2013).Today PG&E’s infrastructure includes more than 40,000 miles of distribution pipelines, 6,000 miles of transport pipelines, and eight compressor stations (Smallwood 2013).

4.4.1.4 Individual Tribal Perspectives

The Topock area and adjacent lands along the Colorado River, beginning in the Hoover Dam area and extending to the Mexican border, are the ancestral home of a number of Native American Tribes, including the Cahuilla, Chemehuevi, Cocopah, Halchidoma, Havasupai, Hualapai, Maricopa, Mojave, Quechan, Serrano, and Yavapai peoples. Six of these Native American Tribes, the Chemehuevi Indian Tribe, Cocopah Indian Tribe, CRIT, FMIT, the Fort-Yuma Quechan Indian Tribe, and the Hualapai Indian Tribe have actively participated in the Topock project and are hereafter referred to as “Interested Tribes.” Each of the Interested Tribes has been, and continues to be, economically and culturally reliant on the Colorado River, and all are historically and spiritually rooted in the Colorado River region. Although each Interested Tribe has its own history and belief system tied to the region and the river, the Interested Tribes share an interest in the health and welfare of all people, the land, wildlife, things above and below ground, and natural resources. As indicated in the *Topock Compressor Station Tribal Cultural Values Assessment* (McDowell et al. 2013), several of the Interested Tribes feel that:

> Plants, animals, minerals, artifacts, rock arrangements, view-sheds, the Colorado River, and many other tangible and intangible elements are interwoven into the very fabric of tribal cultures. Topock, in being such a significant religious and spiritual "place," involves a dynamic understanding of traditions, religion, ceremonies, oral histories, and a plethora of other social-communal aspects, that is difficult for non-tribal entities to grasp with its many different layers of existence (McDowell et al. 2013).

The following section provides an overview of the comments and information provided to date by each of the six Interested Tribes. In an effort to provide a meaningful account of each Interested Tribe's input, the following includes a summary of information provided by each during the Groundwater Remediation Project and the current DEIR processes.

Chemehuevi Indian Tribe

On April 26, 2013, the California Department of Toxic Substances Control (DTSC) met with the Chemehuevi Tribal Council regarding the proposed Project. Chairman Tito Smith indicated that moving dirt is a sensitive subject for some of the Interested Tribes up north and the Chemehuevi are cognizant of this and respect the religious values and cultures of the Interested Tribes located upriver. During outreach for the Groundwater FEIR, the chairman of the Chemehuevi Indian Tribe expressed that the Tribe does not have any cultural resource concerns in the Project Site (DTSC 2011).

Cocopah Indian Tribe

The Cocopah Indian Tribe feels strongly in the belief that the Topock area embodies significant cultural importance for Native American Tribes of the region. According to the Cocopah, "[o]nce, this was all our land; it belonged to all Indian people. The entire Colorado River corridor was home to many Tribes, and the river is the life blood of these people. The river and the surrounding landscape is a sacred place. Its reverence is shown through the Creation Story, and the many songs of the Tribes. These stories and songs commemorate the significant events and places that make the river sacred to all Indian people of the region" (BLM 2012: 50).

The Cocopah have expressed concern about the lack of conceptual understanding of the region as a landscape and encourage that it be treated as a whole. Jill McCormick, Cocopah Cultural Resources Manager, indicated at a meeting on October 28, 2013, that looking at individual key views is contradictory to the way that Native American Tribes view the relationships amongst landscape features and the significance of the landscape and its associated viewshed. During a site visit on September 30, 2013, Ms. McCormick expressed concern that, although archaeological resources only comprise one aspect of the cultural significance of the area, many of the resources require more detailed documentation and that undocumented resources such as trails be documented.

During the Groundwater FEIR process, the vice chairman of the Cocopah Indian Tribe expressed that the Colorado River is an important cultural element to all Native American Tribes along the river, and the region has been occupied and utilized by Yuman-speaking tribes throughout history (DTSC 2011). The Cocopah creation story tells how the twin creators, Sipa and Komat, after creating the earth, traced a line through the desert—the Colorado River (Cocopah, n.d.(a)).

The Colorado River provides "physical and spiritual nourishment" for the Tribe and the plants that grow along the river, such as arrow weed, creosote, mesquite, cottonwood, and wild rice, are considered culturally significant as well. Arrow weed was traditionally used to construct homes, and its smoke was used in spiritual cleansing and sacred death ceremonies. Cottonwood, creosote, and longleaf ephedra had many medicinal uses. Honey and screwbean mesquite pods were an important source of food, and their wood provided fuel. Tule was used for food, pigment, basketry, and to make rafts (Cocopah, n.d.(b)). In addition to the wild plants found along the river, the Cocopah also practiced agriculture in the river's floodplain, growing maize, squash, beans, and gourds.

Equal in importance to the river, however, are the cultural resources in the surrounding landscape, which some Native American Tribes consider irreplaceable and unique to the region. The Tribe has great concern over the destruction of cultural resources in the area and believes that the preservation of the Topock Maze (as well as the surrounding landscape) should be at the forefront in all future remediation plans for the area. The Cocopah Indian Tribe supports the concerns expressed by the FMIT.

Colorado River Indian Tribes

The CRIT have numerous enrolled members who are identified as being of Mojave and Chemehuevi cultural descent, as well as Navajo, Hopi, and other cultural groups. The CRIT have expressed significant concern over the impacts to the resources in the Topock area. Howard Magill, CRIT representative, indicated on October 28, 2013, feeling that the area was very special, and that the landscape should be viewed as contiguous.

During the Groundwater FEIR process, some Tribal members suggested that the Topock Maze is of relatively recent origin and do not believe that it is highly significant culturally. It was also noted by this representative that the Topock Maze area has been repeatedly disturbed over the past 100 years by transportation corridors, hydrographic changes, and other linear infrastructure (DTSC 2011). Subsequently, statements from the CRIT Tribal Council during meetings with DTSC suggested that the Topock Maze area continues to be of cultural concern for some members of CRIT.

In a resolution provided to DTSC on April 16, 2007, by the CRIT Chairman, Daniel Eddy Jr., the following statements were made with regard to the Topock Compressor Station Groundwater Remediation Project and Tribal concerns regarding environmental impacts (DTSC 2011):

- The affected and contaminated land, water, and air, and especially the Colorado River, has critical and defined cultural significance and meaning to both the Mohave and Chemehuevi people.
- The CRIT, a federally recognized Tribal government, has been representing members of both the Mohave and Chemehuevi people since 1865.
- As a downstream entity, the CRIT will bear the brunt of any health, economic, and/or cultural impacts resulting from any contamination-related activities directly upstream at the site of the spill.
- Although some Mohave cultural sites may be potentially affected by investigative, remedial, and final remedies, and/or other cleanup-related activities, the overriding health and safety concerns of living people shall have priority in this situation.

In a June 2009 letter sent to DTSC by Envirometrix, a consultant hired on behalf of the CRIT stated a number of specific concerns regarding cultural resources, including (DTSC 2011):

- Based on the constitution of the CRIT, the Tribal government has the expressed power to preserve and protect, as well as encourage the culture and traditions of the Tribes.
- The large population of Mojave members enrolled at CRIT. "CRIT has both Mohave and Chemehuevi members, and encompasses politically the largest membership for both Tribes." It is noted that some Mojave people are not enrolled in either Tribe, and that Chemehuevi and Mojave people can be found on reservations throughout the region.
- The Groundwater Remediation project area, including portions of the Topock Maze, "does not appear to be an untouched or pristine cultural or historical site that is not impacted by [more modern] human activities."

Fort Mojave Indian Tribe

The FMIT provided comments on the Soil Investigation notice of preparation (NOP) in a letter dated January 17, 2013 (Coyle 2013). Regarding cultural resources, the FMIT indicated that the Project Site is part of a larger, connected Tribal cultural landscape that should be considered within the CEQA process. They also requested that cultural resources studies include more than just physical aspects, such as archaeological remains. Many Tribal members feel that they have been entrusted with serious and weighty responsibilities as caretakers of the natural and cultural resources within their traditional territories, as has been traditionally known and passed down for generations to its membership since time immemorial (McDowell-Antone 2010a; McDowell 2014). The following paragraphs provide a synthesis of information and concerns voiced by the FMIT over the past 5 years.

To the FMIT, the Topock area is an important, integral part of a much larger cultural landscape along the Colorado River. This landscape includes important named places such as *Avi Kwa Ame* (Spirit Mountain), *Avi Vas Qui* (Boundary Cone), and *Huqueamp-Avi* (The Needles Peaks). The FMIT's traditional beliefs about the Topock area are tied to Tribal history and identity and are integral to FMIT's traditional culture. "[T]raditional songs are tied to the land on and surrounding the project site. The songs describe the Tribe's creation and history and provide guidance about the Creator's commandments about how to live life" (McDowell-Antone 2010a). FMIT Tribal members hold "the Topock landscape within their minds—knowledge of a place of peace, a place of holiness, a place that is inscribed within our hearts, a place specific to our natural being, a holy place of existence for the Mojave people, atonement for the soul of our people, past, present, and the future" (McDowell-Antone 2010a).

The FMIT also maintains a deep cultural connection to the Colorado River and the water in the area. It is widely noted that the Mojave term for themselves, the Aha Makav, means "People of the Water," which suggests a strong connection by itself. Tribal representatives also noted that the linguistic part "Makav" is also used in the term for "diaper" and has a connotation similar to "swaddle," suggesting that "People Swaddled by Water" could be a more literal translation of Aha Makav. This is an important distinction because it suggests a more nuanced connection between the Mojave people and the Colorado River. Aside from being a people in close proximity to the river, the Mojave believe that they are protected and secured by the river, as it provides everything for them and is a constant, reliable force in the Mojave culture as a source of water and nourishment (McDowell-Antone 2010b). Today, the Colorado River remains an important natural resource and aspect of the Topock cultural landscape, as well as a social link for several Native American Tribes. As described by Ms. McDowell of the FMIT on October 28, 2013, each year, many Native American Tribes associated with the Colorado River meet on the river to socialize and engage in traditional cultural education (McDowell 2013a). Key activities involve camping and the teaching of moral codes.

The Topock area is critical to FMIT cultural beliefs about the afterlife. According to FMIT representatives, the Topock Maze area is where spirits of the deceased go to pass on to the next world (McDowell 2013a). The Maze, which is an array of windrows, is not considered to be a true Maze with an entrance and exit, but is represented as a place where a final test of character for a spirit of the deceased occurs (Montoya 2010).

To the FMIT, the Topock Maze is more than just the site as it has been defined by archaeologists. Rather, it is a larger area that includes the spaces between the loci, the areas where the Maze physically once was, and associated intaglios, both those still visible and those no longer present. In addition, there is a belief that the remaining parts of the Topock Maze are part of a larger system of cultural sites that once existed that were important areas for rituals and celebrations. To the FMIT, these areas within the larger landscape are interconnected and spiritually linked and therefore "[i]f you impact or sever one area, that affects the whole. Like cutting off a limb, it can affect your well being and cannot be recreated" (McDowell-Antone 2010b).

For Tribal members, the Topock Maze is representative of larger, intangible cultural beliefs. An example given by one Tribal member likened the Topock Maze to Arlington National Cemetery, with both areas serving as a symbolic image of honor, sacrifice, and shared history associated with those who have passed on from this world. The Topock Maze area is a place for purification, for example, after engaging in warfare or, in more modern times, for other types of spiritual healing and strength. It is also a teaching area for Tribal youth.

The FMIT notes that the cultural resources of importance to the Tribe not only include the artifacts found within the Project Site, but also that “the cultural landscape within which the artifacts are located…has the deepest importance to the Tribe, and the desecration of this landscape, not simply the disturbance or destruction of artifacts that needs to be, and must be, acknowledged” (DTSC 2011). The Tribe believes that the naturally occurring reactive zone in the fluvial sediments of the Colorado River is, “owed to the wisdom of Providence,” and believes that, “this is earth’s natural process of self-healing after an unnatural intrusion” (DTSC 2011). The FMIT is affiliated deeply with the land, plants and animals, air, and water of the region and feels a responsibility to be stewards of its historical land and the environment. The Tribe respects the land and the spirit of the place, and believes they were put there by the Creator for a purpose. They have never severed their relationship with the land and the entire environment.

Impacts to the Topock area are considered to be devastating to the Tribe. There is a strong feeling that if impacts to the Topock area occur, this would be a desecration that could not be remedied, mitigated, or undone (Aha Makav Cultural Society 2010).

The FMIT is also concerned about physical modifications to the landscape. Visible changes in the landscape can affect FMIT Tribal members’ “relational/spiritual perceptions” of the landscape. These “perceived impacts are as significant to Tribal members as visible impacts. It is important to the Tribes to include and describe both the visual and perceptual impacts of any site activities” (FMIT 2013). Since the Topock area is where spirits of the deceased go to pass on to the next world, the FMIT believe that visual cues on the landscape serve as important paths for both living and deceased Tribal members, and can help the spirits find their way to the afterlife. Changes to the landscape in the Topock area could disrupt this spiritual journey (McDowell 2013; McDowell-Antone 2010a; Otero 2010).

According to the FMIT, the viewshed of this cultural landscape is integral to the landscape’s connection to Tribal history and culture. To the Tribe, the scale of the viewshed extends far beyond any lines-of-sight associated specifically with the Topock Maze (McDowell 2013a). Although the Tribe is concerned about visual disturbances in and around the immediate area of the Topock Maze and physical intrusions on the current cultural and spiritual use of the area by Tribal members, the Tribe also shares a broader concern involving the visual intrusion on a much larger scale. Many of the prominent natural landform features that are visible from the Topock area, including Spirit Mountain (*Avi Kwa Ame*), Boundary Cone (*Avi Vas Qui*), and the Needles Mountains (*Huqueamp-Avi*), are sacred to many Native American Tribes and play a significant role in their history and cultural traditions, which are generally rich in detail and mythical occurrences commonly associated with identifiable places and landmarks. Mojave oral histories and songs, for example, recount journeys, places, and the transformation of mythical persons into animals or landforms. For the Tribe, sensitive viewsheds also include those of the river, the mountains, the valley, and other features of the landscape, which create a context for spiritual and cultural experiences (McDowell 2013a). Furthermore, from the perspective of the FMIT, important views are not limited to a view(s) in a particular direction(s), but also in the direction of an “area situated along an important spiritual alignment between two features that are located on either side of the area” (FMIT 2013b). On a visit to the Project Site on October 28, 2013, Ms. McDowell, expressed that the viewshed is the natural physicality of the land itself, and represents a collective power that enables a discussion of how important the landscape is. The viewshed is as, if not more, important in some respects than actual physical land itself, and since the entire viewshed is connected and contiguous, it should be considered as a whole (McDowell 2013a).

Also considered sacred by the FMIT is the soil itself, as it is part of the cultural landscape. Physical alterations or removal of the earth are considered to be an impact to the cultural landscape. In a scoping meeting held December 12, 2012, Dr. Michael Sullivan, FMIT consultant, stated “Soil samples are generally not considered a big deal. Here it constitutes a significant and irreversible change. It is significant because it is desecrating an area; irreversible because it can’t be placed back in.” In a later meeting (October 28, 2013), Nora McDowell likened this Project to someone putting hundreds of holes in the floor of the Vatican. On several occasions FMIT representatives have requested that a Tribal Land Use Scenario alternative be included in the Soil Investigation DEIR, which would result in fewer samples and sampling locations (Coyle 2013; Sullivan 2012, 2013). The Tribal Land Use Alternative is addressed in Chapter 7, “Alternatives to the Proposed Project,” Section 7.5.1.

As pointed out by some Tribal representatives, they are sensitive not only to permanent intrusions but also to those that may be characterized by some as “temporary.” They feel that even those activities or physical intrusions characterized as “temporary” result in spiritual disturbances that remain for long periods of time and although these disturbances may not be visible to the physical eye, they can still be seen from the “mind’s eye” (McDowell 2013a). According to Tribal members, the knowledge of alterations to the landscape remain in the collective consciousness of those who associate deep spiritual beliefs and values with the area long after the landscape has been restored and the evidence of destruction is no longer physically visible. In other instances, physical evidence of disturbance lasts long after the project and “restoration” have concluded. The desert is easily scarred and slow to heal, such as the old pond area where trails were altered and the scarring of the land use remains (McDowell 2013b).

Because the Topock area is sacred, excessive noise is considered to be disruptive to those who use the area for religious or ceremonial purposes. FMIT representatives have generally voiced concerns over noise in the vicinity of the Topock Maze and consider Tribal users as sensitive noise receptors. The FMIT is also concerned about inappropriate land uses and behavior in and near this sacred area. This can include use of recreational machinery, alcohol, loud music, inappropriate language, firearms, and alarms. These uses conflict with Tribal values and uses.

In a letter response to a request for FMIT review and comment on Tribal perspectives dated February 19, 2014, the FMIT also noted (McDowell 2014):

- Regarding the landscape, it is the Tribe’s perspective that all of the landscape scales for the significance of Topock must be evaluated. This evaluation must include the critical interconnection among what might otherwise be considered a separate landscape. Scales for ethnographic landscape assessments can range from the relatively local to the regional and trans-regional.

- Regarding Tribal cultural values, the Tribe's perspective is that the Topock project has been subject to archaeological biases in the past on surveys, significance determinations and treatment, whereas the Tribal perspectives have at times gone unacknowledged.
- Finally, the Tribe is concerned that Tribal perspectives be fully integrated into Project design and analysis.

Fort Yuma-Quechan Indian Tribe

The Fort-Yuma Quechan Indian Tribe did not provide any input or comments on the soil investigation project; however, the Tribe did provide the following comments and information during the Groundwater FEIR process. The Fort Yuma-Quechan Tribal Historic Preservation Officer, with members of the Cultural Committee, expressed concerns that government entities have not taken tribal concerns into consideration, citing as an example the installation of wells in Arizona despite Native American opposition. Another concern of the Fort-Yuma Quechan Indian Tribe is the lack of staff continuity within the government agencies, which results in tribal members having to repeat the same concerns with each new agency person who becomes involved in the project.

Specific cultural resources concerns cited during the meeting included the preservation of the water in the river and the aquifer, both of which are important parts of the Quechan culture. The river and aquifer also nourish the plants and animals in the area, which were cited as also being important. For the Tribe, the river, plants, animals, land, and air are all interconnected, with damage to one resulting in damage to the entire whole.

The Colorado River is the link for all the people living along it, and a number of songs and stories tell of the history and travels that once occurred along the river. Trails in the region mark where ancestors travelled, with travelling occurring both in the physical realm and also in the dream realm. Geoglyphs/intaglios and cleared areas may indicate ceremonial areas, as well as lithic scatters, pottery scatters, and rock rings, which are not always associated with subsistence activities. Finally, clay deposits were identified as important cultural sites, as high-quality clay was important for pottery-making, face-painting, and as a form of sunscreen (DTSC 2011).

Hualapai Indian Tribe

The Hualapai provided comments on the Soil Investigation NOP in a letter dated January 14, 2013. The letter indicated that the Hualapai expected protocols and measures developed previously would equally apply to the Soil Investigation Project, and requested that DTSC meet with the Tribe regarding cultural resources, alternatives, and mitigation measures. The Tribe requested that a "future-Tribal-land-use-risk-based evaluation" be included in the CEQA document (Jackson-Kelly 2013). The Tribe also requested to review any draft language relative to cultural issues. On December 12, 2012, during a Project scoping meeting, Dawn Hubbs likened the effects of soil sampling on the earth as "Swiss cheese" and stated: "In the overall project, there has been so much done already, to even think of more soil samples is incredible." The following paragraphs provide a synthesis of information and concerns voiced by the Hualapai over the past 5 years.

The Hualapai Department of Cultural Resources has been actively engaged with PG&E at Topock since the mid-1990s through consultations, monitoring and participating in government-to-government meetings. During interviews, several Hualapai Elders who were asked to discuss Topock and Needles, stated that regarding Topock, "…there is a common history that all River Tribes shared at one time," while another Elder also said that, "years ago all the River Tribes use to gather and meet at different places along the River. This is probably one of those places because the roads now days follow some of the old trails. Today we still try to keep up those kinds of things with the other Tribes" (HDCR 2014). On February 4, 2014, Ms. Hubbs told of an important annual event that the Hualapai practice. Tribal members gather and spend 1 to 2 weeks traveling down the river, stopping at significant and extremely meaningful cultural sites where they pay reverence, teach children, and engage Tribal elders ensuring Tribal values and beliefs are transferred to future generations.

The Colorado River and its associated canyons are central to Hualapai cultural history and Tribal identity. The northern and western boundaries of the Hualapai's territory traditionally are considered by the Tribe to be the middle of the Colorado River, referred to as the *Ha' yidt ta,* or the "Backbone of the River" (BLM 2012: 38). "The long expanse of the River through the canyon and the riparian eco-systems makes a life-way connection that flows through the hearts of the Hualapai people. The Hualapai maintain this connection through ties of sacredness to the Colorado River" (HDCR 2010). Hualapai tradition holds that they were created from the sediment clay, and reeds found along the river's banks (Jackson 2008). A sacred spring called *Ha'thi-el,* meaning "Salty Spring," flows from a side canyon, and petrogylphs there tell the story of Creation (HDCR 2010).

According to the late Hualapai Elder Auggie Smith, prior to European contact, Hualapai occupied lands in the area of Topock (The Needles, or Kwiđ-Kwiđ) and Boundary Cone, or Wi Veskwiya, at the base of the Black Mountains. Wi kwiđ-kwiđ is the south-western most boundary. Today all of these areas are tied to Hualapai's place of creation, Wikame. When the world was covered in flood waters, all the Yuman people were created on Wikame. In the Hualapai's Creation Story, depicted in the petroglyphs at *Wikahme*, which is located 20 miles north of the point where Arizona, Nevada, and California meet, (and visible from the Station as are the Needles) the Hualapai originated from 'Wikahme', also known as Spirit Mountain and Newberry Mountain. According to the Hualapai creation story, a spirit prayed life into canes cut from along the Colorado River near Spirit Mountain. "The Creator…made two more beings. These ones He made and called Land Older Brother and Land Younger Brother. He placed them at 'Wikahme' and they lived there," (HDCR 2013:33). Wi Veskwiya is mentioned in Hualapai Oral Traditional Stories including traditional songs, and is an important land marker for the Hualapai Band who traversed in the southernmost ancestral territories delineated by this butte known in English as Boundary Cone Butte. The Gods (the two brothers) at *Wik- ame*' (Spirit Mountain) specified this Butte to be the traditional marker for Hualapai territory therefore reinforcing the Butte as a Sacred Site. Since traditional practitioners limited secular activities on the mountain, the absence of indigenous material other than the sacred petroglyphs, highlights the significance of Spirit Mountain for Yuman-speaking people. It also suggests that the area was used exclusively for religious purposes. Another oral account tells of a huge flood covering the world. All the Pai fled to Spirit Mountain. Once the waters receded, the Needles, or Wi kwiđ-kwiđ were formed, therefore Needles and the locality of Topock are considered sacred landscapes, or TCPs by the Hualapai Tribe (HDCR 2014).

To the Hualapai Tribe, the land, water, plants, and animals are seen as inherently connected and are all valued: "The air, the earth's surface, and the subsurface of the landscape are all part of a sacred continuum" (DTSC 2011). The Hualapai see the water and springs, rocks, plant and animal life, and material culture within the Topock and Colorado River region, without temporal limits, as a traditional cultural place. The Hualapai people regard their traditional lands in the Topock and Colorado River Region with "the highest esteem and most profound respect" (BLM 2012: 39).

The Hualapai consider many of the natural features in the Topock area to be important. These include the Needles (Wi kwiđ-kwiđ), Boundary Cone (Wi Veskwiya), and Spirit Mountain (Wikame), the Hualapai's place of creation, all of which are visible from the Project Site (BLM 2012). Dawn Hubbs indicated on a site visit on April 19, 2013, that smaller natural features, such as rock alignments or cleared areas, are interconnected or have meaning across the landscape—they often line up with larger features like Boundary Cone and Spirit Mountain. The Topock area is also where the Tribe used to collect arrow weed (Hubbs 2013).

Because of the connected nature of the cultural landscape, impacts to one part of the landscape inevitably are felt throughout the rest. The notion that holes are being punctured into such a sacred space brings on hurt and pain for the Tribe. The collective pain the Tribe feels is inexpressible.

To the Tribe, the best practice related to places of spiritual or cultural importance is to respect it and not to disturb it. Physical impacts to these important places, including to the Topock area, represent an irreparable destruction and desecration of the land. The Hualapai believe strongly that reparation for destruction to the land and larger environment rests on the Tribe and presents an enormous personal and spiritual burden to Tribal members. These impacts also disrupt traditional and religious practices. The Hualapai have always sought to protect their ancestral lands, and feel a strong sense of responsibility to do so. As spoken by Delbert Havatone (as quoted in BLM 2012: 44):

> If these sites are defiled, it becomes impossible to practice Hualapai traditional and religious thought…"thought," being essential because it comes from within each individual spirit. This is an abstraction to many people, but it is real to the Hualapai. At an archaeological site, or cultural landscapes, we pray to the land to everything in the cultural environment…we talk in Hualapai language to the spirits that are there, letting them know that our visit is not meant to be disrespectful; we are there to insure that the Hualapai are working to protect the home site of our ancestors. Essential to Hualapai traditional thought is the knowledge that if you don't talk in that manner, these things come back on you to harm your family or yourself. Without fulfilling Hualapai responsibility for the protection of these sites and the opportunity to express respect for

> these sites, great harm can come to the Tribe. That is what Hualapai religion means. That is what Wikahme means.

For the Tribe, the puncturing of the land represents much more than visual scars. While the action of digging the hole is short lived, the impact of soil borings will be felt long after the action has taken place. The sensitive nature and values of the Topock area are such that it may never be possible to return it to its former, whole, state.

4.4.1.5 Cultural Resources

Topock Traditional Cultural Property

The Project Site is located within, and is encompassed by, a TCP of traditional religious and cultural significance to several Interested Tribes. As a result of Section 106 consultation for the Topock Remediation Project (defined by the U.S. Bureau of Land Management [BLM] to include remedial investigations and groundwater and soil removal and response actions pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA]), which resulted in the preparation of a Programmatic Agreement (PA) (BLM et al. 2010) and a Cultural and Historical Properties Management Plan (CHPMP) (BLM 2012), the BLM determined that there was a TCP of religious and cultural significance to several Interested Tribes within the Area of Potential Effects (APE) for the Groundwater Remediation Project, a larger area of approximately 1,600 acres that surrounds and encompasses the Project Site. The BLM defined the boundaries of the TCP as corresponding to the then identified APE. However, the BLM also acknowledged that “Tribal members believe that the area known as the Topock TCP is part of a broader cultural landscape that includes the Colorado River, extending beyond the limits of the currently designed APE, and should not be understood as a discrete or detached site, but as part of a larger area of cultural significance” (BLM 2012). The BLM did not identify the contributing elements of the Topock TCP with the exception of prehistoric archaeological sites, which were identified as “contributing properties” to the TCP (BLM 2012).

The BLM determined that the TCP was eligible for inclusion in the National Register of Historic Places (NRHP) under Criterion A (BLM et al. 2010). Because the TCP has been determined eligible for inclusion in the NRHP, it is automatically listed in the California Register of Historical Resources (CRHR) (Public Resources Code Section 5024.1(d)(1)) and is considered a historical resource per CEQA Guidelines Section 15064.5(a). The resource identified in the Groundwater FEIR (DTSC 2011) as the Topock Cultural Area (TCA) is within and part of the TCP defined by the BLM.

DTSC, through coordination with Interested Tribes, identified additional physical characteristics that convey the significance of the Topock TCP, which include land (including landforms, soil, and clays), water, plants (particularly indigenous plants of traditional cultural significance), animals, and the viewshed. These physical characteristics, including prehistoric archaeological sites previously identified by the BLM as “contributing properties,” are described hereinafter as “contributing elements.”

Archaeological and Historic-Period Built Resources

Several archaeological and historic-period built resources inventories that encompass the Project Site were previously conducted for the Groundwater Remediation Project. These studies included records searches of the California Historical Resources Information System (CHRIS) at San Bernardino Archaeological Information Center (SBAIC) housed at the San Bernardino County Museum in Redlands, California, in 2004 and 2011 and archaeological and historic-period built resource surveys conducted between 2004 and 2007 (Davy et al. 2004; McDougall and Horne 2007).

In addition, a site condition assessment field visit was conducted by Applied Earthworks, Inc. (AE) on behalf of PG&E on September 30 and October 1, 2013 (Hearth et al. 2013). Attendees included representatives from AE, PG&E, DTSC, Environmental Science Associates, FMIT, CRIT, Hualapai Indian Tribe, and Cocopah Indian Tribe. The field visit included site conditions assessments for 14 previously recorded resources within the Project Site to determine if site conditions have changed since their most recent documentation (see **Table 4.1-1**). As a result of the site condition assessment field visit, updates to California Department of Parks and Recreation (DPR) 523 forms were prepared for resources CA-SBR-11867 and -11993, and three new archaeological sites were documented (AE-Topock-183, AE-Topock-184/H, and AE-Topock-185) (Hearth et al. 2013).

As a result of these past studies, a total of 208 archaeological and historic-period built resources have been identified within approximately one mile of the Project Site, including 143 prehistoric archaeological sites, 17 historic archaeological sites, 4 multicomponent archaeological sites, 38 isolated artifacts, and 6 historic-period built resources. Of the 208 archaeological and historic-period built resources, 23 are located within the Project Site, including 18 archaeological resources and five historic-period built resources (Table 4.1-1). Of the 18 archaeological resources within the Project Site, 6 are prehistoric archaeological sites (CA-SBR-11867, -11993, -13796, -14698, AE-Topock-183, and AE-Topock-185), 7 are historic-period archaeological sites (CA-SBR-11704H, -11862H, -11865H, -11866H, -12642H, -13791H, and -13793H), two are multicomponent archaeological sites (CA-SBR-11705/H and AE-Topock-184/H), 2 are historic-period isolates (36-020379 and -023219), and one is a prehistoric isolate (36-021491). The five historic-period built resources include Route 66/National Old Trails Highway (CA-SBR-2910H), the A&P/Atchison Topeka & Santa Fe Railway (AT&SF) railroad alignment (CA-SBR-6693H), a bridge (CA-SBR-11997H), the Route 66 sign (36-012486), and the PG&E Topock Gas Compressor Station.

Of the 23 resources in the Project Site, three (CA-SBR-11704H [historic-period archaeological site associated with a gravel processing site]) (see Earle and Price 2014), 36-020379 [historic-period isolate], and 36-023219 [historic-period isolate]) are not eligible for listing in the CRHR and are not considered historical or unique archaeological resources under CEQA. Two resources, CA-SBR-2910H (Historic Route 66/National Old Trails Highway) and CA-SBR-6693H (A&P/AT&SF railroad alignment), have been determined eligible for listing in the NRHP

TABLE 4.4-1
ARCHAEOLOGICAL AND HISTORIC-PERIOD BUILT RESOURCES WITHIN THE PROJECT AREA

Resource Identifier	Resource Type	Description	Date Recorded	NRHP/CRHR Eligibility Status	Contributing Element of Topock TCP
CA-SBR-2910H	Historic Built Resource	Historic Route 66/National Old Trails Highway	2012	[a]Determined eligible	No
CA-SBR-6693H	Historic Built Resource	Atlantic & Pacific/Atchison Topeka & Santa Fe Railroad alignment	1999	[b]Determined eligible	No
*CA-SBR-11704H	Historic Arch Site	Historic Gravel Processing Site/ Refuse Scatter	2004	[c]Not eligible	No
*CA-SBR-11705/H	Multicomponent Arch Site	Refuse scatter, roads, quarries/tailings, and a lithic scatter	2009	[e]Historic component not evaluated/ Discretionarily eligible; [f]Prehistoric component not evaluated/ Discretionarily eligible	Prehistoric component only
*CA-SBR-11862H	Historic Arch Site	Remains of the El Rancho Colorado Road House and Gas Station	2004	[d]Recommended eligible	No
*CA-SBR-11865H	Historic Arch Site	Segment or siding of the 1890–1947 Atlantic & Pacific/Atchison Topeka & Santa Fe RR	2004	[e]Not evaluated/ Discretionarily eligible	No
*CA-SBR-11866H	Historic Arch Site	Sedimentation ponds and ditch	2007	[e]Not evaluated/ Discretionarily eligible	No
*CA-SBR-11867	Prehistoric Arch Site	Lithic Assay Station	2004	[e]Not evaluated/ Discretionarily eligible	Yes
*CA-SBR-11993	Prehistoric Arch Site	Rock Shelter	2004	[f]Not evaluated/ Discretionarily eligible	Yes
*CA-SBR-11997H	Historic Built Resource	Rock and Mortared Bridge	2005	[e]Not evaluated/ Discretionarily eligible	No
*CA-SBR-12642H	Historic Arch Site	Concrete Bridge Footing	2007	[e]Not evaluated/ Discretionarily eligible	No
*CA-SBR-13791H	Historic Arch Site	Railroad-related Refuse Scatter	2008	[e]Not evaluated/ Discretionarily eligible	No
*CA-SBR-13793H	Historic Arch Site	TNT/Nitro storage hole cut into an arroyo	2009	[e]Not evaluated/ Discretionarily eligible	No
*CA-SBR-13796	Prehistoric Arch Site	Lithic Reduction Station	2010	[f]Not evaluated/ Discretionarily eligible	Yes
*CA-SBR-14698	Prehistoric Arch Site	Lithic Assay Station	2010	[f]Not evaluated/ Discretionarily eligible	Yes
36-020379	Historic Isolate	Possible truck body or hopper	2004	Not eligible	No
*36-021486	Historic Built Resource	Historic Route 66 Sign	2009	[e]Not evaluated/ Discretionarily eligible	No
36-021491	Prehistoric Isolate	2 chert cortical flakes	2010	[f]Not evaluated/ Discretionarily eligible	Yes
36-023219	Historic Isolate	2 spheres refractory material	2008	Not eligible	No
AE-Topock-183	Prehistoric Arch Site	Lithic Assay Station	2013	[f]Not evaluated/ Discretionarily eligible	Yes
AE-Topock-184/H	Multicomponent Arch Site	Lithic Assay Station/Historic Refuse Scatter	2013	[f]Not evaluated/ Discretionarily eligible	Prehistoric component only
AE-Topock-185	Prehistoric Arch Site	Lithic Assay and Reduction Station	2013	[f]Not evaluated/ Discretionarily eligible	Yes
-	Historic Built Resource	PG&E Topock Gas Compressor Station (19 bldgs./structures constructed between 1950 and 1961)	2013	[g]Recommended eligible	No

*denotes resource re-visited during 2013 site condition assessment field visit
[a] Davy et al. 2004
[b] BLM 2012
[c] Earle and Price 2014
[d] Earle and Price 2013
[e] denotes resource determined discretionarily eligible (DTSC 2011)
[f] denotes resource determined discretionarily eligible by DTSC for the purposes of this DEIR pursuant to CEQA Section 15064.5(a)(3)
[g] Smallwood 2013

through consensus and are therefore listed in the CRHR and considered historical resources under CEQA (BLM 2012; Davy et al. 2004). Two resources, CA-SBR-11862H (El Rancho Colorado Roadhouse and Gas Station) and the PG&E Topock Gas Compressor Station, have been evaluated and recommended eligible for listing in the NRHP and are considered historical resources under CEQA (CEQA Guidelines Section 15064.5) (Earle and Price 2013; Smallwood 2013).

The remaining sixteen of the 23 resources (CA-SBR-11705/H, -11865H, -11866H, -11867, -11993, -1997H, -12642H, -13791H, -13793H, -13796, -14698, 36-021486, 36-021491, AE-Topock-183, AE-Topock-184/H, AE-Topock-185) identified in the proposed Project Site that have not been evaluated for listing in the NRHP or the CRHR have been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and are considered historical resources for purposes of this DEIR.

Archaeological Sites

***Resource CA-SBR-11704H:** This resource is a historic-period archaeological site consisting of a historic gravel processing area and refuse dump. The site was originally recorded by CH2M HILL in 2004, who documented six features (Features 1-6). Features 1 through 4 are shaker screens locations. Feature 5 is a north-south oriented trench measuring approximately 70 feet long by 18 feet wide and 4 feet deep. It may have been used for loading of gravel and sand into haul trucks (Ballantyne 2004). A refuse dump is located in the trench. Artifacts in the trench include gray stoneware fragments, white hotelware fragments, church-key opened beer cans, brown glass beverage bottles, condensed milk cans, paint or grease cans, and oil cans. Feature 6 consists of a scatter of steel plate, carriage spring fragment, carriage bolts, thick steel wire, brass machine fittings and valves, brass rivets, and unidentified steel fragments in an approximate 5-foot by 6--oot area. The site was interpreted as a gravel processing area for road construction during pipeline installations. The historic refuse dump was interpreted as a deposit related to the El Ranch Colorado Roadhouse and Gas Station (CA-SBR-11862H) (Davy et al. 2004). Part of the site was graded/bladed and used as a staging area during the construction of Interim Measure 3 (IM-3) and the Eastern Access Road (Hearth et al. 2013). This site was re-visited during the 2013 site condition assessment field visit and appears to have been disturbed since the time of its original recording. Part of the site had been cleared since its recordation, likely relating to the use of the site as a staging area during PG&E's construction of IM- 3 and an access road. Resource CA-SBR-11704H was previously recommended not eligible for listing in the NRHP (Davy et al. 2004; Earle and Price 2014). The site is not eligible for listing in the CRHR and is not considered a historical resource or unique archaeological resource under CEQA.

Resource CA-SBR-11705/H: This resource is a multi-component archaeological site with two prehistoric lithic reduction stations and gravel processing area. The prehistoric component of the site was originally recorded in 2004 by CH2M HILL and measures 23 meters (N-S) by 15 meters (E-W) (Davy et al. 2004; McDougall and Gothar 2009a). This component was recommended not eligible for listing in the NRHP in 2004 (Davy et al. 2004). In 2009, AE revisited the site and documented a historic component, expanding the site boundary to approximately 275 meters (NNW-SSE) by 72 meters (WSW-ENE). The historic component is a gravel processing area that likely dates to the 1940s or ‘50s and consists of four loci and ten features, as well as an associated historic artifact scatter. The artifact scatter consists of multiple beverage and condiment bottle fragments, two 55-gallon drums, motor oil cans, sanitary cans, beer cans, braided metal cable, iron pipe, scrap iron, and one tire rim (McDougall and Gothar 2009b). This site was re-visited during the 2013 site condition assessment field visit and appears unchanged since the original recordation. The historic component of resource CA-SBR-11705/H has not been evaluated for listing in the NRHP or the CRHR; however, it has been discretionarily determined historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA (DTSC 2011). Furthermore, because the resource includes a prehistoric component that is considered a contributing element of the Topock TCP, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA for the purposes of this DEIR.

***Resource CA-SBR-11862H:** This resource is a historic-period archaeological site consisting of the remnants of the El Rancho Colorado Roadhouse and Gas Station associated with Historic Route 66. The roadhouse and gas station were owned by Harold and Vera Workman, and was probably in operation from about 1947, when Route 66 was constructed, until about the 1960s, when Route 66 was replaced by I-40. The buildings and structures were demolished sometime in the 1970s (Davy et al. 2004). The site was documented by AE in 2004 and measures 775 feet (NW-SE) by 460 feet (NE-SW) (McDougall and Gothar 2004). AE documented three loci (Loci 1-3) and four features (Features 1-4). Locus 1 is located on an upper terrace and measures 165 feet (NW-SE) by 400 feet (NE-SW). This locus includes the poured cement foundation of the roadhouse/gas station (Feature 1) and erosion control ditch (Feature 2), as well as a flat graded parking area. Locus 2 is located on a lower terrace and measures 65 feet (N-S) by 120 feet (E-W). This locus consists of two poured cement foundations (Features 3 and 4). Locus 3 is located in a ravine and measures 65 feet (N-S) by 180 feet (E-W). This locus consists of the structural remains of the demolished roadhouse and a refuse scatter. Artifacts include thousands of glass bottles and cans, ceramics, car parts, oil drum, water heater, plumbing parts, electrical conduits, and oil filters. This site was re-visited during the 2013 site condition assessment field visit and appears to have been disturbed by recreational users and other visitors, who have used the lower NE portions of the site for parking vehicles. Resource CA-SBR-11862H was previously recommended not eligible for listing in the NRHP (Davy et al. 2004); however, the site has recently been re-evaluated and recommended eligible for listing in the NRHP under Criterion D (Earle and Price 2013). The archaeologically significant portion of the site is restricted to the historic-period refuse deposit in Locus 3 and the immediately adjacent portions of Locus 1, and Locus 2. The lower NE portion of the site that has been previously disturbed by vehicle parking does not contribute to the eligibility of the site as a whole. Since the site was recommended eligible for the NRHP, it is also considered eligible for listing in the CRHR and is considered a historical resource under CEQA.

***Resource CA-SBR-11865H:** This resource is a historic-period archaeological site consisting of a 213-foot-long railroad grade or siding associated with CA-SBR-6693H (A&P/AT&SF). The site was recorded in 2004 by AE (McDougall and Horne 2007). One related feature (Feature 1) was documented and consists of a 26-foot-long rock alignment that may have been constructed as a retaining wall to support fill for the grade (Farrugia 2004). This site was re-visited during the 2013 site condition assessment field visit and appears largely unchanged from 2007, aside from some riverbank erosion. Resource CA-SBR-11865H has not been evaluated for listing in the NRHP or the CRHR; however, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA (DTSC 2011).

***Resource CA -SBR-11866H:** This resource is a historic-period archaeological site that consists of two concrete-lined sedimentation ponds (Features 1 and 2) and an associated northeast-southwest trending ditch located to the east. The site was originally recorded by AE in 2004. Each sediment pond measures about 25-feet square by 2.5 feet deep. The ponds are lined with concrete and have 45 degree sloping walls surrounded by earthen berms (McDougall and Horne 2007). Archival research indicated that the ponds are associated with a temporary workers camp known as Camp J. Itinerant laborers working on the construction of U.S. Route 66 were housed at this location from January 1 to April 15, 1932 (McDougall 2007). This site was re-visited during the 2013 site condition assessment field visit and appears unchanged since its previous recordation. Resource CA-SBR-11866H has not been evaluated for listing in the NRHP or the CRHR; however, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA (DTSC 2011).

***Resource CA-SBR-11867:** This resource is a prehistoric archaeological site consisting of a lithic assay station. The site was originally recorded by AE in 2004 and measures 2 meters by 1 meter. Cultural constituents include two tested quartzite cobbles, three pieces of quartzite debitage, two chert (a type of sedimentary rock) flakes, and a quartzite cobble hammerstone (McDougall and Horne 2007). This site was re-visited during the 2013 site condition assessment field visit and the north-northeast boundary was extended 2 meters to include previously undocumented lithics. An update to the DPR 523 form was prepared (Hearth et al. 2013). Resource CA-SBR-11867 has not been evaluated for listing in the NRHP or the CRHR; however, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA (DTSC 2011). Furthermore, because the resource is a prehistoric archaeological site, it is also considered a contributing element of the Topock TCP.

***Resource CA-SBR-11993:** This resource is a prehistoric archaeological site consisting of a rock-shelter located within Bat Cave Wash. The site was originally recorded by AE in 2004. One feature (Feature 1) was documented. Feature 1 is a low wall at the mouth of the shelter constructed of water-rounded cobbles. Artifacts noted include one tested quartzite cobble with a single flake removed and a ceramic sherd (pottery fragment). This site was re-visited during the 2013 site condition assessment field visit. Additional ceramic sherds and manuports were noted and a DPR 523 form update was prepared (Hearth et al. 2013). Resource CA-SBR-11993 has not been evaluated for listing in the NRHP or the CRHR; however, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA for the purposes of this DEIR. Furthermore, because the resource is a prehistoric archaeological site, it is also considered a contributing element of the Topock TCP.

***Resource CA-SBR-12642H:** This resource is a historic-period archaeological site recorded by AE in 2007 consisting of a poured concrete footing, which is the last surviving component of the Red Rock Bridge. The bridge was constructed over the Colorado River in 1890 for the A&P Railroad. It was converted to a highway bridge for Route 66 in 1947, and was dismantled in the 1970s. The footing measures 10 feet long by 23.5 feet wide, and ranges in height from 23 to 64 inches (McDougall and Gothar 2007). This site was re-visited during the 2013 site condition assessment field visit and appears unchanged since its previous recordation. Resource CA-SBR-12642H has not been evaluated for listing in the NRHP or the CRHR; however, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA (DTSC 2011).

***Resource CA-SBR-13791H:** This resource is a historic-period archaeological site recorded by AE in 2008, consisting of a diffuse scatter of railroad-related debris. The site is located immediately north of Park Moabi Road which was originally the alignment for the A&P/AT&SF railroads (CA-SBR-6693H) from 1890 to 1947. Artifacts within the site consist of approximately 1,000 fragments of broken locomotive firebox bricks, timbers, bolts, tie-plates, spikes, various metal cans, brown glass bottle fragments, cast-iron stanchions, wooden fence posts and white earthenware dinner plates. One intact firebox brick with a maker's mark of the "American Arch Security Co." was identified. A maker's mark of "O.P. Co. Syracuse China" was noted on the earthen ware dinner plates. The site likely represents a dump used by the AT&SF railroad, and may date to the late 19th and early 20th centuries based on the observed maker's marks (Moloney and McDougall 2008). This site was re-visited during the 2013 site condition assessment field visit and appears largely unchanged, aside from some impacts from water erosion. Resource CA-SBR-13791H has not been evaluated for listing in the NRHP or the CRHR; however, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA (DTSC 2011).

***Resource CA-SBR-13793H:** This resource is a historic-period archaeological site recorded by AE in 2009 consisting of a manually excavated rectangular hole cut into the base of a cut-bank of an arroyo. The entrance the hole is approximately 5 feet wide by 6 feet tall, and it extends approximately 6 feet into the cut-bank. The back wall measures 5.5 feet high by 3.25 feet wide, and the floor is capped by a layer of tar. Artifacts noted include one piece of sheet metal, one piece of strap metal, one clear glass jug fragment, and numerous wire-cut nails of various sizes. It is postulated that the hole was used to store unstable explosives such as TNT during the construction of Route 66 (McDougall and Gothar 2009c). This site was re-visited during the 2013 site condition assessment field visit and appears largely unchanged, aside from some dust and silt accumulation. Resource CA-SBR-13793H has not been evaluated for listing in the NRHP or the CRHR; however, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA (DTSC 2011).

***Resource CA-SBR-13796:** This resource is a prehistoric archaeological site recorded by AE in 2010, consisting of a single lithic reduction station located on a level area of desert pavement just above a deep arroyo. The site measures 7.7 meters by 5.7 meters and contains one chert core, three chert flakes, and one fragment of chert shatter. The site likely represents a single episode of lithic reduction (Moloney 2010a). This site was re-visited during the 2013 site condition assessment field visit and appears unchanged. Resource CA-SBR-13796 has not been evaluated for listing in the NRHP or the CRHR; however, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA for the purposes of this DEIR. Furthermore, because the resource is a prehistoric archaeological site, it is also considered a contributing element of the Topock TCP.

***Resource CA-SBR-14698:** This resource is a prehistoric archaeological site recorded by AE in 2010, consisting of a lithic testing or assay station with two concentrations (Concentrations A and B), located on a highly disturbed terrace overlooking the Colorado River (Moloney 2010b). Concentration A consists of a total of 14 artifacts that include three quartzite flakes, four quartz flakes, six chert flakes and one chert core. Concentration B consists of nine artifacts and includes seven chert flakes, one tested chert cobble, and one chalcedony flake. Additional artifacts within the site boundaries include four tested quartzite cobbles, four quartzite flakes, two rhyolite flakes, one chert core, and chert flake. The site likely represents the opportunistic assaying of naturally occurring river cobbles (Moloney 2010b). This site was re-visited during the 2013 site condition assessment field visit and appears unchanged. Resource CA-SBR-14698 has not been evaluated for listing in the NRHP or the CRHR; however, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA for the purposes of this DEIR. Furthermore, because the resource is a prehistoric archaeological site, it is also considered a contributing element of the Topock TCP.

Resource Æ-Topock-183: This resource is a prehistoric archaeological site recorded by AE as a result of the 2013 site condition assessment field effort. The site consists of a discrete scatter of 14 lithic artifacts in two concentrations (Concentration 1 and Concentration 2). Concentration 1 consists of five chert flake cores and one primary chert flake. Concentration 2 consists of three quartzite flake cores and three primary quartzite flakes. There are also two artifacts outside of the concentrations, which include a tested quartzite cobble and one chert core (Moloney and Hearth 2013a). Resource Æ-Topock-183 has not been evaluated for listing in the NRHP or the CRHR; however, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA for the purposes of this DEIR. Furthermore, because the resource is a prehistoric archaeological site, it is also considered a contributing element of the Topock TCP.

Resource Æ-Topock-184/H: This resource is a multicomponent archaeological site recorded by AE as a result of the 2013 site condition assessment field visit. The site consists of a discrete lithic assay station and historic refuse scatter located above the Colorado River on the northeast toe of a disturbed hill (Moloney and Hearth 2013b). The site measures 20 meters (NW-SE) by 4 meters (NE-SW) and includes 13 lithic artifacts and 13 fragments from two glass insulators. The lithic artifacts include one quartzite primary flake, one quartzite core, two quartzite hammerstones, one quartz primary flake, one piece of quartz shatter, one chalcedony primary flake, one chalcedony secondary flake, one chalcedony core, two chert primary flakes, one chert secondary flake, and one rhyolite flake. The glass insulator fragments represent two insulators: a

Whithall-Tatum #2 insulator with a date of manufacture range from 1935 to 1938; and a Hemingrey #16 with a date of manufacture range from 1944 to 1945 (Moloney and Hearth 2013a). The prehistoric component of the site likely represents the opportunistic testing and reduction of lithic materials and may be the remnants of a larger site that was possibly connected to CA-SBR-14698 (Moloney and Hearth 2013b). The historic component may represent the discard of insulators from nearby utility poles. Resource Æ-Topock-184/H has not been evaluated for listing in the NRHP or the CRHR; however, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA for the purposes of this DEIR. Furthermore, the prehistoric component of the site is also considered a contributing element of the Topock TCP.

Resource Æ-Topock-185: This resource is a prehistoric archaeological site recorded by AE as a result of the 2013 site condition assessment field effort. The site consists of a lithic assay and reduction station located above the Colorado River on the northeast toe of a mechanically disturbed hill (Moloney and Hearth 2013c). The site measures 16.8 meters (NE-SW) by 2.3 meters (NW-SE) and includes 45 lithic artifacts, 39 of which are concentrated in the northwestern portion of the site (Concentration A). Concentration A measures 4.8 meters (SW-NE) by 2.3 meters (NW-SE) and is composed of 18 chert artifacts (16 flakes, 2 cores), 14 quartzite artifacts (13 flakes, 1 hammerstone), one piece of chalcedony shatter, and 6 rhyolite artifacts (5 flakes, 1 core). The six outlying artifacts not located within Concentration A consist of three chert flakes, two quartzite flakes, and one quartzite hammerstone. The site likely represents the opportunistic testing and reduction of lithic materials and may be the remnants of a larger site that was possibly connected to CA-SBR-14698 (Moloney and Hearth 2013c). Resource Æ-Topock-185 has not been evaluated for listing in the NRHP or the CRHR; however, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA for the purposes of this DEIR. Furthermore, because the resource is a prehistoric archaeological site, it is also considered a contributing element of the Topock TCP.

Historic-Period Built Resources

Resource CA-SBR-2910H: This resource consists of several abandoned portions of Historic Route 66. Portions of the resource were documented by CH2M HILL in 2004 and by AE in 2007 (Davy et al. 2004; McDougall and Horne 2007). From 1911 to 1926 the route was known as the National Old Trails Highway and provided a roadway for automobiles in the southern California desert (McDougall and Horne 2007). In 1926 the highway was designated U.S. Route 66 and was one of the main routes from the Midwest to southern California. In 1932 portions of the route were realigned for road-straightening purposes and by 1938, the entire route was paved. In 1957, eight miles of the route was realigned to eliminate sharp curves and dips between Needles, CA and Topock, AZ (Davy et al. 2004). Segments and obliterated portions of the National Old Trails Highway and Historic Route 66 and associated features have been documented within the Project Site. The segments located within the Project Site include Sections 1 through 4, which are graded and gravel-bedded road segments of the 1914-1932 route located north of the post 1932 route. Associated features include three culverts, a rock-lined ditch (TP-5), a concrete route marker (TP-4), a retaining wall (Feature 14), a utility pole used for erosion control (Feature 23), an upright wooden post (Feature 24), a porch possibly associated with the Teapot Dome Restaurant (Feature 25), a wooden sign (Feature 26), a cement bag revetment (TP-3), and a historic refuse scatter (Locus A). The California portion of Historic Route 66 was determined eligible for listing in the NRHP through consensus in 1990 under Criterion A, with some segments and features eligible under B and C, and is therefore automatically listed in the CRHR (Davy et al. 2004). As a result, resource CA-SBR-2190H is considered a historical resource under CEQA. Segments of Historic Route 66 and associated features within the Project Site are considered contributing elements to the eligible property for the purposes of this DEIR.

Resource CA-SBR-6693H: This resource is a historic-period built resource consisting of the A&P/AT&SF railroad alignment which bisects portions of the Project Site. This resource was documented by CH2M HILL in 2004 and by AE in 2007. The alignment was the first railroad to cross the Colorado River in the Topock region when it was constructed in 1890 (McDougall and Horne 2007). The alignment was originally built as part of the A&P Railroad Company and was acquired by the AT&SF in 1890. The original alignment, which was used from 1890 through 1947, corresponds to the present route of the Park Moabi Road and bisects portions of the Project Site (Davy et al. 2004). In 1947, the AT&SF moved the alignment to its present location just north of, and generally parallel to, I-40. The current alignment is operated by BNSF and also bisects portions of the Project Site. Resource CA-SBR-6693H was determined eligible for listing in the NRHP under Criterion A through consensus in 1994 (BLM 2012) and is therefore automatically listed in the CRHR. As a result, resource CA-SBR-6693H is considered a historical resource under CEQA.

***Resource CA-SBR-11997H:** This resource is a historic-period built resource originally recorded by AE in 2005 consisting of a flagstone and masonry bridge and culvert located at the intersection of Park Moabi Road (National Old Trails Highway) and Bat Cave Wash (McDougall and Horne 2007). The bridge measures 90 feet by 80 feet and was originally constructed in 1890 to channel flood water under the A&P Railroad right-of-way. It was modified in 1947 by the addition of a concrete extension when the alignment was widened for conversion into a roadway for automobiles. This resource was re-visited during the 2013 site condition assessment field visit and appears unchanged. Resource CA-SBR-11997H has not been evaluated for listing in the NRHP or the CRHR; however, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA (DTSC 2011).

***Resource P-36-021486:** This resource is a historic-period built resource that consists of a large "Welcome to Historic Route 66" sign likely constructed by at least 1935 (McDougall and Gothar 2009b). The sign measures 40 feet in length and is approximately 15.5 feet tall. The sign consists of a sunken cement foundation, two cement columns, a rock-faced cement base, a white-washed cement central portion with the Route 66 logo. On the northwest side of the sign "HISTORIC/ROUTE 66/WELCOME!/TURN RIGHT/NEXT EXIT" is written in large black letters and on the southeast side "HISTORIC/ ROUTE 66/COME/BACK/AGAIN" is written. This resource was revisited during the 2013 site condition assessment field visit and appears unchanged. Resource P-36-021486 has not been evaluated for listing in the NRHP or the CRHR;

however, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA (DTSC 2011).

PG&E Topock Gas Compressor Station: This resource consists of the historic-period PG&E Topock Gas Compressor Station. This resource was documented by AE in 2012, and is an irregularly shaped compound of 33 structures located on approximately 12 acres of land. The PG&E Topock Gas Compressor Station is one of the three original compressor stations constructed for PG&E's natural gas transportation and distribution system, which supplies natural gas to customers from Bakersfield to Portland (Smallwood 2013). The compound consists of 33 buildings and structures, 19 of which were constructed between 1951 and 1960. The other 14 structures have been installed within the past 30 years. The 19 buildings and structures dating to the 1950s include the main compressor building, the generator building, the former water conditioning building, the former chemical building, the maintenance supervisor's office, the parking structure, the district office, two water tanks, the A and B-side scrubbers, the old meter house, the odorant tank saddle and drain tank, the oil tank farm, the A and B-side valve nests, the cooling system power generator, the cooling system for the A and B-side compressors, the radio mast and control room, the PG&E Topock Gas Compressor Station sign, the blow-down stack, and the weather station box. The 19 buildings and structures constructed between 1950 and 1961 (the period of significance) of the PG&E Topock Gas Compressor Station have been evaluated as eligible for listing in the NRHP under Criteria A and C (Smallwood 2013). These 19 buildings and structures are therefore considered historical resources under CEQA. The other 14 buildings and structures in the complex are modern in age, post-dating the station's period of significance (1951-1960), and therefore are not eligible for the NRHP or considered historical resources under CEQA.

Isolates

Resource P-36-020379: This resource is a historic isolate that consists of a possible truck body or hopper located in a wash approximately 25 meters south of Route 66. The resource is constructed of thick gauge iron sheeting braced with angle iron and bar stock bolted to a wooden frame (Gothar and Everett 2004). Some plate glass was noted, suggesting the presence of a windshield. Because of their isolated nature and lack of important contextual information, isolated artifacts are generally not considered significant resources and therefore resource P-36-020379 is not considered eligible for listing in either the NRHP or CRHR, nor does it qualify as a historical resource or unique archaeological resource under CEQA.

Resource P-36-021491: This resource is a prehistoric isolate consisting of two chert cortical flakes found on a desert pavement surface located approximately 180 meters west of the Station (Moloney 2010c). Although isolated artifacts are not generally eligible for listing in the NRHP or CRHR due to the lack of archaeological context associated with them, because this prehistoric isolate could be considered a contributing element of the Topock TCP it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA for the purposes of this DEIR.

Resource P-36-023219: This resource is a historic isolate consisting of two spheres measuring 13 centimeters in diameter and composed of a refractory material (Moloney 2008). The spheres were discovered approximately 1 to 1.5 meters below the ground surface and were located in a wash collection basin approximately 120 meters south of Interstate 40. Due to its isolated nature and lack of important contextual information, resource P-36-023219 is not considered eligible for listing in either the NRHP or CRHR, nor does it qualify as a historical resource or unique archaeological resource under CEQA.

4.4.1.6 Geoarchaeological Review

A desktop geoarchaeological analysis was conducted for this Project to determine which landforms have the potential for surface and subsurface archaeological resources (Lockwood 2014). This analysis included an examination of available geologic maps and studies and review of *Geoarchaeological Assessment for the Topock Remediation Project, Mohave County, Arizona, and San Bernardino County, California*, prepared by Brady and Associates Geologic Services January 2013.

The Project Site is located within the Mojave Desert along the western bank of the Colorado River in southeastern San Bernardino County, California. The Project Site is situated within the Basin and Range physiographic province, in which crustal extension has caused widespread faulting and the formation of valleys or basins (Dickinson 2002). Elevation within the Project Site ranges between approximately 450 feet above mean sea level (amsl) along the Colorado River to approximately 800 feet amsl at the southern boundary of the survey area within the Chemehuevi Mountains. Surface topography consists of alluvial terrace deposits dissected by incised, ephemeral washes, including Bat Cave Wash and East Ravine. A low-lying floodplain, less than 40 feet above water level, lies along the Colorado River (DTSC 2011).

The effects of topographic variation, an arid climate with flashy precipitation, and sparse vegetation combine to create a landscape characterized by coalesced alluvial fans composed of coarse-grained sediments, including sand, gravel, and boulders, which fill valleys over time. Steeply sloped upper segments of alluvial fans tend to be less stable and more susceptible to erosion and debris flows when compared with flatter, lower fan segments. During intense episodes of rain, large quantities of runoff may flow violently down washes. Younger alluvial wash deposits are inset within fan surfaces.

In the vicinity of the Project Site, sediments comprising of alluvial fans are eroded from the adjacent, uplifted mountain ranges, the Chemehuevi Mountains. Mountain bedrock in the area is a complex set of extremely old (> 1 billion to approximately 5 million years [my]) Paleoproterzoic, Cretaceous, and Tertiary (Miocene) intrusive igneous and metamorphic rocks (Miller et al. 1983; Howard et al. 2013). Alluvial processes have operated at least intermittently since the Miocene (23.0 to 5.3 my), and the oldest alluvial deposits have become lithified into fanglomerate or sedimentary rock.

Washes act as tributaries to the Colorado River, which has been evolving within this area since the Pliocene (5.3 to 2.6 my). Evidence of the river's earliest history is seen in the form of outcroppings of sandstone and conglomerate. Due to channel incision, elevated portions of the Project Site have not been subject to alluvial deposition from the Colorado River since the Pleistocene (2.6 my to 12,000 years ago), although the low-lying floodplain adjacent to the channel has continued to aggrade.

The Project Site has been subject to extensive modification within the historic and recent period. The area is crossed by the A&P/AT&SF (BNSF) railroads, construction of which in the late 1800s involved placement of ballast/railbed material ostensibly collected locally (DTSC 2011). Roadways, including the historic US-66/I-40 corridor, traverse the area, and are easily discerned as anthropogenic fill. In 1938, the Bureau of Reclamation (BOR) completed Parker Dam approximately 40 river miles south of the Project Site, and the impoundment resulted not only in filling of Lake Havasu, but also the formation of Topock Marsh upstream. The area west of the Colorado River has been subject to development as the Station, and multiple pipelines have been installed across this area.

A total of 11 separate geological units have been mapped within those parts of the Project Site that would be subject to soil investigation activities (Howard et al. 2013; **Table 4.4-2**; **Figure 4.4-1**). These units range from Paleoproterzoic bedrock south of I-40 and west of the Colorado River to Holocene/Recent deposits along active washes. Two geological units formed by humans (anthropogenic) are also identified within soil sampling areas, including those where artificial fill has been placed along railways and roadways, and those areas disturbed as result of the Station.

Anthropogenic units (af, d) have all been formed since the historic period. While these units lack the potential to contain in situ prehistoric archaeological resources, roadbeds, railbeds, and other locally derived borrow material may contain disturbed archaeological resources and may bury other geological units that have the potential to contain archaeological resources. Furthermore, these units may contain historic-period archeological resources associated with their construction, use, and maintenance.

Based solely on age, geological units formed during the Holocene (Qa3 andQa4), have the potential to contain subsurface prehistoric archaeological resources. However, high-energy environments, such as washes dominated by coarse-grained gravel and sand, are often too dynamic to bury and preserve archaeological resources very well. These geomorphic processes have continued into the historic and recent period. Younger piedmont alluvium (Qa3) was formed in the pre-contact period and therefore has the potential to contain buried prehistoric resources, but not historic-period resources. Deposition of recent Holocene youngest piedmont alluvium (Qa4) began in the pre-contact period and extended into the historic period; it therefore has the potential to contain both subsurface prehistoric and historic-period resources. The Holocene piedmont alluvial units (Qa3 and Qa4) exhibit virtually no surface prehistoric archaeological resources, particularly toward the south. A possible explanation is that fluvial processes discouraged significant cultural use of the washes and/or destroyed or buried whatever cultural residues were deposited.

TABLE 4.4-2
GEOLOGIC UNITS WITHIN AREAS OF PROPOSED SOIL INVESTIGATION ACTIVITIES

Unit Symbol	Unit Name	Age	Description	Sensitivity for Surface Archaeological Resources	Sensitivity for Subsurface Archaeological Resources
af	Artificial fill	Historic-Recent	Unconsolidated: Fill materials in highway and railway grades	**Moderate (historic only)** - may have historic resources at surface. No potential for prehistoric resources at surface.	**Moderate (prehistoric/historic)** - may contain disturbed prehistoric and/or historic, and in situ historic subsurface.
d	Disturbed ground	Historic-Recent	Original geology obscured	**Moderate (historic only)** - may have historic resources at surface. No potential for prehistoric resources at surface.	**Low to moderate (prehistoric/historic)** - depending on location, may contain isolated intact historic and/or prehistoric remnants subsurface.
Qa4	Youngest piedmont alluvium	Holocene-Recent	Unconsolidated: Angular to subangular, poorly to moderately sorted, unconsolidated sand and gravel in active washes	**Moderate (prehistoric/historic)** - may have prehistoric and historic resources at surface.	**Low (prehistoric/historic)** - may contain prehistoric and historic resources subsurface.
Qa3	Younger piedmont alluvium	Holocene	Unconsolidated: Angular to subangular, poorly to moderately sorted, unconsolidated sand and gravel terraces above modern washes	**Moderate (prehistoric/historic)** - may have prehistoric and historic resources at surface.	**Moderate (prehistoric only)** - may contain prehistoric resources subsurface. No potential for historic resources.
Qa2	Intermediate-aged piedmont alluvium	Upper Pleistocene	Unconsolidated: Fan remnants dissected and isolated by modern washes; typically surfaced with varnished desert pavement	**High (prehistoric) to moderate (historic)** - contains a disproportionate percentage of prehistoric resources at surface. May contain historic resources at surface.	**Low (prehistoric only)** – unlikely to contain prehistoric resources subsurface, but cannot be discounted. No potential for historic resources subsurface.
Qtp	Pink silty sand	Upper Pleistocene	Moderately consolidated: Massive to bedded, pale-orange-gray, quartz-rich clayey silty sand	**Moderate (prehistoric/historic)** - may have prehistoric and historic resources at surface.	**Low (prehistoric only)** – unlikely to contain prehistoric resources subsurface, but cannot be discounted. No potential for historic resources subsurface.
Trbb	Boulder conglomerate of Bat Cave Wash	Upper Pliocene(?)-Pleistocene	Moderately consolidated to cemented: Boulder and cobble conglomerate, containing rounded quartz pebbles	**High (prehistoric) to moderate (historic)** – likely source of lithic materials during prehistoric period. May have historic resources at surface.	**None (prehistoric/historic)** – no potential to contain prehistoric or historic resources subsurface.
Tf	Fanglomerate	Pliocene-Miocene	Consolidated conglomerate: Poorly sorted sandy conglomerate of locally derived angular to subangular clasts	**High (prehistoric) to moderate (historic)** - likely source of lithic materials during prehistoric period. May contain historic resources at surface.	**None (prehistoric/historic)** – no potential to contain prehistoric or historic resources subsurface.

TABLE 4.4-2
GEOLOGIC UNITS WITHIN AREAS OF PROPOSED SOIL INVESTIGATION ACTIVITIES

Unit Symbol	Unit Name	Age	Description	Sensitivity for Surface Archaeological Resources	Sensitivity for Subsurface Archaeological Resources
Tcgn	Gneiss-clast conglomerate	Middle Miocene	Consolidated conglomerate: Red/red-brown weathering, poorly sorted alluvial fan deposits; derived from rocks above the Chemehuevi Fault	**Moderate (prehistoric/historic)** - may have prehistoric and historic resources at surface.	**None (prehistoric/historic)** – no potential to contain prehistoric or historic resources subsurface.
TKwq	Quartz monzonite	Cretaceous(?)-Miocene	Bedrock: Horneblend-biotite quartz monzonite, granodiorite, and granite rocks	**Moderate (prehistoric/historic)** - may have prehistoric and historic resources at surface.	**None (prehistoric/historic)** – no potential to contain prehistoric or historic resources subsurface.
Xgm	Mylonitic gneiss and migmatite	Paleoproter-zoic	Bedrock: mylonitic, heterogeneous rocks including migmatite, granite, and amphipolite-facies orthogneiss and paragneiss	**Moderate (prehistoric/historic)** - may have prehistoric and historic resources at surface.	**None (prehistoric/historic)** – no potential to contain prehistoric or historic resources subsurface.

SOURCE: Adapted from Howard et al. 2013.

Topock Soil Investigation
Project EIR
Background Source: USGS Geologic Map
Available at http://pubs.usgs.gov/sim/3236/
Created By Parus Consulting, Inc.
Map Creation Date: 02/24/2014

Geological Units

Figure 4.4-1

ESA | PARUS CONSULTING, INC.

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Intact, unconsolidated sediments (intermediate-aged piedmont alluvium [Qa2] and pink silty sand [Qtp]) date to the Upper Pleistocene (126,000 to 11,700 years ago) and generally lack the potential to contain subsurface prehistoric and historic-period archaeological resources; however, the very youngest of these Pleistocene deposits overlaps with the initial onset of PaleoIndian occupation of the California Desert region. Subsurface prehistoric archaeological resources associated with these two units would be unlikely, but is possible. Intermediate-aged piedmont alluvium (Qa2) has been shown to be strongly associated with surface evidence of prehistoric archaeological resources, including the Topock Maze, possibly due to attractive stable surfaces during the Holocene that may have encouraged use of these areas.

Consolidated rock units (Xgm, TKwg, Tcgn, Tf, and Trbb), include igneous and metamorphic rocks, as well as sedimentary rocks such as sandstone and conglomerate, which formed millions of years before the arrival of people and in geological settings that preclude the possibility for containing prehistoric or historic-period archaeological resources within them; however, prehistoric and historic-period archaeological resources may be encountered at the surface of these rock exposures. Loose cobbles and gravel eroded and weathered from upper Miocene fanglomerate (Tf) and especially upper Pliocene-aged conglomerate of Bat Cave Wash (Trbb), which lies on the western shore of the Colorado River adjacent to National Trails Highway, were sources of lithic raw material in the past and are more strongly associated with surface archaeological scatters.

Conclusions

Based on the geoarchaeological review, all 11 geological units within the proposed soil sample collection locations have the potential to contain surface archaeological resources. Two units (af and d) are considered moderately sensitive for historic-period resources at surface, but do not have the potential for intact prehistoric resources at surface. Three units (Qa2, Tf, and Trbb) are considered highly sensitive for prehistoric resources at surface and moderately sensitive for historic-period resources at surface. The remaining six units (Qa4, Qa3, Qtp, Tcgn, Tkwq, and Xgm) are considered moderately sensitive for both prehistoric and historic-period resources at surface.

In addition, some units have a higher potential for subsurface archaeological resources. Artificial fill may contain subsurface disturbed prehistoric/historic-period resources or intact historic-period resources and this unit should be considered moderately sensitive. Although disturbed (d) areas have been subject to ground-disturbing alterations, the depths of the disturbances may vary and therefore would not completely preclude the presence of prehistoric/historic-period archaeological materials at depths and should be considered low to moderately sensitive depending on nature of previous disturbances. Youngest piedmont alluvium (Qa4) and younger piedmont alluvium (Qa3) may contain subsurface prehistoric and/or historic-period resources and should be considered moderately sensitive. Intermediate-aged piedmont alluvium (Qa2) and pink silty sand (Qtp) are unlikely to contain subsurface prehistoric resources, although this possibility cannot be completely discounted. These two units (Qa2 and Qtp) are considered to have low sensitivity for prehistoric resources and no potential for subsurface historic-period resources. The remaining five units (Trbb, Tf, Tcgn, Tkwq, and Xgm) do not have the possibility to contain subsurface prehistoric or historic-period resources and are not considered sensitive for archaeological resources.

4.4.1.7 Native American Scoping

Scoping involving Native American Tribes with affiliation to the Project Site began with a search of the California Native American Heritage Commission (NAHC) Sacred Lands File (SLF). The NAHC was contacted on February 13, 2013 to request a search of the SLF. The NAHC responded to the request in a letter dated February 14, 2013. The letter did not indicate the presence of Native American cultural resources within the Project Site; however, the NAHC stated that the FMIT has indicated that a number of sacred sites are present in the Topock area. The letter also included an attached list of Native American contacts.

In support of the Native American scoping program, a Native American contact list was compiled from sources that included contacts from earlier phases of the Topock project, as well as the list of contacts provided by the NAHC as part of this DEIR process. The individuals and organizations contacted were divided into actively participating and not actively participating Native American Tribes. The actively participating Tribes included the Chemehuevi Indian Tribe, Cocopah Indian Tribe, CRIT, FMIT, and Hualapai Indian Tribe. The Native American Tribes not actively participating included the Fort Yuma-Quechan Indian Tribe,[1] Havasupai Indian Tribe, Las Vegas Paiute Tribe, San Manuel Band of Mission Indians, Serrano Nation of Mission Indians, Torres-Martinez Desert Cahuilla Indian Tribe, Twenty-Nine Palms Indian Tribe, and Yavapai-Prescott Indian Tribe.

On March 5, 2013, DTSC sent letters to actively participating Native American Tribes requesting Tribal input regarding cultural resources impacts and potential mitigation measures. The letters described the proposed Project and asked that all participants reply by April 19, 2013 if they had concerns regarding the Project. No responses were received.

On March 19, 2013, DTSC sent letters to the remaining Native American Tribes not actively participating in order to solicit input about the Project. The letters described the proposed Project and included a map depicting its location. Recipients were requested to reply with any information they are able to share about places of cultural importance to Native Americans that might be affected by the Project by April 19, 2013. No responses were received.

On April 11, 2013 and May 23, 2013, follow-up phone calls were made to the not actively participating Native American Tribes in an effort to make sure any Tribal input/concerns were captured. The following five individuals were reached by phone and provided input regarding the Project:

[1] The Fort-Yuma Quechan Indian Tribe's participation in the Topock project has diminished since the Groundwater FEIR and the Tribe was re-invited into the soil investigation scoping process via the March 13, 2014 letter sent to tribes identified as not actively participating in the Topock project. The Tribe did not respond to the letter or follow-up phone calls. Nonetheless, the Tribe has been included as one of the six "Interested Tribes" for the soil investigation project because of its role as an Interested Tribe during the Groundwater EIR process.

- Preston J. Arrow-Weed of the Ah-Mut-Pipa Foundation expressed his concern about the Project and stated that he opposes it, although it is outside of his area of concern. However, he stated that he is related to the Mojave and that the Project Site is very culturally sensitive. He requested that DTSC continue to mail him information regarding the Project.
- Dr. Marshall Cheung, Environmental Coordinator for the Twenty-Nine Palms Indian Tribe, had no comment on the Project, but wished to remain on the mailing list.
- Roland Ferrer, Planning Director for the Torres-Martinez Desert Cahuilla Indian Tribe, requested that DTSC keep him and Matt Krystall, the Tribal Resource Manager, on the mailing list. Mr. Ferrer also requested that a Native American cultural monitor be present for all ground-disturbing activities.
- Matthew Putesoy, Vice Chairperson of the Havasupai Indian Tribe, stated that cultural and archaeological information and impacts should be included in the DEIR analysis. Mr. Putesoy requested additional information be emailed to him, and that he would bring up the Project at the council meeting to be held on April 12, 2013 to see if there was any Tribal interest. No additional comments have been received from the Havasupai Indian Tribe.
- Ms. Goldie Walker, Chairwoman of the Serrano Nation of Mission Indians, requested that a copy of the final cultural resources report be sent to her.

The DEIR for the proposed soil investigation was initiated with release of the NOP and associated public comment period held between November 28, 2012 and January 14, 2013. DTSC convened public scoping meetings during this period to inform interested parties and seek input on the proposed Soil Work Plan and associated potential environmental impacts. DTSC also requested Tribal and stakeholder input at the January 2013 Consultative Work Group. On February 19, 2013, during the Topock Clearinghouse Task Force meeting, participating Interested Tribes requested that the Cultural Resources analysis (Section 4.4) of the Groundwater FEIR (January 2011) be distributed to facilitate their review as they consider the future analysis for the Soil Investigation DEIR. The requested section was provided on March 1, 2013, as was a copy of the Project description contained in the NOP.

A total of five formal Tribal scoping meetings were held by DTSC:

- DTSC presented information on the Project and requested input from the FMIT and Hualapai Tribes at the FMIT Tribal council office on December 12, 2012.
- DTSC presented information on the Project and requested input from the Chemehuevi Tribe during a Chemehuevi Tribal council meeting on April 26, 2013.
- DTSC met with the FMIT, Hualapai, CRIT, and Cocopah Tribes on October 1, 2013 to garner input regarding the aesthetics and visual analysis.
- DTSC met with FMIT, Hualapai, and Cocopah on December 16, 2013 to request input regarding conceptual mitigation measures.
- DTSC met with FMIT, Hualapai, and CRIT on January 23, 2014 to request input regarding conceptual mitigation measures.

In addition to these formal scoping meetings, DTSC has conducted informal meetings and field visits with Tribal members and representatives, and have solicited written comments. Information obtained through the scoping meetings, informal meetings and field visits has been incorporated into this DEIR.

During the planning phase of this Project, archaeologists and Tribal representatives, together with PG&E, DTSC, visited the proposed sampling locations in order to incorporate resource avoidance into the design. Prior to the submittal of the May 2011 Soil Work Plan, DTSC held multiple coordination meetings and site visits with Interested Tribes and other stakeholders during the soil data gap evaluation process in order to garner input on the Soil Work Plan.

The Phase 1 data gaps and the proposed Phase 2 sampling plan were presented at two meetings with the United States Department of the Interior (DOI), DTSC, and several Interested Tribes held at the Station on October 6 and 7, 2010, and November 2 and 3, 2010. During the meeting, soil data were reviewed with stakeholders, each AOC was visited, and preliminary data gap evaluations were discussed. A subsequent meeting was held on December 7, 2010, between DOI, DTSC, and several Interested Tribes to discuss Unincorporated Area (UA)-1/UA-1 alternate and sampling at the mouth of Bat Cave Wash. On December 13, 2010, DTSC issued direction to PG&E on UA-1 and UA-1A alternate location. On December 15, 2010, DOI issued direction to PG&E on sampling at the mouth of Bat Cave wash. On January 13, 2011, a meeting was held to discuss Interested Tribes' comments on the preliminary data gaps evaluation (CH2M HILL 2013 – Appendix A).

In response to concerns raised by some Interested Tribes through letters provided by the FMIT consultants and the Hualapai Department of Cultural Resources, and as a result of meetings with several Interested Tribes held December 7, 2010, and January 13, 2011, DOI and DTSC evaluated the possibility of reducing the number of Phase 2 samples. Based on the number of samples and disturbances to sensitive cultural resources, the agencies evaluated each sample location to determine which, if any, sample locations could be eliminated. DOI and DTSC issued a joint letter dated February 25, 2011, with a revised Phase 2 sampling plan removing approximately 50 sample locations as a result of input received from some of the Interested Tribes (CH2M HILL 2013 – Appendix A).

A Draft Final Part A Phase 1 Draft Final Data Gaps Evaluation Report was provided in Appendix A to the *Soil RCRA Facility Investigation/Remedial Investigation Work Plan, Pacific Gas and Electric Company (PG&E) Topock Compressor Station, Needles, California,* submitted to the DTSC and DOI in May 2011 (CH2M HILL 2013 – Appendix A). This work plan is referred to as the 2011 Draft Soil RFI/RI Work Plan. Comments on the 2011 Draft Soil RFI/RI Work Plan were received from the following:

1. Karen Baker of DTSC Geological Services Unit, August 19, 2011
2. Pamela S. Innis of DOI, August 16, 2011
3. Leo S. Leonhart of Hargis + Associates, Inc on behalf of the FMIT, August 1, 2011
4. Loretta Jackson-Kelly of the Hualapai Department of Cultural Resources, July 21, 2011

Three Topock Working Group (TWG) meetings were held in September and December, 2011 with several Interested Tribes and other stakeholders at the Station to discuss comments on the Draft Soil RFI/RI Work Plan. On September 15, 2011, DTSC and DOI met with the FMIT and Hualapai. Items discussed during these meetings included comments related to perimeter and storm drain sampling, AOC 14 Monitoring Well (MW)-24 Bench, UA-1, management of displaced soil, mouth of Bat Cave Wash, East Ravine sediment and pore water sampling, and sampling inside the station fence line. On April 4, 2012, a meeting was held in Needles to discuss risk evaluation and land use related items. On June 15, 2012, a meeting was held to discuss items related to the response to the comments table. The FMIT submitted a letter dated July 23, 2012, regarding items related to the Draft Soil RFI/RI Work Plan, to which DOI and DTSC responded in a joint letter dated August 31, 2012. A revised version of the Draft Soil Work Plan was circulated for public review and comment in September 2012. Comments were submitted by DTSC, DOI, the FMIT, and the Hualapai. Responses to these comments were provided by PG&E (see Appendix I of the Soil Work Plan). The Soil Work Plan was then revised and presented to DTSC and DOI in a final document dated January 2013 (CH2M HILL 2013; included as Appendix A to this DEIR).

In response to comments received from the FMIT and Hualapai, DTSC/DOI made the following revisions to the workplan to resolve or address their concerns:

1. Minimized sample locations by eliminating potentially redundant sample locations, combining and optimizing data from different investigation areas (multi-purpose sample locations), and making assumptions about potential physical barriers that may confine contaminant extent.
2. Utilized the lesser intrusive X-ray fluorescence (XRF) method to reduce and optimize soil sample locations and at UA-1.
3. Developed soil repatriation procedures to assist in the proper handling and potential reuse of displaced soil resulting from the investigation activities.
4. Used a phased approach using XRF and surface geophysics prior to making decisions on drilling/trenching.
5. Addressed the potential harm of the dye to be used in the dye-testing of the storm drains.

4.4.1.8 Paleontological Resources

A Paleontological Resources Management Plan (PRMP) was prepared for the Groundwater Remediation Project by ARCADIS in December, 2012. This plan included a paleontological literature review, records check, and field survey of the Groundwater Remediation project area, which encompasses the Project Site.

As part of the PRMP, a paleontological records check was conducted by Dr. Samuel McLeod, Vertebrate Paleontology Division of the Natural History Museum of Los Angeles County (LACM), by Eric Scott, Curator of Paleontology Division of Geological Sciences Museum of San Bernardino County (SBCM), and at the online databases of the LACM, Invertebrate

Paleontology Section, and the University of California Museum of Paleontology database (ARCADIS 2012).

The records check from the SBCM indicated that three fossil localities (SBCM 1.39.1, SBCM 1.39.2 and SBCM 1.39.3) have been recorded in the vicinity of the Project Site. These fossil localities are located just west and south of the Station and are associated with the presumed Pleistocene-age sediments of the Chemehuevi Formation.

The PRMP identified the following formations within the Project Site and assigned each a paleontological sensitivity rating based on the federal Potential Fossil Yield Classification (PFYC) system (ARCADIS 2012).

Holocene Deposits

Holocene alluvial deposits (Qal, Qs, Qya) (<0.01 my) include silts, sands, and conglomerates exist in the form of drainage fill, alluvial fans, and dunes (Qs). The character of River deposits (Qal) differs depending on stream flow energy and distance from the source. In the Colorado River area, River deposits consist of poorly to moderately sorted sands and gravels having angular to subangular clasts (rock fragments) composed of igneous and metamorphic rock. The younger alluvial fan deposits (Qya) may overlie older deposits. Available borehole data indicates that recent alluvium is present at depths up to 10 to 25 feet across the Project Site. Holocene alluvial deposits (Qal, Qs, Qya) are assigned a PFYC ranking of 2 (Low) because they are too young to contain fossils. However, they may overlie older, more paleontologically sensitive formations.

Chemehuevi Formation

Sediments of the Chemehuevi Formation (Qrg, Qrs) (11,000 years to 2.5 my) consist of about 800 feet of sands (Qrs) and gravels (Qrg) from the ancestral Colorado River that form terraces along the river valleys. Chemehuevi Formation gravels are interbedded with Chemehuevi Formation sands. The Chemehuevi Formation gravels consist of well-sorted sands and gravels composed of well-rounded clasts of limestone, quartzite, and chert, much of which is derived as erosional debris from the Colorado Plateau. Locally derived clasts of gneiss and volcanic rocks are also present and include boulders up to 3 feet in diameter. The Chemehuevi Formation sands consist of pink to tan, weakly to moderately indurated clays, silts, and sands interbedded with well-sorted, well-rounded pebble conglomerates.

According to the record search results from the SBCM, the Chemehuevi Formation has "high potential to contain significant nonrenewable paleontologic resources subject to adverse impact by development-related excavation." Two localities (SBCM 1.39.1 and SBCM 1.39.3) within the vicinity of the Project consist of root casts, animal burrows, and mollusk shells of the presumed Pleistocene-age Chemehuevi Formation. Locality SBCM 1.39.2, located within one-half mile of the southern portion of the Project Site, yielded fossil root casts and microvertebrate bones. Exposures of the Chemehuevi Formation are located on the western and eastern shores of the Colorado River. No borehole data is available for depth of the Chemehuevi Formation. The Chemehuevi Formation (Qrg, Qrs) has been assigned a PFYC ranking of 3a (Moderate with uneven distribution) because it is known to produce vertebrate fossils or scientifically significant nonvertebrate fossils, but only as unpredictable scatters or isolates.

Pleistocene Older Alluvium

The Pleistocene (11,000 years to 2.5 my) older alluvium (Qc) are undifferentiated sediments of the Chemehuevi Formation. This unit is up to tens of meters thick, and consists of poorly sorted sands to boulder conglomerates, dissected by younger stream channels. The Pleistocene fan deposits can be distinguished from similar Holocene deposits by the Pleistocene fans' deep dissection, varnishing, terracing, thickness, and presence of clasts of basalt from the Black Mountains and gneiss from the Hualapai Mountains. Boreholes in the part of Bat Cave Wash south of I-40 indicate that contact between recent and older alluvium is at between 10.5 to 12 feet in that area. The Pleistocene older alluvium (Qc) is also ranked as PFYC 3a (Moderate with uneven distribution) because it is essentially similar to the Chemehuevi Formation, but has not been formally described.

Miocene Fanglomerate

Miocene (7 to 26 my) nonmarine deposits within the Project Site consist of a gneiss-rich fanglomerate (Tf). These are dark-red to brown, poorly sorted alluvial fan deposits having subangular to subrounded clasts of Proterozoic gneiss, granite, and amphibolite from the Chemehuevi Mountains. Exposures of Miocene conglomerate are present in Bat Cave Wash and along the Colorado River corridor. Available borehole data indicates that contact between alluvium and Miocene sediments varies from 23 to 200 feet across the Project Site. The Miocene Fanglomerate (Tf) has been assigned a PFYC ranking of 2 (Low) because it is too coarse-grained to contain fossils.

Cretaceous or Jurassic Whale Mountain Quartz Monzonites

A Cretaceous (65 to 136 my) or Jurassic (136 to 190 my) granitoid bodies of the Whale Mountain sequence occurs within the Project Site. It consists of a porphyritic hornblende-biotite monzogranite and quartz monzonite (KJqm), and is tan to pale-pink, medium- to coarse-grained with feldspar crystals of up to 1.25 inches long. Exposures of Cretaceous or Jurassic Whale Mountain quartz monzonite are present in a couple of shallow caves in Bat Cave Wash. No borehole data is available for depth of the Cretaceous or Jurassic Whale Mountain quartz monzonite. Because it consists of igneous and metamorphic rocks the Jurassic Whale Mountain Quartz Monzonites (KJqm) are ranked PFYC 1 (Very Low) due to heat and pressure of their formation.

Early Proterzoic Gneiss

Early Proterozoic (1.6 to 2.5 billion years [by]) gneiss (p€g) is composed of highly metamorphosed rocks including augen gneiss, granitic to dioritic gneiss, and several named gneisses. No exposures of Early Proterzoic Gneiss were noted during the paleontological survey. No borehole data is available for depth of the Early Proterzoic Gneiss. Because it consists of igneous and metamorphic rocks Early Proterzoic Gneiss (p€g) is ranked PFYC 1 (Very Low) due to heat and pressure of formation.

4.4.2 Regulatory Background

Cultural and paleontological resources are considered under a variety of federal and state laws, regulations, guidelines, and policies. These are presented below as they are relevant to the analysis required by CEQA or potential future actions and approvals that may be associated with the proposed Project.

4.4.2.1 Federal

Section 106 of the National Historic Preservation Act

Resources that qualify as historic properties under the National Historic Preservation Act (NHPA) are considered historical resources under CEQA. Therefore, the NHPA is relevant to the identification and management of cultural resources under CEQA. Section 106 of the NHPA requires federal agencies to consider the effect of their undertakings on historic properties, to provide the Advisory Council on Historic Preservation an opportunity to comment, and to resolve any adverse effects on historic properties through the process provided in the Section 106 regulations (36 CFR Part 800 et seq.). Historic properties consist of resources listed in or eligible for listing in the NRHP. Because DTSC is not a federal agency and is not responsible for compliance with the NHPA, DTSC cannot make a determination of what resources in the Project Site constitute historic properties or the effect that federal undertakings necessary to implement the remediation would have on these resources. This section, however, reviews the process for determining if cultural resources qualify as historic properties under the Section 106 implementing regulations because it is relevant to the identification of historical resources under CEQA. This is because Public Resources Code Section 5024.1(d), provides that the CRHR includes California properties determined eligible for the NRHP. Similarly, Public Resources Code Section 21084.1 provides that a historical resource includes CRHR-eligible properties based on the NRHP. Given this, properties potentially eligible for the NRHP are also potentially historical resources under CEQA.

To be eligible for listing in the NRHP, a property must possess both significance and integrity, as defined at 36 CFR Section 60.4:

> The quality of significance in American history, architecture, archeology, 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 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 prehistory or history.

Ordinarily, cemeteries, birthplaces, or graves of historical figures; properties owned by religious institutions or used for religious purposes; structures that have been moved from their original locations; reconstructed historic buildings; properties primarily commemorative in nature; and properties that have achieved significance within the past 50 years shall not be considered eligible for the NRHP, unless certain limited exceptions apply (none of which are relevant on the Project Site).

National Register Bulletin 38

The NHPA provides that historic properties may include TCPs of religious and cultural significance to Native American Tribes. National Register Bulletin 38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties* (NPS 1998), outlines in more detail how to evaluate and document these types of historic properties. TCPs are resources eligible for the NRHP based on traditional cultural significance derived from the "role the property plays in a community's historically rooted beliefs, customs, and practices" (NPS 1998:1). National Register Bulletin 38 defines a TCP as "one that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (NPS 1998:1). TCPs can embrace a wide range of historic properties, such as the location associated with a Native American group's origin or the origin of the world (cosmogony), or an urban neighborhood that is the traditional home of a particular cultural group and that still reflects and is associated with their beliefs and practices. Other examples of TCPs include places where traditional people historically have gone and continue to visit for ceremonial practices. These examples are not intended to be exhaustive, but instead to illustrate the range of possible TCPs. The identification and evaluation of TCPs can be conducted only by consultation with members of the relevant group of people that ascribe value to the resource, or through other forms of ethnographic research. TCPs retain an essential importance to the communities who value them. "Traditional cultural values are often central to the way a community or group defines itself, and maintaining such values is often vital to maintaining the group's sense of identity and self respect. Properties to which traditional cultural value is ascribed often take on this kind of vital significance, so that any damage to or infringement upon them is perceived to be deeply offensive to, and even destructive of, the group that values them" (Parker and King 1998:2).

Evaluation of Traditional Cultural Properties for NRHP Eligibility

Evaluation of a TCP requires that it be identified as such by the community which recognizes its traditional and cultural value. TCPs may be evaluated for their eligibility to the NRHP, in the same way that other types of resources are evaluated, considering the four NRHP criteria as set forth in 36 CFR Section 60.4 (criteria [a]–[d]).

As with any resource that is evaluated for listing on the NRHP, the TCP must be a tangible district, site, building, structure, or object (NPS, 1998). These terms are not meant to limit or exclude places from evaluation as a TCP; for instance, a bare grassy expanse at Mt. Tonaachaw on Truk, an island that is part of the Federated States of Micronesia, has been evaluated as a component of a TCP (NPS 1998) because it is associated with at least two different spirits who reside on or are represented by the mountain. This consideration requires merely that the TCP be a tangible property, rather than the intangible beliefs or values alone.

Integrity

The TCP must have integrity, like any property eligible for listing on the NRHP. For traditional cultural resources this means that they must have "integrity of relationship" and "integrity of condition" (NPS 1998). Integrity of relationship means simply that the specific place is integral and necessary to a traditional cultural group's beliefs or specific practices (NPS 1998). National Register Bulletin 38 gives the example of two different cultures, one that believes that baptism at a specific river is necessary to accept individuals as members, and another that simply requires baptism in any body of water. For the first example, the river is integrated into beliefs and practices of a traditional culture and thus has integrity of relationship.

Integrity of condition requires simply that the TCP has not been altered in such a way that it no longer can serve its function for the traditional cultural group. For example, a pilgrimage route to a sacred site would no longer have integrity of condition if modern construction had physically interrupted the route and thus made it unusable. This requirement does not mean that the TCP must be completely intact without any changes to the setting or features of the resource; rather, the test is whether or not the resource can still function for traditional cultural purposes or whether the presence of new elements disrupts the function. National Register Bulletin 38 offers an example of a resource that has integrity despite changes to the setting. One reach of the Klamath River in Northern California is within the ancestral and present territory of the Karuk people, and is the place where they carry out world renewal ceremonies and other rituals despite the presence of a modern highway, a U.S. Forest Service ranger station, and modern residences (NPS 1998).

If the TCP has integrity of relationship and integrity of condition, evaluation progresses to the second step of evaluating the resource for eligibility for listing on the NRHP applying the criteria set forth in 36 CFR Section 60.4, as described above.

National Park Service Preservation Brief 36: Protecting Cultural Landscapes

The NPS defines cultural landscapes as an additional category of resources that can qualify as historic properties. Cultural landscapes consist of (NPS 1994):

> a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.

The NPS defines four general types of cultural landscapes, which are not mutually exclusive: historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes (NPS 1994):

1. A historic site is a landscape significant for its association with a historic event, activity, or person. Examples include battlefields and president's house properties.
2. A historic designed landscape is significant as a design or work of art; was consciously designed and laid out either by a master gardener, landscape architect, architect, or horticulturist to a design principle, or by an owner or other amateur according to a recognized style or tradition; has a historical association with a significant person, trend, or movement in landscape gardening or architecture, or a significant relationship to the theory or practice of landscape architecture. Examples include parks, campuses, and estates.
3. A historic vernacular landscape is one whose use, construction, or physical layout reflects endemic traditions, customs, beliefs, or values; expresses cultural values, social behavior, and individual actions over time; is manifested in physical features and materials and their interrelationships, including patterns of spatial organization, land use, circulation, vegetation, structures, and objects. Examples include rural villages, industrial complexes, and agricultural landscapes.
4. An ethnographic landscape contains a variety of natural and cultural resources that associated people define as heritage resources, including plant and animal communities, geographic features, and structures, each with their own special local names. Examples include contemporary settlements, religious sacred sites, and massive geological structures. Small plant communities, animals, and subsistence and ceremonial grounds are often components [of the landscape].

Antiquities Act of 1906

The Antiquities Act of 1906 (U.S. Code, Title 16, Sections 431–433) is meant to protect cultural resources by requiring a fine and/or imprisonment be leveled upon any person "who shall appropriate, excavate, injure, or destroy any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States."

Historic Sites Act of 1935

The Historic Sites Act of 1935 sets forth as a national policy that the United States should "preserve for public use historic sites, buildings and objects of national significance for the inspiration and benefit of the people of the United States." The act also sets forth duties by the National Park Service related to the preservation and interpretation of historic sites.

American Indian Religious Freedom Act of 1978

The American Indian Religious Freedom Act of 1978 makes it the policy of the United States to "protect and preserve for the American Indians their inherent right to freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites."

Archaeological Resources Protection Act of 1979

The Archaeological Resources Protection Act is meant to secure the protection of archaeological resources on public and Tribal land for the present and future benefit of the American people. It is designed to prevent looting and the destruction of archeological resources and provides for civil and criminal penalties. It is also meant to increase information exchange between professional archaeologists, governmental officials, and private individuals concerning collections and archaeological resources. Under the Act, "archaeological resources" are defined as items: (1) of archaeological interest over 100 years old; and (2) found in an archaeological context on federal or Indian lands. The Act requires finders of such resources to obtain a federal permit before excavating, and potentially recovering these objects, consistent with the standards and requirements of the Federal Archaeology Program.

Native American Graves Protection and Repatriation Act of 1990

The Native American Graves Protection and Repatriation Act provides for the protection of Native American graves, including human remains, funerary objects, and "objects of cultural patrimony" throughout the United States and its territories. It outlines the procedures for determining ownership for Native American human remains, funerary objects, and other sacred objects that may be discovered intentionally or unintentionally on federal land.

Religious Freedom Restoration Act of 1993

The Religious Freedom Restoration Act prohibits the government from substantially burdening religious exercise without demonstrating a compelling governmental interest as a justification for the burden. The government must also demonstrate that the action contemplated is the least restrictive means of furthering the demonstrated compelling governmental interest.

Paleontological Resources Preservation Act

The Paleontological Resources Preservation Act (PRPA) requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on federal land using scientific principles and expertise (BLM 2013). The PRPA provides authority for the protection of paleontological resources including criminal and civil penalties for fossil theft and vandalism. The PRPA affirms the authority for many of the policies the federal land managing agencies, including the BLM, already have in place for the management of paleontological resources, such as issuing permits for collecting paleontological resources, curation of paleontological resources, and confidentiality of locational data (BLM 2013).

Executive Order 11593

Executive Order 11593, entitled Protection and Enhancement of the Cultural Environment, mandates that the federal government preserve, restore, and maintain the "historic and cultural environment" of the United States for future generations. It requires the federal government to initiate measures that protect federally owned, and nonfederally owned, "sites, structures, and objects of historical, architectural or archaeological significance."

Executive Order 12875

Executive Order 12875, entitled Enhancing the Intergovernmental Partnership, establishes regular and meaningful consultation and collaboration with state, local, and Tribal governments on federal matters that significantly or uniquely affect their communities.

Executive Order 13007

Executive Order 13007, entitled Indian Sacred Sites, mandates that agencies managing federal lands shall, to the extent feasible, permitted by law, and not clearly inconsistent with essential agency functions "(1) accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and (2) avoid adversely affecting the physical integrity of such sacred sites." For the purposes of this executive order, sacred sites are considered to be any specific, discrete, narrowly delineated location on federal land that is identified by an Indian Tribe or associated Native American individual to be representative of the Native American religion in discussion.

Executive Order 13175

Executive Order 13175, entitled Consultation and Coordination with Indian Tribal Governments, mandates that federal agencies conduct "regular and meaningful consultation and collaboration with Tribal officials in the development of federal policies that have Tribal implications…." It also requires agencies to participate in these consultation processes to strengthen government-to-government relations with Native American Tribal entities. Consultation guidance from the BLM is also discussed specifically in Manual Section 8120 and BLM Handbook 8120-1. Further, on November 5, 2009 President Obama issued a Presidential Memorandum For the Heads of Executive Departments and Agencies Re: Tribal Consultation. This memorandum reaffirms the federal government's commitment to regular and meaningful consultation and collaboration with Tribal officials in policy decisions that have Tribal implications. All federal agencies are required to complete a detailed plan of actions the agency will take to implement the policies and directives of Executive Order 13175, after consultation by the agency with Native American Tribes and Tribal officials.

Executive Order 13287

Executive Order 13287, entitled Preserve America, is meant to outline the role of the federal government in creating partnerships between governmental entities in the preservation and reuse of historic properties. It actively advances the protection, enhancement, and contemporary use of the historic properties owned by the federal government and promotes intergovernmental cooperation and partnerships for the preservation and use of historic properties. It advocates that each federal agency seek partnerships with state and local governments, Native American Tribes, and the private sector to promote local economic development. Specifically, by pursing these partnerships, the federal government can "promote the preservation of the unique cultural heritage of communities and of the Nation and to realize the economic benefit that these properties can provide."

Executive Order 13352

Executive Order 13352, entitled Facilitation of Cooperative Conservation, is meant to ensure that the Department of Interior (as well as other federal departments) implements laws relating to the environment and natural resources in a manner that promotes cooperative conservation. According to the executive order, the term cooperative conservation means, "actions that relate to use, enhancement, and enjoyment of natural resources, protection of the environment, or both, and that involve collaborative activity among federal, state, local, and Tribal governments, private for-profit and nonprofit institutions, other nongovernmental entities and individuals."

Presidential Memorandum on Government-to-Government Relationship with Tribal Governments (September 23, 2004)

This presidential memorandum reaffirms the existence and durability of the unique government-to-government relationship and commitment to working with federally recognized Tribal governments on a government-to-government basis. It advocates that all departments and agencies adhere to these principles and work with Tribal governments in a manner that cultivates mutual respect and fosters greater understanding to reinforce these principles.

Bureau of Land Management Manual 8100, Handbook 8120-1

Sections 8110 through 8140 of this BLM Manual provide specific guidance for the BLM concerning cultural resources, which may include TCPs. Section 8100 provides a general summary of the framework for managing cultural resources. Specific objectives include, among others, the recognition of the public uses and values attributed to cultural resources on public lands, the preservation of cultural resources on public lands for current and future generations, and the assurance that proposed land uses would avoid inadvertent damage to cultural resources. Section 8110 outlines the procedures recommended for the identification and description of cultural resources. Specific objectives of Section 8120 include the assurance that Tribal issues and concerns are given consideration during the planning and decision-making process. Objectives of consultation should also include input from Native American Tribes as to proper collection, evaluation, and protection methodologies employed during the consultation process. Guidelines for this process are specifically outlined in BLM Handbook 8120-1. BLM Handbook 8120-1 also outlines the process for determining NRHP eligibility for a TCP and states that eligibility must be based on application of the NRHP criteria, that only places fulfilling one or more of the criteria may be found eligible, and that no type of property is automatically eligible for the NRHP, including TCPs. Section 8130 provides planning guidance for the BLM that considers the current and future use of cultural resources with the aim to resolve use allocation conflicts that have the potential to affect cultural properties. Finally, Section 8140 outlines objectives for the preservation of cultural resources, including the safeguarding of cultural resources from improper use and responsibly maintained in the public interest. Section 8140 also outlines the BLM's responsibility to adequately consider the effects on cultural properties from land use decisions.

Bureau of Land Management Manual 8270 and Handbook H-8270-1

BLM Manual 8270 and BLM Handbook H-8270-1 (General Procedural Guidance for Paleontological Resource Management) contain the agency's guidance for the management of paleontological resources on public land. The Manual has information on the federal authorities and regulations related to these resources. The handbook gives procedures for permit issuance, requirements for qualified applicants, information on paleontology and planning, and a classification system for potential fossil-bearing geologic formations on public lands (BLM 2013).

In October 2007, BLM formalized the use of the new classification system for identifying fossil potential on public lands with the release of instruction memorandum 2008-2009. The classification system is based on the potential for the occurrence of significant paleontological resources in a geologic unit, and the associated risk for impacts to the resource based on federal management actions. It is intended to be applied in a broad approach for planning efforts, and as an intermediate step in evaluating specific projects. This IM is part of a larger effort to update the Handbook H-8270-1.

In October 2008, the BLM introduced guidelines for assessing potential impacts on paleontological resources in order to determine mitigation steps for federal actions on public lands under the Federal Land Policy and Management Act (FLPMA) and the National Environmental Policy Act (NEPA) in IM 2009-011. In addition, this IM provides field survey and monitoring procedures to help minimize impacts to paleontological resources from federal actions cases where it is determined that significant paleontological resources would be adversely affected by a federal action.

Bureau of Land Management Lake Havasu Field Office Resource Management Plan

In 2007, BLM approved the Lake Havasu Field Office Resource Management Plan (RMP), which outlined the BLM's plan for managing approximately 1.3 million acres of public land, including the Beale Slough Areas of Critical Environmental Concern (ACECs) that overlap in part with the Project Site. The RMP requires that "Beale Slough Riparian and Cultural ACEC will be managed to protect and prevent irreparable damage to the relevant characteristics and important values," acknowledging that the ACEC contains "significant cultural resources [and] cultural sites within part of a regional cultural complex." The RMP also notes that "the area's fragile and irreplaceable prehistoric sites are eligible for inclusion on the NRHP." The RMP designates an area near Topock as part of the Topock-Needles Special Cultural Resource Management Area (SCRMA), which is categorized as an area for "Conservation for Future Use" and as an area for "Traditional Use" (BLM 2007). As an area categorized as allocated for Traditional Use, the Topock-Needles SCRMA is considered a site that is "important for maintaining [Native American] cultural identity, heritage, or wellbeing." The final environmental impact statement for the RMP addresses these designations in the context of the Project, stating, "ACEC designation or SCRMA allocation is meant to protect significant cultural resources. Management decisions relating to Chromium VI remediation will take into account the special status of these lands but will not preclude necessary actions to protect the Colorado River from contamination" (BLM 2006:5-117).

4.4.2.2 State of California

California Environmental Quality Act

CEQA requires lead agencies to determine if a proposed project would have a significant effect on the environment, including significant effects on historical or archaeological resources.

Under CEQA (Section 21084.1), a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment. The CEQA Guidelines (Title 14 California Code of Regulations [CCR] Section 15064.5) recognize that an historical resource includes: (1) a resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in, the CRHR; (2) a resource included in a local register of historical resources, as defined in Public Resources Code (PRC) Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); and (3) any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California by the lead agency, provided the lead agency's determination is supported by substantial evidence in light of the whole record. The fact that a resource does not meet the three criteria outlined above does not preclude the lead agency from determining that the resource may be an historical resource as defined in PRC Sections 5020.1(j) or 5024.1. PRC Section 21084.1 and CEQA Guidelines Section 15064.5(a) establish three analytical categories for use in determining whether a historical resource exists for purposes of CEQA. These are (1) mandatory historical resources; (2) presumptive historical resources; and (3) discretionary historical resources. A mandatory historical resource is one that has been listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR). Only an official determination by the State Historical Resources Commission triggers this mandatory determination.

Resources presumed to be historically or culturally significant include those that have been listed in a local register of historical resources, as defined in Section 5020.1(k) of the PRC, or identified as significant in an a historical resources survey that meets specified criteria (e.g., PRC 5024.1[g]), unless the preponderance of evidence demonstrates otherwise.

A discretionary historical resource is a resource that does not fit within the mandatory or presumptive categories, but that is determined to be a historical resource in the exercise of the lead agency's discretion. This includes, in relevant part, "[a]ny object . . . site, area, place . . . . which a lead agency determines to be historically significant or significant in the . . . cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record." (CEQA Guidelines Section 15064.5, subd. (a)(3)). A lead agency evaluating potential project impacts under CEQA therefore has broad discretion to determine whether a particular resource that may be affected by a proposed project is a historical resource for purposes of CEQA. When such a determination is made, the criteria to be applied include the criteria for listing on the CRHR.

If a lead agency determines that an archaeological site is an historical resource, the provisions of Section 21084.1 of CEQA and Section 15064.5 of the CEQA Guidelines apply. If a project may cause a substantial adverse change (defined as physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired) in the significance of an historical resource, the lead agency must identify potentially feasible measures to mitigate these effects (CEQA Guidelines Sections 15064.5(b)(1), 15064.5(b)(4)).

If an archaeological site does not meet the criteria for a historical resource contained in the CEQA Guidelines, then the site may be treated in accordance with the provisions of Section 21083, which is a unique archaeological resource. As defined in Section 21083.2 of CEQA a “unique” archaeological resource is an archaeological artifact, object, or site, about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information;
- Has a special and particular quality such as being the oldest of its type or the best available example of its type; or,
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

If an archaeological site meets the criteria for a unique archaeological resource as defined in Section 21083.2, then the site is to be treated in accordance with the provisions of Section 21083.2, which state that if the lead agency determines that a project would have a significant effect on unique archaeological resources, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place (Section 21083.1(a)). If preservation in place is not feasible, mitigation measures shall be required.

The CEQA Guidelines note that if an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment (CEQA Guidelines Section 15064.5(c)(4)).

California Register of Historical Resources

The CRHR is “an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change” (PRC Section 5024.1[a]). The criteria for eligibility for the CRHR are based upon NRHP criteria (PRC Section 5024.1[b]). Certain resources are determined by the statute to be automatically included in the CRHR, including California properties formally determined eligible for, or listed in, the NRHP.

To be eligible for the CRHR, a resource must be significant at the local, state, and/or federal level under one or more of the following criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. Is associated with the lives of persons important in our past;
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4. Has yielded, or may be likely to yield, information important in prehistory or history.

A resource eligible for the CRHR must meet one of the criteria of significance described above, and retain enough of its historic character or appearance (integrity) to be recognizable as a historical resource and to convey the reason for its significance. It is possible that a resource may not retain sufficient integrity to meet the criteria for listing in the NRHP, but it may still be eligible for listing in the CRHR.

Additionally, the CRHR consists of resources that are listed automatically and those that must be nominated through an application and public hearing process. The CRHR automatically includes the following:

- California properties listed on the NRHP and those formally determined eligible for the NRHP;
- California Registered Historical Landmarks from No. 770 onward; and,
- Those California Points of Historical Interest that have been evaluated by the California Office of Historic Preservation (OHP) and have been recommended to the State Historical Commission for inclusion on the CRHR.

Other resources that may be nominated to the CRHR include:

- Historical resources with an NRHP code of 3 through 5 (those properties identified as eligible for listing in the NRHP, the CRHR, and/or a local jurisdiction register);
- Individual historical resources;
- Historical resources contributing to historic districts; and,
- Historical resources designated or listed as local landmarks, or designated under any local ordinance, such as an historic preservation overlay zone.

Another category of "historical resources" are those "deemed significant pursuant to criteria set forth in PRC Section 5024.1(g), which states that "[a] resource identified as significant in an historical survey may be listed in the CRHR if the survey meets all of the following criteria:

(1) The survey has been or will be included in the State Historic Resources Inventory.

(2) The survey and the survey documentation were prepared in accordance with…procedures and requirements [of the (California) Office of Historic Preservation OHP].

(3) The resource is evaluated and determined [by the OHP] to have a significance rating of Category 1 to 5 on [the DPR Historic Resources Inventory Form].

(4) If the survey is 5 years or more old at the time of its nomination for inclusion in the CRHR, the survey is updated to identify historic resources which have become eligible or ineligible due to changed circumstances or further documentation and those which have been demolished or altered in a manner that substantially diminished the significance of the resource.

Resources identified by such surveys are presumed to be historically or culturally significant unless the preponderance of evidence demonstrates otherwise.

TCPs may also be eligible for the CRHR under CEQA Guidelines Section 15064.5(a)(3). Section 15064.5 provides that, in general, a resource not listed in state or local registers of historical resources shall be considered by the lead agency to be historically significant if the resource meets the criteria for listing in the CRHR.

Section 15064.5(e) of the CEQA Guidelines requires that excavation activities be stopped whenever human remains are uncovered and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are those of Native Americans, the NAHC must be contacted within 24 hours. At that time, CCR Section 15064.5(d) of the CEQA Guidelines directs the lead agency to consult with an appropriate Native American as identified by the NAHC and directs the lead agency (or applicant), under certain circumstances, to develop an agreement with the Native Americans for the treatment and disposition of the remains.

Public Resources Code 5020.7

PRC Section 5020.7 directs public agencies to carry out their responsibilities in a manner that encourages owners of identified (and unidentified) historical resources to preserve and enhance these historical resources for the general public.

Public Resources Code 5097.9

PRC Section 5097.9 requires that no public agency (or private party using or occupying public property) interfere with “the free expression or exercise of Native American religion as provided in the United States Constitution and the California Constitution.” Specifically, no part shall cause, “severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine located on public property, except on a clear and convincing showing that the public interest and necessity so require.”

Public Resources Code 5097.91

PRC Section 5097.91, as amended by Assembly Bill 2641, establishes the NAHC, “consisting of nine members appointed by the Governor with the advice and consent of the Senate.”

Public Resource Code 5097.98

PRC Section 5097.98, as amended by Assembly Bill 2641, provides procedures in the event human remains of Native American origin are discovered during project implementation. PRC Section 5097.98 requires that no further disturbances occur in the immediate vicinity of the discovery, that the discovery is adequately protected according to generally accepted cultural and archaeological standards, and that further activities take into account the possibility of multiple burials. PRC Section 5097.98 also requires the NAHC, upon notification by a County Coroner, designate and notify a Most Likely Descendant (MLD) regarding the discovery of Native American human remains. Once the MLD has been granted access to the site by the landowner and inspected the discovery, the MLD then has 48 hours to provide recommendations to the landowner for the treatment of the human remains and any associated grave goods. In the event that no descendant is identified, or the descendant fails to make a recommendation for disposition, or if the land owner rejects the recommendation of the descendant, the landowner may, with appropriate dignity, reinter the remains and burial items on the property in a location that will not be subject to further disturbance.

Public Resources Code 5097.99

PRC Section 5097.99 prohibits acquisition or possession of Native American artifacts or human remains taken from a Native American grave or cairn after January 1, 1984, except in accordance with an agreement with the NAHC.

Public Resources Code 5097.991

PRC Section 5097.991 states that it is the policy of California that Native American remains (and associated grave artifacts) shall be repatriated.

Public Resources Code 5097.993 and 5097.994

This section establishes as a misdemeanor the unlawful and malicious excavation, injury, destruction, or defacement of any property eligible for listing in the CRHP, including, "any historic or prehistoric ruins, any burial ground, any archaeological or historic site, any inscriptions made by Native Americans at such site, any archaeological or historic feature of a Native American historic, cultural, or sacred site" located on public land or on private land, by a person, other than the landowner.

Health and Safety Code 7050.5-7055

Health and Safety Code Sections 7050.5-7055 provide for punishment relating to the intentional disturbance, mutilation, or removal of interred human remains as a misdemeanor. In some cases, this intention disturbance, mutilation, or removal can be considered a felony. The Health and Safety Code Section 7050.55 requires that in the event human remains are discovered, the County Coroner be contacted to determine the nature of the remains. In the event the remains are determined to be Native American in origin, the Coroner is required to contact the NAHC within 24 hours to relinquish jurisdiction.

California Executive Order W-26-92

California Executive Order W-26-92 affirms that all state agencies shall recognize, preserve, and maintain the significant heritage resources of the state.

California Environmental Protection Agency (EPA) Policy Memorandum CIT-09-01: EPA for Working with California Indian Tribes

EPA Policy Memorandum CIT-09-01 is meant to provide “a framework for EPA and its Boards, Departments and Offices (BDOs) to improve and maintain communication and collaboration between EPA, its BDOs, and California Indian Tribes to further the mission of EPA.” The memorandum puts forth a number of guidance principles for EPA and its BDOs, including, but not limited to; the acknowledgement of Tribal sovereignty; to identify, include, and communicate with California Native American Tribes in decision-making processes that may affect Tribal lands and/or cultural resources; and consider the potential impact of activities on Tribal lands and cultural resources. The memorandum includes 10 actions that are identified to help EPA achieve its guiding principles, with many focusing on increasing and/or improving communication between EPA and Native American Tribes (EPA 2009).

4.4.2.3 Local

County of San Bernardino 2007 General Plan

According to the *County of San Bernardino 2007 General Plan*, nearly 12,000 cultural resources have been recorded in the San Bernardino County. This includes 122 properties within the county on the California Point of Historic Interest list, 39 on the California Historical Landmarks list, 413 properties eligible for the NRHP, and 49 properties that are listed on the NRHP. A goal of the County General Plan is the preservation and promotion of San Bernardino County’s historic and prehistoric cultural heritage. Policies related to cultural resources include:

- **Policy CO 3.1:** Identify and protect important archaeological and historic cultural resources in areas of the County that have been determined to have known cultural resource sensitivity.
- **Policy CO 3.2:** Identify and protect important archaeological and historic cultural resources in all lands that involve disturbance of previously undisturbed ground.
- **Policy CO 3.3:** Establish programs to preserve the information and heritage value of cultural and historical resources.
- **Policy CO 3.4:** The County will comply with Government Code Section 65352.2 (SB 18) by consulting with Tribes as identified by the California Native American Heritage Commission on all General Plan and specific plan actions.
- **Policy CO 3.5:** Ensure that important cultural resources are avoided or minimized to protect Native American beliefs and traditions.

Programs identified in the County General Plan with specific application to this Project include two programs related to Policy CO 3.5:

- **Program 1:** Consistent with SB 18, as well as possible mitigation measures identified through the CEQA process, the County will work and consult with local Tribes to identify, protect and preserve TCPs. TCPs include both manmade sites and resources as well as natural landscapes that contribute to the cultural significance of areas.

- **Program 3:** The County will work in good faith with the local Tribes, developers/applicants and other parties of the local affected Tribes request the return of certain Native American artifacts from private development projects. The developer is expected to act in good faith when considering the local Tribe's request for artifacts. Artifacts not desired by the local Tribe will be placed in a qualified repository as established by the California State Historical Resources Commission. If no facility is available, then all artifacts will be donated to the local Tribe.

In the event that archaeological sites are affected by a project, the following actions related to Policy CO 3.5 are required by the County regarding the disposition of archaeological sites and cultural remains (including human remains):

(a) The NAHC and local reservation, museum, and other concerned Native American leaders will be notified in writing of any proposed evaluation or mitigation activities that involve excavation of Native American archaeological sites, and their comments and concerns solicited.

(b) The concerns of the Native American community will be fully considered in the planning process.

(c) If human remains are encountered during grading and other construction excavation, work in the immediate vicinity will cease and the County Coroner will be contracted pursuant to the state Health and Safety Code.

(d) In the event that Native American cultural resources are discovered during project development and/or construction, all work in the immediate vicinity of the find will cease and a qualified archaeologist meeting U.S. Secretary of the Interior standards will be hired to assess the find. Work on the overall project may continue during this assessment period.

(e) If Native American cultural resources are discovered, the County will contact the local Tribe. If requested by the Tribe, the County will, in good faith, consult on the discovery and its disposition with the Tribe.

4.4.3 Environmental Impacts

4.4.3.1 Impact Methodology

Analysis of impacts on cultural and paleontological resources was based on consideration of the nature and scope of soil investigation activities, the location of known cultural and paleontological resources, and the potential for the inadvertent discovery of unknown cultural or paleontological resources. The resulting data is described in Sections 4.4.1.5 (Cultural Resources), 4.4.1.6 (Geoarchaeological Review), 4.4.1.7 (Native American Scoping), and 4.4.1.8 (Paleontological Resources). Several historic-period built resources and archaeological resources inventories were previously conducted for the Groundwater Remediation Project, which encompass the Project Site. These studies include records searches of the CHRIS-SBAIC in 2004 and 2011 and historic-period built resources and archaeological resources surveys conducted between 2004 and 2007 (Davy et al. 2004; McDougall and Horne 2007).

A site condition assessment field visit was conducted by AE on behalf of PG&E on September 30 and October 1, 2013 (Hearth et al. 2013). Attendees included representatives from AE, PG&E,

DTSC, Environmental Science Associates, FMIT, CRIT, Hualapai Indian Tribe, and Cocopah Indian Tribe. The field visit included site conditions assessments for 14 previously recorded resources within the Project Site to determine if site conditions have changed since their most recent documentation.

A geoarchaeological review was conducted, focusing on the sampling locations within the Project Site. The desktop geoarchaeological review (Lockwood 2014) consisted of a review of existing geologic maps and literature in order to characterize the various landforms for their potential to contain surface and subsurface archaeological resources.

Information gleaned through Native American scoping efforts in connection with this Project, comment letters on the Groundwater FEIR, and other information provided by Interested Tribes was reviewed in order to assess potential impacts to the Topock TCP. The Soil Work Plan was prepared through a multiyear public involvement process. In May 2011, PG&E submitted the draft Soil Work Plan to agencies, Native American Tribes, and other stakeholders. The draft Soil Work Plan was refined after comments were received from these entities. PG&E and DTSC worked together to minimize, to the extent possible, the effects of the proposed soil investigation activities on sensitive resources, particularly within the Topock TCP. Section 4.4.1.7, “Native American Scoping,” provides a description of the Native American scoping process undertaken as part of the soil investigation project. Section 7.4, “Alternatives” provides a summary of the changes that were made to the Soil Work Plan based on input from agencies, Native American Tribes, and other stakeholders.

In addition, a PRMP was prepared for the Groundwater Remediation Project by ARCADIS in December, 2012. This plan included a paleontological literature review, records check, and field survey of the Groundwater Remediation project area, which encompasses the Project Site.

4.4.3.2 Thresholds of Significance

Consistent with Appendix G of the CEQA Guidelines, the proposed Project would result in a significant impact if it would:

- Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5;
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or
- Disturb any human remains, including those interred outside of formal cemeteries.

According to CEQA Guidelines (Section 15064.5(b)), a project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment. The guidelines further state that a substantial adverse change in the significance of a resource means the physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historic resource would be materially impaired. Actions that would materially impair the significance of a historical resource are any actions that would demolish or adversely alter those physical characteristics of a historical resource that convey its historical significance and qualify it for inclusion in the CRHR or in a local register or survey that meet the requirements of PRC Sections 5020.1(k) and 5024.1(g). A lead agency must also take into account impacts to unique archaeological resources (CEQA Guidelines Section 15064.5(c)(1)-(4)).

4.4.3.3 Impact Analysis

Impacts to cultural and paleontological resources could result from Project-related activities. Specific Project activities that may impact cultural and paleontological resources include:

- The presence of equipment, workers, and vehicles during soil investigations;
- Access road improvements to create physical access to certain locations where limited access currently exists;
- Trimming, pruning, or clearing of up to 2 acres of vegetation at the mouth of Bat Cave Wash, or movement of boulders to enhance access to some of the soil sampling collection locations;
- Setting up staging areas that are, to the extent feasible, located in previously disturbed and existing operational areas (approximately 26 acres) for equipment storage, maintenance/fueling, and decontamination (work area exclusion zones); and for displaced soil management;
- Foot traffic during these events including, sampling, survey of subsurface utilities, establishment of temporary weather- and dust-monitoring stations, bench scale tests, pilot studies, geotechnical evaluations, and other Project activities;
- Operation of equipment including truck- or track-mounted drilling rigs, backhoes, and excavators;
- Drilling or excavation of soil borings using the following methods:
    - small hand tools (trowel, shovel, slide-hammer, and hand auger),
    - a sonic or hollow-stem auger drilling rig,
    - a hydrovac truck in conjunction with hand tools, or
    - a backhoe/excavator;
- Removal of soil from the Project Site through the collection of soil samples, the disposal of investigation-derived waste, and bench scale tests;
- Implementation of bench scale tests using hand tools or an excavator;
- Implementation of geotechnical evaluations using a hollow-stem auger drill;

- Implementation of pilot studies to test the effectiveness of in situ soil flushing (within the bottom of Bat Cave Wash) and in situ stabilization/chemical fixation (within the bottom of Bat Cave Wash and the Station);
- Sampling of plant or other biota; and
- Raking of the ground to remove tire tracks during work area restoration.

These types of activities could result in significant impacts to cultural and paleontological resources, which would require measures to avoid or mitigate substantial adverse changes in the significance of historical or unique archaeological resources, unique paleontological resources, or human remains. Pursuant to Section 106 of the NHPA, in 2010, BLM, the U.S. Fish and Wildlife Service (USFWS), State Historic Preservation Officers (SHPOs) of California and Arizona, PG&E, the Advisory Council on Historic Preservation (ACHP), and the Hualapai Tribe entered into a PA for the Topock Remediation Project (including the soil investigation). In 2012, in conformance with the PA, BLM developed a CHPMP that specifies how cultural and historic properties are to be treated during the Topock Remediation Project (including the soil investigation). The mitigation presented in this section is intended to be implemented in addition to any treatment requirements under the PA and CHPMP.

Topock Traditional Cultural Property

The Project Site is located within a larger area determined by the BLM to encompass the NRHP-eligible Topock TCP. Impacts to those physical characteristics (contributing elements) that convey the TCP's historical significance, such as the Topock Maze, land, water, plants, animals, prehistoric archaeological resources, and the viewshed, would result in a significant impact to the historical resource identified as the Topock TCP. Contributing elements that would not be affected by the Project include the Topock Maze, water, and animals. Contributing elements that could be affected by the Project include land, plants, prehistoric archaeological resources, and the viewshed. Impacts to each of these elements are considered below.

Land

Activities involving ground disturbance would directly and adversely affect the soil and landforms identified by some Interested Tribes as contributing elements of the Topock TCP. Because the land itself is essential to the significance of the TCP, the disturbance and removal of soil is considered a profound disruption in the belief system of some Interested Tribes and would affect the TCP long after the Project is completed.

Plants

Up to 2 acres of vegetation at the mouth of Bat Cave Wash would be trimmed, pruned, or cut (leaving roots in place) to enhance access to some of the soil investigation locations. Impacts to vegetation may also occur from the proposed plant or other biota sampling. Native vegetation, particularly those indigenous species of ethnobotanical importance, is significant to some Interested Tribes as an integral part of the Topock TCP. Pruning or alteration of the natural growth of native and traditional plant species for reasons other than traditional uses is considered disruptive to the natural environment of the Topock TCP.

Prehistoric Archaeological Resources

Some Interested Tribes value prehistoric archaeological resources as an integral part of the TCP (see **Table 4.4-3** for list of nine known prehistoric archaeological resources in the Project Site that contribute to the Topock TCP). Any damage, destruction, or alteration to such an archaeological resource would negatively affect the TCP

Viewshed

Some Interested Tribes have expressed that the viewshed, comprising a panoramic 360-degree view of the Project Site and vicinity (see Figures 4.1-2A-2C) is more important than individual line-of-sight views. Because some Interested Tribes have broad conception of visual intrusions to the Topock TCP, impacts to the TCP viewshed go beyond visible physical disturbances and extend into the metaphysical plane in the opinion of the some Interested Tribes. The viewshed of the Topock TCP is not limited to a view in a particular direction, or even to a 360-degree view, but includes a three-dimensional perspective that extends below ground surface. Soil sample collection activities would include drilling hundreds of bore holes that would be backfilled. Following Project completion, the ground surface would closely resemble pre-investigation conditions and would not leave a permanent visual impact on the landscape. Nonetheless, as noted above in Section 4.4.1.4, for some Interested Tribes these disturbances can still be seen from the "mind's eye." The knowledge of physical alterations to the landscape remain in the collective consciousness of those Interested Tribes who associate deep spiritual beliefs and values with the area long after the landscape has been restored and evidence of destruction is no longer physically visible.

TABLE 4.4-3
PROJECT IMPACTS TO KNOWN HISTORICAL RESOURCES (INCLUDING THE TOPOCK TCP)

				Project Impact		
Historical Resource	**Resource Type**	**Description**	**Contributing Element of Topock TCP**	**Significant Impact**	**No Impact – Avoided through Project Design**	**Less than Significant Impact**
Topock TCP	Traditional Cultural Property	TCP of traditional religious and cultural significance to several local Tribes. Contributing elements include: the Topock Maze, land, water, plants, animals, prehistoric archaeological resources, and the viewshed		X		
CA-SBR-2910H	Historic Built Resource	Historic Route 66/National Old Trails Highway				X
CA-SBR-6693H	Historic Built Resource	Atlantic & Pacific/Atchison Topeka & Santa Fe Railroad alignment			X	
CA-SBR-11705/H	Multicomponent Archaeological Resource	Refuse scatter, roads, quarries/tailings, and a lithic scatter	X		X	
CA-SBR-11862H	Historic-Period Archaeological Resource	Remnants of El Rancho Colorado Roadhouse				X
CA-SBR-11865H	Historic-Period Archaeological Resource	Segment or siding of the 1890–1947 Atlantic & Pacific/Atchison Topeka & Santa Fe RR			X	
CA-SBR-11866H	Historic-Period Archaeological Resource	Sedimentation ponds and ditch			X	
CA-SBR-11867	Prehistoric Archaeological Resource	Lithic assay station	X		X	
CA-SBR-11993	Prehistoric Archaeological Resource	Rock-shelter	X		X	
CA-SBR-11997H	Historic Built Resource	Rock-and-mortared bridge			X	
CA-SBR-12642H	Historic-Period Archaeological Resource	Concrete bridge footing			X	

TABLE 4.4-3
PROJECT IMPACTS TO KNOWN HISTORICAL RESOURCES (INCLUDING THE TOPOCK TCP)

Historical Resource	Resource Type	Description	Contributing Element of Topock TCP	Project Impact: Significant Impact	Project Impact: No Impact – Avoided through Project Design	Project Impact: Less than Significant Impact
CA-SBR-13791H	Historic-Period Archaeological Resource	Railroad-related refuse scatter			X	
CA-SBR-13793H	Historic-Period Archaeological Resource	TNT/Nitro storage hole cut into an arroyo			X	
CA-SBR-13796	Prehistoric Archaeological Resource	Lithic reduction station	X		X	
CA-SBR-14698	Prehistoric Archaeological Resource	Lithic assay station	X		X	
36-021486	Historic Built Resource	Historic Route 66 Sign			X	
36-021491	Prehistoric Archaeological Resource	2 chert cortical flakes	X		X	
AE-Topock-183	Prehistoric Archaeological Resource	Lithic assay station	X		X	
AE-Topock-184/H	Multicomponent Archaeological Resource	Lithic assay station/historic refuse scatter	X		X	
AE-Topock-185	Prehistoric Archaeological Resource	Lithic assay and reduction station	X		X	
-	Historic Built Resource	PG&E Topock Gas Compressor Station				X

IMPACT CR-1 **Potential Impacts to the Topock Traditional Cultural Property.** *Implementation of the proposed Project could cause a substantial adverse change in the significance of the historical resource identified as the Topock TCP as a result of the physical destruction and alteration to the characteristics of the property that convey its historical significance and qualify it for inclusion in the CRHR as defined in CEQA Guidelines Section 15064.5. The substantial adverse change to the TCP and its contributing elements would result from ground-disturbing activity that would directly and adversely affect the soil, landforms, and prehistoric archaeological resources; pruning or alteration of the natural growth of native and traditional plant species; and the presence of equipment, workers, and vehicles, which would introduce activities that are inconsistent with the natural setting associated with the Topock TCP. These activities would also materially affect the cultural values ascribed to the TCP by Tribes. This impact would be* ***significant****.*

Mitigation Measure CR-1: Historical Resource Identified as the Topock TCP

CR-1a: Tribal Coordination

CR-1a-1: Tribal Document Review and Comment. Interested Tribes shall continue to be afforded the opportunity to review and comment on all cultural resources-related documentation prepared as a result of this Project. Tribal comments shall be considered to the extent feasible by DTSC, in coordination with Interested Tribes, PG&E, and representative landowners (BLM, BOR, FMIT, PG&E, and USFWS). Cultural resources documents shall include, but not be limited to, pre-investigation verification survey memoranda; daily archaeological monitoring logs; monitoring report to be prepared at the close of ground-disturbing activities; annual monitoring reports; and any documentation arising as a result of the inadvertent discovery of potential historical resources of a Tribal nature pursuant to CR-2d (Inadvertent Discovery of Potential Historical Resources and Unique Archaeological Resources). Interested Tribes shall also be afforded the opportunity to review and comment on technical documents including, but not limited to, soil investigation-related plans and reports, bench and pilot study implementation plans, and biological resources reports.

CR-1a-2: Tribal Access. Interested Tribes shall be provided access to the Project Site to the extent PG&E has the authority to facilitate such access and be consistent with existing laws, regulations, and agreements as they pertain to property within the Project Site. On federal property, access shall be governed by the provisions of Appendix B (*Tribal Access Plan*) of the CHPMP. On non-federal property, access shall be accommodated by PG&E to the extent feasible**;** the access plan may place restrictions on access into certain areas, such as the Station and the existing evaporation ponds, subject to DTSC review with regard to health and safety concerns and to ensure noninterference with approved investigation activities. PG&E shall retain copies of all access-related communications to be provided to DTSC on a quarterly basis, as required by CR-1a-3.

CR-1a-3: Tribal Communication. Consistent with past practices and the communication processes previously entered into by PG&E with Interested Tribes, PG&E shall continue to communicate with Interested Tribes prior to the start of and during investigation activities for the Project. PG&E shall document, and accommodate where feasible, the Tribes' preferences for method of communication and for transmitting large documents, and shall seek to avoid scheduling conflicts between scientific survey (i.e., pre-investigation historical resources verification survey, annual historical resources monitoring, and biological resources survey) and Topock-related meeting activities to the greatest extent possible. Outreach efforts between the Interested Tribes and PG&E shall be communicated by PG&E to DTSC quarterly during investigation activities for review and input.

Communication protocols as they relate to Tribal involvement in the worker cultural resources sensitivity training shall be governed by CR-1b.

Communication protocols as they relate to Tribal monitoring of scientific survey and Project-related ground-disturbing activities shall be governed by CR-1d.

Communication protocols as they relate to Tribal monitoring of annual historical resource monitoring shall be governed by CR-2c.

Communication protocols as they relate to inadvertent discoveries of potential historical resources as defined by CEQA will be governed by CR-2d. Human remains will be governed by CR-4.

CR-1b: Worker Education Program

A worker cultural resources sensitivity program shall continue to be implemented for the Project consistent with existing practices. Specifically, an initial sensitivity training session shall be provided by PG&E to all Project employees, contractors, subcontractors, and other professionals prior to their involvement in any ground-disturbing activities, with subsequent training sessions to be held as new personnel become involved in the Project. PG&E shall invite Interested Tribes to participate in and present Tribal perspectives during the training sessions. The sensitivity program shall address: the cultural (Native American, archaeological, and paleontological) sensitivity of the Project Site and a tutorial providing information on how to identify these types of resources; appropriate behavior; worker access routes and restrictions; work area cleanliness; procedures to be followed in the event of an inadvertent discovery; safety procedures when working with monitors; and consequences in the event of noncompliance. PG&E shall notify DTSC and the Interested Tribes no less than 2 weeks prior to the initial training session. Subsequent training sessions may be of a less formal nature; however, they must be comprehensive in the subject matter covered. DTSC and Tribes will be notified prior to the occurrence of subsequent training sessions and afforded the opportunity to participate. The program agenda and materials together with attendance rosters will be provided to DTSC within 1 week of each training session.

CR-1c: Pre-Investigation Historical Resources Field Check

CR-1c-1: Personnel Qualifications Standards. Cultural resources consulting staff shall meet, or be under the direct supervision of individuals meeting, the minimum professional qualifications standards (PQS) set forth by the Secretary of the Interior (codified in 36 CFR Part 61; 48 FR 44739). DTSC shall have approval authority over PG&E's cultural resources consultant.

CR-1c-2: Pre-Investigation Historical Resources Field Check. A pre-investigation historical resources field check shall be conducted by PG&E not less than four weeks prior to the commencement of ground-disturbing activities. The field check shall include all sampling locations, including any future pilot study areas, new access areas, and equipment and materials staging areas, plus a 50-foot buffer surrounding sampling areas where topography allows. Sampling activities may occur within the buffer area without additional field check. Interested Tribes shall be afforded the opportunity to participate and shall be provided 2 weeks (14 calendar days) notice prior to the start of the field check. The objective of the field check will be to verify that additional resources qualifying as historical resources under CEQA are not present within the investigative location areas. Interested Tribes shall be afforded the opportunity to identify, and DTSC to consider, for the purposes of avoidance, any physical features of Tribal significance within the field check area, including but not limited to trails, rock features, desert pavement areas, and cleared circles that might be considered contributors to the TCP. A *Pre-Investigation Historical Resources Field Check Memorandum* following the California Office of Historic Preservation's (OHP's) *Archaeological Resource Management Reports (ARMR)* guidelines, shall be prepared by PG&E that documents the methods of the field check, participants involved in the field check, and the results of the field check. Interested Tribes shall be invited to prepare a section that reports Tribal observations during the field check, and asked to provide any observations to PG&E within 2 weeks. The Memorandum shall be submitted to DTSC for review and comment within 3 weeks from completion of the field check, and the submission shall include any Tribal observations given to PG&E within the two-week time frame set forth above. Tribal review and comment of the *Pre-Investigation Historical Resources Field Check Memorandum* shall be governed by CR-1a-1.

In the event that resources qualifying as historical resources under CEQA are found in the investigation areas, including physical features of traditional cultural value to Interested Tribes as contributors to the TCP or archaeological resources, are identified during the field check, treatment of such resources shall be governed by procedures outlined in CR-1e and CR-2, respectively. If avoidance of the identified resources is determined by DTSC, in coordination with respective landowners, Interested Tribes, and PG&E to be infeasible because it would impede the fundamental Project objective to obtain sufficient information to allow for a complete soil characterization of the area, protective actions (such as elevated ramps, protective coverings or other types of temporary capping) shall be taken to reduce or minimize impacts to the resource to the maximum extent feasible. Any protective measures would be implemented in coordination with DTSC. Work areas would be restored to pre-investigation conditions consistent with CR-1e-6.

CR-1d: Cultural Resources Monitoring Program

The Cultural Resources Monitoring Program shall be consistent with Appendix C (*Topock Remediation Project Programmatic Agreement Tribal and Archaeological Monitoring Protocols*) of the PA and Section 6.6.4, "*Construction Monitoring*," of the CHPMP. PG&E shall include DTSC as a party requiring notification and coordination along with the parties already listed in the Appendix C Monitoring Protocols.

Archaeological monitoring shall be conducted during all Project-related ground-disturbing activities for the purpose of identifying and avoiding impacts to archaeological resources that could potentially qualify as historical resources under CEQA. Archaeological monitors shall work under the direct supervision of an archaeologist meeting the PQS as described in CR-1c-1 and shall complete daily monitoring logs. Upon completion of investigation activities, a Soil Investigation Monitoring Report shall be prepared following ARMR guidelines. The monitoring report shall document dates of monitoring and monitoring participants, activities observed, soil types observed, and any archaeological resources encountered. PG&E shall provide Interested Tribes an opportunity to contribute their observations to the monitoring report. To be included in the monitoring report, the Tribal section must be provided to PG&E within 8 weeks after completion of monitoring activities. DPR 523 forms, following the OHP's *Instructions for Recording Historical Resources,* shall be prepared and filed with the SBAIC for all newly identified resources and shall be appended to the monitoring report. The report shall be provided to the Tribes for review and comment consistent with CR-1a-1. The report shall be provided to DTSC and the Tribes for review and comment within 16 weeks of Project completion.

Interested Tribes shall be invited to monitor during scientific survey (as defined in CR-1a-3) and all ground-disturbing activities associated with the Project. PG&E shall provide Tribal monitors with reasonable compensation consistent with historic rates, for all monitoring work performed. Interested Tribes shall be afforded a minimum of 1 week's notice prior to the commencement of project-related ground-disturbing activities. During Project activities, Interested Tribes shall be provided with weekly work forecasts to facilitate scheduling of monitors. Because Project implementation activities are often unpredictable, there may be changes in work activities. Interested Tribes shall be notified by PG&E of any scheduling changes as soon as possible. PG&E will utilize daily field meetings, telephone, and email as methods of communicating work schedules. Tribal Monitors shall be alerted at the end of each work day whether work activities will be taking place the following day.

CR-1e: Protective Measures for the Topock TCP

CR-1e-1: Avoidance and Preservation in Place. PG&E shall carry out, and require all subcontractors to carry out, all Project activities in ways that minimize significant impacts to resources associated with the Topock TCP consistent with Stipulation I (B) of the PA and Section 7.1 of the CHPMP, and to the maximum extent feasible as it relates to the Project objectives of soil characterization as determined by DTSC, in coordination with PG&E, Interested Tribes, and respective landowners.

CR-1e-2: Restrict Personnel Access Beyond Delineated Work Areas. Work areas (including sampling locations, new access areas, and materials and equipment staging areas) shall be fenced, or otherwise delineated, in coordination with Tribal monitors to prevent incursion of personnel outside of designated work areas.

CR-1e-3: Prioritized use of Previously Disturbed Areas. Priority shall be given to siting project elements within previously disturbed areas (areas disturbed within the last 50 years) over undisturbed or pristine areas to the maximum extent feasible as determined by DTSC, in coordination with Interested Tribes, PG&E, and respective landowners, to minimize impacts to intact landforms and natural features important to Tribes as part of the Topock TCP. Interested Tribes shall be afforded the opportunity to express, and DTSC shall consider, whether there are specific instances where disturbed areas may be more culturally sensitive than non-disturbed areas.

CR-1e-4: Avoidance of Indigenous Plants of Biological and Cultural Significance. Prior to Project initiation, a qualified biologist capable of identifying both native and non-native plants within the region (to species) shall flag (or otherwise mark) indigenous plant specimens that shall be protected and avoided. The qualified biologist shall educate all on-site Project personnel about the indigenous plants prior to their involvement in Project activities at the Project Site. During Project activities, a biological monitor shall be present at all times to ensure the indigenous plant species of biological and traditional cultural significance as identified in Appendix D-3 of this DEIR are protected and avoided during Project implementation to the extent practicable. Flagging of indigenous plant species and worker education (consistent with CR-1b) shall occur prior to Project initiation. Protection of identified species shall occur through biological monitoring during investigative activities and Project implementation.

CR-1e-5: Minimize Noise Disturbances. Impacts to the natural auditory setting associated with the TCP shall be minimized to the extent feasible as governed by NOI-1.

CR-1e-6: Work Area Restoration. As discussed in the "Project Description," Section 3.5.6, following completion of work in each work area, all Project equipment and materials shall be removed from the work areas. If the area is not paved, the area will be raked/brushed to remove tire tracks and restored to substantially the same condition(s) as prior to the soil investigation sampling, to minimize impacts to the natural environment associated with the Topock TCP.

CR-1e-7: Displaced Soil Procedures. Treatment, handling, and disposition of Resource Conservation and Recovery Act (RCRA) and non-RCRA hazardous materials, nonhazardous materials, and clean materials shall comply with *Management Protocol for Handling and Disposition of Displaced Site Material, Topock Remediation Project, Needles, CA* of the Soil RCRA Facility Investigation/Remedial Investigation Work Plan. Soil export, including clays, and soil import will be limited where feasible as determined by DTSC, consistent with the *Protocol*.

CR-1e-8: Technical Review Committee. The Technical Review Committee (TRC), constituting a multidisciplinary panel of independent scientific and engineering experts to advise the Interested

Tribes, shall continue through soil remedy selection and construction phase of the Groundwater Remedy (whichever comes later), at which time the necessity and dollar value of the TRC shall be assessed by PG&E and, with the approval of DTSC, shall either be extended, reduced, or terminated. This TRC is the same committee established by CUL-1a-4 of the January 2011, Certified Groundwater Remedy EIR.

CR-1e-9: Open Grant Funding. Open grant funding, constituting two part-time cultural resource specialist/project manager positions, shall continue through soil remedy selection and construction phase of the Groundwater Remedy (whichever comes later), at which time the necessity and dollar value of the open grant program shall be assessed by PG&E and, with the approval of DTSC, shall either be extended or terminated. This Open Grant Funding is the same as established by CUL-1a-11 of the January 2011, Certified Groundwater Remedy EIR.

Timing:	Before, during, and after Project activities, as detailed in the individual Mitigation Measures CR-1a through CR-1e.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	The impact would be **significant and unavoidable** after implementation of the measures detailed above. The Project would result in the destruction or alteration of contributing elements which convey the historical significance of the Topock TCP. Although the implementation of Mitigation Measures CR-1a through CR-1e would reduce or minimize impacts to the Topock TCP, they would not be reduced to a less than significant level. Therefore, impacts to the historical resource identified as the Topock TCP would be significant and unavoidable.

Historical Resources (other than the Topock TCP) and Unique Archaeological Resources

Known Historical Resources

A total of 23 known cultural resources are located within the Project Site, including 18 archaeological resources and 5 historic-period built resources (see Table 4.4-1). Three resources (CA-SBR-11704H [historic-period archaeological site associated with a gravel processing site], 36-020379 [historic-period isolate], and 36-023219 [historic-period isolate]) are not eligible for listing in the CRHR and are not considered historical or unique archaeological resources under CEQA. Two resources, CA-SBR-2910H (Historic Route 66/National Old Trails Highway and CA-SBR-6693H (A&P/AT&SF railroad alignment), have been determined eligible for listing in the NRHP through consensus and are therefore listed in the CRHR. Two resources, CA-SBR-11862H (El Rancho Colorado Roadhouse and Gas Station) and the PG&E Topock Gas Compressor Station (19 buildings and structures) have been evaluated and recommended eligible for listing in the NRHP and are considered historical resources per CEQA Guidelines Section

15064.5. An additional 16 resources (CA-SBR-11705/H, -11865H, -11866H, -11867, -11993, -11997H, -12642H, -13791H, -13793H, -13796, -14698, 36-021486, 36-021491, AE-Topock-183, AE-Topock-184/H, AE-Topock-185) have not been evaluated for listing in the NRHP or the CRHR; however, they have been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and are considered historical resources under CEQA for the purposes of this DEIR. Therefore, a total of 20 historical resources, including 15 archaeological resources and 5 historic-period built resources, are located within the Project Site (see Table 4.4-3).

Five of the historic-period built resources (CA-SBR-2910H, CA-SBR-6693H, CA-SBR-11997H, 36-012486, and the PG&E Topock Gas Compressor Station), resource CA-SBR-6693H (A&P/AT&SF railroad alignment), CA-SBR-11997H (a bridge), and 36-012486 (the Route 66 sign), would not be impacted by the Project. Resource CA-SBR-2910H, Historic Route 66/National Old Trails Highway, would be used as an access route and would be subject to physical impacts from two borings. Use as a vehicle access route would be consistent with the historic use of the resource and would not constitute a significant impact. The bore holes would be restored after sampling is completed and the pavement returned to its original condition, and therefore would not constitute a significant impact. These Project impacts would not materially impair the significance of resource CA-SBR-2910H and therefore would not be considered significant. Project work at the Station would consist primarily of the excavation of borings and the use of the area for staging. This would not impact any of the structures that were evaluated as eligible for listing in the NRHP. Therefore, the PG&E Topock Gas Compressor Station would not be significantly impacted.

Fourteen of the 15 significant archaeological resources (CA-SBR-11705/H, -11865H, -11866H, -11867, -11993, -12642H, -13791H, -13793H, -13796, -14698, 36-021491, AE-Topock-183, AE-Topock-184/H, AE-Topock-185), including 9 prehistoric archaeological resources contributing to the Topock TCP (see Table 4.4-3), would be avoided by Project design (CH2M HILL 2013). Therefore, there would be no direct impact to known archaeological resources that qualify as historical resources. In addition, indirect impacts to known archaeological resources from erosion are not anticipated because the Project would adhere to the SOPs and BMPs described in the Soil Work Plan and adhere to the substantive provisions of applicable local, state, and federal laws that address potential erosion and drainage pattern alteration impacts (see Section 4.6, "Hydrology and Water Quality"). None of the 14 known archaeological resources have been assessed for qualification as unique archaeological resources under CEQA Section 15064.5 and PRC Section 21083.

One of the significant archaeological resources (CA-SBR-11862H) would be used as a construction staging area; however, staging would be limited to the lower NE part of the site that has been previously disturbed by vehicle parking. The Project would avoid the significant portion of the site (historical debris deposit in Locus 3 and adjacent areas in Loci 1 and 2 on its perimeter). Because staging would occur in a portion of the site that does not contribute to the site's eligibility under NRHP/CRHR Criterion D/4 (information), the site would not be significantly impacted. This resource has not been assessed for qualification as unique archaeological resources under CEQA Section 15064.5 and PRC Section 21083.

Implementation of Mitigation Measures CR-1a through CR-1d, and CR-2 would ensure that known historic-period built resources and archaeological resources qualifying as historical resources under CEQA are avoided during Project implementation.

Unknown Historical Resources and Unique Archaeological Resources

The majority of the Project Site lacks potential for subsurface archaeological deposits. Consolidated rock units, such as igneous and metamorphic rocks, as well as sedimentary rocks such as sandstone and conglomerate, were formed millions of years before the arrival of humans in southern California and do not have potential to contain subsurface archaeological deposits. These types of rock units are located northeast and south of the Station, on both sides of Bat Cave Wash south of I-40, adjacent to the Colorado River between the National Old Trails Arch Bridge and to just north of the Route 66 sign where the Station main access road bends to the west. Upper Pleistocene geological units generally lack the potential to contain subsurface prehistoric and historic-period archaeological resources; however, the very youngest of these Pleistocene deposits overlaps with the initial onset of PaleoIndian occupation of the California Desert region. Subsurface prehistoric archaeological resources associated with these two units would be unlikely, but possible. Based solely on age, Holocene alluvium in Bat Cave Wash has the potential for subsurface archaeological deposits; however, high-energy environments, such as washes, are often too dynamic to bury and preserve archaeological resources very well. The areas with the greatest potential for subsurface archaeological deposits include a Holocene alluvium pocket near the Transwestern Bench and artificial fill and disturbed areas, which may contain intact historic-period resources or disturbed prehistoric resources, though they may overlie other geological units with the potential to contain intact prehistoric resources. These areas are located just east of the Station and on both sides of the main access road east to the security gate. See **Table 4.4-4** for a summary of subsurface archaeological resources sensitivity by geologic unit.

Because the Project involves ground-disturbing activities, there is the potential for such activities to disturb unknown potentially significant resources qualifying as historical resources under CEQA. Ground-disturbing activities associated with the Project would have the potential to cause substantial adverse changes to unknown historical resources. Any damage to or destruction of such resources during the discovery process could result in significant impacts. Mitigation Measures CR-1a through CR-1d and CR-2 would reduce the impacts to historical resources in the event of inadvertent discovery. Because prehistoric archaeological resources are considered contributors to the Topock TCP, even with the implementation of these mitigation measures, impacts to these resources would not be reduced to a less than significant level. Therefore, impacts to unknown historical resources would be significant and unavoidable.

TABLE 4.4-4
GEOLOGIC UNITS AND SUBSURFACE POTENTIAL

Unit Symbol	Unit Name	Age	Description
Greatest Potential to Encounter Subsurface Archaeological Deposits			
Af	Artificial fill	Historic-Recent	Unconsolidated: Fill materials in highway and railway grades
D	Disturbed ground	Historic-Recent	Original geology obscured
Qa3	Younger piedmont alluvium	Holocene	Unconsolidated: Angular to subangular, poorly to moderately sorted, unconsolidated sand and gravel terraces above modern washes
Potential (Though Unlikely) to Encounter Subsurface Archaeological Deposits			
Qa4	Youngest piedmont alluvium	Holocene-Recent	Unconsolidated: Angular to subangular, poorly to moderately sorted, unconsolidated sand and gravel in active washes
Qa2	Intermediate-aged piedmont alluvium	Upper Pleistocene	Unconsolidated: Fan remnants dissected and isolated by modern washes; typically surfaced with varnished desert pavement
Qtp	Pink silty sand	Upper Pleistocene	Moderately consolidated: Massive to bedded, pale-orange-gray, quartz-rich clayey silty sand
No Potential to Encounter Subsurface Archaeological Deposits			
Trbb	Boulder conglomerate of Bat Cave Wash	Upper Pliocene (?)-Pleistocene	Moderately consolidated to cemented: Boulder and cobble conglomerate, containing rounded quartz pebbles
Tf	Fanglomerate	Pliocene-Miocene	Consolidated conglomerate: Poorly sorted sandy conglomerate of locally derived angular to subangular clasts
Tcgn	Gneiss-clast conglomerate	Middle Miocene	Consolidated conglomerate: Red/red-brown weathering, poorly sorted alluvial fan deposits; derived from rocks above the Chemehuevi Fault
TKwq	Quartz monzonite	Cretaceous(?)-Miocene	Bedrock: Horneblend-biotite quartz monzonite, granodiorite, and granite rocks
Xgm	Mylonitic gneiss and migmatite	Paleoproterzoic	Bedrock: mylonitic, heterogeneous rocks including migmatite, granite, and amphipolite-facies orthogneiss and paragneiss

SOURCE: Adapted from Howard et al. 2013.

IMPACT CR-2 **Potential Impacts to Known and Unknown Historical Resources and Unknown Unique Archaeological Resources.** *Known historical resources would be avoided through Project design. No known unique archaeological resources have been identified within the Project Site. Implementation of the proposed Project could, however, cause a substantial adverse change in the significance of unknown historical resources (other than the TCP) and unknown unique archaeological resources pursuant to CEQA Guidelines Section 15064.5 resulting from ground-disturbing activity. This impact would be* ***significant****.*

Mitigation Measure CR-2: Historical Resources (Other than the Topock Traditional Cultural Property [TCP]) and Unique Archaeological Resources.

CR-2a: Avoidance and Preservation in Place. PG&E shall carry out, and require all subcontractors to carry out, all investigation activities in ways that avoid significant impacts to historical resources consistent with General Principle I(B) of the PA and Section 7.3 of the CHPMP to the maximum extent feasible as it relates to the Project objectives of soil characterization as determined by DTSC, in coordination with Tribes, PG&E, and respective landowners.

CR-2b: Additional Protective Measures. Mitigation Measures CR-1a through CR-1d, CR-1e-2, and CR-1e-3 shall be implemented to further reduce impacts to historical resources (other than the Topock TCP) and unique archaeological resources.

CR-2c: Annual Historical Resources Monitoring Program. PG&E shall add the known 20 historical resources (including 15 archaeological resources and 5 historic-period built resources located within the Project Site [see Table 4.4-3]), plus any additional historical resources that may be identified during Project implementation, to the established annual monitoring program as prescribed by Section 6.6.5, "Periodic Site Monitoring," of the CHPMP. Monitoring shall continue on an annual basis (or less frequently as determined by DTSC) until completion of the soil investigation. PG&E shall afford Tribes the opportunity to participate in Tribal monitoring during the annual monitoring program and provide, at a minimum, 2 weeks' written notice to Tribes prior to the commencement of annual monitoring.

The annual monitoring program shall include: confirmation of resource boundaries with submeter GPS; any relocation of previously identified features; confirmation of locations, quantities, and types of artifacts present; and photography to document whether any change in resource condition has occurred. Field observations shall be documented in a Site Condition Assessment Form and a database spreadsheet (such as Microsoft Access of Excel) in accordance with Section 6.6.5, "Periodic Site Monitoring" of the CHPMP. DPR 523 form updates, following OHP *Instructions for Recording Historical Resources,* will be prepared and filed with the SBAIC for all resources where changes in setting or condition are observed. The Site Condition Assessment Forms, database spreadsheet, and DPR 523 form updates shall be provided to DTSC upon completion of each annual monitoring event. PG&E shall notify DTSC upon scheduling and completion of each annual monitoring event. Each annual monitoring event shall be documented in an *Annual Monitoring Report* following *ARMR* guidelines and shall be submitted to DTSC by December 1 of each year. Review and comment of the report by Tribes shall be governed by CR-1a-1.

CR-2d*: *Inadvertent Discovery of Potential Historical Resources and Unique Archaeological Resources. In the event that resources potentially qualifying as historical resources or unique archaeological resources per CEQA Guidelines Section 15064.5 are inadvertently discovered during ground-disturbing activities, work in the vicinity of the discovery shall immediately cease within a 50-meter radius and temporary protective measures shall be implemented. The radius of the protected area may be modified if determined appropriate by the relevant landowner, PG&E, and the Tribal Monitor, with approval by DTSC. PG&E shall notify DTSC within 24 hours of the discovery of any potential historical or unique archaeological resources. Avoidance and preservation in place shall be the preferred manner of mitigating impacts to such resources to maintain the important relationship between artifacts and their archaeological context in order to preserve each resource's scientific value, as well as to preserve the cultural values ascribed to resources by the Tribes. The feasibility of avoidance, as it relates to the Project objectives, shall be determined by DTSC, in coordination with PG&E, Tribes, and respective landowners. Preservation alternatives for consideration shall include (and are listed here in order of preference as indicated by Interested Tribes from most to least preferred): avoidance, data recovery of the materials associated with the resource, and capping.

Treatment of discoveries shall be managed under Stipulation IX, "Discoveries" of the PA and Section 8, "Discoveries" and Appendix C, "Discovery Plan" of the CHPMP. PG&E shall notify DTSC and coordinate with the parties already listed in the Appendix C Discovery Plan protocols. Avoided resources may be determined discretionarily eligible by DTSC pursuant to CEQA Section 15064.5(a)(3) as individual resources eligible for listing in the NRHP and the CRHR and as contributors to the Topock TCP. In the event, data recovery is the only feasible mitigation available, resources subject to data recovery shall be evaluated for individual listing in the NRHP and CRHR and as contributors to the Topock TCP, taking into consideration all four register criteria, and as unique archaeological resources. Curation of recovered archaeological materials recovered from federal lands shall be consistent with Stipulation XIII(A) and (B) of the PA. Curation of recovered materials from non-federal lands shall be coordinated by and between DTSC, Tribes, and the respective landowner.

Timing:	Before, during, and after Project activities, as detailed in the individual Mitigation Measures CR-2a through CR-2d.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	The impact would be **significant and unavoidable** after implementation of the measures detailed above. The Project as designed would avoid impacts to known historical resources. No

unique archaeological resources have been identified. The implementation of Mitigation Measures CR-2a through CR-2d would ensure avoidance of impacts to known historical resources and would reduce impacts in the event of inadvertent discovery of unknown historic-period archaeological resources, potentially qualifying as historical resources or unique archaeological resources under CEQA, to a less than significant level. However, even with the implementation of Mitigation Measures CR-2a through CR-2d, impacts to historical resources and unique archaeological resources resulting from the inadvertent discovery of unknown prehistoric archaeological resources would be significant and unavoidable given their relationship as contributors to the Topock TCP. Therefore, impacts to known and unknown historical resources and unique archaeological resources would be significant and unavoidable.

Paleontological Resources

Given the geologic setting of the Project Site, there is the potential for unique paleontological resources to occur. Two of the five geologic formations mapped within the Project Site, the Chemeheuvi Formation and the Pleistocene Older Alluvium, have been assigned a PFYC ranking of 3a (Moderate with uneven distribution), meaning that these formations are known to produce vertebrate fossils or scientifically significant nonvertebrate fossils, generally as unpredictable scatters or isolates, some of which may be considered unique paleontological resources under CEQA. Excavation in the Miocene Fanglomerate, Whale Mountain Quartz Monzonites, Early Proterzoic Gneiss, or Holocene Alluvium has a low potential to encounter any significant vertebrate fossils. Ground-disturbing activities within the Chemehuevi Formation and the Pleistocene Older Alluvium would have the potential to encounter, and therefore impact, unique paleontological resources, which would result in a potentially significant impact to paleontological resources.

Grading for the purposes of enhanced access and hand sampling are unlikely to impact paleontological resources because these activities will cause only shallow disturbances. Drill sampling and geotechnical evaluations could potentially impact paleontological resources; however, given the small diameter of the bore holes, it is unlikely that any potentially significant fossils would be destroyed. Backhoe excavation could impact paleontological resources; fossil specimens that may be uncovered during this excavation could, however, be feasibly recovered.

IMPACT CR-3 **Potential Impacts to Significant Paleontological Resources.** *Implementation of the proposed Project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature as a result of ground disturbing activity. This impact would be* ***significant****.*

Mitigation Measure CR-3: Paleontological Resources

CR-3a: Worker Education Program

PG&E shall fully enforce participation in the Worker Education Program as governed by CR-1b to ensure personnel awareness of cultural and paleontological sensitivities associated with the Project Site.

CR-3b: Inadvertent Discovery of Paleontological Resources

In the event of inadvertent discovery of paleontological resources, all work shall be halted within a 50-meter radius and temporary protective measures shall be implemented until the discovery can be evaluated by a qualified paleontologist (defined as a paleontologist meeting the requirements of the Society of Vertebrate Paleontology [SVP, 2010]). The radius of the protected area may be modified if determined appropriate by the relevant landowner, PG&E, and the qualified paleontologist, with approval by DTSC. (Appropriate treatment of the discovery shall be determined by DTSC, in coordination with the qualified paleontologist, PG&E, and respective landowners. Based on the nature of the discovery, the qualified paleontologist shall also reassess the need to initiate paleontological monitoring and make recommendations of such to DTSC, PG&E, and the respective landowner. PG&E shall provide DTSC notification of any paleontological discoveries within 24 hours.

Timing:	During Project activities.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	The impact would be **less than significant** after implementation of the measure detailed above. Ground disturbing activities could potentially encounter paleontological resources. Mitigation Measure CR-3 would reduce impacts to any unique paleontological resource or site or unique geologic feature to a less than significant level.

Human Remains

Ground-disturbing activities associated with the Project could result in the inadvertent discovery of human remains. The lack of any identified human remains in the Project Site does not preclude the possibility that unknown human remains may be present given the length of human occupation of the area.

IMPACT CR-4 **Potential Impacts to Human Remains.** *Implementation of the proposed Project could, through the process of ground-disturbing activities, disturb human remains, including those interred outside of formal cemeteries. This impact would be* ***significant.***

Mitigation Measure CR-4: Human Remains

In the event of inadvertent discovery of human remains, all work shall be halted within a 50-meter radius and temporary protective measures shall be implemented. The radius of the protected area may be modified if determined appropriate by the relevant landowner, PG&E, and the Tribal Monitor, with approval by DTSC. Avoidance and preservation in place shall be emphasized as the preferred manner of mitigation for human remains and disturbances shall be avoided to the maximum extent feasible as it relates to the Project objectives of soil characterization, as determined by DTSC, in coordination with Tribes, PG&E, and respective landowners. PG&E shall notify DTSC of any inadvertent discovery of human remains within 24 hours of the discovery.

On non-federal land, PG&E shall contact the San Bernardino County Coroner to evaluate the remains and follow the procedures and protocols set forth in Section 15064.4 (e)(1) of the California Environmental Quality Act. If the Coroner determines the remains are Native American in origin, the Coroner shall contact the NAHC. As provided in PRC Section 5097.98, the NAHC shall identify the person or persons believed to be most likely descended from the deceased Native American. The MLD shall be afforded the opportunity to provide recommendations concerning the future disposition of the remains and any associated grave goods as provided in PRC 5097.98. Per PRC Section 5097.98, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred with the MLD regarding their recommendations, taking into account the possibility of multiple human remains.

On federal land, the BLM Havasu City Field Office shall be notified and human remains and associated funerary objects shall be treated pursuant to the Native American Graves Protection and Repatriation Act and in accordance with Sections IX and XIII of the PA and Section 8.2 and Appendix D of the CHPMP.

Timing:	During Project activities.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	The impact would be **significant and unavoidable** after implementation of the measure detailed above. The Project could result in the destruction or alteration of human remains of significance to Native American Tribes in the extraordinary context of the Topock TCP. Although the implementation of

Mitigation Measure CR-4 would reduce or minimize impacts to human remains, it would not be reduced to a less than significant level. Therefore, impacts to human remains would be significant and unavoidable.

4.5 Hazards and Hazardous Materials

This section describes the existing conditions contributing to hazards and hazardous materials at the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Soil Investigation Project (Project) Site; describes relevant federal, state, regional, and local laws and regulations; and addresses the potential hazards and hazardous materials impacts of the proposed Project.

4.5.1 Existing Setting

4.5.1.1 Listed Hazardous Materials Sites

The California Department of Toxic Substances Control (DTSC) EnviroStor and the State Water Resources Control Board (SWRCB) GeoTracker websites were checked for listed hazardous materials sites in the local area (DTSC 2013; SWRCB 2013). The PG&E Topock Compressor Station (Station) is listed as a DTSC hazardous waste site and as a DTSC Corrective Action site. In 1996, PG&E, the owner and operator of the Station, entered into a voluntary agreement to investigate and remediate contaminants if necessary. Investigations have been on-going and DTSC has identified specific chemicals released to the environment as a result of the PG&E Station's historical activities. The soil sampling activities described within the *Soil RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan* (Soil RFI/RI Work Plan or Soil Work Plan) (CH2M HILL 2013; Appendix A to this DEIR) will provide necessary information to further determine the nature and extent of chemicals released at the Project Site. Samples collected in accordance with the Soil Work Plan will be analyzed for the chemicals listed below. Not all chemicals listed below are necessarily present at elevated concentrations or at significant risk levels. For additional information on the sampling proposed, please refer to Table 3-2 in Chapter 3, "Project Description."

- Title 22 metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc) and hexavalent chromium
- Volatile organic compounds (VOCs)
- Semivolatile organic compounds (SVOCs)
- Polycyclic aromatic hydrocarbons (PAHs)
- Polychlorinated biphenyls (PCBs)
- Total petroleum hydrocarbons (TPH) – purgeable and extractable
- Dioxins/Furans
- Pesticides
- Acid volatile sulfides

- Total organic carbon
- Ammonia
- Target Compound and Target Analyte Lists (TAL/TCL) Analytical Suite[1]
- Dissolved oxygen
- Asbestos
- General chemicals (may include sodium, potassium calcium, magnesium, manganese, and iron or alkalinity, cation exchange capacity,[2] electric conductance, orthophosphate, pH, phosphate, sulfide, total organic carbon, chloride)

The Cortese List website (CalEPA 2012), which includes the GeoTracker and EnviroStor websites, was also checked for nearby listed sites such as landfills. There are no other active listed hazardous materials sites within at least 7.5 miles of the Project Site.

4.5.1.2 Schools

The nearest public school is the Topock Elementary School, located in Topock, Arizona, about 4 miles north of the Project Site. The Chemehuevi Indian Education Center is located at the Needles Airport, about 6 miles northwest of the Project Site. The Chemehuevi Education Center is located in Lake Havasu, about 18 miles south of the Project Site.

4.5.1.3 Aviation

The SkyVector website was checked to identify public, private, and military airports in the Project vicinity (SkyVector 2013). The nearest public use airport is the Needles Airport, located south of Needles and approximately 6 miles northwest of the Project Site. The Chemehuevi Valley Airport and the Lake Havasu City Airport are located about 13.5 and 13 miles south, respectively, from the Project Site. The nearest military airport is the Twentynine Palms Strategic Expeditionary Landing Field, located approximately 95 miles west-southwest of the Project Site. The nearest privately owned airstrip in the Project vicinity is the Massey airstrip, located in Arizona about 22 miles to the southeast. The dirt Massey airstrip has no fueling or maintenance facilities.

[1] TAL/TCL Analytical Suite – The USEPA Contract Laboratory Program (CLP) laboratories use CLP analytical methods for the isolation, detection, and quantitation of specific target compounds and analytes. The CLP TAL/TCLs were originally derived from the USEPA Priority Pollutant List. In the years since the inception of the CLP, compounds and analytes have been added to, and deleted from, the list based on advances in analytical methods, evaluation of method performance data, and the needs of the Superfund program. The target compounds and analytes for TCL include volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and pesticides/Arochlors (polychlorinated biphenyl (PCBs). The target compounds and analytes for TAL include metals and cyanide. Further details are on the USEPA website at http://www.epa.gov/superfund/programs/clp/target.htm

[2] Cation exchange capacity is a measure of the soil's ability to hold positively charged ions (e.g., sodium, potassium calcium, magnesium are positively charged ions). It is a very important soil property influencing soil structure stability, nutrient availability, soil pH, and the soil's reaction to amendments such as those that would be added for the soil fixation/stabilization pilot study, if conducted.

4.5.1.4 Vegetation and Wildfire Hazards

As discussed in Section 4.3, "Biological Resources," most of the Project Site consists of sparsely vegetated desert, unvegetated desert pavement, numerous washes, and gently rolling hills. Vegetation in the area is typical of Mojave Desert uplands and includes creosote bush scrub, saltbush scrub, mesquite, palo verde, mesquite/palo verde, salt cedar/mesquite, arrow weed, and salt cedar (tamarisk). Aquatic habitats associated with the Colorado River include freshwater marsh and emergent wetlands. Tamarisk is an invasive, exotic plant species that develops into dense monotypic stands commonly growing with a sparse understory of native arrow weed (*Pluchea sericea*) and is associated with wetter environments.

The California Department of Forestry and Fire Protection (CAL FIRE) fire hazard severity zone map identifies the Project Site as within the lowest level of its fire hazard severity zones, which is the lowest possible risk category (CAL FIRE 2008).

4.5.2 Regulatory Background

As described in Section 2.3, the various on-site response and corrective actions required to investigate and clean up contamination are exempt from obtaining federal, state, and local permits pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121(e)(1). This does not, however, remove the requirement to meet the substantive provisions of applicable laws.

4.5.2.1 Federal

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) established a regulatory system to track hazardous wastes from the time of generation to final disposal, frequently described as "cradle-to-grave." The law requires safe and secure procedures to be used in treating, transporting, storing, and disposing of hazardous wastes. RCRA's provisions give state regulatory agencies authority to regulate solid and hazardous wastes. In California, the DTSC is authorized to implement RCRA in lieu of the U.S. Environmental Protection Agency (USEPA).

Hazardous waste generated during operation of the proposed Project would be required to comply with all applicable hazardous waste laws and regulations, including RCRA. The goal of RCRA is to protect human health and the environment, reduce waste, conserve energy and natural resources, and eliminate generation of hazardous waste as expeditiously as possible. The Hazardous and Solid Waste Amendments (HSWA) of 1984 significantly expanded the scope of RCRA by adding new corrective action requirements, land disposal restrictions, and technical requirements. HSWA also provided for more oversight by USEPA, related to the investigation and corrective action within certain facilities where hazardous materials may have been discharged. The corresponding regulations in Title 40 of the Code of Federal Regulations (CFR), Parts 260 through 279, provide the general framework for managing hazardous waste, including requirements for entities that generate, store, transport, treat, and dispose of hazardous waste.

Wastes generated during facility operations and investigation activities must be classified as either nonhazardous or hazardous waste, based on specific criteria, and must then be transported and disposed of in accordance with the classification. Transportation requirements for hazardous wastes include packaging for transport, generating a manifest, and displaying the placard required by the hazardous materials transportation regulations in 49 CFR Part 172, Subpart F.

Comprehensive Environmental Response, Compensation, and Liability Act

CERCLA, commonly known as Superfund, was enacted by Congress on December 11, 1980, and reauthorized and amended by the Superfund Amendments and Reauthorization Act on October 17, 1986. This law created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA established prohibitions and requirements concerning closed and abandoned hazardous waste sites, provided for liability of persons responsible for releases of hazardous waste at these sites, and established a trust fund to provide for cleanup when no responsible party could be identified.

CERCLA authorizes appointed federal agencies, in this case the DOI for this Project, to respond directly to releases of hazardous substances that could endanger public health or the environment. CERCLA directs the federal agency to list national priorities among the known “releases or threatened releases” of hazardous substances.

The various on-site response and corrective actions required to investigate and clean up contamination are exempt from obtaining federal, state, and local permits pursuant to CERCLA Section 121(e)(1). (See 42 U.S.C. § 9621(e).) The intent behind this provision is that CERCLA actions should not be delayed by time-consuming and duplicative administrative requirements such as permitting, although remedial remedies should achieve the substantive standards of otherwise applicable laws. However, the substantive elements or conditions that would be required by a particular permit must still be attained after conferring with the applicable agency as appropriate, consistent with the requirements of CERCLA.

U.S. Department of Transportation Hazardous Materials Regulations (Title 49 CFR Parts 100–185)

The U.S. Department of Transportation (DOT) Hazardous Materials Regulations cover all aspects of hazardous materials packaging, handling, and transportation. Parts 173 (“Packaging Requirements”), 177 (“Highway Transportation”), 178 (“Packaging Specifications”), and 180 (“Packaging Maintenance”) would apply to the proposed Project activities. Additional potentially applicable parts include Part 171 (“General Information, Regulations and Definitions”) and Part 172 (“Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, Training Requirements, and Security Plans”).

Under DOT regulations, a hazardous material is “a substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and has designated as hazardous under section 5103 of Federal hazardous materials transportation law (49 U.S. Code 5103).” The term includes hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, and materials designated as hazardous in the Hazardous Materials Table (49 CFR 172.101). DOT classifies hazardous materials into nine primary classes: explosives, gases, flammable liquids, other flammable substances, oxidizing substances and organic peroxides, toxic (poisonous) and infectious substances, radioactive materials, corrosives, and miscellaneous dangerous goods. Some have subclasses. For example, compressed gases are divided into subclasses for flammable, nonflammable, and poisonous gases. The Hazardous Materials Transportation Act requires that carriers report accidental releases of hazardous materials to DOT at the earliest practical moment.

Emergency Planning and Community Right-to-Know Act (42 U.S. Code 11001 et seq.)

Also known as Title III of the Superfund Amendments and Reauthorization Act, the Emergency Planning and Community Right-to-Know Act (EPCRA) was enacted by Congress as the national legislation on community safety. This law was designated to help local communities protect public health, safety, and the environment from chemical hazards. To implement EPCRA, Congress required each state to appoint a State Emergency Response Commission (SERC). SERCs are required to divide their states into Emergency Planning Districts and to name a Local Emergency Planning Committee for each district. EPCRA provides requirements for emergency release notification, chemical inventory reporting, and toxic release inventories for facilities that handle chemicals.

Safe, Efficient Use, and Preservation of Navigable Airspace (14 CFR Part 77.9 – Construction or alteration requiring notice)

The maximum Federal Aviation Administration (FAA) Notification Surface for construction is 20,000 feet or 3.79 miles from any point on the runway of any public use airport, military airport, or airport operated by a federal agency of the Department of Defense, or airport or heliport with at least one FAA-approved instrument approach procedure.

U.S. Department of Agriculture Standard for Spark Arresters for Internal Combustion Engines

The U.S. Department of Agriculture enforces standards establishing the minimum performance and maintenance requirements of spark arresters for single and multiposition small internal combustion engines used in proximity to grass, brush, timber, and similar cellulose materials. The regulations require installation and maintenance requirements of eternal combustion engines.

4.5.2.2 State of California

Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65)

In 1986, California voters approved an initiative to address their growing concerns about exposure to toxic chemicals. That initiative became the Safe Drinking Water and Toxic Enforcement Act of 1986, better known by its original name of Proposition 65. Proposition 65 requires the State to publish a list of chemicals known to cause cancer or birth defects or other reproductive harm. This list, which must be updated at least once a year, has grown to include approximately 800 chemicals since it was first published in 1987.

Proposition 65 requires businesses to notify Californians about significant amounts of chemicals in the products they purchase, in their homes or workplaces, or that are released into the environment. By providing this information, Proposition 65 enables Californians to make informed decisions about protecting themselves from exposure to these chemicals. Proposition 65 also prohibits California businesses from knowingly discharging significant amounts of listed chemicals into sources of drinking water. The following section is relevant to this Project because the Colorado River is a source of drinking water.

> Section 25249.5. Prohibition On Contaminating Drinking Water With Chemicals Known to Cause Cancer or Reproductive Toxicity. No person in the course of doing business shall knowingly discharge or release a chemical known to the state to cause cancer or reproductive toxicity into water or onto or into land where such chemical passes or probably will pass into any source of drinking water, notwithstanding any other provision or authorization of law except as provided in Section 25249.9.

NPDES Construction General Permit

In accordance with the CERCLA exemption (see Section 2.3), PG&E would not be required to submit a Notice of Intent (NOI) or a Stormwater Pollution Prevention Plan (SWPPP) to the Regional Water Quality Control Board (RWQCB) for their review and approval to comply with the requirement of the state Construction General Permit (CGP). This does not, however, remove the requirement to meet the substantive provisions of applicable laws. Therefore, as part of the Project, PG&E will develop and implement an erosion control plan that is in conformance with the substantive requirements of the CGP. Because the erosion control plan will fulfill the requirements of the CGP, it will have substantive components similar to those that would be included in an SWPPP. The general CGP requirements are summarized below.

The RWQCB administers the National Pollutant Discharge Elimination System (NPDES) stormwater permitting program in the Colorado River Basin region. Construction activities disturbing one acre or more of land are subject to the permitting requirements of the NPDES Construction General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (CGP; Order 2009-0009-DWQ). Project activities such as clearing, grading, stockpiling, and excavation would be subject to the statewide general construction activity NPDES permit.

The CGP requires that the site be assigned a risk level of 1 (low), 2 (medium), or 3 (high) based on sediment and receiving waters risk. The sediment risk level is the relative amount of sediment that can be discharged given the project and location details. The receiving waters risk level reflects the risk sediment discharges pose to the receiving waters. A construction analysis provides a preliminary risk level assessment.

For non-exempt projects, the CGP requires the preparation and implementation of a SWPPP prior to construction commencement. At a minimum, the SWPPP includes the following:

- Description of construction materials, practices, and equipment storage maintenance

- List of pollutants likely to contact stormwater and site specific erosion and sedimentation control practices
- List of provisions to eliminate or reduce discharge of materials to stormwater
- BMPs for fuel and equipment storage
- Non-stormwater management measures such as installing specific discharge controls during activities such as paving operations and vehicle and equipment washing and fueling
- Equipment, materials, and workers will be available for rapid response to spills and/or emergencies. All corrective maintenance or BMPs will be performed as soon as possible, depending upon worker safety

An SWPPP provides specific construction-related BMPs to prevent soil erosion and loss of topsoil. BMPs implemented could include, but would not be limited to, physical barriers to prevent erosion and sedimentation, construction of sedimentation basins, limitations on work periods during storm events, use of swales, protection of stockpiled materials, and a variety of other measures that would substantially reduce or prevent erosion from occurring during construction. Post-construction requirements require that construction sites match pre-project hydrology to ensure that the physical and biological integrity of aquatic ecosystems are sustained in their existing condition, unless the site is located within an area subject to the post-construction standards of an active Phase I or II municipal separate storm sewer system (MS4) permit that has an approved stormwater management plan. This Project Site is not within a MS4 area. The post-construction standards (post-investigation standards for the purposes of the proposed Project) include structural and nonstructural control measures to replicate the pre-project water balance and pre-project drainage density, and reduce pollutants in storm water discharges.

Hazardous Waste Control Law (California Health and Safety Code, Division 20, Chapter 6.5)

This statute is the basic hazardous waste law for California. The Hazardous Waste Control Law implements the federal RCRA cradle-to-grave waste management system in California, although this program regulates more materials as hazardous wastes than the federal program. California hazardous waste regulations can be found in the CCR Title 22, Division 4.5, "Environmental Health Standards for the Management of Hazardous Wastes." The program is administered by DTSC.

Hazardous Material Release Response Plans and Inventory Law (California Health and Safety Code, Division 20, Chapter 6.95)

This state law requires businesses to disclose the hazardous materials used in their businesses and to develop a Hazardous Material Management Plan or a "business plan" for hazardous materials emergencies if they handle, at any one time, more than 500 pounds, 55 gallons, or 200 cubic feet of hazardous materials. The business plan includes an inventory of all hazardous materials stored or handled at a facility above these thresholds. This law is designed to reduce the occurrence and severity of hazardous material releases and to promote emergency response preparedness by local agencies. The Hazardous Materials Management Plan must be submitted to the Certified Unified Program Agency (CUPA), which for the Project vicinity is the San Bernardino County Fire Department, Hazardous Materials Division. The state has integrated the federal EPCRA reporting requirements into this law; once a facility is in compliance with the local administering agency requirements, submittals to other agencies are not required. The Hazardous Material Management Plan also defines response procedures and equipment for spills or releases of hazardous materials.

Cortese List (California Government Code, Section 65962.5)

The Hazardous Waste and Substances Sites List (Cortese List) is a planning document used by the state, local agencies, and developers to comply with requirements in providing information about the location of hazardous materials release sites. Government Code Section 65962.5 requires the California Environmental Protection Agency to develop an updated Cortese List at least annually. The DTSC is responsible for a portion of the information contained in the Cortese List, as are other state and local government agencies. The Cortese List documents active and inactive landfills, underground pipelines, federal and state hazardous waste sites, Leaking Underground Storage Tank (LUST) sites, and solid waste disposal facilities with known migration of hazardous waste. As noted above, the Station is listed on the DTSC EnviroStor website; however, no other listed sites are located near the Station.

California Vehicle Code Section 38366

The California Vehicle Code, Section 38366, requires spark arresting equipment on vehicles that travel off-road. The section is as follows.

(a) Notwithstanding Section 4442 of the Public Resources Code, and except for vehicles with mufflers as provided in Article 2 (commencing with Section 27150) of Chapter 5 of Division 12, no person shall use, operate, or allow to be used or operated, any off-highway motor vehicle, as defined in Section 38006, on any forest-covered land, brush-covered land, or grass-covered land unless the vehicle is equipped with a spark arrester maintained in effective working order.

(b) A spark arrester affixed to the exhaust system of a vehicle subject to this section shall not be placed or mounted in such a manner as to allow flames or heat from the exhaust system to ignite any flammable material.

(c) A spark arrester is a device constructed of nonflammable materials specifically for the purpose of removing and retaining carbon and other flammable particles over 0.0232 of an inch in size from the exhaust flow of an internal combustion engine or which is qualified and rated by the United States Forest Service.

(d) Subdivision (a) shall not be applicable to vehicles being operated off the highway in an organized racing or competitive event upon a closed course, which is conducted under the auspices of a recognized sanctioning body and by permit issued by the fire protection authority having jurisdiction.

California Emergency Services Act

The California Emergency Services Act provides the basic authority for conducting emergency operations following a proclamation of emergency by the governor and/or appropriate local authorities. Local government and district emergency plans are considered to be extensions of the California Emergency Plan, established in accordance with the California Emergency Services Act.

4.5.2.3 Local

San Bernardino County Fire Department, Hazardous Materials Division

The purpose of the Hazardous Materials Division (HMD) is to protect the health and safety of the public and the environment of San Bernardino County by ensuring that hazardous materials are properly handled and stored. HMD accomplishes this through inspection, emergency response, site remediation, and hazardous waste management services. An overview of these services is provided below.

- Inspections: HMD inspects hazardous material handlers and hazardous waste generators to ensure full compliance with laws and regulations. HMD also implements CUPA programs for the development of accident prevention and emergency plans, proper installation, monitoring, and closure of underground tanks and for the handling, storage, transportation, and disposal of hazardous wastes.
- Emergency Response: HMD provides 24-hour response to emergency incidents involving hazardous materials or wastes to protect the public and the environment from accidental releases and illegal activities.
- Investigation/Remediation Oversight: HMD oversees the investigation and remediation of environmental contamination caused by releases from underground storage tanks, hazardous waste containers, chemical processes, or the transportation of hazardous materials. However, in cases where a site such as the Station was previously subject to DTSC oversight due to hazardous waste treatment, disposal, or other activities, DTSC usually continues to oversee the cleanup and remediation activities.
- Enforcement Actions: HMD conducts investigations and takes enforcement action as necessary against anyone who disposes of hazardous waste illegally or otherwise manages hazardous materials or wastes in violation of federal, state, or local laws and regulations.

San Bernardino County Hazardous Waste Management Plan

California Assembly Bill 2948 authorized counties to prepare hazardous waste management plans designed to serve as the primary planning document for the management of hazardous waste within the counties. The *San Bernardino County Hazardous Waste Management Plan* identifies the types and amounts of wastes generated in the county; establishes programs for managing these wastes; identifies an application process for the siting of specified hazardous waste facilities; identifies mechanisms for reducing the amount of waste generated in the county; and identifies goals, policies, and actions for achieving effective hazardous waste management.

4.5.3 Environmental Impacts

4.5.3.1 Impact Methodology

The potential impacts relative to hazards and hazardous materials were evaluated by assessing the proposed access, investigation, and restoration activities for the Project, as described in the Project Description (Chapter 3), the Soil Work Plan (CH2M HILL 2013), and the *Corrective Measures/Feasibility Study Work Plan* (CM/FS Work Plan) (CH2M HILL 2008). In addition to soil sampling, the proposed soil investigation activities may include bench scale tests and pilot studies to assess potential soil remedy options if remedial action is necessary; geotechnical evaluations; and plant or other biota sampling. The CM/FS Work Plan describes the bench scale tests and pilot studies that may be conducted to evaluate various treatment technologies.

The Soil Work Plan describes and references standard operating procedures (SOPs) and Best Management Practices (BMPs) that have been developed during the previous investigations. Among other things, the SOPs and BMPs will reduce potential impacts relative to hazards and hazardous materials during the soil investigation activities. The proposed Project will follow the SOPs in the *Topock Program Sampling, Analysis, and Field Procedures Manual, PG&E Topock Compressor Station, Needles, California* (CH2M HILL 2005), which are included as Appendix G of the Work Plan. Section 2.2 of the Work Plan describes the BMPs that have been developed as part of the Project. These provisions are also described in the Project Description, Section 3.5.7, and will be implemented as part of the proposed Project. These provisions apply to all Project activities including soil sampling, bench scale tests, pilot studies, geotechnical evaluations, and plant or other biota sampling. Accordingly, the impact analysis for hazards and hazardous materials takes into consideration the full implementation of the SOPs and BMPs. In addition, PG&E will meet the substantive provisions of the state CGP in accordance with the CERCLA exemption (see Section 2.3), and prepare and implement an erosion control plan as part of the Project. To ensure the implementation of the SOP, BMP, and erosion control plan provisions, DTSC will include them as Conditions of Approval for the Project if the Project is approved.

4.5.3.2 Thresholds of Significance

Based on the CEQA Guidelines, Appendix G, a project may be deemed to have a significant effect on the environment with respect to hazards and hazardous materials if it would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;

- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment;
- For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area;
- For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Based on the location and characteristics of the proposed Project, the following criteria are not considered in the impact analyses for the reasons described below.

- The proposed soil investigation activities consist of a short-term sampling program and do not include routine transport, use, or disposal activities. Therefore, there would be no impact relative to routine transport, use, or disposal of hazardous waste and this threshold is not considered further in this draft environmental impact report (DEIR). Potential hazards could occur through reasonably foreseeable upset and accident conditions, as analyzed below.

- The proposed soil investigation activities would not occur within one-quarter mile of an existing or proposed school. The nearest school is the Topock Elementary School, located in Topock, Arizona, about 4 miles north of the Project Site. Therefore no impacts would occur, and this threshold is not considered further in this DEIR.

- The nearest airport to the proposed Project is the public-use Needles Airport, located 6 miles to the northwest. The Project is not located within 2 miles of an airport, within an area covered by an airport land use plan, or within the vicinity of a private airstrip. Therefore no impacts would occur, and these thresholds are not considered further in this DEIR.

- The proposed soil investigation activities would utilize existing public roads for access and delivery purposes, similar to existing operations at the Station. No new access roads would be built for the proposed Project and no increases in traffic volumes are anticipated that would conflict with an adopted emergency response plan or emergency evacuation plan. Therefore no impacts would occur, and this threshold is not considered further in this DEIR.

4.5.3.3 Impact Analysis

The proposed Project includes the collection of soil and pore water samples at 292 locations using drilling rigs, hydrovac trucks, excavators, support trucks, and hand tools. Further, due to unforeseen circumstances or data gaps, additional samples/ sampling locations may be necessary. As part of this draft environmental impact report (DEIR), therefore, a contingency of up to 25 percent additional sampling locations (i.e. up to 73 additional locations) is included in the DEIR evaluation. In addition, bench tests, pilot studies, geotechnical evaluations, and plant or other biota sampling may be conducted to evaluate possible treatment technologies. The bench tests would involve the collection of small volumes of contaminated soil (three to five 5 gallon buckets) for offsite testing. The in situ soil flushing pilot study, if conducted, would involve grading a small depression to create an infiltration gallery that is 35 foot by 115 foot in size. Alternately, the infiltration could be accomplished with injection wells. The in situ stabilization/fixation pilot study, if conducted, would involve the addition of a stabilization agent to soil known to be contaminated through the same delivery system as described for soil flushing. The soil would then be sampled to evaluate the effectiveness of the stabilization agent (see Section 3.5.3.2 for a list of reagents that may be used). Access to investigation sites would be predominantly on existing roadways. Some areas would require minor improvement of existing roadways, and/or the trimming, pruning, or clearing of some vegetation to provide access.

After sampling is complete, up to five boreholes would be converted to soil gas probes. The remaining boreholes drilled by the sonic method would be decommissioned by grouting the boreholes from the bottom up to the ground surface with cement grout. Hydrovac potholes would be sealed with bentonite chips and the surface restored to the previous condition (asphalt, concrete, or soil). Potholes and trenches excavated by an excavator or hand tools would be backfilled with the excavated soil cuttings and the surface restored to the previous condition (asphalt, concrete, or soil). Decontamination of sampling equipment would use existing staging areas within the Station. Staging areas used for previous projects will be used for these soil investigation activities, thus eliminating the need for the construction of any new staging areas. Any decontamination water would be collected on a decontamination pad lined with plastic-sheeting and collected into covered portable storage tanks within secondary containment.

Potential for Hazardous Materials Release

Grading and Site Preparation Activities

The proposed soil investigation activities would require the use of a sonic drilling rig, hydrovac truck, or excavator, depending on access and depth considerations, to collect soil and pore water samples for analysis. Activities may also include preparing a surface depression, infiltration gallery, or injection and recovery wells for the in situ pilot studies (35-foot by 115-foot area). Minor improvements to existing roads would be required to access some of the investigation locations. The types of equipment to be used will depend on sample location, access, and sample depth considerations and could include a sonic drilling rig, a hydrovac truck, an excavator, and support trucks. The equipment would be used for minor grading and ground disturbance to facilitate access and to collect samples either by drilling boreholes or excavating boreholes or trenches. These ground disturbance activities could disturb soil such that rain events could result in the discharge of sediments to drainages and eventually to the Colorado River. The ground disturbance activities could also result in the generation of airborne dust. In addition, to reach the desired sample depth intervals, the sampling process would generate waste soil from drilling, hydrovacing, or excavation activities. Some of the sample intervals could contain soil with chemicals at elevated concentrations. If improperly managed and disposed of, sediment and/or chemicals from the waste soil could be released to the environment, mobilized by storm water runoff, and enter drainages and eventually the Colorado River. As discussed in Section 4.5.2, “Regulatory Background,” action levels have been established for various chemicals that would prohibit their release into the environment. Discharge of excess sediment or chemical pollutants from Project activities could exceed sediment discharge objectives or chemical action levels, or otherwise violate water quality standards prescribed for the Colorado River in the Colorado River Basin Regional Water Quality Control Basin Plan.

The improvement of existing roads and the grading of investigation locations and/or the in situ pilot study locations to facilitate access would result in the collective disturbance of more than one acre of land. In addition, some of the investigation locations are within or adjacent to areas designated as Waters of the United States, as discussed in Section 4.6, Hydrology and Water Quality. Any impacts within or adjacent to Waters of the United States would not require the acquisition of permits under Section 401 or 404 of the CWA as the Project activities fall under the CERCLA Section 121(e)(1) permit exemption (see Section 2.3). As described previously however, PG&E will develop and implement an erosion control plan as part of the Project (see Section 3.5.7). The erosion control plan would be in conformance with the substantive requirements of the CGP and would therefore be similar to an SWPPP.

The plan, moreover, would be prepared by a Qualified SWPPP Developer and would be under the direction of a Qualified SWPPP Practitioner. The provisions in the erosion control plan will be required as Conditions of Approval for the Project if the Project is approved.

As a part of the grading and site preparation elements of the Project, PG&E will implement and conduct the following actions:

- Complete a Risk Assessment to determine pollution prevention requirements pursuant to the three Risk Levels as established in the CGP and relevant for the proposed Project.
- Eliminate or reduce non-stormwater discharges to Waters of the United States
- Prepare and implement an erosion control plan, which would include, but not be limited to the following BMPs developed by the California Stormwater Quality Association (CASQA 2011):
  - Scheduling (EC-1): Proper scheduling assists in identifying ways to minimize disturbed areas, which allows for a reduction in the active Project Site requiring protection and also minimizes the length of time disturbed soils are exposed to erosive processes. This would include limitations on construction work during storm events.
  - Preservation of Existing Vegetation (EC-2): Preserving existing vegetation to the maximum extent practicable facilitates protection of surfaces from erosion and can also help to control sediments. Sensitive areas should also be clearly identified and protected.

  - Hydraulic Mulch (EC-3), Straw Mulch (EC-6), and Wood Mulching (EC-8): Using various mulches is a method for temporarily stabilizing soil and can be used on surfaces with little or no slope.
  - Geotextiles, Plastic Covers, and Erosion Control Blankets/Mats (EC-7): These erosion control methods can be used on flat or, usually, sloped surfaces, channels, and stockpiles.
  - Stabilized Construction Entrance/Exit (TC-1): A graveled area or pad located at points where vehicles enter and leave a construction site can be built. This BMP provides a buffer area where vehicles can drop their mud and sediment to avoid transporting it onto public roads, to control erosion from surface runoff, and to help control dust.
  - Silt Fence (SE-1): A temporary sediment barrier consisting of fabric is designed to retain sediment from small disturbed areas by reducing the velocity of sheet flows.
  - Gravel Bag Berm (SE-6) and Sand Bag Barrier (SE-8): A temporary sediment barrier consisting of gravel-filled fabric bags is designed to retain sediment from small disturbed areas by reducing the velocity of sheet flows.
- Secondary concerns include potential pollutants from inappropriate material storage and handling procedures and non-stormwater discharges. These will be addressed through the following types of BMPs, which will be included in the erosion control plan:
  - Material Delivery and Storage (WM-1): Provide covered storage for materials, especially toxic or hazardous materials, to prevent exposure to stormwater. Store and transfer toxic or hazardous materials on impervious surfaces that will provide secondary containment for spills. Park vehicles and equipment used for material delivery and storage, as well as contractor vehicles, in designated areas.
  - Spill Prevention and Control (WM-4): Ensure that spills and releases of materials are cleaned up immediately and thoroughly. Ensure that appropriate spill response equipment, preferably spill kits preloaded with absorbents in an overpack drum, is provided at convenient locations throughout the site. Spent absorbent material must be managed and disposed of in accordance with applicable regulations. In particular, absorbents used to clean up spills of hazardous materials or waste must be managed as hazardous waste unless characterized as nonhazardous.
  - Vehicle and Equipment Fueling (NS-9): Use off-site fueling stations as much as possible. Absorbent spill cleanup materials and spill kits should be available in fueling areas and on fueling trucks, and should disposed of properly after use. Drip pans or absorbent pads should be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area. Maintain clean fuel-dispensing areas using dry cleanup methods, such as sweeping or using rags and absorbents for leaks and spills. Cover the fueling area to prevent contact with stormwater. Train personnel in pollution prevention, focusing on containment of spills and leaks.
  - Outdoor Loading/Unloading (SC-30): Load and unload chemicals during dry weather, if possible, and load and unload in designated areas. Check equipment regularly for leaks.

- Solid Waste Management (WM-5): Provide a sufficient number of conveniently located trash and scrap receptacles to promote proper disposal of solid wastes. Ensure that the receptacles are provided with lids or covers to prevent windblown litter.
- Hazardous Waste Management (WM-6): Provide a sufficient number of proper receptacles to promote proper disposal of hazardous wastes.
- Sanitary/Septic Waste Management (WM-9): Locate sanitary and septic waste facilities away from drainage courses and traffic areas. Maintain the facilities regularly.
- Vehicle and Equipment Cleaning (NS-8): Clean vehicles and equipment that regularly enter and leave the construction site.
- Vehicle and Equipment Maintenance (NS-10): Use off-site maintenance facilities whenever possible. Any on-site maintenance areas must be protected from stormwater runoff and on-site flooding.

Adherence to the erosion control plan would substantially reduce or prevent waterborne pollutants or sediments from entering drainages, per Colorado River Basin RWQCB standards. The provisions would prevent the accidental release of contaminants during grading and investigation activities and ensure that the proposed Project would not result in significant hazards to the public and the environment during the field work.

In accordance with the Soil Work Plan, the Project will implement SOPs and BMPs to control fugitive airborne dust. Vehicle speeds will be limited to 15 miles per hour or slower to limit generation of dust on unimproved roads. Dust may also be created from soil sampling activities. Fugitive dust emissions resulting from vehicle traffic or soil sampling activities would be controlled by wetting surfaces or spraying approved dust suppressants. Appropriate dust control measures will be implemented to avoid visible dust from any earthmoving activities, and/or any earthmoving activities may be curtailed if dust control measures are not sufficient to reduce visible dust during high winds. Implementation of these BMPs would reduce and control the generation of fugitive dust.

Some sample locations in AOC 10 along the shoreline of the Colorado River would be sampled for sediment and pore water. Boats would be used to access some of these locations (e.g., the East Ravine Sediment and Pore Water (ERPW) sampling locations -2, -4, and -9) and, in these locations, only hand tools would be used to collect samples. Planks would be placed on vegetation and shoreline soil to facilitate access and further minimize ground disturbance. This access method would minimize ground disturbance and reduce the mobilization of sediment.

Management of Waste Soil from Investigation Activities

As part of the Project, the Soil Work Plan provides SOPs and BMPs to manage waste soil generated from drilling and excavating activities. Displaced soil will be handled in accordance to the *Management Protocol for Handling and Disposition of Displaced Site Material, Topock Remediation Project, Needles, CA* provided in Appendix J of the Soil Work Plan (CH2M HILL 2013). The Appendix presents specific displaced soil and hazardous waste management procedures that would be implemented for the Project.

As explained in the Soil Work Plan, the waste soil will be stored in DOT-compliant drums or lined, steel roll-off soil bins that would be temporarily staged in previously used staging areas to the extent practicable. Additional procedures that are required for the storage containers are described in the *Displaced Soil and Hazardous Waste Management Procedures* provided in Appendix J of the Soil Work Plan (CH2M HILL 2013), including the following:

- Only DOT-specification containers will be used for soil accumulation.
- Drums will be inspected and inventoried upon arrival onsite for signs of contamination and/or deterioration.
- Drums and small containers will be transported to the temporary accumulation areas on wood pallets and will be secured together with nonmetallic banding.
- Drums will be placed within a bermed and lined area or otherwise will be provided with secondary containment.
- Adequate aisle space (for example, 36 inches) will be provided for containers such as 55-gallon drums to allow the unobstructed movement of personnel and equipment.
- Drums will be placed with no more than two drums per row. The column length must fit within the lined, bermed area.
- Each drum will be provided with its own label, and labels will be visible for inspection purposes.
- Drums will remain closed except when removing or adding soil to the drum. Closed means that the lid and securing ring must be on and securely tightened.
- Drums will be disposed of with the contents. If the contents are removed from the drums for offsite transportation and treatment or disposal, the drums will be reused only for compatible soil and waste streams.

The number and size of drums and roll off bins would vary depending on how many borings are installed, the drilling method used, and how quickly investigation activities are required to proceed. Standard practices, such as use of plastic sheeting over the ground surface, would be employed in the drilling and staging areas as necessary to keep the drilling materials and equipment clean and to minimize contact of the drilling materials and equipment with the ground surface.

Soil analytical results would be used to identify appropriate management of waste soil. All soil and other investigation-derived waste (IDW) would be handled, transported, and disposed of in accordance with applicable local, state, and federal laws. Displaced soil would be analyzed and characterized as described in the *Management Protocol for Handling and Disposition of Displaced Site Material, Topock Remediation Project, Needles, CA* provided in Appendix J of the Soil Work Plan (CH2M HILL 2013) and will be identified as one of the following categories based on the characterization results: (1) RCRA or non-RCRA hazardous waste; (2) non-hazardous clean soil (unregulated); (3) or nonhazardous soil for long-term storage (also unregulated). After sampling and characterization, the drums or bins with hazardous soil cuttings would be removed within 90 days of generation from the IDW staging area and transported for disposal in a permitted off-site hazardous waste disposal facility. Soil that is classified as hazardous waste and placed in containers must comply with Title 22 of the California Code of Regulations (CCR) Div. 4.5, Chapter 15, Article 9 (Container Management); Article 27, Article 28, and Article 28.5 (Air Emission Standards); and with 22 CCR Div. 4.5,Chapter 14, Article 9 (Container Management). Unregulated soil would be stockpiled at designated soil storage areas, in accordance with Appendix J, Attachment 1, of the Soil Work Plan, which describes the protocols, including planning (including Tribal input), short-term and long-term handling and storage procedures, contamination assessment, and determination of final disposition.

Decontamination of the sampling tools would be conducted on a temporary decontamination pad lined with plastic sheeting located on PG&E property at specific locations to be determined. Heavy equipment such as drill rigs and drill rods will be decontaminated at the concrete-lined decontamination pad located adjacent to the Station's access road. Downhole drilling tools, excavator and backhoe buckets, tracks on track rigs, and the back ends of the drilling rigs will be decontaminated prior to arrival at the site and will be cleaned between investigation areas as determined necessary by the field team leader. In addition, downhole drilling tools, excavator and backhoe buckets, core barrel, drill stem, and drive casings will be decontaminated between boring locations. Decontamination will be accomplished by steam cleaning or pressure-washing the equipment, and back of the drilling rig. Equipment may also be cleaned using dry methods prior to leaving an excavation area to prevent the tracking of material out of the area. The backs of drill rigs and downhole drilling tools will be decontaminated before arrival at the site. Drilling equipment will be decontaminated prior to removal from the site. Equipment will also be inspected, and any soil will be removed from the equipment prior to moving the equipment via any publicly maintained roads.

Water generated during decontamination activities would be stored temporarily in drums, bins, or portable storage tanks. These tanks would be located temporarily at the drilling sites and/or at the existing IDW staging areas developed during previous investigations. Samples of the decontamination water would be analyzed and the results would be used to identify the appropriate disposal of the decontamination water. After characterization, water generated from decontamination activities would likely be processed on-site at the existing IM-3 treatment facility and reinjected into the aquifer, or trucked off-site for disposal Prior to treatment of water at IM-3 treatment facility, the water will be tested to determine whether it contains contaminants (i.e., organics) that the IM-3 is not designed to treat. If the water contains contaminants that the IM-3 will not treat, then it will be disposed of off-site at an appropriate facility.

IMPACT HAZ-1 **Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.** *Implementation of the proposed Project could result in the release of hazardous materials from the use of equipment (fuels, oils and grease, solvents) or from the release of chemicals from the sampled media at hazardous levels. This impact would be* ***less than significant****. No mitigation would be required.*

Hazards Related to Existing Contamination

The Station is a listed hazardous waste site. There are no other active listed sites within at least 7.5 miles. In 1996, PG&E, the owner and operator, entered into a voluntary agreement to investigate and remediate contaminants to agreed-upon action levels, and the Station is in the DTSC Cleanup Program. The access, investigation, sample collection, and restoration activities proposed as part of the soil investigation will determine the nature and extent of chemicals released from the Station's historical activities. As described above, the access and sampling activities could result in the release of chemicals that could present a significant hazard to the public or environment.

As discussed above, the soil investigation activities would involve implementation of the SOPs and BMPs discussed above and adherence to the substantive provisions of local, state, and federal laws.

IMPACT HAZ-2 **Effects related to existing hazardous waste site.** *The Station is a listed hazardous waste site. Implementation of the proposed Project could create a significant hazard to the public or the environment by the potential release of contaminants known to be present in soil and groundwater at and beneath the Station. This impact would be* ***less than significant****. No mitigation would be required.*

Wildland Fires

The improvement of existing roads and the proposed soil investigation activities would require the use of mechanized equipment with internal combustion engines. The equipment would include sonic drilling rigs, hydrovac trucks, excavators, and support trucks. Parts of the engines and exhaust systems could get hot enough to ignite dry vegetation and cause a wildfire and expose people or structures to significant risk.

As previously discussed, the CAL FIRE fire hazard severity zone map identifies the Project Site as within the lowest level of its fire hazard severity zones, which is the lowest possible risk category. In addition, the adherence to provisions of the DOT and California Vehicle Code for spark arrester protection on vehicles would further reduce the potential risk.

IMPACT HAZ-3 **Increased Risk of Wildland Fires.** *Soil investigation equipment that uses internal combustion engines could ignite wildland fires that could expose people or structures to significant risk. However, the CAL FIRE fire hazard severity zone map identifies the Project Site as within the lowest level of its fire hazard severity zones which is the lowest possible risk category. Moreover, the Project would adhere to substantive provisions of federal and state regulations that address spark arrester protection to prevent potential wildland fire impacts. This impact would be* ***less than significant****. No mitigation would be required.*

4.6 Hydrology and Water Quality

This section describes the existing conditions contributing to the hydrology and water quality at the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Soil Investigation Project (Project) Site and surrounding area; describes the relevant federal, state, regional, and local laws and regulations; and addresses the potential hydrology and water quality impacts of the proposed Project.

4.6.1 Existing Setting

This section describes the physical hydrologic and water quality characteristics and setting with regard to the soil investigation activities to be conducted at the Project Site.

4.6.1.1 Climate

The climate in the site vicinity is typical of low desert areas along the Colorado River, with hot summers and mild winters. The nearest weather station, located approximately 6.3 miles upriver from the PG&E Topock Compressor Station (Station) in the Havasu National Wildlife Refuge (HNWR), is operated by the U.S. Department of Interior, Bureau of Land Management (BLM). The closest National Weather Service station is at Needles Airport, approximately 6 miles northwest of the Station.

The average daily maximum temperature ranges from 63.8°F in January to 108.6°F in July. The average daily maximum temperature exceeds 100°F during June, July, August, and September, and the temperature rarely drops below freezing. Based on the 30-year period of 1961 to 1990, average precipitation was 4.67 inches per year in Needles. Between 1950 and 1990, the maximum annual rainfall was 9.6 inches. In a typical year, rain primarily occurs during summer thunderstorms from July through early September or during winter from January to March. May and June are typically the driest months.

The predominant wind direction in the site vicinity is south-southwest, with an average speed of 8.8 miles per hour. The second most predominant wind direction is north-northwest, with an average speed of 10.7 miles per hour. Wind direction and speed are more variable in the vicinity and are largely controlled by the local topography. PG&E personnel at the Station report the winds are predominantly to the southeast.

4.6.1.2 Surface Water

The following subsections discuss surface water at the Project Site, including flow conditions and water quality.

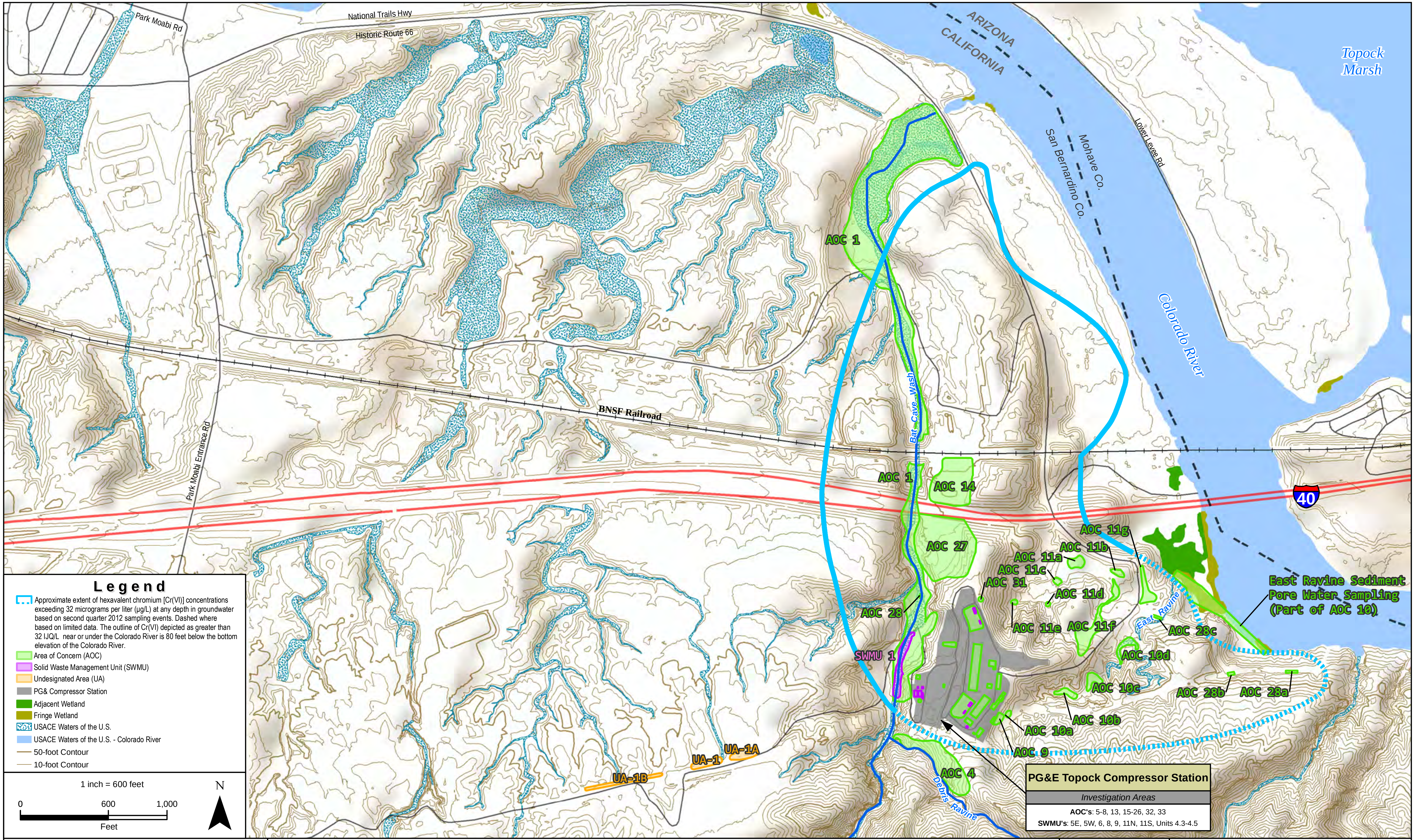
Surface Water Features

The Project Site is located in the East Colorado River Basin Planning Area of the Colorado River Basin California Regional Water Quality Control Board (RWQCB; RWQCB 2006). The East Colorado River Basin Planning Area is 200 miles long with a maximum width of 40 miles. It encompasses the eastern portion of San Bernardino, Riverside, and Imperial Counties and is bounded on the north by Nevada, on the east by the Colorado River (which generally forms the Arizona–California state line), on the south by Mexico, and on the west by the drainage division of the California streams and washes. The area is characterized by desert valleys and low mountains that are generally less than 4,000 feet above sea level.

In the Project vicinity, as well as in upstream areas, a floodplain borders both sides of the Colorado River, although, because of upstream dams and flow regulation, the river no longer floods. Topography on the floodplain is subtle, with elevations typically less than 40 feet above the river elevation. The width of the floodplain adjacent to the Project Site averages 500 feet and narrows south of the site as the river enters the Topock Gorge, where the shoreline becomes consolidated bedrock. Near the Project Site, the floodplains on both sides of the river are covered with sand dunes, which have been attributed to historical dredging activities. The Havasu National Wildlife Refuge and the 4,000-acre Topock Marsh are located across the river northeast of the Project Site.

The primary surface water features in the Project vicinity are the Colorado River, its adjacent wetlands and marshes, and ephemeral drainages[1], specifically, the Bat Cave Wash, Debris Ravine, and the East Ravine. These features are shown on **Figure 4.6-1**, along with the general locations of the Areas of Concern (AOCs), Solid Waste Management Units (SWMUs), and Undesignated Areas (UAs) where investigation activities are proposed. Figures 3-3 through 3-6 show closer views that include the proposed sampling investigation locations relative to Bay Cave Wash (Figures 3-3 and 3-5), the Debris Ravine, which drains northward into Bat Cave Wash (Figure 3-5), and the East Ravine (Figure 3-4).

[1] Ephemeral drainages or washes only flow during and shortly after rain events. Intermittent streams flow for part of the year.



Topock Soil Investigation
Project EIR
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Map Creation Date: 01/20/2014 Background Source: ESRI Terrain

Site Hydrology

Figure 4.6-1

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Surface Water Flow Conditions

Colorado River

The flow of the Colorado River is dynamic, fluctuating seasonally and daily largely because of upstream flow regulations. The flow of the river in the Project vicinity is controlled primarily by water releases at Davis Dam on Lake Mohave, approximately 41 miles upstream. River levels in the area fluctuate by 2 to 3 feet per day and by approximately 5 feet seasonally, with the higher water levels occurring in late spring to early summer. Daily average flows vary from 4,000 to 25,000 cubic feet per second, according to the dam releases.

The seasonal and daily fluctuations of the river level result in both losing stream conditions (surface water moves to a groundwater aquifer) and gaining stream conditions (groundwater moves to surface water). In general, the Colorado River is considered a losing stream throughout the northern and central Mohave Valley groundwater basin. This results in surface water from the river mixing with groundwater along the sides of the river. In the southern portion of the basin, near the Project Site, the Colorado River is generally considered a gaining stream. However, the groundwater extraction wells (that are part of Interim Measure 3 [IM-3] extraction system) located along the National Trails Highway (Route 66) from the railroad tracks north to near where Bat Cave Wash enters the Colorado River maintain losing stream conditions to prevent contaminated groundwater from entering the river. Water levels in Topock Marsh on the east side of the river are maintained slightly higher than the river at Topock by diverting river water at an upstream location near Needles and by controlling release from a downstream dike surrounding the marsh.

Ephemeral Drainages

The ephemeral drainages in the Project vicinity flow only briefly, following intense rainfall events, and all drain to the Colorado River. Figure 4.6-1 identifies the three main drainages in the Project vicinity.

Bat Cave Wash is a north-draining dry wash (ephemeral stream) with its upper reaches located immediately adjacent to the Station on the west. Bat Cave Wash drains northward to the Colorado River. This wash has been designated by the U.S. Army Corps of Engineers (USACE) as Waters of the U.S. (CH2M HILL 2005a). AOC 1 is located in this wash and the AOCs and SWMUs along the west side of the Station drain toward this wash.

The East Ravine is a dry wash network located east of the Station that drains northeast to the Colorado River. This wash has been designated by the USACE as Waters of the U.S. and drains into an area designated as a Fringe and Adjacent Wetlands along the Colorado River (CH2M HILL 2005a). AOCs 2, 10, 11, and 28 are located in and around this dry wash network.

The Debris Ravine is a northwest-draining dry wash located south of the Station that drains into Bat Cave Wash. This wash has not been designated by the USACE as Waters of the United States. AOC 4 is located in this wash area.

Surface Water Quality

Colorado River

The section of the Colorado River in the vicinity of the Project Site is not on the list of impaired water bodies required by Section 303(d) of the federal Clean Water Act and therefore does not have any established Total Maximum Daily Loads (TMDLs). The primary chemicals of potential concern (COPCs) for surface water related to the Station would be total chromium [Cr(T)] and hexavalent chromium [Cr(VI)]. Cr(VI) has only been confirmed in one sample out of over 700 samples collected from the river. As noted previously and discussed further in this document, the IM-3 extraction system prevents groundwater from entering the Colorado River.

Ephemeral Drainages

The primary potential source of surface water quality impact from Project activities is sediment or chemicals from contaminated soil that may be mobilized by stormwater runoff from SWMUs and AOCs. The California Department of Toxic Substances Control (DTSC) collected five stormwater samples from ephemeral drainages after a rain event on January 27, 2010, to evaluate the potential for contaminants in soil to affect groundwater and surface water (DTSC March 9, 2010, as cited in DTSC 2011, Table 4.7-2). Surface water sampling location (SW)-1 and SW-2 are located along the wetlands adjacent to the Colorado River in the East Ravine area. The other three samples were collected in AOCs 10c, 10d, and 11, also all located in the East Ravine. Cr(T) was detected in four of five samples at concentrations ranging from 0.58 to 12 micrograms per liter (ug/L). Molybdenum concentrations ranged from 1.0 to 5.6 ug/L. Selenium was detected in four of five samples at concentrations ranging from 1.7 to 3.4 ug/L.

4.6.1.3 Groundwater

The soil sampling activities proposed in the *Soil RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan* (Soil RFI/RI Work Plan or Soil Work Plan) (CH2M HILL 2013; Appendix A to this DEIR) do not include collecting groundwater samples. The maximum depth of drilling is 80 feet below ground surface in some borings and it is not anticipated that drilling will encounter groundwater. As described in Chapter 3, “Project Description,” while no studies are currently planned, a pilot study for evaluating in situ soil flushing as a remedial technology may be conducted in the future at a location in Bat Cave Wash. As a part of the pilot study, injection and recovery wells may be installed and groundwater samples may be collected for chemical analyses. The following information regarding groundwater provides an overview level of detail commensurate with the potential for impacts.

The Project Site lies at the southern end of the Needles Valley groundwater basin (DWR Basin 7-44; DWR 2003), which is bisected by the Colorado River. Groundwater in the Needles Valley basin occurs in the alluvial basin deposits (Wilson and Owen-Joyce 1994). The groundwater system in the Project vicinity has been described as a “river aquifer” (Wilson and Owen-Joyce 1994; Guay et al. 2006). The river aquifer consists of permeable and partly saturated sediments and sedimentary rocks that are hydraulically connected to the Colorado River, allowing water to move between the river and the aquifer in response to withdrawal of water from the aquifer or differences in water-level elevations between the river and the aquifer (Wilson and Owen-Joyce

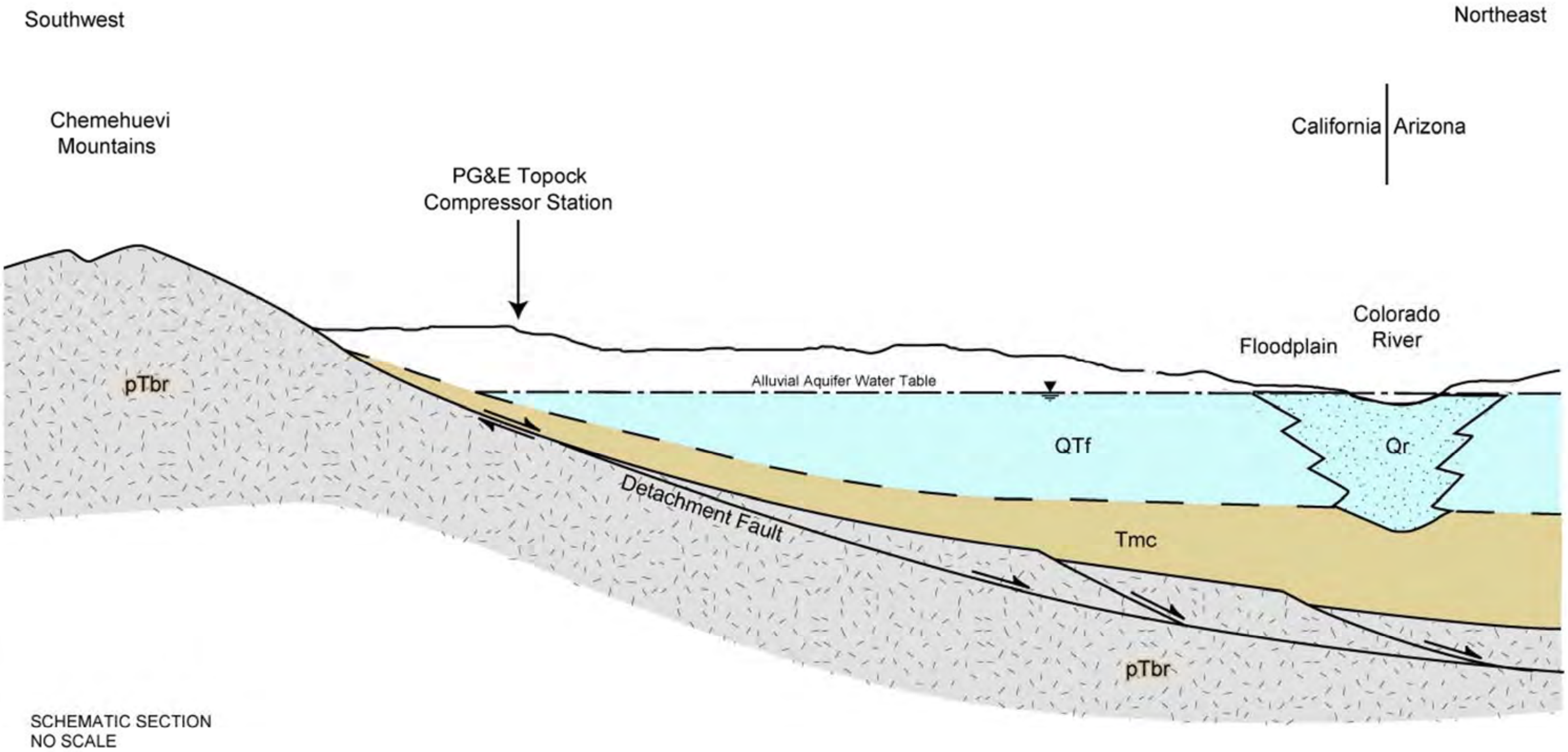
1994; Guay and Eastoe 2009). The boundaries of the river aquifer are the low-permeability bedrock that forms the bottom and sides of the basins that underlie the valley.

Groundwater occurs under both unconfined[2] and semiconfined[3] conditions in the alluvial fan and fluvial sediments, which make up the Alluvial Aquifer under the Project Site. Groundwater in the Alluvial Aquifer occurs at depths ranging from as shallow as 5 feet below ground surface (bgs) on the floodplain adjacent to the river to 170 feet bgs in the upland alluvial terrace areas under the Station (CH2M HILL 2009c:2-6). **Figure 4.6-2** presents a regional hydrogeologic cross-section that illustrates the relationship between the Alluvial Aquifer, groundwater, and bedrock. Groundwater flow in the Project vicinity is mainly in the Alluvial Aquifer. The overall regional direction of groundwater flow is eastward toward the river.

The COPCs in groundwater at the Project Site are Cr(VI) and Cr(T). The general extent of contaminated groundwater in the Alluvial Aquifer is shown on Figure 4.6-1 and encompasses an area of approximately 175 acres that includes groundwater under Bat Cave Wash, the Station, and the floodplain (CH2M HILL 2009c:2-11). This groundwater plume has been defined as groundwater that exceeds a Cr(VI) concentration of 31.8 (rounded to 32) µg/L, which has been established as the alluvial background concentration for the Project (CH2M HILL 2009c:2-10). Cr(VI) concentrations range from less than 0.2 µg/L to 15,700 µg/L within the plume boundaries, with the highest concentrations observed in the area of the Monitoring Well (MW)-20 bench (along the National Trails Highway about 500 feet north of the Burlington Northern Santa Fe Railway) and the Well MW-24 bench (about 500 feet north of the Station) (CH2M HILL 2009b: Table 2-4). Total dissolved solids (TDS) (as specific conductance), arsenic, molybdenum, selenium, and nitrate have been found in groundwater samples from the Project Site at concentrations exceeding regional background concentrations or maximum contaminant levels (MCLs). The highest concentrations are 157 ug/L for arsenic, 301 ug/L for molybdenum, and 155 ug/L for selenium (CH2M HILL 2009a: Table 6-8).

2 An unconfined aquifer is underlain by an impermeable stratum, but the top of the aquifer consists of soil layers that are permeable enough to provide easy passage of water, at least in the vertical sense. Such an aquifer has a free water table surface.

3 A semiconfined aquifer is an aquifer underlain by an impermeable stratum and bounded at the top by soil layers of relatively low permeability.



PRIMARY GEOLOGIC UNITS

QTf	Alluvial Fan Deposits (Qoa, Toa units)	Alluvial Aquifer
Qr	Colorado River Fluvial Deposits (Qr0, Qrl, Qr2, Qr3 units)	Alluvial Aquifer
Tmc	Miocene Conglomerate	Bedrock
pTbr	Metamorphic and Igneous Rocks	Bedrock

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Topock Soils Study Project EIR
Source: CH2M Hill 2009a: Figure 3-9
Creation Date: 01/17/2014

Regional Hydrogeologic Cross Section

Figure 4.6-2

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4.6.2 Regulatory Background

As described in Section 2.3, the various on-site response and corrective actions required to investigate and clean up contamination are exempt from obtaining federal, state, and local permits pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121(e)(1). This does not, however, remove the requirement to meet the substantive provisions of applicable laws.

4.6.2.1 Federal

Federal Clean Water Act

In accordance with the CERCLA exemption, PG&E would not be required to apply for or obtain Clean Water Act (CWA) permits as long as the Project actions are implemented in compliance with the substantive elements of the guiding principles associated with Sections 401 and 404 of the CWA, described below.

The CWA (33 USC 1251-1376) is the major federal legislation governing water quality. The CWA established the basic structure for regulating discharges of pollutants into the waters of the U.S. and gave the U.S. Environmental Protection Agency the authority to implement pollution control programs such as setting wastewater standards for industry. The CWA sets water quality standards for all contaminants in surface waters. Sections 401 and 404 provide for water quality standards, criteria, and guidelines. The statute employs a variety of regulatory and nonregulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. The USACE has jurisdiction over all waters of the U.S. including, but not limited to, perennial and intermittent streams, lakes, and ponds, as well as wetlands in marshes, wet meadows, and side hill seeps.

Executive Order 11988

Under Executive Order 11988 – Floodplain Management, the Federal Emergency Management Agency (FEMA) is responsible for management of floodplain areas defined as the lowland and relatively flat areas adjoining inland and coastal waters subject to a one percent or greater chance of flooding in any given year (the 100-year floodplain). FEMA requires that local governments covered by federal flood insurance pass and enforce a floodplain management ordinance that specifies minimum requirements for any construction within the 100-year floodplain. The Order addresses floodplain issues related to public safety, conservation, and economics. It generally requires federal agencies constructing, permitting, or funding a project in a floodplain to:

- Avoid incompatible floodplain development
- Be consistent with the standards and criteria of the National Flood Insurance Program
- Restore and preserve natural and beneficial floodplain values

Executive Order 11990

Under Executive Order 11990 – Protection of Wetlands, federal agencies are required to follow avoidance, mitigation, and preservation procedures, with public input, before proposing new construction in wetlands. It generally requires:

- Avoidance of wetlands
- Minimization of activities in wetlands
- Coordination with the USACE and Section 404 of the CWA regarding wetlands mitigation

4.6.2.2 State of California

SWRCB Resolution No. 68-16 – State Nondegradation Policy

The State Water Resources Control Board (SWRCB) has broad authority over discharges to waters of the state. In 1968, the SWRCB adopted a nondegradation policy aimed at maintaining the high quality of waters in California through the issuance of Resolution No. 68-16 ("Statement of Policy with Respect to Maintaining High Quality Waters in California"), whereby actions that tend to degrade the quality of water are prohibited. Oversight of this policy is done through the RWQCBs. The nondegradation policy states that:

- Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the state that any change will be consistent with maximum benefit to the people of the state, will not unreasonably affect present and anticipated beneficial use of such water, and will not result in water quality less than that prescribed in the policies.
- Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters must meet waste discharge requirements, which will result in the best practicable treatment or control of the discharge necessary to ensure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the state will be maintained.

SWRCB has interpreted Resolution No. 68-16 to incorporate the federal antidegradation policy, which is applicable if a discharge that began after November 28, 1975, will lower existing surface water quality.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) provides the basis for water quality regulation within California and defines water quality objectives as the limits or levels of water constituents that are established for reasonable protection of beneficial uses. The SWRCB administers water rights, water pollution control, and water quality functions throughout the state, while the Colorado River Basin RWQCB conducts planning, permitting, and enforcement activities. The Porter-Cologne Act requires the RWQCB to establish a regional basin plan with water quality objectives, while acknowledging that water quality may be changed to some degree without unreasonably affecting beneficial uses. Beneficial uses, together with the corresponding water quality objectives, are defined as standards, per federal regulations. Therefore, the regional basin plans form the regulatory references for meeting state and federal requirements for water quality control. Changes in water quality are allowed if the change is consistent with the maximum beneficial use of the state, does not unreasonably affect the present or anticipated beneficial uses, and does not result in water quality less than that prescribed in the water quality control plans. The basin plan for this location is discussed below.

Water Quality Control Plan for the Colorado River Basin

The Colorado River Basin RWQCB, under the authority of the state Porter-Cologne Water Quality Control Act and pursuant to the CWA, is responsible for authorizing and regulating activities that may discharge wastes to surface water or groundwater resources. The preparation and adoption of water quality control plans (Basin Plans) are required by the California Water Code (Section 13240). According to Section 13050 of the California Water Code, Basin Plans consist of a designation or establishment for the waters within a specified area of beneficial uses to be protected, water quality objectives to protect those uses, and a program of implementation needed for achieving the objectives. Because beneficial uses, together with their corresponding water quality objectives, can be defined per federal regulations as water quality standards, the Basin Plans are regulatory references for meeting the state and federal requirements for water quality control.

The Basin Plan for the Colorado River Basin, originally adopted by the Colorado River Basin RWQCB in 1993 and last amended in June 2006, identifies the beneficial uses of water bodies and provides water quality objectives and standards for waters of the Colorado River Basin. The beneficial uses for each type of water body in the Basin are:

- Surface Waters of the Colorado River – municipal and domestic water supply, agricultural supply, aquaculture, industrial service supply, groundwater recharge, contact and noncontact water recreation, warm and cold freshwater habitats, hydropower generation, and preservation and enhancement of rare, threatened, or endangered species
- Washes (ephemeral streams) – potential[4] municipal and domestic, groundwater recharge, contact and noncontact water recreation, warm freshwater habitats, and preservation and enhancement of rare, threatened, or endangered species
- Groundwater in the East Colorado Basin, Piute Hydrologic Unit (713.00) – municipal and domestic water supply, industrial service supply, and agricultural supply

The Colorado River Basin Plan identifies specific narrative and numeric water quality objectives for a number of physical properties (e.g., temperature, turbidity, and suspended solids), biological constituents, and COPCs, including inorganic parameters, trace metals, and organic compounds.

[4] Potential use designation will be determined on a case-by-case basis as necessary in accordance with the "Sources of Drinking Water Policy" in the Basin Plan.

Water quality objectives for toxic priority pollutants (i.e., select trace metals and synthetic organic compounds) are also identified in the Basin Plan.

Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65)

In 1986, California voters approved an initiative to address their growing concerns about exposure to toxic chemicals. That initiative became the Safe Drinking Water and Toxic Enforcement Act of 1986, better known by its original name of Proposition 65. Proposition 65 requires the state to publish a list of chemicals known to cause cancer or birth defects or other reproductive harm. This list, which must be updated at least once a year, has grown to include approximately 800 chemicals since it was first published in 1987.

Proposition 65 requires businesses to notify Californians about significant amounts of chemicals in the products they purchase, in their homes or workplaces, or that are released into the environment. By providing this information, Proposition 65 enables Californians to make informed decisions about protecting themselves from exposure to these chemicals. Proposition 65 also prohibits California businesses from knowingly discharging significant amounts of listed chemicals into sources of drinking water. The following section is relevant to this Project because the Colorado River is a source of drinking water.

> <u>Section 25249.5. Prohibition On Contaminating Drinking Water With Chemicals Known to Cause Cancer or Reproductive Toxicity</u>. No person in the course of doing business shall knowingly discharge or release a chemical known to the state to cause cancer or reproductive toxicity into water or onto or into land where such chemical passes or probably will pass into any source of drinking water, notwithstanding any other provision or authorization of law except as provided in Section 25249.9.

NPDES Construction General Permit

In accordance with the CERCLA exemption (see Section 2.3), PG&E would not be required to submit a Notice of Intent or a Stormwater Pollution Prevention Plan (SWPPP) to the RWQCB for their review and approval to comply with the requirement of the state Construction General Permit (CGP). This does not, however, remove the requirement to meet the substantive provisions of applicable laws. Therefore, as part of the Project, PG&E will develop and implement an erosion control plan that is in conformance with the substantive requirements of the CGP. Because the erosion control plan will fulfill the requirements of the CGP, it will have substantive components similar to those that would be included in an SWPPP. The general CGP requirements are summarized below.

The RWQCB administers the National Pollutant Discharge Elimination System (NPDES) stormwater permitting program in the Colorado River Basin region. Construction activities disturbing one acre or more of land are subject to the permitting requirements of the NPDES Construction General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (Construction General Permit [CGP]; Order 2009-0009-DWQ; NPDES No. CAS000002). Project activities such as clearing, grading, stockpiling, and excavation would be subject to the statewide general construction activity NPDES permit.

The CGP requires that the site be assigned a risk level of 1 (low), 2 (medium), or 3 (high) based on sediment and receiving waters risk. The sediment risk level is the relative amount of sediment that can be discharged given the project and location details. The receiving waters risk level reflects the risk sediment discharges pose to the receiving waters. A construction analysis provides a preliminary risk level assessment.

For non-exempt projects, the CGP requires the preparation and implementation of a SWPPP prior to construction commencement. At a minimum, the SWPPP includes the following:

- Description of construction materials, practices, and equipment storage maintenance
- List of pollutants likely to contact stormwater and site specific erosion and sedimentation control practices
- List of provisions to eliminate or reduce discharge of materials to stormwater
- BMPs for fuel and equipment storage
- Non-stormwater management measures such as installing specific discharge controls during activities such as paving operations and vehicle and equipment washing and fueling
- Equipment, materials, and workers will be available for rapid response to spills and/or emergencies. All corrective maintenance or BMPs will be performed as soon as possible, depending upon worker safety

An SWPPP provides specific construction-related BMPs to prevent soil erosion and loss of topsoil. BMPs implemented could include, but would not be limited to, physical barriers to prevent erosion and sedimentation, construction of sedimentation basins, limitations on work periods during storm events, use of swales, protection of stockpiled materials, and a variety of other measures that would substantially reduce or prevent erosion from occurring during construction. Post-construction requirements require that construction sites match pre-project hydrology to ensure that the physical and biological integrity of aquatic ecosystems are sustained in their existing condition, unless the site is located within an area subject to the post-construction standards of an active Phase I or II municipal separate storm sewer system (MS4) permit that has an approved stormwater management plan. This Project Site is not within a MS4 area. The post-construction standards (post-investigation standards for the purposes of the proposed Project) include structural and nonstructural control measures to replicate the pre-project water balance and pre-project drainage density, and reduce pollutants in storm water discharges.

California Water Code

Section 13801(c), California Well Standards, Bulletin 74-90 (Supplement to Bulletin 74-81) sets forth minimum standards for the construction of water supply, cathodic, and monitoring wells. These standards include the destruction of exploratory boreholes.

Law of the River (Colorado River Allocations)

The Colorado River is the most important waterway in the region. The river supplies water for use within the region and elsewhere. Apportionment of water available for diversion from the River is made in accordance with a number of documents collectively referred to as the Law of the River. These include interstate compacts, federal legislation, water delivery contracts, state legislation, a treaty with Mexico, U.S. Supreme Court decrees, and federal administrative actions. Presently, California is receiving waters unused by other states. The 2003 Quantification Settlement Agreements created California's "soft landing" by reducing California's Colorado River water usage from 5.2 million acre-feet per year (AFY) to 4.4 million AFY in a normal year over 15 years through the conservation and transfer of water from agricultural to urban uses in San Diego County Water Authority's, Metropolitan's, and Coachella Valley Water District's jurisdictions, through quantifying the agencies' priority water rights to the River and allocating water in times of shortage. This effort was called the "Interim Surplus Guidelines." PG&E's existing contracted entitlement is 422 acre-feet annually (DTSC 2011).

4.6.2.3 Local

County of San Bernardino Department of Public Health

The San Bernardino County Department of Public Health, Division of Environmental Health Services (EHS) is responsible for issuing permits for the installation of soil borings, vapor monitoring wells, and groundwater wells in San Bernardino County. EHS personnel are responsible for inspecting boring and well installations for conformance with state and local well standards. Soil borings deeper than 25 feet are required to be permitted under Program Element 4555 (San Bernardino County 2013).

4.6.3 Environmental Impacts

4.6.3.1 Impact Methodology

The potential impacts to hydrology and water quality were evaluated by assessing the proposed access, soil investigation, and restoration activities for the Project, as described in the Project Description (Chapter 3), the Soil Work Plan (CH2M HILL 2013; Appendix A to this DEIR), and the *Corrective Measures/Feasibility Study Work Plan* (CM/FS Work Plan) (CH2M HILL 2008). The Soil Work Plan describes and references Standard Operating Procedures (SOPs) and BMPs that have been developed during the previous investigations to reduce potential impacts to hydrology and water quality. The CM/FS Work Plan and this DEIR also describe the bench scale tests and pilot studies to be conducted to evaluate various treatment technologies.

The Soil Work Plan describes and references SOPs and BMPs that have been developed during the previous investigations. Among other things, the SOPs and BMPs will reduce potential impacts to hydrology and water quality during the soil investigation activities. The proposed Project will follow the SOPs in the *Topock Program Sampling, Analysis, and Field Procedures Manual, PG&E Topock Compressor Station, Needles, California* (CH2M HILL 2005b), which are included as Appendix G of the Work Plan. Section 2.2 of the Work Plan describes the BMPs that have been developed as part of the Project. These provisions are also described in the Project

Description, Section 3.5.7, and will be implemented as part of the proposed Project. These provisions apply to all Project activities including soil sampling, bench scale tests, pilot studies, geotechnical evaluations, and plant or other biota sampling. Accordingly, the impact analysis for hydrology and water quality takes into consideration the full implementation of the SOPs and BMPs. In addition, PG&E will meet the substantive provisions of the state CGP in accordance with the CERCLA exemption (see Section 2.3), and prepare and implement an erosion control plan as part of the Project. To ensure the implementation of the SOP, BMP, and erosion control plan provisions, DTSC will include them as Conditions of Approval for the Project if the Project is approved.

4.6.3.2 Thresholds of Significance

Based on the California Environmental Quality Act (CEQA) Guidelines, Appendix G, a project may be deemed to have a significant effect on the environment with respect to hydrology and water quality if it would:

- Violate any water quality standards or waste discharge requirements;
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site;
- Create or contribute runoff water, which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- Otherwise substantially degrade water quality;
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows;
- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- Result in inundation by seiche, tsunami, or mudflow.

Based on the location and characteristics of the proposed Project, the following criteria are not considered in the impact analyses for the reasons described below.

- The Project does not include the on-site treatment or discharge of waste water. Therefore, the Project would not exceed Waste Discharge Requirements and this impact is not discussed further.

- The Project does not include the construction of housing, thus the proposed Project would not place housing within a 100-year flood hazard area. Therefore, the Project would not place housing within a 100-year flood hazard area and this impact is not discussed further.

- The proposed Project would not involve construction of any structures within a 100-year flood hazard area, and would therefore not impede or redirect flood flows. The Project includes the minor improvement of existing roads to enhance access but would use localized runoff management BMPs, if needed, to handle on-site flows, and would not result in changes to surface water flow patterns. Therefore, the Project would not impede or redirect flood flows and this impact is not discussed further.

- The proposed Project would not expose people or structures to a significant risk involving flooding as a result of the failure of a levee or dam. The closest upstream dams to the Project Site are the Davis Dam and Hoover Dam, located approximately 55 and 108 miles upstream of the Project Site, respectively. The Hazards Overlay Map of the County General Plan indicates that the Project Site is not in an area that would be subject to inundation from failure of either dam. Therefore, the Project would not result in inundation caused by dam failure and this impact is not discussed further.

- The proposed Project would not result in inundation by seiche, tsunami, or mudflow. Seiches are waves in a semi-enclosed or enclosed body of water such as a lake, reservoir, or harbor. There are no enclosed water bodies within the Project Site and the nearest active fault that could generate a seismic event is 93.5 miles away from the Project Site. Tsunamis are waves caused by an underwater earthquake, landslide, or volcanic eruption. The Project Site is located in an inland area that is not susceptible to tsunamis, which generally occur in the ocean and affect areas along the shoreline and for a small distance inland. Mudflows generally result from volcanic activity, catastrophic dam failure, or a large volume precipitation event on saturated soil. The Project is not located in an area of volcanic activity. As discussed above, the Project Site is not in an area that would be subject to inundation from failure of either dam. The minimal amount of rain received at the site is not favorable to the generation of a mudflow. Therefore, no impact would occur related to inundation caused by seiche, tsunami, or mudflow and this impact is not discussed further.

4.6.3.3 Impact Analysis

The proposed Project consists of the collection of soil and pore water samples at 292 locations using drilling rigs, hydrovac trucks, excavators, support trucks, and hand tools. Further, due to unforeseen circumstances or data gaps, additional samples/sampling locations may be necessary.

As part of this draft environmental impact report (DEIR), therefore, a contingency of up to 25 percent additional sampling locations (i.e., up to 73 additional locations) is included in the DEIR evaluation. In addition, bench scale tests, pilot studies, geotechnical evaluations, and plant or other biota sampling may be conducted to support the evaluation of possible treatment technologies. Bench scale tests would involve the collection of small volumes of contaminated soil (three to five 5-gallon buckets for off-site testing. The in situ soil flushing pilot study, if conducted, would involve grading a small depression to create an infiltration gallery that is 35 foot by 115 foot in size. Alternately, infiltration could be accomplished with injection wells. The in situ stabilization/fixation pilot study, if conducted, would involve the addition of a stabilization agent to soil known to be contaminated through the same delivery system as described for soil flushing (see Section 3.5.3.2 for a list of reagents that may be used; these agents bind to contaminated soil minimizing the potential for contaminants to be released to the environment). The soil would then be sampled to evaluate the effectiveness of the stabilization agent. Access to investigation sites would be predominantly on existing roadways. Some areas would require minor improvement of existing roadways, and/or the trimming, pruning, or clearing of some vegetation to provide access.

After sampling is complete, up to five boreholes would be converted to soil vapor probes. The remaining boreholes would be decommissioned by grouting the boreholes from the bottom up to the ground surface with cement grout. Hydrovac potholes would be sealed with bentonite chips and the surface restored to the previous condition (asphalt, concrete, or covered with soil from the Project Site). Potholes and trenches excavated by an excavator or hand tools would be backfilled with the excavated soil cuttings and the surface restored to the previous condition (asphalt, concrete, or soil). Decontamination of sampling equipment would use existing staging areas within the Station as described in greater detail below. To the extent feasible, staging areas will be located in previously disturbed and existing operational areas, thus eliminating the need for the construction of any new staging areas on undisturbed land. Any decontamination water would be collected on a decontamination pad lined with plastic sheeting and collected into covered portable storage tanks within secondary containment.

Water Quality

Grading and Site Preparation Activities

The proposed soil investigation activities would require the use of a sonic drilling rig, hydrovac truck, or excavator, depending on access and depth considerations, to collect soil and pore water samples for analysis. Activities may also include preparing a surface depression, infiltration gallery, or injection and recovery wells for the in situ pilot studies (35-foot by 115-foot area). Minor improvements to existing roads would be required to access some of the investigation locations. Investigation locations may also require minor grading and disturbance of soil to facilitate sampling equipment. These ground disturbance activities could disturb soil such that rain events could result in the discharge of sediments to drainages and eventually to the Colorado River degrading water quality. To reach the desired sample depth intervals, the sampling process would generate waste soil from drilling, hydrovacing, and excavation activities. Some of the sample intervals could contain soil with chemicals at elevated concentrations. If improperly managed and disposed of, chemicals from the waste soil could be released to the environment or mobilized by stormwater runoff and enter drainages and the Colorado River at concentrations exceeding water quality standards. As discussed in Section 4.5, "Hazards and Hazardous Materials," action levels have been established for various chemicals that would prohibit their release into the environment. In addition, if improperly managed, sediments from the waste soil could be mobilized by stormwater runoff and could deliver sediment-laden runoff to drainages and the Colorado River degrading water quality. Discharge of excess chemical pollutants or sediment from Project activities could exceed sediment discharge objectives or chemical action levels or violate water quality standards prescribed for the Colorado River in the Colorado River Basin Regional Water Quality Control Basin Plan.

The improvement of existing roads and previously disturbed staging areas, and the preparation of investigation locations and/or the in situ pilot study would result in the collective disturbance of more than one acre of land. In addition, some of the investigation locations are within or adjacent to areas designated as Waters of the U.S. Any impacts within or adjacent to Waters of the U.S. would not require the acquisition of permits under Section 401 or 404 of the CWA as the Project activities fall under the CERCLA Section 121(e)(1) permit exemption (see Section 2.3). As described previously however, PG&E will develop and implement an erosion control plan as part of the Project (see Section 3.5.7). The erosion control plan would be in conformance with the substantive requirements of the CGP and would therefore be similar to an SWPPP.

The plan, moreover, would be prepared by a Qualified SWPPP Developer and would be under the direction of a Qualified SWPPP Practitioner. The provisions in the erosion control plan will be required as Conditions of Approval for the Project if the Project is approved.

As a part of the grading and site preparation elements of the Project, PG&E will implement and conduct the following actions:

- Complete of a CGP Risk Assessment to determine pollution prevention requirements pursuant to the three Risk Levels as established in the CGP and relevant for the proposed Project.
- Eliminate or reduce non-stormwater discharges to Waters of the United States.
- Prepare and implement an erosion control plan, which would include, but not be limited to the following BMPs developed by the California Stormwater Quality Association (CASQA 2011):
    - Scheduling (SS-1): Proper scheduling assists in identifying ways to minimize disturbed areas, which allows for a reduction in the active project area requiring protection and also minimizes the length of time disturbed soils are exposed to erosive processes. This would include limitations on construction work during storm events.
    - Preservation of Existing Vegetation (SS-2): Preserving existing vegetation to the maximum extent practicable facilitates protection of surfaces from erosion and can also help to control sediments. Sensitive areas should also be clearly identified and protected.

  - Hydraulic Mulch (SS-3), Straw Mulch (SS-6), and Wood Mulching (SS-8): Using various mulches is a method for temporarily stabilizing soil and can be used on surfaces with little or no slope.
  - Geotextiles, Plastic Covers, and Erosion Control Blankets/Mats (SS-7): These erosion-control methods can be used on flat or, usually, sloped surfaces, channels, and stockpiles.
  - Stabilized Construction Entrance/Exit (TC-1): A graveled area or pad located at points where vehicles enter and leave a construction site can be built. This BMP provides a buffer area where vehicles can drop their mud and sediment to avoid transporting it onto public roads, to control erosion from surface runoff, and to help control dust.
  - Silt Fence (SC-1): A temporary sediment barrier consisting of fabric is designed to retain sediment from small disturbed areas by reducing the velocity of sheet flows.
  - Gravel Bag Berm (SC-6) and Sand/Gravel Bag Barrier (SC-8): A temporary sediment barrier consisting of gravel-filled fabric bags is designed to retain sediment from small disturbed areas by reducing the velocity of sheet flows.
- Secondary concerns include potential pollutants from inappropriate material storage and handling procedures and non-stormwater discharges. These will be addressed through the following types of BMPs, which will be included in the erosion control plan:
  - Material Delivery and Storage (WM-1): Provide covered storage for materials, especially toxic or hazardous materials, to prevent exposure to stormwater. Store and transfer toxic or hazardous materials on impervious surfaces that will provide secondary containment for spills. Park vehicles and equipment used for material delivery and storage, as well as contractor vehicles, in designated areas.
  - Spill Prevention and Control (WM-4): Ensure that spills and releases of materials are cleaned up immediately and thoroughly. Ensure that appropriate spill-response equipment, preferably spill kits preloaded with absorbents in an overpack drum, is provided at convenient locations throughout the site. Spent absorbent material must be managed and disposed of in accordance with applicable regulations. In particular, absorbents used to clean spills of hazardous materials or waste must be managed as hazardous waste unless characterized as nonhazardous.
  - Spill Prevention, Control, and Cleanup (SC-11): Store materials properly to prevent spills from entering the storm drain system or surface waters. Ensure that spill cleanup materials are located on-site and are easily accessible. Clean up leaks and spills immediately using proper absorbent materials. Absorbents used to clean up hazardous materials must be disposed of as hazardous waste. Educate employees about spill prevention and cleanup.
  - Vehicle and Equipment Fueling (SC-20): Maintain clean fuel-dispensing areas using dry cleanup methods, such as sweeping or using rags and absorbents for leaks and spills. Cover the fueling area to prevent contact with stormwater. Train personnel in pollution prevention, focusing on containment of spills and leaks.

- Outdoor Loading/Unloading (SC-30): Load and unload chemicals during dry weather, if possible, and load and unload in designated areas. Check equipment regularly for leaks.
- Solid Waste Management (WM-5): Provide a sufficient number of conveniently located trash and scrap receptacles to promote proper disposal of solid wastes. Ensure that the receptacles are provided with lids or covers to prevent windblown litter.
- Hazardous Waste Management (WM-6): Provide a sufficient number of proper receptacles to promote proper disposal of hazardous wastes.
- Concrete Waste Management (WM-8): Dispose of excess concrete in specific concrete washout facilities.
- Sanitary/Septic Waste Management (WM-9): Locate sanitary and septic waste facilities away from drainage courses and traffic areas. Maintain the facilities regularly.
- Vehicle and Equipment Cleaning (NS-8): Clean vehicles and equipment that regularly enter and leave the construction site.
- Vehicle and Equipment Fueling (NS-9): Fuel vehicles and equipment off-site whenever possible. If off-site fueling is not practical, establish a designated on-site fueling area with proper containment and spill cleanup materials.
- Vehicle and Equipment Maintenance (NS-10): Use off-site maintenance facilities whenever possible. Any on-site maintenance areas must be protected from stormwater runoff and on-site flooding.

Adherence to the identified SOPs and BMPs would substantially reduce or prevent Project-related activities from causing existing waterborne pollutants and contaminated sediments from entering drainages, per Colorado River Basin RWQCB standards. The provisions would protect water quality during grading and sampling activities and ensure that the proposed Project would not result in water quality degradation or violation of a water quality standard during all investigation activities.

Some sample locations in AOC 10 along the shoreline of the Colorado River would be sampled for sediment and pore water. Boats would be used to access some of these locations (e.g., the East Ravine Sediment and Pore Water [ERPW] sampling locations -2, -4, and -9) and, in these locations, only hand tools would be used to collect samples. Planks would be placed on vegetation and shoreline soil to facilitate access and further minimize ground disturbance. This access method would minimize ground disturbance and reduce the mobilization of sediment.

Grading and Project Site preparation would involve implementation of the SOPs and BMPs discussed above, as well as adherence to the substantive provisions of applicable local, state, and federal laws.

Management of Waste Soil from Investigation Activities

As part of the Project, the Soil Work Plan provides SOPs and BMPs to manage waste soil generated from drilling and excavating activities. Displaced soil will be handled in accordance to the *Management Protocol for Handling and Disposition of Displaced Site Material, Topock Remediation Project, Needles, CA* provided in Appendix J of the Soil Work Plan (CH2M HILL 2013; Appendix A to this DEIR). The Appendix presents specific displaced soil and hazardous waste management procedures that would be implemented for the Project. The waste soil will be stored in U.S. Department of Transportation-compliant drums or lined, steel roll-off soil bins that would be temporarily staged in previously used staging areas to the extent practicable. The number and size of drums and roll-off bins would vary depending on how many borings are installed, the drilling method used, and how quickly investigation activities are required to proceed. Standard practices, such as use of plastic sheeting over the ground surface, would be employed in the drilling and staging areas as necessary to keep the drilling materials and equipment clean and to minimize contact of the drilling materials and equipment with the ground surface.

Soil analytical results would be used to identify appropriate management of waste soil. All soil and other investigation-derived waste (IDW) would be handled, transported, and disposed of in accordance with applicable local, state, and federal laws. Displaced soil would be analyzed and characterized as either RCRA or non-RCRA hazardous waste, nonhazardous clean soil (unregulated) or nonhazardous soil for long-term storage (also unregulated). After sampling and characterization, the drums or bins with hazardous soil cuttings would be removed within 90 days of generation from the IDW staging area and transported for disposal in a permitted off-site hazardous waste disposal facility. Unregulated soil would be stockpiled at designated soil storage areas, in accordance with Appendix J, Attachment 1, of the Soil Work Plan, which describes the protocols, such as planning (including Native American Tribal input), short-term and long-term handling and storage procedures, contamination assessment, and determination of final disposition.

Decontamination of the sampling tools would be conducted on a temporary decontamination pad lined with plastic sheeting located on PG&E property at specific locations to be determined. Heavy equipment such as drill rigs and drill rods will be decontaminated at the concrete-lined decontamination pad located adjacent to the Station’s access road. Water generated during decontamination activities would be stored temporarily in drums, bins, or portable storage tanks. These tanks would be located temporarily at the drilling sites and/or at the existing IDW staging areas developed during previous investigations. Samples of the decontamination water would be analyzed and the results would be used to identify the appropriate disposal of the decontamination water. After characterization, water generated from decontamination activities would likely be processed on-site at the existing IM-3 treatment facility and re-injected into the aquifer, or trucked off-site for disposal. Prior to treatment of water at IM-3 treatment facility, the water will be tested to determine whether it contains contaminants (i.e., organics) that the IM-3 is not designed to treat. If the water contains contaminants that the IM-3 will not treat, then it will be disposed of off-site at an appropriate facility.

IMPACT HYDRO-1 **Exceedance of Water Quality Standards.** *Implementation of the proposed Project could result in the exceedance of water quality standards or otherwise substantially degrade water quality as a result of releasing contaminants or sediment from waste soil into the environment. This impact would be* ***less than significant****. No mitigation would be required.*

Groundwater

Because the Project does not include the construction of impervious surfaces that would impede surface water infiltration into the subsurface, the Project will not impact the recharge of groundwater. The Project does include the decontamination of sampling equipment to prevent cross-contamination of samples for analyses and potential release of contaminants to the environment. The decontamination water would be trucked from the existing water tanks at the Station.

Water at the Station is supplied by wells located on the Arizona side of the Colorado River. Water use at the Station varies tremendously by season. The majority of the water is used by the cooling towers, and much higher demand occurs in the summer. The amount of water potentially used by drilling activities is minimal compared to the amount of water used by the Station. The decontamination of sampling equipment for all of the sample locations is estimated to use a combined total of about 2,000 gallons plus an additional 500 gallons for contingency sampling over the life of the Project. Many of the sample locations would use hand tools or excavation equipment that would require little water for decontamination. The sample locations accessed by sonic drilling would use relatively more. This volume of water use would be spread out over several months, depending on the rate or drilling, excavation, and sampling. In addition, between 700,000 to 1,000,000 total gallons of water would be needed for the in situ soil flushing pilot test, and an additional 200,000 gallons for the in situ stabilization/fixation pilot study for a total of up to 1,200,000 total gallons. This water would be sourced from the Station water supply via a temporary 1-inch-diameter rolled high-density polyethylene (HDPE) tubing that will run above ground.

As discussed in the Regulatory Background, PG&E’s existing Lower Colorado River Water Supply Project contracted entitlement is 422 AFY. The Station typically uses about 70 to 100 AFY. The IM-3 groundwater treatment facility has a net consumptive use of about 10 to 20 AFY. The pilot studies, if conducted, would use between 2.2 AF and 3.1 AF total for the soil flushing pilot study and 0.6 AF total for the in-situ fixation/stabilization pilot study. The collective volume of water used for sampling equipment decontamination activities would be less than one acre foot per year, leaving the total volume of groundwater use (up to approximately 100 AFY) well below the Station’s entitlement of 422 AFY.

IMPACT HYDRO-2 **Substantially Deplete Groundwater Supplies or Interfere Substantially with Groundwater Recharge.** *The proposed soil investigation activities would use water from the Station water supply system. The source of this water is from groundwater. The use of this water could deplete groundwater supplies; however the estimated volume of water use would be within the Station's allotment. This impact would be* ***less than significant****. No mitigation would be required.*

Drainage, Runoff, and Erosion

Minor improvement of existing roads would be required to access some of the sampling and pilot study locations. The sampling and pilot study locations themselves may require minor grading and disturbance of soil to facilitate access for sampling equipment. The in situ soil flushing and/or soil fixation/stabilization pilot studies would require excavation of an area up to 35 feet by 155 feet in size, one potentially located in the bottom of Bat Cave Wash. These grading and ground disturbance activities could disturb soil and alter drainage patterns such that rain events could result in the discharge of polluted runoff to drainages and eventually to the Colorado River. These grading and ground disturbance activities could alter drainage patterns of localized areas such that rain events could exceed the capacity of existing or planned stormwater drainage systems. The alteration of drainage patterns could also increase the potential for on-site or off-site flooding.

PG&E will implement SOPs and BMPs, as described above, which will be required as Conditions of Approval for the Project if the Project is approved. Additional Project-specific BMPs would also be determined during development of the erosion control plan. Adherence to the substantive provisions of federal and state regulations for stormwater quality would also reduce the potential impacts from erosion, runoff, or drainage pattern alteration to ensure less than significant impacts from the Project.

IMPACT HYDRO-3 **Increased Erosion, Runoff, or Drainage Pattern Alterations.** *Access improvement and site preparation associated with implementation of the proposed Project could disturb surface soil, underlying soil, runoff water, or existing drainage patterns, which could increase erosion, siltation, surface runoff, or flooding. This impact would be* ***less than significant****. No mitigation would be required.*

4.7 Noise

This section provides an overview of the existing noise environment at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Soil Investigation Project (Project) Site and surrounding area, the regulatory framework, an analysis of potential noise and vibration impacts that would result from implementation of the Project, and mitigation measures to address significant impacts.

4.7.1 Existing Setting

4.7.1.1 Acoustic Fundamentals

Noise is defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) that is measured in decibels (dB), which is the standard unit of sound amplitude measurement. The dB scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound, with zero dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A-weighted noise levels are shown in **Figure 4.7-1**.

4.7.1.2 Noise Exposure and Community Noise

An individual's noise exposure is a measure of noise over a period of time. A noise level is a measure of noise at a given instant in time. The noise levels presented in Figure 4.7-1 are representative of measured noise at a given instant in time; however, they rarely persist consistently over a long period of time. Rather, community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes

COMMON OUTDOOR ACTIVITIES	NOISE LEVEL (dBA)	COMMON INDOOR ACTIVITIES
	110	Rock band
Jet flyover at 1,000 feet		
	100	
Gas lawnmower at 3 feet		
	90	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80	
Noisy urban area, daytime		
Gas lawnmower at 100 feet	70	Garbage disposal at 3 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60	
		Large business office
Quiet urban daytime	50	Dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime		
	30	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
	10	
	0	

SOURCE: Caltrans 2009

Figure 4.7-1
Typical Noise Levels

throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and changes in atmospheric conditions. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short-duration single-event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.

These successive additions of sound to the community noise environment varies the community noise level from instant to instant requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below.

L_{eq}: The L_{eq}, or equivalent sound level, is used to describe noise over a specified period of time in terms of a single numerical value. The L_{eq} of a time-varying signal and that of a steady signal are the same if they deliver the same acoustic energy over a given time. The L_{eq} may also be referred to as the average sound level.

L_{max}: The maximum, instantaneous noise level experienced during a given period of time.

L_{min}: The minimum, instantaneous noise level experienced during a given period of time.

L50: The noise level that is equaled or exceeded 50 percent of the specified time period. The L50 represents the median sound level.

L90: The noise level that is equaled or exceeded 90 percent of the specified time period. The L90 is sometimes used to represent the background sound level.

DNL: The average A-weighted noise exposure level during a 24-hour day, which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night ("penalizing" nighttime noises). Noise between 10:00 p.m. and 7:00 a.m. is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises.

L_{dn}: See DNL, the L_{dn} is the same as the DNL.

CNEL: The Community Noise Equivalent Level (CNEL) is the average A-weighted noise level during a 24-hour day that adds a 5-dBA "penalty" for the evening hours between 7:00 p.m. and 10:00 p.m. and a 10-dBA penalty between the hours of 10:00 p.m. and 7:00 a.m.

As a general rule, in areas where the noise environment is dominated by traffic, the L_{eq} during the peak-hour is generally equivalent to the DNL at that location (Caltrans 2009).

4.7.1.3 Effects of Noise on People

The effects of noise on people can be placed into three categories:

- *Interference with activities such as speech, sleep, and learning* – The thresholds for speech interference indoors are about 45 dBA, if the noise is steady, and above 55 dBA, if the noise is fluctuating. Outdoors, the thresholds are about 15 dBA higher.

- *Subjective effects of annoyance, nuisance, and dissatisfaction* – Based on attitude surveys used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas, the main causes for annoyance are interference with speech, radio and television, house vibrations, and interference with sleep and rest. The DNL as a noise metric has been found to provide a valid correlation of noise level and the percentage of people annoyed. Three aspects of community noise are most important in determining subjective response: the level of sound, the frequency composition or spectrum of the sound, and the variation of sound level with time.

- *Physiological effects such as hearing loss or sudden startling* – While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise, but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise.

Environmental noise typically produces effects in the first two categories. Workers at industrial plants often experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is evaluating the way the new noise compares to the existing noise levels to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise would be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- Outside of the laboratory, a 3 dBA change in noise levels is considered to be a barely perceivable difference;
- A change in level of at least 5 dBA is considered to be a readily perceivable difference; and
- A 10 dBA change in noise levels is subjectively heard as doubling of the perceived loudness.

These relationships occur in part because of the nonlinear, logarithmic nature of sound and the decibel system. As an example, a ruler is a linear scale: it has marks on it corresponding to equal quantities of distance. One way of expressing this is to say that the ratio of successive intervals is equal to one. A logarithmic scale, on the other hand, is different in that the ratio of successive intervals is not equal to one. Each interval on a logarithmic scale is some common factor larger than the previous interval. A typical ratio is 10, so that the marks on the scale read: 1, 10, 100, 1,000, 10,000, etc., which doubles the variable plotted on the x-axis. The human ear perceives sound in a nonlinear fashion; hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, rather they combine logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

4.7.1.4 Noise Attenuation

Sound level naturally decreases with distance from the source. This basic attenuation rate is referred to as the geometric spreading loss. The basic rate of geometric spreading loss depends on whether a given noise source can be characterized as a point source or a line source. Point sources of noise, including stationary mobile sources such as idling vehicles or on-site construction equipment, attenuate (lessen) at a rate of 6 dBA per doubling of distance from the source. Line sources (such as traffic noise from vehicles) attenuate at a rate of 3 dBA for each doubling of distance from the source. In many cases, additional noise attenuation occurs due to ground absorption, reflective wave canceling, and physical barriers and/or topography that block the line of sight between the source and receiver. These factors are collectively referred to as excess ground attenuation.

Trees and vegetation, buildings, and barriers reduce the noise level that would otherwise occur at a given receptor distance. However, for a vegetative strip to have a noticeable effect on noise levels, it must be dense and wide. For example, a stand of trees must be at least 100 feet wide and dense enough to completely obstruct a visual path to the source to attenuate noise by five dBA (Caltrans 2009). A row of structures can shield more distant receivers depending upon the size and spacing of the intervening structures and site geometry. Generally, for an average residential area where the first row of houses covers at least 40 percent of the total area, the reduction provided by the first row of houses is approximately 3 dBA and 1.5 dBA for each additional row (Caltrans 2009).

4.7.1.5 Vibration

Vibration is an oscillatory motion through a solid medium in which the motion’s amplitude can be described in terms of displacement, velocity, or acceleration. The effects of ground-borne vibration include movement of the floors in a building, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. In extreme cases, vibration can cause damage to buildings. There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to measure RMS. The relationship of PPV to RMS velocity is expressed in terms of the “crest factor,” defined as the ratio of the PPV amplitude to the RMS amplitude. Peak particle velocity is typically a factor of 1.7 to 6 times greater than RMS vibration velocity (FTA 2006). The VdB acts to compress the range of numbers required to describe vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration (FTA 2006). Sensitive receptors for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick people), and vibration-sensitive equipment.

4.7.1.6 Existing Noise Environment

The existing noise environment within the Project Site is influenced primarily by transportation noise emanating from vehicular traffic along Interstate 40 (I-40) and train operations on the Burlington Northern Santa Fe Railway (BNSF). The majority of vehicular traffic noise occurs along I-40 and to a lesser extent along Park Moabi Road and National Trails Road. Noise associated with the operation of the PG&E Topock Compressor Station (Station) is audible within the vicinity of the Station and the Interim Measure 3 (IM-3) Groundwater Extraction and Treatment Facility (IM-3 Facility); however, because of the existing topography (intervening mesas) noise-sensitive receptors in the Project Site vicinity do not have direct exposure to these noise sources. Additional noise sources are occasional aircraft overflights and recreational activities (watercraft operations) at regional parks nearby.

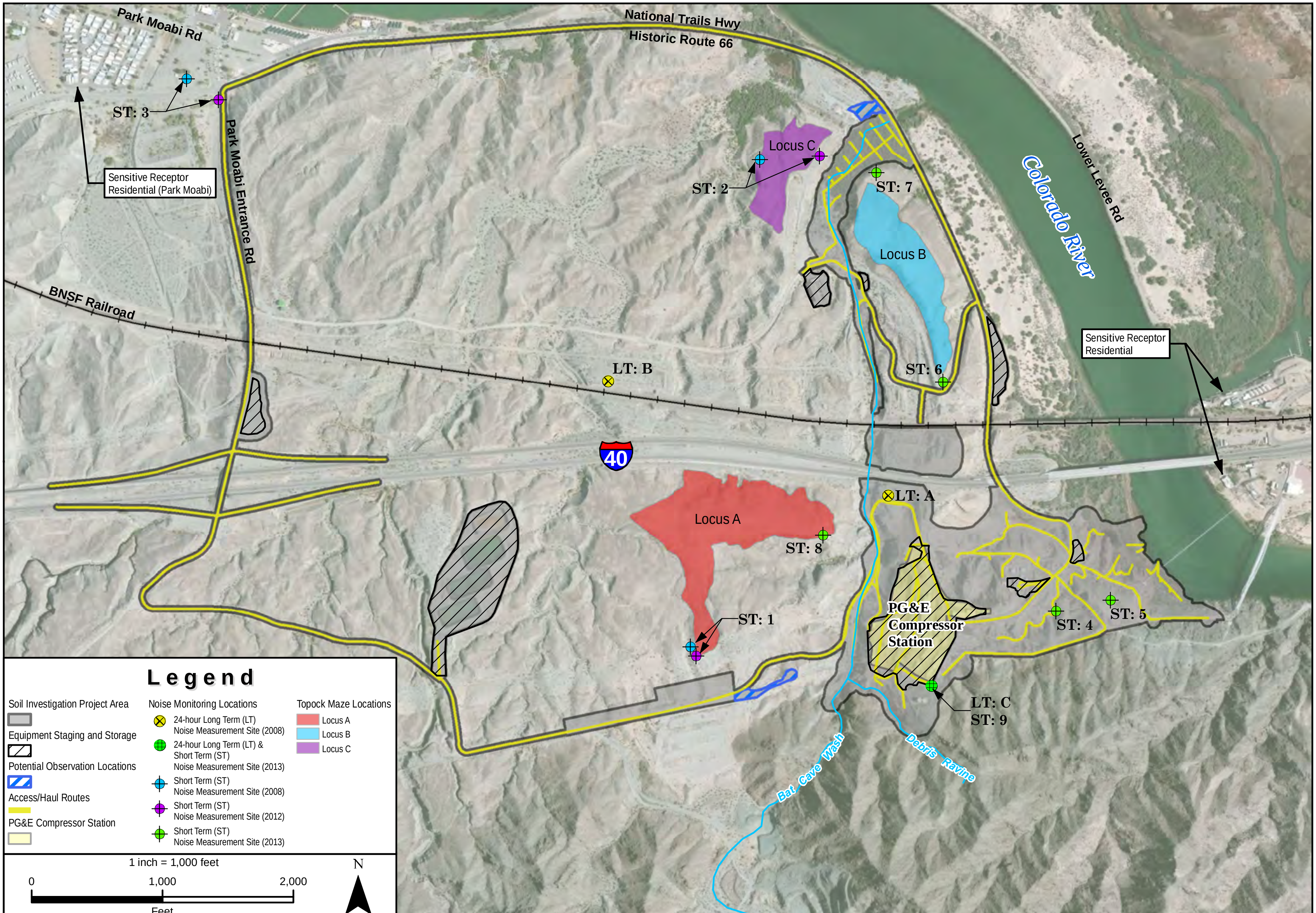
Ambient noise surveys were conducted in and around the Project Site in December 2008, August 2012, December 2012 to January 2013, and December 2013. The purpose of the noise measurements was to establish baseline ambient noise levels for the existing setting. Three measurement sites were chosen to collect long-term (24-hour) noise level data at 1-hour intervals. Nine noise measurement sites were chosen to collect short-term (15 minutes) ambient noise levels. **Figure 4.7-2** shows the locations of the short-term and long-term noise measurement sites used for this analysis. Local roadway traffic, rail operations, aircraft overflights, and wind gusts dominated the noise environment at each of the noise measurement sites. The results of the ambient noise survey are summarized in **Table 4.7-1**.

4.7.1.7 Sensitive Land Uses

Noise-Sensitive Land Uses

Noise-sensitive land uses are generally those uses where noise exposure could result in health-related risks to individuals and places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. In addition, land uses such as schools, places of worship, hotels, libraries, nursing homes, retirement residences, parks, historic sites, and recreation areas are also considered noise-sensitive land uses.

The Topock Traditional Cultural Property (TCP), which includes the Project Site, described in Section 4.4 of this draft environmental impact report (DEIR), is considered a noise-sensitive land use because of the special values this resource holds in the traditional and cultural belief systems of some Native American Tribes. Although specific Tribal activities that are undertaken on the land were not specified by some Native American Tribes aside from sacred ceremonial uses, changes in land use and modern intrusions within the Topock TCP, including those related to noise, could adversely affect the significant values ascribed to this area by some Native American Tribes.



Topock Soils Study
Created By Parus Consulting, Inc.
Sources: ESRI Bing Aerial
Map Creation Date: 01/16/2014

Soil Investigation Areas: *Noise Measurement Locations*

Figure 4.7-2

ESA
PARUS CONSULTING, INC.

TABLE 4.7-1
SUMMARY OF MEASURED AMBIENT NOISE SURVEY LEVELS

Long-Term Noise Measurements (2008)

Site	Location	Date	L_{dn}	Daytime (7 a.m.–10 p.m.) Leq	Daytime (7 a.m.–10 p.m.) Lmax	Nighttime (10 p.m.–7 a.m.) Leq	Nighttime (10 p.m.–7 a.m.) Lmax
			Average Measured Hourly and Max Noise Levels, dBA				
A	Adjacent to I-40	12/10/08–12/11/08	77.3	73.0	84.7	70.4	85.4
B	Adjacent to BNSF tracks	12/10/08–12/11/08	74.3	65.7	86.2	68.2	88.3

Long-Term Noise Measurement (2013)

Site	Location	Date	L_{dn}	Daytime (7 a.m.–10 p.m.) Leq	Daytime (7 a.m.–10 p.m.) Lmax	Nighttime (10 p.m.–7 a.m.) Leq	Nighttime (10 p.m.–7 a.m.) Lmax
			Average Measured Hourly and Max Noise Levels, dBA				
C	Southeast Fence Line of Station	12/16/13–12/17/13	72.2	66.2	82.5	65.0	81.7

Comparison of Average (Leq, dBA) Sound Levels at the Short-Term Monitoring Sites

		December 2008[a]	August 2012				December 2012-January 2013			
			Daytime (7 a.m.–10 p.m.)		Nighttime (10 p.m.–7 a.m.)		Daytime (7 a.m.–10 p.m.)		Nighttime (10 p.m.–7 a.m.)	
Site	Location	Leq (15 min)	Max Hourly Leq	Min Hourly Leq	Max Hourly Leq	Min Hourly Leq	Max Hourly Leq	Min Hourly Leq	Max Hourly Leq	Min Hourly Leq
1	South of I-40	47	63	39	61	40	63	42	61	42
2	North of I-40	41	70	40	62	37	75	39	73	39
3	Moabi Regional Park	58	76	51	64	50	69	40	60	34

Additional Short-Term Measurements (December 2013)

Site	Location	Leq (15 min)	Noise Sources
4	South of I-40, ~550' East of Station	50	• Station, traffic on I-40, goods movement train
5	South of I-40, ~940' East of Station	57	• Station, traffic on I-40, high winds
6	~385' North of BNSF Track, ~40' South of Locus B	61	• Station, traffic on I-40, backup beepers
7	60' North of Locus B	51	• Traffic on I-40, high winds
8	South of I-40, Eastern Boundary of Locus A	64	• Station, buffered traffic noise, high winds, several trains
9	Southeast Fence Line of Station	60	• Station equipment

DEFINITIONS: BNSF = Burlington Northern and Santa Fe Railway; dBA = A-weighted decibels; Ldn = day-night average noise level; Leq = the equivalent hourly average noise level; Lmax = maximum noise level; Lmin = minimum noise level; ~ = approximate; ' = feet.
NOTE: ESA conducted additional short-term and a long-term measurement in December 2013 to provide up-to-date ambient noise monitoring information..
[a] A single 15-minute measurement was collected at these locations in December 2008.

Sources: DTSC 2011; CH2M HILL 2013.

In addition to Native American land uses, several homes located across the Colorado River (north and south of I-40) would also be considered noise-sensitive. The Moabi Regional Park (which includes the Pirates Cove Resort) is also a noise-sensitive land use. Moabi Regional Park allows for short-term residents in mobile homes for a period of up to 5 months in a given year.

Noise-sensitive receptors and noise-sensitive land uses in the vicinity of the Project Site are shown in Figure 4.7-2. Of note, the entire Project Site would be within the Topock TCP. In addition, specific distances of sensitive land uses nearest to the Project soil investigation sites include: the three Topock Maze locations, Locus A, Locus B, and Locus C, which are approximately 160 feet, 80 feet, and 80 feet, respectively, from the nearest soil investigation area. Specific distances of sensitive receptors nearest to the soil investigation area are the existing residences located 685 feet east (single home across the Colorado River and south of I-40), 1,090 feet east (several homes across the Colorado River and north of I-40), and 2,450 feet northwest (cluster of homes in the Moabi Regional Park) of the soil investigation area.

In regards to the vegetation trimming, pruning, and clearing activities in the mouth of Bat Cave Wash, which would require different heavy equipment than the sampling activities, the distances to the nearest noise-sensitive land uses are 2,200 feet (Loci A), 80 feet (Loci B and Loci C), and the distances to the nearest noise-sensitive receptors are 3,100 feet (several homes across the Colorado River and north of I-40), 3,400 feet (single home across the Colorado River and south of I-40), and 5,400 feet (homes in the Moabi Regional Park).

Vibration-Sensitive Land Uses

High levels of groundborne vibration can damage fragile buildings or interfere with equipment that is highly sensitive to groundborne vibration. While high levels of vibration can cause physical personal injury or damage to buildings, groundborne vibration generally does not affect human health. The homes located across the Colorado River (north and south of I-40) would be considered vibration-sensitive.

4.7.2 Regulatory Background

4.7.2.1 Federal

The U.S. Environmental Protection Agency (USEPA) Office of Noise Abatement and Control was originally established to coordinate federal noise control activities. After its inception, the USEPA's Office of Noise Abatement and Control issued the Federal Noise Control Act of 1972, establishing programs and guidelines to identify and address the effects of noise on public health and welfare and the environment. USEPA administrators determined in 1981 that subjective issues such as noise would be better addressed at lower levels of government. Consequently, in 1982, responsibilities for regulating noise control policies were transferred to state and local governments. However, noise control guidelines and regulations contained in the rulings by the USEPA in prior years remain upheld by designated federal agencies, allowing more individualized control for specific issues by designated federal, state, and local government agencies.

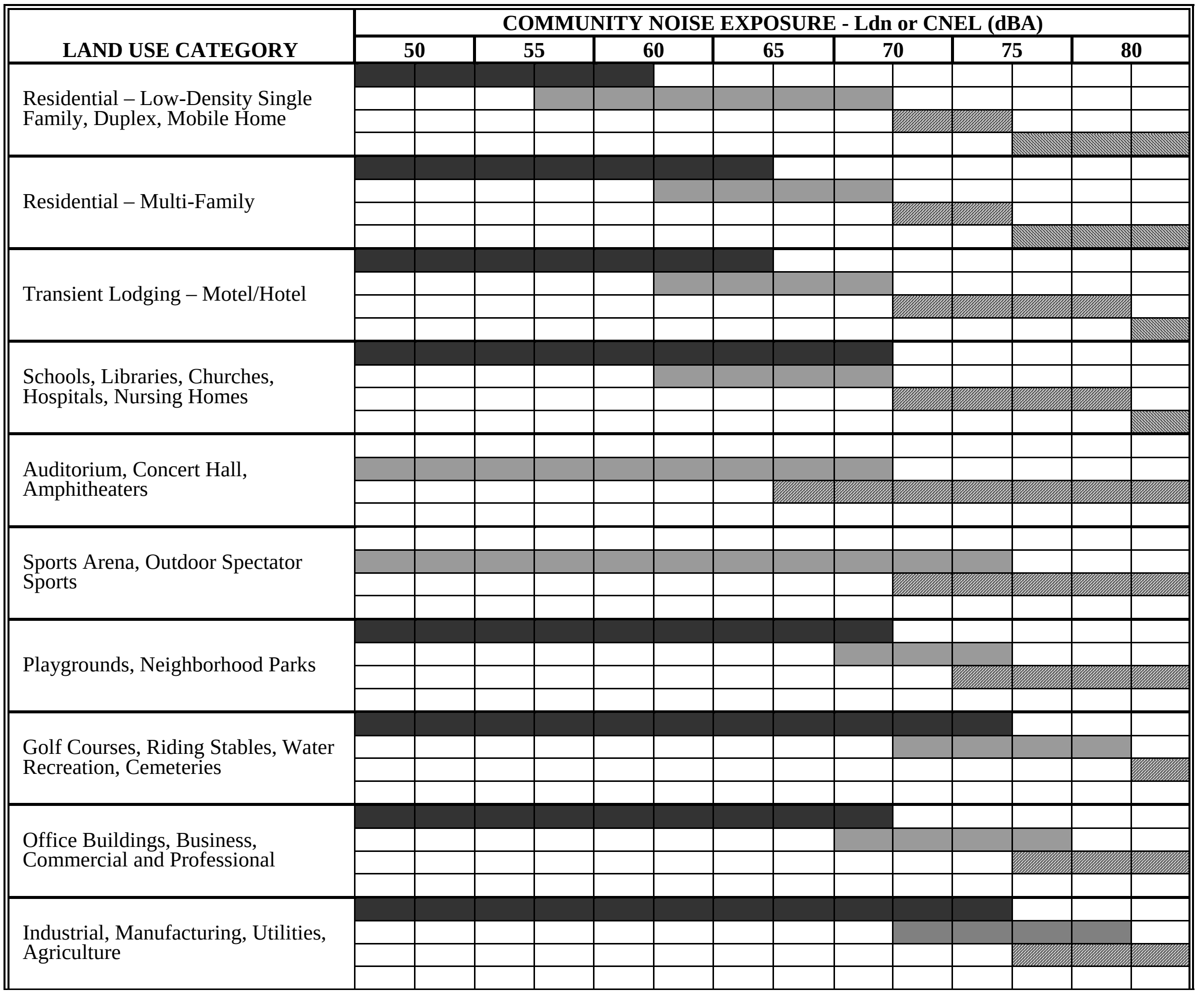
In regard to ground-borne vibration, building damage is not a factor for most projects, with the occasional exception of blasting and pile driving during construction. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by only a small margin. A vibration level that causes annoyance will be well below the damage threshold for normal buildings. The Federal Transit Administration's (FTA's) threshold of architectural damage for conventional sensitive structures is 0.2 inches per second PPV and human annoyance response ground-borne vibration threshold level of 80 VdB (FTA 2006).

4.7.2.2 State of California

The State of California has guidelines for evaluating the compatibility of various land uses as a function of community noise exposure, as shown in **Figure 4.7-3**. The State of California also establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the state pass-by standard is consistent with the federal limit of 80 dB. The state pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters from the center line. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by state and local law enforcement officials.

For the protection of fragile, historic, and residential structures from groundborne vibration, Caltrans recommends a more conservative threshold of 0.2 inches/second PPV for normal residential buildings and 0.08 inches/second PPV for old or historically significant structures (Caltrans 2004). These standards are more stringent than the federal standards presented above.

Figure 4.7-3
Land Use Compatibility for Community Noise Environment



	Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
	Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
	Clearly Unacceptable	New construction or development generally should not be undertaken.

SOURCE: Office of Planning and Research (OPR) 2003.

4.7.2.3 Local

County of San Bernardino 2007 General Plan

The Noise Element in the *County of San Bernardino 2007 General Plan* establishes specific goals and policies to ensure an acceptable noise environment for each land use. This element establishes maximum acceptable interior and exterior noise level criteria for a variety of land uses. These County noise standards are contained in the San Bernardino County Development Code. Applicable goals and policies applied to the proposed Project include the following (San Bernardino County 2007):

GOAL N 1. The County will abate and avoid excessive noise exposures through noise mitigation measures incorporated into the design of new noise-generating and new noise-sensitive land uses, while protecting areas within the County where the present noise environment is within acceptable limits.

- **Policy N 1.1** Designate areas within San Bernardino County as "noise impacted" if exposed to existing or projected future exterior noise levels from mobile or stationary sources exceeding the standards listed in Chapter 83.01 of the Development Code.
- **Policy N 1.2** Ensure that new development of residential or other noise-sensitive land uses is not permitted in noise-impacted areas unless effective mitigation measures are incorporated into the project design to reduce noise levels to the standards of Noise-sensitive land uses include residential uses, schools, hospitals, nursing homes, places of worship and libraries.
- **Policy N 1.4** Enforce the state noise insulation standards (California Administrative Code, Title 24) and Chapter 35 of the California Building Code (CBC).
- **Policy N 1.5** Limit truck traffic in residential and commercial areas to designated truck routes; limit construction, delivery, and through-truck traffic to designated routes; and distribute maps of approved truck routes to County traffic officers.
- **Policy N 1.6** Enforce the hourly noise-level performance standards for stationary and other locally regulated sources, such as industrial, recreational, and construction activities as well as mechanical and electrical equipment.

- **GOAL N 2.** The County will strive to preserve and maintain the quiet environment of mountain, desert and other rural areas.
- **Policy N 2.1** The County will require appropriate and feasible on-site noise attenuating measures that may include noise walls, enclosure of noise generating equipment, site planning to locate noise sources away from sensitive receptors, and other comparable features.
- **Policy N 2.2** The County will continue to work aggressively with federal agencies, including the branches of the military, the U.S. Forest Service, BLM, and other agencies to identify and work cooperatively to reduce potential conflicts arising from noise generated on federal lands and facilities affecting nearby land uses in unincorporated County areas.

San Bernardino County Development Code

To protect people from severe noise levels, the San Bernardino County Development Code sets limits for interior and exterior noise levels generated throughout the community for stationary and mobile sources as well as vibration levels that affect noise-sensitive land uses. Specifically, Division 3, Countywide Development Standards, establishes the following noise and vibration standards (83.01.080 Noise and 83.01.090 Vibration, San Bernardino County Development Code):

83.01.080 Noise

(b) Noise impacted areas. Areas within the County shall be designated as "noise-impacted" if exposed to existing or projected future exterior noise levels from mobile or stationary sources exceeding the standards listed in Subsection (d) (Noise standards for stationary noise sources) and Subsection (e) (Noise standards for adjacent mobile noise sources), below. New development of residential or other noise-sensitive land uses shall not be allowed in noise-impacted areas unless effective mitigation measures are incorporated into the project design to reduce noise levels to these standards. Noise-sensitive land uses shall include residential uses, schools, hospitals, nursing homes, religious institutions, libraries, and similar uses.

(c) Noise standards for stationary noise sources.

(1) Noise standards. Table 83-2 of the San Bernardino County Development Code - Noise Standards for Stationary Noise Sources (**Table 4.7-2** in this DEIR) describes the noise standard for emanations from a stationary noise source, as it affects adjacent properties:

TABLE 4.7-2
NOISE STANDARDS FOR STATIONARY NOISE SOURCES

Affected Land Uses (Receiving Noise)	7 a.m.–10 p.m. L_{eq}	10 p.m.–7 a.m. L_{eq}
Residential	55 dB(A)	45 dB(A)
Professional Services	55 dB(A)	55 dB(A)
Other Commercial	60 dB(A)	60 dB(A)
Industrial	70 dB(A)	70 dB(A)

Leq = equivalent energy level. The sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over a given sample period, typically 1, 8, or 24 hours.
dB(A) = A-weighted sound pressure level. The sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter deemphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitivity range of the human ear.

Source: San Bernardino County Development Code, 83.01.080 Noise

(2) Noise limits categories. No person shall operate or cause to be operated a source of sound at a location or allow the creation of noise on property owned, leased, occupied, or otherwise controlled by the person, which causes the noise level, when measured on another property, either incorporated or unincorporated, to exceed any one of the following:

(A) The noise standard for the receiving land use as specified in Subsection B (Noise-impacted areas), above, for a cumulative period of more than 30 minutes in any hour.

(B) The noise standard plus 5 dB(A) for a cumulative period of more than 15 minutes in any hour.

(C) The noise standard plus 10 dB(A) for a cumulative period of more than five minutes in any hour.

(D) The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour.

(E) The noise standard plus 20 dB(A) for any period of time.

(d) Noise standards for adjacent mobile noise sources. Noise from mobile sources may affect adjacent properties adversely. When it does, the noise shall be mitigated for any new development to a level that shall not exceed the standards described in the following Table 83-3 of the San Bernardino County Development Code - Noise Standards for Adjacent Mobile Noise Sources (**Table 4.7-3** in this DEIR).

TABLE 4.7-3
NOISE STANDARDS FOR ADJACENT MOBILE NOISE SOURCES

		Ldn (or CNEL) dB(A)	
Land Use Categories	**Uses**	**Interior[1]**	**Exterior[2]**
Residential	Single and multifamily, duplex, mobile homes	45	60[3]
Commercial	Hotel, motel, transient housing	45	60[3]
	Commercial retail, bank, restaurant	50	N/A
	Office building, research and development, professional offices	45	65
	Amphitheater, concert hall, auditorium, movie theater	45	N/A
Institutional/Public	Hospital, nursing home, school classroom, religious institution, library	45	65
Open Space	Park	N/A	65

Ldn = day-night noise level. The average equivalent A-weighted sound level during a 24-hour day obtained by adding 10 decibels to the hourly noise levels measured during the night (from 10 pm to 7 am). In this way Ldn takes into account the lower tolerance of people for noise during nighttime periods.
CNEL = community noise equivalent level. The average equivalent A-weighted sound level (dB[A]) during a 24-hour day, obtained after addition of approximately 5 decibels to sound levels in the evening from 7 p.m. to 10 a.m. and 10 decibels to sound levels in the night before 7 a.m. and after 10 p.m.
[1] The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors.
[2] The outdoor environment shall be limited to hospital/office building patios, hotel and motel recreation areas, mobile home parks, multifamily private patios or balconies, park picnic areas, private yard of single-family dwellings, school playgrounds
[3] An exterior noise level of up to 65 dB(A) (or CNEL) shall be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dB(A) (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level shall necessitate the use of air conditioning or mechanical ventilation.

SOURCE: San Bernardino County Development Code, 83.01.080 Noise

(e) Increases in allowable noise levels. If the measured ambient level exceeds any of the first four noise limit categories in Subsection (d)(2), above, the allowable noise exposure standard shall be increased to reflect the ambient noise level. If the ambient noise level exceeds the fifth noise limit category in Subsection (d)(2), above, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level.

(f) Reductions in allowable noise levels. If the alleged offense consists entirely of impact noise or simple tone noise, each of the noise levels in Table 83-2 - Noise Standards for Stationary Noise Sources (Table 4.7-2) shall be reduced by 5 dB(A).

(g) Exempt noise. The following sources of noise shall be exempt from the regulations of this section:

(1) Motor vehicles not under the control of the commercial or industrial use.

(2) Emergency equipment, vehicles, and devices.

(3) Temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and Federal holidays.

83.01.090 Vibration

(a) Vibration standard. No ground vibration shall be allowed that can be felt without the aid of instruments at or beyond the lot line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to two-tenths (0.2) inches per second measured at or beyond the lot line.

(b) Vibration measurement. Vibration velocity shall be measured with a seismograph or other instrument capable of measuring and recording displacement and frequency, particle velocity, or acceleration. Readings shall be made at points of maximum vibration along any lot line next to a parcel within a residential, commercial and industrial land use zoning district.

(c) Exempt vibrations. The following sources of vibration shall be exempt from the regulations of this Section.

(1) Motor vehicles not under the control of the subject use.

(2) Temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and Federal holidays.

4.7.3 Environmental Impacts

4.7.3.1 Methodology

Project-specific information contained in Chapter 3, "Project Description," and data collected during on-site noise monitoring were used to identify the locations of sensitive receptors and existing sources of noise and vibration in the vicinity of the Project Site. Sensitive receptors and major noise sources near the proposed Project Site were identified based on existing documentation (e.g., equipment noise levels and attenuation rates) and site reconnaissance data. The proposed Project consists of soil investigation activities, bench scale tests, pilot studies, geotechnical evaluations, and plant or other biota sampling, all of which would be short-term, and, as such, would not include long-term operational activities and sources of noise or vibration.

To assess potential short-term Project-related noise impacts, sensitive receptors and their relative exposure (considering intervening topography and distance) to Project-generated noise levels were identified. Project-generated noise levels were predicted using the FTA's Noise and Vibration Impact Assessment methodology (FTA 2006).

Vibration levels generated from Project-related activities were also evaluated for potential impacts at sensitive receptors. Typical activities evaluated for potential building damage due to vibration include demolition, pile driving, and drilling or excavation in close proximity to structures. The Project's ground-borne vibration levels were also evaluated for human perception and annoyance. Vibration propagates according to the following expression, based on point sources with normal propagation conditions:

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

Where PPV (equip) is the peak particle velocity in inches/second of the equipment adjusted for distance, PPV (ref) is the reference vibration level in inches/second at 25 feet, and D is the distance from the equipment to the receiver. As discussed previously, PPV is defined as the maximum instantaneous positive or negative peak of the vibration and is often used in monitoring vibration because it is related to the stresses experienced by structures.

To determine the Project's potential vibration impacts associated with human annoyance, the RMS vibration level (L_v) in VdB generated by the various construction equipment used at the Project Site was estimated based on the following equation:

$$L_v(D) = L_v(25 \text{ ft}) - 30\log(D/25)$$

where D is the distance from the equipment to the receiver.

The predicted Project-related noise and vibration levels were compared with applicable standards for determination of significance.

4.7.3.2 Thresholds of Significance

Based on the California Environmental Quality Act Guidelines, Appendix G, the proposed project would result in a significant impact on the environment if it would:

- Expose persons to or generate noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies;
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels without the project; or
- Expose persons to or generation of excessive ground-borne vibration or ground-borne noise levels.
- Expose people residing or working in the project area to excessive noise levels if the project is located within an area covered by an airport land use plan, or where such plan has not been adopted, within 2 miles of a public airport or public use airport.

- Expose people residing or working in the project area to excessive noise levels if the project is located in the vicinity of a private airstrip.

Generally, for the proposed Project, the significance determination of noise-related impacts is based on a comparison between predicted noise levels and noise criteria defined by San Bernardino County. The significance determination of vibration-related impacts is based on the FTA criteria for generation of ground-borne vibration or any related ground-borne noise levels. Impacts are considered significant if existing or proposed sensitive receptors would be exposed to noise levels in excess of the San Bernardino County General Plan and Development Code as described in Section 4.7.2, "Regulatory Background." For a discussion of land use compatibility with respect to places of worship and the Topock TCP, please refer to Section 4.4, "Cultural Resources."

The proposed Project consists of short-term soil investigation activities, bench scale tests, pilot studies, geotechnical evaluations, and plant or other biota sampling, and, as such, would not include sources of long-term noise. In regard to the noise environment, after these investigations are complete, the area would return to pre-investigation conditions. The proposed Project would not result in a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project. Therefore, the Project activities would not result in a Project-related permanent increase in ambient noise in the Project Site and this impact is not discussed further.

The Project Site is not located within 2 miles of a public or private airstrip. Needles Airport is located 6 miles from the Project Site's most western boundary. The proposed Project is not located within the vicinity of a private airstrip or within an Airport Land Use Plan area or in an area within 2 miles of a public airport or public use airport; therefore, the Project would not expose people residing or working in the area to excessive noise levels. The Project would not result in aircraft noise exposure on the proposed Project and this impact is not discussed further.

4.7.3.3 Impact Analysis

Noise-Sensitive Land Uses

As described in Chapter 3, "Project Description," soil investigation activities would involve the use of a drill rig, hydrovac truck, and back hoe. Additional equipment would be needed to trim, prune, and clear vegetation near the mouth of Bat Cave Wash, including a loader, an excavator, a wood chipper, and chainsaws. A drill rig would also be used during a portion of the Bat Cave Wash or Station pilot studies and during geotechnical studies. Material haul trips and worker vehicles during soil investigation activities, bench scale tests, pilot studies, geotechnical evaluations, and plant or other biota sampling would raise ambient noise levels along access routes. The proposed Project's workforce is expected to reach 13 workers per day at its peak and several haul trucks during concurrent investigation activities, which would be a minimal addition to the roadway network. Short-term field sampling and vegetation trimming, pruning, and clearing activities could potentially expose persons in the vicinity of the activity, such as Tribal members at the Topock TCP, residents, or recreationalists to noise levels in excess of the applicable noise standards and/or result in a noticeable increase in ambient noise levels. The magnitude of Project-related noise that would be generated depends upon the activity or the equipment in operation at a given time and at a given distance from noise-sensitive receptors in the vicinity. **Table 4.7-4** shows typical noise levels produced by types of construction equipment that would be used for Project investigation activities.

TABLE 4.7-4
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT OPERATIONS

Construction Equipment	Noise Exposure Level, L_{max} dBA @ 50 Feet[1]
Drill Rig Truck	84
Backhoe	80
Vac-Truck	85
Loader	80
Excavator	85
Chainsaw	85
Wood Chipper	75

1. All noise levels are from the FHWA RCNM software, except for the wood chipper. The wood chipper noise level is derived from the Noise Navigator Sound Level Database, which lists a chipper at 99 dBA at 1 meters.

SOURCES: Federal Highway Administration 2008; Berger et al. 2013.

Noise from construction activity generally attenuates (decreases) at a rate of 6 to 7.5 dBA per doubling of distance. Using the Federal Highway Administration (FWHA) Roadway Construction Noise Model (RCNM) and conservatively assuming an attenuation of 6 dBA per doubling of distance and that a drill rig truck, backhoe, and vacuum truck would operate at the same site location concurrently (a conservative assumption since equipment use at a site would be staggered rather than used concurrently), the soil investigation sampling activities could lead to noise levels of 78 dBA L_{eq} at Topock Maze Loci B or C, 72 dBA L_{eq} at Locus A. The nearest sensitive residence to the active soil sampling area is a home located approximately 685 feet away, which would be exposed to lower noise levels of approximately 60 dBA due to distance.

In regards to the vegetation trimming, pruning, and clearing activities around the mouth of Bat Cave Wash, assuming an attenuation of 6 dBA per doubling of distance and that an excavator, loader, wood chipper, and chainsaw operate at the same site location concurrently, the vegetation trimming, pruning, and clearing could lead to noise levels of 77 dBA L_{eq} at Topock Maze Loci B or C, 48 dBA L_{eq} at Locus A. The nearest sensitive residence to the active soil sampling area are homes located approximately 3,100 feet away, which would be exposed to lower noise levels of approximately 45 dBA due to distance.

These noise levels, especially at the Topock Maze locations, would be substantially greater than ambient noise levels. As described in Table 4.7-1, the range in ambient noise levels at Locus A, B, and C are 39 dBA to 64 dBA, 51 dBA to 61 dBA, and 37 to 75 dBA, respectively. Thus, implementation of the proposed Project could result in future noise that could expose the Topock TCP (considered as a place of worship for Native Americans in terms of the San Bernardino County's standards) to levels that exceed the County's standards or would conflict with Native American values associated with this resource. As noted in Section 4.4, "Cultural Resources" of this DEIR, the Topock TCP is considered highly sensitive, and changes in the noise environment would adversely affect some Native American Tribes. Vegetation trimming, pruning, and clearing and soil investigation activities would result in noise levels that conflict with the use of this area.

Project-related noise levels would exceed applicable County standards for a place of worship and could consequently result in a temporary substantial increase in ambient noise levels, especially when investigation activities would occur during the nighttime hours. Ambient noise levels at existing noise-sensitive land uses may experience increased noise levels due to soil investigation activities for short-term periods.

IMPACT NOI-1 **Potential to expose persons and noise-sensitive land uses to a substantial temporary or periodic increase in ambient noise levels and/or exceed standards established by San Bernardino County.** *Ambient noise levels at existing noise-sensitive land uses may experience increased noise levels due to soil investigation activities for short term periods. The proposed Project would exceed applicable County standards for a place of worship and could result in a temporary substantial increase in ambient noise levels. This impact would be* ***significant.***

Mitigation Measure NOI-1: Potential Impacts to Noise Levels and Noise Standards.

- Investigation activities shall be limited to the daytime hours between 7:00 A.M. to 7:00 P.M., and prohibited on Sundays and federal holidays.
- Investigation equipment shall be properly maintained per manufacturer specifications and fitted with the best available noise suppression devices (e.g., mufflers, silencers, wraps). Pneumatic powered socket wrenches shall be shrouded or shielded, and all intake and exhaust ports on power equipment shall be muffled or shielded.
- Investigation equipment shall not idle for extended periods of time (more than 15 minutes) when not being utilized during investigation activities.
- A disturbance coordinator shall be designated by PG&E, which will post contact information in a conspicuous location near investigation areas so that it is clearly visible to nearby noise-sensitive receptors as labeled in Figure 4.7-2. In addition, mailing of the same information will be sent to nearby noise-sensitive receptors as labeled in Figure 4.7-2 and Interested Native American Tribes (Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, the Fort-Yuma Quechan Indian Tribe, and the Hualapai Indian Tribe). The coordinator will manage complaints resulting from the investigation noise. Reoccurring disturbances will be evaluated by a qualified acoustical consultant retained by PG&E to ensure compliance with applicable standards. The disturbance coordinator will contact nearby noise-sensitive receptors as labeled in Figure 4.7-2 and Interested Tribes, advising them of the investigation schedule. The disturbance coordinator will also consider the timing of soil investigation activities in relation

to Tribal ceremonial events that are sensitive to noise, which will be accommodated by PG&E to the extent practicable.

Timing: During all Project activities.

Responsibility: PG&E shall be responsible for the implementation of these measures. DTSC shall be responsible for ensuring compliance.

Significance after Mitigation: The impact would be **significant and unavoidable**, even after implementation of the measure detailed above. The unique values associated with the Topock TCP cannot be reconciled with additional Project-related noise. Implementation of the above Mitigation Measure NOI-1 would ensure that noise generated during temporary Project investigation activities would be minimized and that activities would be limited to the less noise-sensitive daytime hours. However, existing noise-sensitive land uses would still experience increased noise levels due to Project activities for short term periods. The proposed Project would exceed applicable County standards for a place of worship and would consequently result in a temporary substantial increase in ambient noise levels.

Vibration

As shown in **Table 4.7-5,** the vibration levels associated with the equipment that could produce the greatest vibration generation (caisson drilling) is used in this analysis to provide a conservative representation of the potential vibration levels that could be generated by the operation of the drill rig at the Project Site. Other equipment usage during soil investigation activities, bench scale tests, pilot studies, geotechnical evaluations, and plant or other biota sampling would result in less vibration than what is analyzed below.

TABLE 4.7-5
VIBRATION VELOCITIES FOR CONSTRUCTION EQUIPMENT

Equipment/Activity	PPV at 25 ft (inches/second)[a]	PPV at the Nearest Residence[a]	RMS at 25 ft (Vdb)[c]	RMS at the Nearest Residence[a]
Caisson Drilling	0.089	0.0006	87	44
Loaded Trucks	0.076	0.03	86	77

NOTE: ESA applied the FTA reference vibration levels to estimate specific vibrations at the nearest residence.

[a] Buildings can be exposed to ground-borne vibration levels of 0.2 PPV without experiencing structural damage.

[b] The nearest receptor for the drill rig were assumed to be 685 feet (single home across the Colorado River and south of I-40). The loaded trucks were set at 50 feet, since traversed roadways could be that distance from residences (at the Moabi Regional Park mobile homes or Pirates Cove Resort for instance).

[c] The human annoyance response level is 80 RMS VdB.

SOURCE: Federal Transit Administration 2006.

As presented in Table 4.7-5, the use of heavy equipment for Project activities can generate vibration levels up to 0.089 PPV or 87 VdB at a distance of 25 feet. Notably, there will be a work area exclusion zone (EZ) to protect individuals in the vicinity of an active work site. Exact dimensions of the EZ will depend on the area and method of sampling or other activity and will vary at each location. EZs may be as large as 150 feet by 50 feet when drilling with a larger rig, or as small as 10 feet by 10 feet for hand sampling. Any person just outside a 50-foot EZ from a drill rig would be exposed to 78 VdB. Assuming a drill rig would be used a minimum of 685 feet from the nearest structural or residential receptor to a work area (single home across the Colorado River and south of I-40), maximum vibration levels from the drill rig would be up to about 44 VdB and 0.0006 PPV. Assuming loaded trucks would pass by 50 feet or more from the nearest structural or residential receptor (such as mobile homes in the Moabi Regional Park or the Pirates Cove Resort), maximum vibration levels from the trucks would be up to 77 VdB and 0.03 PPV. Therefore, equipment operation during Project activities would generate ground-borne vibration and noise levels that would not exceed the FTA criteria of 0.2 PPV for structural damage and 80 VdB for human annoyance.

IMPACT NOI-2 **Potential to expose persons to or generate excessive ground-borne vibration or any related ground-borne noise levels.** *The proposed Project would utilize equipment that would not exceed Federal Transit Administration criteria for generation of ground-borne vibration. The proposed Project would not generate excessive ground-borne vibration and therefore any related ground-borne noise levels. This impact would be* ***less than significant****. No mitigation would be required.*

CHAPTER 5
Other CEQA Sections

This chapter presents the evaluation of other types of environmental impacts required by the California Environmental Quality Act (CEQA) that are not covered within the other chapters of this draft environmental impact report (DEIR) for the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Soil Investigation Project (Project). The other CEQA considerations include environmental effects for which no mitigation is available to reduce the level of significance to less than significant, the irreversible and irretrievable commitment of nonrenewable resources as a result of the Project, resource areas with no potential for significant impacts, and growth-inducing impacts of the Project.

5.1 Unavoidable Significant Impacts

As required by CEQA Guidelines Section 15126.2(b), an environmental impact report (EIR) must describe any significant impacts that cannot be avoided, including those impacts that can be mitigated but not reduced to a less than significant level. Where there are impacts that cannot be alleviated without imposing an alternative design, their implications and the reasons the project is being proposed, notwithstanding their effect, should be described. Chapter 4, "Environmental Analysis," of this DEIR describes the potential environmental impacts of the proposed Project and recommends mitigation measures to reduce impacts, where feasible. As discussed in this DEIR, implementation of the proposed Project would result in potential impacts that would be mitigated below a level of significance with implementation of mitigation measures for aesthetics, air quality, biological resources, hazards and hazardous materials, and hydrology and water quality. Significant and unavoidable impacts would result to cultural resources and noise.

5.1.1 Cultural Resources

Topock Traditional Cultural Property

The California Department of Toxic Substances Control (DTSC) has determined that implementation of the proposed Project would result in a substantial adverse impact on the National Register of Historic Places-eligible Topock Traditional Cultural Property (TCP). According to input from Interested Tribes, those physical characteristics that convey the TCP's historical significance (contributing elements) include the Topock Maze, land, water, plants, animals, prehistoric archaeological resources, and the viewshed (see Section 4.4.1.5). All of these contributing elements to the Topock TCP, with the exception of the Topock Maze, water, and animals could be affected by the Project.

Implementation of the proposed Project, in addition to the other ongoing activities within the Topock TCP, could cause a substantial adverse change in the significance of the TCP historical resource as a result of the physical destruction and alteration to the characteristics of the property that convey its historical significance and qualify it for inclusion in the California Register of Historical Resources as defined in CEQA Guidelines Section 15064.5. The substantial adverse change to the contributing elements to the Topock TCP would result from ground-disturbing activity that would directly and adversely affect the soil, landforms, and prehistoric archaeological resources; pruning or alteration of the natural growth of native and traditional plant species; and the presence of equipment, workers, and vehicles, which would introduce activities that are inconsistent with the natural setting associated with the Topock TCP. These activities would also materially affect the cultural values ascribed to the TCP by some Native American Tribes. This impact would be **significant**. **(Impact CR-1)**

In order to reduce these impacts, **Mitigation Measures CR-1a, CR-1b, CR-1c, CR-1d,** and **CR-1e** shall be implemented (see Section 4.4).

Implementation of Mitigation Measures CR-1a through CR-1e would reduce but not completely avoid the potential for significant impacts to the historical resources identified in the Topock TCP. The Project would result in the destruction or alteration of contributing elements which convey the historical significance of the Topock TCP. As a result, the impacts to the historical resource identified as the Topock TCP would remain **significant and unavoidable**.

The Project is being proposed notwithstanding these effects because the soil investigation activities are necessary to gather sufficient information to reliably characterize the nature and extent of soil and sediment contamination within the Project Site, enabling completion of the Final RFI/RI Report Volume 3 (Soil) and risk assessment as required by the 1996 Consent Agreement as soon as practicable and consistent with applicable state laws and regulations.

Historical Resources (other than the Topock TCP) and Unique Archaeological Resources

In addition to the Topock TCP, a total of 20 known historical resources are located within the Project Site, including 15 significant archaeological resources and five historic-period built resources. The proposed Project as designed would avoid impacts to known historical resources. However, because the Project involves ground-disturbing activities, there is the potential for such activities to disturb unknown potentially significant resources qualifying as historical resources under CEQA. Ground-disturbing activities associated with the Project would have the potential to cause substantial adverse changes to unknown historical resources. Any damage to or destruction of such resources during the discovery process could result in significant impacts. Because prehistoric archaeological resources are considered contributing elements to the Topock TCP any inadvertent discoveries would be **significant** given their relationship as contributing elements to the Topock TCP. **(Impact CR-2)**

In order to reduce these impacts, **Mitigation Measures CR-2a, CR-2b, CR-2c,** and **CR-2d** shall be implemented (see Section 4.4).

Mitigation Measures CR-2a through CR-2d would ensure avoidance of impacts to known historical resources and would reduce impacts in the event of inadvertent discovery of unknown historic-period archaeological resources, potentially qualifying as historical resources or unique archaeological resources under CEQA, to a less than significant level. However, even with the implementation of Mitigation Measures CR-2a through CR-2d, impacts to historical resources and unique archaeological resources resulting from the inadvertent discovery of unknown prehistoric archaeological resources would be significant and unavoidable given their relationship as contributing elements to the Topock TCP. Therefore, impacts to known and unknown historical resources would remain **significant and unavoidable**.

The Project is being proposed notwithstanding these effects because the soil investigation activities are necessary to gather sufficient information to reliably characterize the nature and extent of soil and sediment contamination within the Project Site, enabling completion of the Final RFI/RI Report Volume 3 (Soil) and risk assessment as required by the 1996 Consent Agreement as soon as practicable and consistent with applicable state laws and regulations.

Human Remains

Implementation of the proposed Project could disturb human remains, including those interred outside of formal cemeteries. The lack of any identified human remains in the Project Site does not preclude the possibility that unknown human remains may be present given the length of human occupation of the area. Ground-disturbing activities could unearth unknown human remains, which would be **significant**. **(Impact CR-4)**

In order to reduce this impact, **Mitigation Measure CR-4** shall be implemented (see Section 4.4).

Mitigation Measure CR-4 would reduce potential impacts to human remains, however, not to a level below significance. As a result, any destruction or alteration of human remains to Native American Tribes in the extraordinary context of the Topock TCP would be significant. Therefore, impacts to human remains would remain **significant and unavoidable.**

The Project is being proposed notwithstanding these effects because the soil investigation activities are necessary to gather sufficient information to reliably characterize the nature and extent of soil and sediment contamination within the Project Site, enabling completion of the Final RFI/RI Report Volume 3 (Soil) and risk assessment as required by the 1996 Consent Agreement as soon as practicable and consistent with applicable state laws and regulations.

Cumulative Impacts

The proposed Project's impacts to cultural resources, when considered in combination with other past, present, and future projects at a regional scale, could contribute to a cumulatively significant impact to historical resources (including the TCP), archaeological resources, and human remains. The Project Site and surrounding vicinity contain a number of important sites of cultural and/or archaeological importance that are integral to the cultural traditions of Native American Tribes located throughout the region.

Projects that have already been implemented or may occur in the foreseeable future at or near the Project Site that could impact cultural resources are described in Chapter 6, "Cumulative Impacts." The projects in the cumulative scenario have the potential to involve ground-disturbing activities that would directly impact significant cultural resources and paleontological resources. These projects may also result in visual, auditory, and other environmental impacts that may adversely affect the Topock TCP. For these reasons, the combined impacts on cultural resources in the geographic scope would be considered cumulatively significant. When considered in combination with the impacts of other projects in the cumulative scenario, the Project's incremental contribution to impacts on cultural resources including historical resources (i.e., the Topock TCP), unique archaeological resources, and human remains would be **cumulatively considerable**. (**Impact CUM-1**)

In order to reduce these impacts **Mitigation Measures CR-1, CR-2,** and **CR-4** shall be implemented (see Section 4.4).

Although implementation of Mitigation Measures CR-1, CR-2, and CR-4 would reduce the significance of the impacts to the degree feasible, the only method to fully mitigate these impacts would be complete avoidance of any future project activity; therefore, no feasible mitigation exists that would reduce the Project's contribution to less than considerable. The Project's contribution to this significant cumulative cultural impact would be cumulatively considerable (**significant and unavoidable**).

The Project is being proposed notwithstanding these effects because the soil investigation activities are necessary to gather sufficient information to reliably characterize the nature and extent of soil and sediment contamination within the Project Site, enabling completion of the Final RFI/RI Report Volume 3 (Soil) and risk assessment as required by the 1996 Consent Agreement as soon as practicable and consistent with applicable state laws and regulations.

5.1.2 Noise

DTSC has determined that implementation of the proposed Project would exceed San Bernardino County noise standards for a place of worship and could consequently result in a temporary substantial increase in ambient noise levels. Ambient noise levels at existing noise-sensitive land uses may experience increased noise levels due to soil investigation activities for short-term periods. As a result, this impact would be **significant**. **(Impact NOI-1)**

In order to reduce this impact **Mitigation Measure NOI-1** shall be implemented (see Section 4.7).

Implementation of Mitigation Measure NOI-1 would ensure that noise generated during temporary soil investigation activities would be minimized and that activities would be limited to the less noise-sensitive daytime hours. However, existing noise-sensitive land uses would still experience increased noise levels due to Project activities for short term periods. The proposed Project would exceed applicable County standards for a place of worship and would consequently result in a temporary substantial increase in ambient noise levels. The unique values associated with the Topock TCP cannot be reconciled with additional Project-related noise. Even after mitigation, this impact would remain **significant and unavoidable**.

The Project is being proposed notwithstanding these effects because the soil investigation activities are necessary to gather sufficient information to reliably characterize the nature and extent of soil and sediment contamination within the Project Site, enabling completion of the Final RFI/RI Report Volume 3 (Soil) and risk assessment as required by the 1996 Consent Agreement as soon as practicable and consistent with applicable state laws and regulations.

5.2 Significant Irreversible Environmental Changes that Would Be Caused by the Proposed Project

Section 21100(b)(2)(b) of the Public Resources Code and Section 15126.2(c) of the CEQA Guidelines require that an EIR analyze the extent to which the proposed project's primary and secondary effects would affect the environment and commit nonrenewable resources to uses that future generations would not be able to reverse. "Significant irreversible environmental changes" include the use of nonrenewable natural resources during the initial and continued phases of the project, should this use result in the unavailability of these resources in the future. Primary impacts and, particularly, secondary impacts generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with projects. Irretrievable commitments of these resources are required to be evaluated in an EIR to ensure that such consumption is justified (CEQA Guidelines §15126.2(c)).

Per Section 15126.2(c) of the CEQA Guidelines, a project would result in an irreversible and irretrievable commitment of resources if it:

- Involved a large commitment of nonrenewable resources;
- Created primary and secondary impacts that would generally commit future generations to similar uses;
- Involved uses in which irreversible damage would result from any potential environmental accidents associated with the project; or
- Proposed consumption of resources that were not justified (e.g., the project involves the wasteful use of energy).

Soil sampling activities are anticipated to last up to 12 months (9 months of active field investigation) with a potential extension of up to 3 months for 25 percent contingency samples. Subsequent activities to support the Soil CMS/FS would be undertaken after the completion of the soil sampling activities in 2016 and are anticipated to last from 13 to 27 months, depending on need for each activity and ability for each activity to be implemented concurrently. The use of resources is considered temporary for the purposes of this discussion. The project does not commit substantial amounts of resources, and the amount of energy and equipment to be used is limited to that needed for the investigation, so there is no irreversible commitment of resources or related significant impact.

Soil investigation activities associated with the proposed Project could potentially disturb cultural resources within the Project Site. Site clearing and grading, drilling, boring activities, and pilot studies have the potential to uncover archaeological and paleontological resources. Despite application of mitigation measures to reduce potential impacts to less than significant levels, including the priority to avoid cultural resources and preservation of resources in place, activities involving data recovery or capping of cultural resources discovered during soil investigation activities could result in irreversible losses. Data recovery requires removal of artifacts from their original context. Capping involves covering an archaeological site with fill such that Project activities could take place unimpeded over the area. Both methods would disturb the archaeological site to differing degrees and would constitute an irreversible and irretrievable commitment of resources.

5.3 Environmental Effects Found Not to Be Significant

As required by Section 15128 of the CEQA Guidelines, an EIR shall contain a brief discussion stating the reasons why various possible significant effects of a project were determined not to be significant and are therefore not discussed in detail in the EIR. In accordance with the CEQA Guidelines, this section discusses the environmental issue areas where impacts were found to not be significant. These discussions address the CEQA Guidelines Appendix G Checklist questions for each of the environmental topic areas.

The proposed Project includes soil sampling and sample analysis as described in the Soil Work Plan (CH2M HILL 2013; Appendix A to this DEIR); potential bench scale tests, pilot studies, and geotechnical evaluations as described in the CM/FS Work Plan to support the Soil CMS/FS; and potential plant or other biota sampling activities to support an ecological risk assessment. Bench scale tests, pilot studies, geotechnical evaluations, and plant or other biota sampling may be implemented after soil sampling and soil sample analysis is completed to evaluate potential soil remedy options if remedial action is determined necessary.

5.3.1 Agricultural Resources

The proposed Project Site is characterized by arid conditions and high temperatures. While there are agricultural uses north of the Project Site and in Needles along the Colorado River, the landscape at the Project Site consists of considerably eroded small to moderately sized terraces with very steep slopes. These conditions are not conducive to agriculture uses. The National Resource Conservation Service has not mapped soils in the Project Site; therefore, no soils in the area have been designated as agricultural soils (NRCS 2013). The California Department of Conservation’s Farmland Mapping and Monitoring Program does not cover the Project Site or surrounding sites; therefore, none of the land in the Project Site has been designated as Prime

Farmland, Unique Farmland, or Farmland of Statewide Importance (California Department of Conservation 2011).

Similarly, the Project Site and surrounding sites are not included in mapping for Williamson Act contracts. As such, no lands under a Williamson Act contract are on or near the Project Site (California Department of Conservation 2013). A review of aerial photographs from 1936 through 2007 show no historic or current agricultural uses either on or near the Project Site (CH2M HILL 2007:3-95 through 3-113; Google Earth 2013). Because no agricultural resources have been identified within the vicinity of the Project, no direct or indirect impacts on agricultural resources would occur from implementation of the proposed Project.

The proposed Project would not be located on land zoned by the County of San Bernardino as forest land or timberland. As discussed, the Project Site has not been designated Farmland, nor does the Project conflict with an existing Williamson Act contract. As a result, no land within the Project Site would be converted to non-forest or nonagricultural use and no impact would occur.

5.3.2 Energy Resources

The proposed Project Site is currently served by the Needles Public Utility Authority (City of Needles) to meet electrical needs associated with the PG&E Topock Compressor Station (Station). Petroleum supplies used for fueling the Project's truck and worker vehicles are purchased by the individual users at fueling stations in nearby communities and in more distant locations including, but not limited to Los Angeles, California; Lake Havasu City, Arizona; Phoenix, Arizona; and Las Vegas, Nevada.

Energy use associated with the proposed Project would include the consumption of petroleum fuel for vehicles and equipment and the use of electricity to power equipment and temporary facilities. The proposed Project would require a total of approximately 52,640 gallons of diesel fuel over the lifetime of the Project. Soil sampling activities would consume 13,914 gallons of diesel fuel; the in situ soil flushing pilot study would consume 36,996 gallons of diesel fuel; and the in situ stabilization/chemical fixation pilot study would consume 1,730 gallons of diesel fuel. The bench scale tests, geotechnical evaluations, and plant or other biota sampling would require a nominal amount of diesel fuel for worker vehicle trips and equipment. The soil sampling activities are estimated to begin in early 2015 and be completed within 12 months of initiation. Pilot studies would be undertaken after the completion of the soil sampling activities, estimated to be in late 2016, and are anticipated to last from 13 to 25 months. In 2013, approximately 141.6 million gallons of diesel fuel were consumed in San Bernardino County.[1] The Project's projected annual diesel fuel consumption would be a fraction of the total consumption, representing approximately 0.037 percent of the San Bernardino County annual total.

The soil sampling activities, bench scale tests, geotechnical evaluations, and plant or other biota sampling would not consume electricity since the equipment and vehicles utilized would be

[1] Annual diesel fuel annual consumption calculation based on 2013 census data (U.S. Department of Commerce 2014) and the Taxable Diesel Gallons 10 Year Report Net of Refunds report (BOE 2014).

powered exclusively by diesel fuel. The in situ soil flushing pilot study would consume a total of approximately 23,713 kilowatt-hours (kWh) of electricity, and the in situ stabilization/chemical fixation pilot study would consume a total of approximately 3,579 kWh of electricity for a total of approximately 27,292 kWh. This energy use would primarily as a result of the activation of the tests themselves, which have a duration of 120 days and 30 days for the in situ soil flushing and the in situ stabilization/chemical fixation studies respectively. Implementation of the proposed Project would intermittently increase energy demands on the Needles Public Utility Authority. The demands to the electrical grid would not be constant as with residential, commercial or industrial uses; in addition Project-related energy use would be temporary in duration. Additional power generation facilities would not be required to serve the proposed Project and the demand would not exceed the annual power supply for the Needles Public Utility Authority which equals approximately 61.7 million kWh (Needles Public Utility Authority 2011). For the reasons stated, the energy demand of the proposed Project would result in a less than significant impact on local and regional energy supplies and capacity requirements. Further, the electricity used to implement the proposed Project would have no impact on peak or base period demand for energy given the temporary duration of the proposed activities that would consume electricity.

During implementation of the proposed Project, PG&E would recycle all recyclable materials at appropriate facilities and would therefore be in compliance with 42 USC §4331(b)(6). The Project would comply with applicable petroleum fuel economy standards. Additionally, the use of electricity during Project implementation is limited to that needed for the investigation activities and would not be unnecessary, wasteful, or inefficient. The Project would comply with all applicable energy standards. No impact would occur.

In terms of transportation energy use, the Project would consume fuel as described above for transportation of materials and worker vehicle trips. The number of workers needed for the Project is limited (up to 13 workers plus agency oversight personnel, an archeological monitor, and invited Native American Tribal monitors) and most workers would drive to the Project Site from nearby communities, including Needles, Laughlin, and Lake Havasu City. The peak for workers on site would occur over the five-month field investigation phase of the Project. Further, equipment will be delivered to the Project Site one time (not daily), reducing the number of necessary trips. The Project will not constitute inefficient, wasteful, or unnecessary transportation energy use. Impacts would be less than significant.

5.3.3 Geology and Soils

The proposed Project is not located within or near an Alquist-Priolo Earthquake Fault Zone or on a seismic zone hazard map, or near any associated faults. The nearest active fault as mapped by the California Department of Conservation is located 93.5 miles from the Project Site. The soil types and climate in the Project Site do not provide the conditions susceptible to liquefaction (DTSC 2011). Therefore, the Project is not expected to be at risk of potential adverse impacts from seismic events. The drilling, excavation, and access road improvement activities associated with the soil sampling would require minimal water for dust control and would therefore not generate enough water to cause erosion or loss of topsoil. The pilot studies would involve the injection of water via a temporary infiltration gallery or injection wells, and would not generate surface water that could cause erosion or loss of topsoil. The decontamination of equipment would occur inside the Station in areas where all decontamination water would be contained and routed to existing Station surface-water runoff-control infrastructure. No unstable geologic units or expansive (subject to shrink-swell) soils have been identified that would affect the short-term sampling activities of the Project. The Project does not include construction of septic tanks or alternate waste-water disposal systems.

Based on the above-cited information, there would be no impact related to geology and soils. Potential impacts resulting from the removal of soil related to the cultural and spiritual beliefs of Native American Tribes is discussed in Section 4.4, "Cultural Resources."

5.3.4 Greenhouse Gas Emissions

In considering whether the proposed Project would generate greenhouse gas (GHG) emissions, either directly or indirectly, the principal GHGs are compared to established thresholds. Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs) are the primary emissions of concern. Because these different GHGs have different warming potential (the amount of heat trapped by a certain mass of a GHG), and CO_2 is the most commonly referenced gas for climate change, GHG emissions often are quantified and reported as CO_2 equivalents (CO_2e). For the worse-case year (2015), the Project would result in 1,137 metric tons per year or 9,735 pounds per day CO_2e.

The Mojave Desert Air Quality Management District has established GHG thresholds for CO_2e for individual projects of 100,000 tons per year or 548,000 pounds per day. The Project is expected to last up to 27 months and could therefore generate up to 2,653 metric tons of CO2e total for the full duration of Project activities, which is substantially below MDAQMD's significance threshold. In addition, the Project also is in compliance with San Bernardino County's GHG Emissions Reduction Plan (GHG Plan; County of San Bernardino 2011). The GHG Plan presents a comprehensive set of actions to reduce San Bernardino County's internal and external GHG emissions to 15 percent below current levels by 2020, consistent with the AB 32 Scoping Plan adopted by the California Air Resources Board (CARB). San Bernardino County has adopted a review standard of 3,000 metric tons per year of CO_2e to identify projects that require the use of the GHG Plan's project screening tables or a project-specific technical analysis to quantify and mitigate project-level GHG emissions. The proposed Project would generate up to 1,137 metric tons per year, which is below San Bernardino County's review standard of 3,000.

Since San Bernardino County adopted its GHG Plan, CARB has adopted the First Update to the Climate Change Scoping Plan (the Scoping Plan Update; CARB 2014). According to the Scoping Plan Update, "California is on track to meet the near-term 2020 greenhouse gas limit and is well positioned to maintain and continue reductions beyond 2020 as required by AB 32." Based on recent scientific data, CARB recalculated the 1990 GHG emissions level to be 431 million metric tons CO_2e and accordingly adjusted upwards in the Scoping Plan Update the prior Scoping Plan's 2020 GHG emissions limit of 427 million metric tons CO_2e. Accordingly, San Bernardino

County's review standard of 3,000 metric tons per year is conservative, since it was based on compliance with the original Scoping Plan's GHG emissions target.

Based on the above-cited information, the Project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. Furthermore, the proposed Project would not result in long-term activities and GHG emissions. In summary, since the proposed Project would result in minimal GHG emissions over a short-term duration, the Project would not result in generating GHG emissions that would have a significant impact on the environment or conflict with an applicable plan, policy or regulation adopted for the purpose of reducing GHG emissions. The proposed Project would result in less than significant GHG emissions.

5.3.5 Land Use and Planning

The proposed Project would conduct soil investigation activities inside the Station fence line, as well as outside the Station fence line in areas that may have been affected by the release of chemicals of potential concern (see Figure 3-2). The lands adjoining the PG&E parcel are owned and/or managed by a number of government agencies and private entities. These include lands owned by the Fort Mojave Indian Tribe (FMIT); the Havasu National Wildlife Refuge, which is managed by the U.S. Fish and Wildlife Service (USFWS); lands managed by the U. S. Department of the Interior (DOI) (including the BLM and Bureau of Reclamation [BOR]); California Department of Transportation (Caltrans)—leased land; the Burlington Northern Santa Fe Railway; and other privately owned lands (see Figure 3-7).

Areas in the Project vicinity are largely undeveloped. The closest residential communities that exist in the vicinity of the proposed Project include the Moabi Regional Park located in the northwestern portion of the Project Site in San Bernardino County, California. The Pirate Cove Resort within Moabi Regional Park allows for short-term residents in mobile homes for a period of up to 5 months in a given year. Several individual residences are located directly across the Colorado River in Arizona. Additionally, the residential community of Topock is located 4 miles north of the Project Site in Mohave County, Arizona. Project activities would not occur within these residential communities. As shown in Figure 3-2, the access/haul routes associated with the proposed Project are located on the Park Moabi Entrance Road and National Trails Highway (Historic Route 66), which are also public access roads to the Moabi Regional Park and mobile home park. Traffic impacts involved with the access/haul route activities (discussed in Section 5.3.10) are temporary and would not divide an established community. No other Project operations would occur adjacent to or within the Moabi mobile home park. As a result, impacts related to physical division of an established community would not occur.

Soil investigation activities would occur on land managed and owned by the agencies and entities described above and shown in Figure 3-7. The *Lake Havasu Field Office Resource Management Plan* (BLM 2007) is the BLM land use regulatory document that provides comprehensive management of approximately 1.3 million acres of the BLM-administered public land located within the Lake Havasu Field Office planning area, which includes the Project Site. The approved plan includes a land use decision that states that no new development of any kind will be allowed in the floodplain of desert washes except for the purposes of public health and safety or resource protection (Policy RR-42) (BLM 2007:99). No new permanent buildings or features would be constructed as part of the proposed Project; infiltration galleries associated with pilot studies would be removed and backfilled with native material and all injection and recovery wells would be removed and holes abandoned in accordance with DTSC guidelines (DWR Bulletin 74-90, California Well Standards) and ASTM Standard 5299-99, Standard Guide for Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes and Other Devices for Environmental Activities. These temporary structures are necessary in order to characterize potentially harmful soil to public health. Therefore, implementation of the proposed Project would not conflict with the policies of BLM's *Lake Havasu Field Office Resource Management Plan*.

The USFWS *Lower Colorado River National Wildlife Refuges Comprehensive Management Plan* includes a goal to ensure that only compatible and appropriate activities occur on the lower Colorado River national wildlife refuges, and to regulate activities, uses, and practices on and off the refuges that are potentially harmful to refuge resources (USFWS 1994:148). Under the proposed Project, soil investigation activities would occur within the USFWS National Wildlife Refuge; however, Project activities are consistent with USFWS's intent of the National Wildlife Refuge, which is to conserve a diversity of wildlife and their habitats for the benefit of current and future generations. Therefore, the Project would not conflict with the resource management goals of the USFWS, which is the applicable habitat conservation plan for the Project Site.

Activities associated with the proposed Project would be located in areas designated for either open space, resource conservation, and/or institutional under the County General Plan (San Bernardino County 2007). The objective of the open space land use designation is to maintain open space. Project activities would be short-term in nature and would not result in any permanent above-ground features that would conflict with the open space designation. The purpose of the resource conservation land use designation is to preserve open space, watershed, and wildlife habitat areas. Because the Project involves investigation of soil contamination for future remediation efforts, and would therefore function to preserve open space, watershed, and wildlife habitat areas in the future, the Project would be consistent with the resource conservation land use designation. The objective of the institutional land use designation is to provide areas for development of future public facilities to meet public needs. The proposed Project would be consistent with this designation because the Project would investigate soil contamination to protect the health and safety of the public. The proposed Project would not conflict with the overall intent of the County General Plan land use designations.

5.3.6 Mineral Resources

The California Surface and Mining Act of 1975 requires the classification of land into Mineral Resource Zones (MRZs) according to the land's known or inferred potential to contain mineral resources (California State Mining and Geology Board 2000). The Project Site has been classified as MRZ-4 (California Department of Conservation 1985). MRZ-4 is defined as areas where geologic information does not rule out either the presence or absence of mineral resources. MRZ-4 is commonly applied to areas of unknown mineral potential that occur within a broader favorable terrain known to host economic mineral deposits.

The following are the three general categories of geologic mineral resources that may be present in the Project Site:

1. Construction Mineral Materials: Sand, gravel, and crushed rock. The federal land management agencies, including the BLM, USFWS, and BOR, refer to these as “saleable mineral resources.”
2. Metallic and Rare Minerals: Gold, silver, platinum, iron, copper, lead, zinc, gemstones, and semiprecious materials. The federal land management agencies refer to these as “locatable mineral resources.”
3. Leasable Mineral Resources: Oil, coal, sodium, potassium, and geothermal resources. The federal land management agencies refer to these as “leasable mineral resources.”

It is possible that any of the three resource categories listed above may be present in the Project Site classified as MRZ-4. The classification of MRZ-4 does not rule out either the presence or absence of mineral resources and the classification is also commonly applied to areas that occur within a broader favorable terrain known to host economic mineral deposits. Metallic, rare, and leasable minerals may also be present, but their existence in the Project Site is unknown at this time. The Project Site’s geologic units/stratigraphy and the physical characteristics and setting of the Project Site, as detailed above, indicate that construction mineral materials, including sand and gravel, are present in the Project Site.

Although there is the potential for some mineral resources to exist in and around the Project Site, the proposed Project would not significantly reduce the availability of known mineral resources. There are no mining claims on or immediately adjacent to the Project Site. In addition, the majority of federal lands in the Project Site are closed to mineral entry (i.e., mining claims) under the General Mining Act of 1872, as amended. The soil investigation activities would be temporary and short-term in nature, and would therefore not be present for extended periods of time. Thus, no impact would occur related to loss of availability of a known mineral resource, either of regional or local importance.

5.3.7 Population and Housing

The proposed Project does not involve displacement of existing housing or people. The soil sampling mobilization would occur for 1 month and active field investigations would occur for approximately 5 months. Soil sampling field investigation activities would require a maximum of 13 employees plus agency oversight personnel, an archaeological monitor, and Tribal monitors. The bench scale tests would require two employees for 3 months, the pilot studies would each require up to three employees for 10 months, the geotechnical evaluations would require up to three employees for 2 months, and the plant or other biota sampling would require two workers for up to 2 months. Due to the small number of temporary employees, no new housing would be required as a result of the proposed Project. No impact would occur to population and housing. For these same reasons, and due to the investigative, short-term nature of the Project, no growth inducing impacts would occur.

5.3.8 Public Services

The proposed Project would not require the provision of new or additional public services. The soil sampling mobilization would occur for 1 month and active field investigations would occur for approximately 5 months. Soil sampling field investigation activities would require a maximum of 13 employees plus agency oversight personnel, an archaeological monitor, and Tribal monitors. The bench scale tests would require two employees for 3 months, the pilot studies would each require up to three employees for 10 months, the geotechnical evaluations would require up to three employees for 2 months, and the plant or other biota sampling would require two workers for up to 2 months. There would be no increases in demand for police, fire, or other emergency services associated with the proposed Project. The proposed Project would not result in substantial adverse impacts to any local schools, parks, hospitals, or other public facilities because the proposed Project involves soil investigation activities and is not a community development project that would generate the need for additional public services and result in impacts to public facilities. Therefore, no impact would occur related to fire protection, police protection, schools, parks, or other public facilities.

5.3.9 Recreation

The proposed Project would not generate additional residents to the area and would not increase the use of existing neighborhood and regional parks or other recreational facilities. The soil sampling mobilization would occur for 1 month and active field investigations would occur for approximately 5 months. Soil sampling field investigation activities would require a maximum of 13 employees plus agency oversight personnel, an archaeological monitor, and Tribal monitors. The bench scale tests would require two employees for 3 months, the pilot studies would each require up to three employees for 10 months, the geotechnical evaluations would require up to three employees for 2 months, and the plant or other biota sampling would require two workers for up to 2 months. The Project does not propose construction of any new recreational facilities. The proposed Project would not introduce facilities that would preclude existing recreational uses that occur on the Colorado River or the National Wildlife Refuge, which includes boating, wildlife observation and photography, education and interpretation, hunting, and fishing. Therefore, no impact would occur related to recreation.

5.3.10 Transportation and Traffic

This discussion addresses whether the proposed Project would degrade a roadway segment or intersection currently operating at an acceptable Level of Service (LOS) C or better to LOS D, E, or F or add traffic to a roadway segment or intersection operating at an unacceptable level; conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system; result in a change in air traffic patterns that result in substantial safety risk; substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses; result in inadequate emergency access; or conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities. This section is supported by traffic data compiled in the Traffic Impact Study prepared by LIN Consulting, which is included as **Appendix E** to this DEIR.

Soil sampling field investigation activities would occur over approximately 5 months and would require a maximum of 1,540 trips. This includes worker trips, equipment hauling, and vehicle deliveries. Water used for drilling activities would be trucked from the existing water tanks at the Station as needed. If implemented, the 25 percent soil sampling contingency would require an additional 385 trips over a 2- to 3-month period. The following activities would be conducted after all soil sampling has taken place: Bench scale tests would require approximately 40 worker trips for 1 month; geotechnical evaluations would require approximately 128 worker and equipment trips for 2 months; and plant or other biota sampling would require approximately 60 worker trips for 6 weeks. Pilot studies would not be conducted concurrently to allow for the same equipment and workers to be used to implement each study; however, the pilot studies could be completed concurrently with the geotechnical evaluations and plant or other biota sampling. The pilot studies at the bottom of Bat Cave Wash would require approximately 482 trips over 8 months, and the pilot study in the Station would require approximately 354 trips over 8 months. To analyze a conservative scenario in this situation, the 25 percent contingency and the soil sampling activities are assumed to occur concurrently.

It is assumed each of the workers for all project components would drive one vehicle to and from the Project Site each day, and would arrive during the morning peak period (7 A.M. to 9 A.M.) and depart during the evening peak period (4:00 P.M. to 6:00 P.M.). Most workers would drive to the Project Site from nearby communities, including Needles, Laughlin, and Lake Havasu City.

The study area for the proposed Project includes the following roadways: Park Moabi Road, I-40, and the National Trails Highway. The access/haul routes associated with the proposed Project are located on the Park Moabi Entrance Road and National Trails Highway, which are also public access roads to the Moabi Regional Park and the mobile home park. Existing roadway segment volumes were compared to roadway segment capacities identified in the San Bernardino County General Plan based upon the LOS C volume threshold of 7,000 Average Daily Traffic (ADT). **Table 5-1** presents the results of the existing ADT count on Park Moabi Road north and south of Interstate 40 (I-40).

TABLE 5-1
EXISTING YEAR ROADWAY SEGMENT VOLUME

Direction	North of Needles (I-40) Freeway (ADT)	South of Needles (I-40) Freeway (ADT)
Northbound on Park Moabi Road	318	8
Southbound on Park Moabi Road	334	8
Total ADT	652	16
LOS C Capacity	7,000	7,000

NOTES: Based on the threshold in the *County of San Bernardino 2007 General Plan*; Existing conditions were taken on June 18, 2013, when a 24-hour tube count was performed on the roadway segments.
SOURCE: LIN Consulting 2014 (Appendix E).

As shown in Table 5-1, the Park Moabi Road segments north and south of I-40 are well below San Bernardino County's threshold of 7,000 ADT. Therefore, roadway segments in the Project vicinity do not operate at a level worse than LOS C and impacts from soil investigation activities would be less than significant.

LOS for a Two-Way-Stop-Control intersection is determined by the Average Control Delay and is defined for each minor movement. Roadway Daily Volume Thresholds in the Desert Region of LOS C intersections have an intersection Average Control Delay of 15–25 seconds/vehicle. Subsequently, intersections with LOS B and LOS A operate at 10–15 seconds/vehicle and 0–10 seconds/vehicle, respectively. The LOS for the study area intersections under 2014 conditions with and without traffic activity from the proposed Project are shown in **Table 5-2**.

TABLE 5-2
CHANGE IN LOS AND AVERAGE CONTROL DELAY – YEAR 2014

	Year 2014 Without Project LOS/ Avg Control Delay		Year 2014 With Project LOS/Avg Control Delay	
Intersection	Weekday A.M. Peak Hour	Weekday P.M. Peak Hour	Weekday A.M. Peak Hour	Weekday P.M. Peak Hour
Park Moabi Road and I-40 westbound on-/off-ramps	LOS A/8.4	LOS A/8.7	LOS A/8.6	LOS A/9.0
Park Moabi Road and I-40 eastbound on-/off-ramps	LOS A/8.6	LOS A/9.1	LOS A/8.6	LOS A/9.4

NOTES: LOS = level of service
For side-street stop-controlled intersections, delay for worst movement was calculated using the 2000 *Highway Capacity Manual* methodology.
SOURCE: LIN Consulting 2014 (Appendix E).

As shown in Table 5-2, the two Park Moabi Road/I-40 intersections under existing conditions (in Year 2014) are operating within the 0–10 seconds/vehicle range (LOS A) during the A.M. and P.M. peak hours, and below the County threshold of 15–25 seconds (LOS C). Table 5-2 demonstrates that even with additional traffic as a result of the proposed Project, Average Control Delay levels continue to operate within the LOS A range.

The additional traffic generated as a result of the proposed Project would be short-term, consistent with the length of Project activities, and intersections and roadway segments would continue to operate below County thresholds during soil investigation activities. As a result, the Project would not add traffic to a roadway segment or intersection that would degrade the operation to an unacceptable level, or conflict with any applicable plan establishing measures of effectiveness of performance of the circulation system. Impacts would be less than significant.

The nearest public airport to the proposed Project is the Needles Airport, located 6 miles from the Project Site's most western boundary. The tallest piece of construction equipment mobilized to the Project Site would be approximately 36 1/2 feet high and would not pose any hazard to nearby airports because of the minimal height and temporary nature. The proposed Project does not involve construction of any facilities that would pose a safety risk to nearby airports or alter traffic control patterns. No impact to airport hazards would occur.

The proposed Project does not involve elements that would create new hazards or hazardous roadways. While the proposed Project would add slight traffic during the short-term Project activities, the increase in traffic is not anticipated to pose a hazard or safety concern such that it would result in a significant environmental impact. Impacts related to an increase in hazards due to a Project element are less than significant.

Adequate emergency access would be maintained throughout the lifetime of the Project. Existing access/haul routes would be used and no additional emergency access would be required as a result of proposed Project activities. No impact to emergency access would occur.

The Project Site is located in a rural, largely undeveloped area that does not have an existing public transit system or bicycle and pedestrian facilities. The Project would implement soil investigation activities, which are not related to the provision of, or changes to, alternative transportation. As a result, Project activities would not conflict with any adopted policies, plans, or programs supporting alternative transportation.

5.3.11 Utilities and Service Systems

As discussed above, the Project would not result in irreversible environmental changes related to inefficient use of energy or natural resources or cause environmental accidents. This subsection analyses the potential impacts to utilities and service systems from implementation of the proposed Project, all of which are less than significant or have no impact.

5.3.11.1 Soil Waste

The proposed Project would generate investigation-derived waste (IDW), including incidental nonhazardous waste and hazardous waste during the soil investigation activities. IDW materials that would be generated include drill cuttings, sampling equipment wash water (decontamination water), personal protective equipment, and incidental trash. The estimated amount of solid waste that may be generated ranges from less than 5 cubic yards up to 20 cubic yards. Nonhazardous incidental wastes from drilling activities, such as trash (e.g., gloves, disposable clothing, food waste) would typically be either hauled off the drill site at the end of the day or placed in dumpsters or roll-off bins that would be hauled off-site periodically by truck to an appropriately permitted municipal solid waste or recycling facility located within approximately 200 miles of the Project Site.

The Soil Work Plan provides standard operating procedures and Best Management Practices to manage waste soil generated from drilling and excavating activities for the soil sampling activities. The waste soil will be stored in U. S. Department of Transportation–compliant drums or lined, steel roll-off soil bins that would be temporarily staged in previously used staging areas to the extent practicable. The number and size of drums and roll-off bins would vary depending on the number of borings installed and the drilling methods used. Standard practices, such as use of plastic sheeting over the ground surface, would be employed in the drilling and staging areas as necessary to keep the drilling materials and equipment clean and to minimize contact of the drilling materials and equipment with the ground surface.

Soil analytical results will be used to identify appropriate management of waste soil. The only anticipated soil disposal would occur for soil sampling activities, the potential 25 percent contingency sampling, and the geotechnical evaluation. All soil and other IDW will be handled, transported, and disposed of in accordance with applicable local, state, and federal laws. Displaced soil as a result of soil sampling activities, 25 percent contingency, and geotechnical evaluations would be analyzed and characterized as either as RCRA or non-RCRA hazardous waste, nonhazardous clean soil (unregulated), or nonhazardous soil for long-term storage (also unregulated). After sampling and characterization, the drums or bins with hazardous soil cuttings would be removed within 90 days of generation from the IDW staging area using heavy trucks and transported for disposal in a permitted off-site hazardous waste disposal facility. These facilities include: Kettleman Hills Landfill in Kings County, California, or Clean Harbors Buttonwillow Landfill in Buttonwillow, California. **Table 5-3** shows the capacity of these landfills, along with the Mojave Valley Landfill in Arizona, which does not accept hazardous waste. Unregulated soil would be stockpiled at designated soil storage areas in accordance with Appendix J, Attachment 1, of the Soil Work Plan, which describes the protocols, including planning (including Tribal input), short-term and long-term handling and storage procedures, contamination assessment, and determination of final disposition.

Soil from the bench scale tests will be hauled off-site for testing and would not be reused on-site or disposed of in a landfill. The temporary infiltration galleries and wells installed as a result of the pilot studies would be backfilled with native material upon completion of tests. No soil disposal would be required. For plant or other biota sampling, tissue samples would be collected from locations where soil sampling has already been completed or planned and no new waste soil is anticipated.

TABLE 5-3
LANDFILLS IN THE VICINITY, PERMITTED CAPACITY, AND ANTICIPATED FACILITY LIFESPAN

Landfill	Remaining Capacity	Maximum Daily Capacity	Distance from Topock (approx.)	Anticipated Cease of Operations
Kettleman Hills	6,000,000 Cubic Yards	8,000 tons/day	375 miles	unknown
Clean Harbors Buttonwillow	9,000,000 Cubic Yards	10,482 tons/day	323 miles	2040
Mohave Valley Landfill	unknown[2]	400 tons/day	20 miles	unknown

NOTE: Data are presented by as a combination of mass (tons/day) and volume (cubic yards).
SOURCE: CalRecycle 2013a and 2013b; Clean Harbors Buttonwillow 2013; Pers. Communication Mohave Valley Landfill 2013.

As shown in Table 5-3, the maximum projected waste stream of up to 20 cubic yards would not exceed the available capacity of relevant landfills. The Project would be served by a landfill with sufficient permitted capacity to accommodate the Project's solid waste disposal needs, and the impact would be less than significant.

5.3.11.2 Water and Wastewater

Soil Sampling Activities and Geotechnical Evaluation

Approximately 2,000 gallons of water would be used during soil sampling and geotechnical evaluation drilling and decontamination activities. Up to 500 additional gallons of water would be used for contingency sampling if required. Decontamination of sampling tools would be conducted on a temporary decontamination pad lined with plastic sheeting located on PG&E property at specific locations to be determined. Heavy equipment such as drill rigs and drill rods will be decontaminated at the concrete-lined decontamination pad located adjacent to the Station access road.

As discussed, water used during drilling activities (e.g., drilling fluid to assist drill rod advancement, decontamination of equipment, dust suppression) would be trucked from the existing water tanks at the Station. PG&E's existing Lower Colorado River Water Supply Project contracted entitlement is 422 acre-feet per year (AFY). Water at the Station is supplied by wells located on the Arizona side of the Colorado River, and these wells would also supply water needed for drilling activities. Up to 2,500 gallons of water (0.006 AFY) would be used for drilling activities, which is a fraction of the 70 to 100 AFY of water used at the Station. No new or enlarged entitlements would be needed as a result of the proposed Project. All extracted water would come from the Colorado River Basin and would be returned after treatment to the Colorado River Basin via reinjection wells within the Colorado River accounting surface. Drinking water for use by personnel conducting investigation activities would be trucked from

[2] Personal communication with a representative at the Mohave Valley landfill indicated that in the last 20 years, the landfill had utilized 17 acres out of 160 acres.

off-site. The Project would have sufficient water supplies available to serve the Project from existing entitlements and resources. The impact to water supply would be less than significant.

Water generated during soil sampling and geotechnical evaluation decontamination activities would be stored temporarily in drums, bins, or portable storage tanks. It is expected that up to 2,000 gallons of wastewater would be generated from soil sampling (plus 500 additional gallons of wastewater for contingency sampling if required). These tanks would be located temporarily at the drilling sites and/or at existing IDW staging areas developed during previous investigations. Samples of the decontamination water would be analyzed and the result would be used to identify the appropriate disposal of the decontamination water. After characterization, water generated from decontamination activities would likely be processed on-site at the existing Interim Measure 3 (IM-3) treatment facility and re-injected into the aquifer, or trucked off-site for disposal if IM-3 treatment facility is off-line or decommissioned in accordance with the groundwater remedy implementation procedures. Prior to treatment of water at IM-3 treatment facility, the water will be tested to determine whether it contains contaminants (i.e., organics) that the IM-3 is not designed to treat. If the water contains contaminants that the IM-3 will not treat, then it will be disposed of off-site at an appropriate facility.

Based on disposal activities conducted to date at the Station, the off-site facility likely would be in the Phoenix or Los Angeles areas. Because this effluent is disposed of by the wastewater contractor and handled consistent with applicable requirements and regulations, it is assumed that it would not exceed applicable water treatment standards and does not exceed existing treatment capacity. Discharges associated with the proposed Project have been permitted by the Colorado River Basin Regional Water Quality Control Board under Waste Discharge Requirements. Because soil sampling and geotechnical evaluation activities would produce up to 2,500 gallons of water[3], the soil sampling and geotechnical evaluations would not generate effluent that would exceed applicable standards or capacity, nor would the proposed Project require the construction of new treatment facilities. Impacts would be less than significant.

Because the Project Site is not located in an incorporated city, no municipal laws or regulations related to utilities and service systems are applicable to the proposed Project. No impact would occur.

Pilot Studies

In Situ Soil Flushing

The in situ soil flushing pilot study would involve the application of water or additives containing water to soil to enhance contaminant solubility. The amount of water required for the flushing would range between 700,000 to 1,000,000 total gallons of water (approximately 8,000 gallons per day). This water would be sourced from the Station water supply via a temporary 1-inch diameter rolled HDPE tubing that would run above ground from the Station down into Bat Cave Wash.

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[3] On average, this would be approximately 6.87 gallons for each of 292 sample locations. However, many of the sample locations will be accessed using hand tools which require much less water, whereas the samples acquired using the sonic drill rig may require more.

PG&E's existing Lower Colorado River Water Supply Project contracted entitlement is 422 AFY. Water at the Station is supplied by wells located on the Arizona side of the Colorado River, and these wells would also supply water needed for in situ soil flushing. Up to 1,000,000 gallons of water (approximately 3 AFY) generated from soil flushing is a fraction of the 70 to 100 AFY of water used at the Station. No new or enlarged entitlements would be needed as a result of the proposed Project. All extracted water would come from the Colorado River Basin and the majority would be returned after treatment to the Colorado River Basin via reinjection wells within the Colorado River accounting surface. Drinking water for use by personnel conducting soil flushing activities would be trucked from off-site. The Project would have sufficient water supplies available to serve the Project from existing entitlements and resources. The impact to water supply would be less than significant.

Recovered flush water would be pumped and piped to a temporary holding tank, located on the Station. Recovered flush solution would be temporarily stored within a 20,000 gallon tank located on the Station. This tank will be pumped to a 7,000 gallon tanker truck for transfer on a daily basis. It is assumed flush water would be transported to:

- The IM-3 water treatment plant for treatment;
- To an offsite treatment facility in Los Angeles (if the water is hazardous) or Phoenix (if the water is nonhazardous); or
- If the recovered water is hazardous, it may also be treated onsite with a portable water treatment system to non-hazardous levels and subsequently trucked to Phoenix.

Because this effluent is disposed of by the wastewater contractor and handled consistent with applicable requirements and regulations, it is assumed that it would not exceed applicable water treatment standards and does not exceed existing treatment capacity. Discharges associated with the proposed Project have been permitted by the Colorado River Basin Regional Water Quality Control Board under Waste Discharge Requirements. Impacts would be less than significant.

Because the Project Site is not located in an incorporated city, no municipal laws or regulations related to utilities and service systems are applicable to the proposed Project. No impact would occur.

In Situ Stabilization/Chemical Fixation

The in situ stabilization/chemical fixation pilot study would involve the application of water or additives containing water to soil to enhance contaminant solubility. Water would be sourced from the Station water supply via a temporary 1-inch diameter rolled HDPE tubing, however for the in-situ fixation/stabilization pilot study, the water needs are much less, totaling approximately 200,000 gallons (approximately 0.61 AFY), and there is no need to recover and treat flushing solutions. Impacts to water supply or wastewater capacity would be less than significant.

Because the Project Site is not located in an incorporated city, no municipal laws or regulations related to utilities and service systems are applicable to the proposed Project. No impact would occur.

5.4 Growth Inducement

As required by CEQA, this EIR must discuss ways in which the project could foster economic or population growth or the construction of additional housing, either directly or indirectly, in the surrounding area (CEQA Guidelines, Section 15126.2[d]). Induced growth is any growth that exceeds planned growth and results from new development that would not have taken place in the absence of a project. A project can be determined to have a growth-inducing impact if it directly or indirectly causes economic or population expansion through the removal of obstacles to growth or encourages or facilitates other activities that could significantly affect the environment; actions that are sometimes referred to as "growth accommodating."

The proposed Project is located in eastern San Bernardino County, California. The U.S. Census Bureau indicates that the population of San Bernardino County grew from 1,709,434 persons in 2000 to 2,035,210 persons in 2010 (U.S. Census Bureau 2010). This represents an increase of 325,776 persons, or a 19 percent increase. Based on projections for San Bernardino County, population growth for the County is expected to continue at a rapid pace, increasing from 2010 to 2040 by approximately 47 percent (California Department of Finance 2013). The city of Needles, located in California, is the closest urban community to the Project Site. Population data specific to Needles shows the community grew from 4,830 persons in 2000 to 4,844 persons in 2010 (U.S. Census Bureau 2010). This represents an increase of 14 persons, or approximately a 0.3 percent increase.

The proposed Project would involve soil investigation activities that are temporary and short-term in nature. Soil sampling field investigation activities would require a maximum of 13 employees plus agency oversight personnel, an archaeological monitor, and Tribal monitors. The bench scale tests would require two employees for three months, the pilot studies would each require up to three employees for ten months, the geotechnical evaluations would require up to three employees for two months, and the plant or other biota sampling would require two workers for up to two months. The proposed Project would not result in the creation of new residences on or adjacent to the Project Site. The anticipated employment, both direct and indirect, generated by the proposed project is evaluated in Section 5.3.7, "Population and Housing."

No new residents are anticipated as a result of the soil investigation activities associated with the proposed Project, so no increase in growth would occur as a result of the soil investigation activities.

The Project Site is currently served by existing roadways, utilities, and public services, and no additional off-site infrastructure is anticipated. Implementation of the proposed Project would not result in primary or secondary environmental effects related to additional growth. No impact would occur.

CHAPTER 6
Cumulative Analysis

6.1 Introduction to Cumulative Analysis

This chapter presents an analysis of the cumulative effects of the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Soil Investigation Project (Project) in combination with other past, present, and reasonably foreseeable future projects within the Project Site and surrounding area that could cause related environmental impacts similar to those anticipated to occur under the proposed Project and discussed in this draft environmental impact report (DEIR). The focus of this cumulative impacts analysis is on the proposed soil investigation activities and the geographic context appropriate for each resource area.

California Environmental Quality Act (CEQA) Guidelines Section 15130 requires that an environmental impact report (EIR) shall discuss cumulative impacts of a project when the project's incremental effect is "cumulatively considerable." "Cumulative impacts" are defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." (CEQA Guidelines, Section 15355; see also Pub. Resources Code, Section 21083, subd. (b).) Stated another way, "a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts." (CEQA Guidelines, Section 15130, subd. (a)(1) (emphasis added).) The definition of cumulatively considerable is provided in Section 15065(a)(3):

> "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

According to Section 15130(b) of the CEQA Guidelines:

> [t]he discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.

For purposes of this DEIR, the proposed Project would cause a cumulatively considerable and therefore significant cumulative impact if:

- The cumulative effects of other past, current, and probable future projects without the Project are not significant and the Project's incremental impact is substantial enough, when added to the cumulative effects, to result in a significant impact; or
- The cumulative effects of other past, current, and probable future projects without the Project are already significant and the Project would result in a cumulatively considerable contribution to the already significant effect. The standards used herein to determine whether the contribution is cumulatively considerable include the existing baseline environmental conditions, and whether the project would cause a substantial increase in impacts, or otherwise exceed an established threshold of significance.

6.2 Geographic Scope

The geographic area affected by the proposed Project and its potential to contribute to cumulative impacts varies based on the environmental resource under consideration. Generally, the geographic area associated with the environmental effects of the Project as described in Chapter 4 define the boundaries of the area used for compiling the list of past, present and reasonably foreseeable future related projects considered in the cumulative impact analysis. The air quality analysis, however, includes consideration of regional air emissions (e.g., reactive organic gases [ROG]/nitrogen oxides [NO_x] and particulate matter [PM]) and therefore includes the entire air basin. Conversely, in the case of noise impacts, given the localized impact Area of Concern (AOC), a smaller more localized area surrounding the immediate Project Site is appropriate for consideration. **Table 6-1** presents the geographic areas included within this analysis for purposes of determining whether the Project's contribution to a particular impact would be cumulatively considerable and therefore significant. An explanation of the geographic scope selected for each resource is also briefly included below under the impact analysis.

TABLE 6-1
GEOGRAPHIC SCOPE OF CUMULATIVE IMPACTS ANALYSIS

Resource Issue	Geographic Scope
Aesthetics	The foreground zone that extends 0.25 miles to 0.5 miles from the Project Site and the middleground zone that extends from the foreground up to 3 to 5 miles
Agricultural Resources	Eastern San Bernardino County, California (Desert Regions)
Air Quality	Mojave Desert Air Basin; Global (greenhouse gases)
Biological Resources	Project Site and surrounding lands along with drainages that are connected to the Project Site, including the Colorado River
Cultural Resources	Lower Colorado River Valley
Energy Resources	Eastern San Bernardino County, California
Geology and Soils	Project Site and areas immediately adjacent
Hazardous Materials	Mojave Desert Air Basin, watershed, groundwater basin, with focus on and in the vicinity of the Project Site
Hydrology and Water Quality	East Colorado River Basin (focus on downstream areas); Needles Valley groundwater basin
Land Use and Planning	San Bernardino County, California

TABLE 6-1
GEOGRAPHIC SCOPE OF CUMULATIVE IMPACTS ANALYSIS

Resource Issue	Geographic Scope
Mineral Resources	Eastern San Bernardino County, California (Desert Regions)
Noise	Project Site and areas immediately adjacent
Population and Housing	Region (San Bernardino County, California, which includes the city of Needles, California, and neighboring Mohave County, Arizona)
Public Services	San Bernardino County, California
Recreation	Region (San Bernardino County, California, which includes the city of Needles, California, and neighboring Mohave County, Arizona, which includes the city of Lake Havasu City, Arizona.)
Transportation and Traffic	Park Moabi Road, I-40, and the National Trails Highway
Utilities and Service Systems	Eastern San Bernardino County, California

6.3 Temporal Scope

This cumulative impact analysis considers other projects that have been recently completed, are currently under construction, or are reasonably foreseeable (e.g., for which an application has been submitted). Both short-term and long-term cumulative impacts of the proposed Project, in conjunction with other cumulative projects in the area, are evaluated in this chapter of the DEIR.

The schedule and timing of the proposed Project and other cumulative projects, however, is relevant to the consideration of cumulative impacts, since the soil investigation activities associated with the proposed Project are short-term. The cumulative impact analysis, therefore, pays particular attention to any cumulative projects with implementation schedules that could overlap with the proposed soil investigation schedule for this Project. The majority of the related projects included in this cumulative impact analysis and discussed in Section 6.4 are projects overseen by PG&E at the Topock Compressor Station (Station).

6.3.1 Soil Sampling and Sample Analysis

Implementation of the proposed Project is anticipated to begin in 2015, pending approval of the *Soil RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan* (Soil RFI/RI Work Plan or Soil Work Plan) (CH2M HILL 2013; Appendix A to this DEIR) and completion of the CEQA process. The soil sampling activities are estimated to be completed within 12 months of initiation. The permitting and site planning is expected to take 2 months, field mobilization is expected to take 1 month, and field implementation is expected to take 9 months. The field implementation phase would occur over three stages that would include field investigation, data compilation, and stakeholder coordination. The field implementation would occur for approximately 9 months between February 2015 and October 2015, and would occur at the Station and surrounding area. All other Project-related activities would be conducted off-site.

6.3.2 Bench Scale Tests, Pilot Studies, Geotechnical Evaluations, and Plant or Other Biota Samples

These Project activities are anticipated to begin in late 2016, after the completion of the soil sampling and sample analysis. Bench scale tests would precede the pilot studies. Each pilot study would be implemented independently in order to make use of the same equipment and work force. The geotechnical evaluation and plant or other biota sampling would be conducted independent of bench scale tests and pilot studies, although these activities could occur concurrently with the bench scale tests and pilot studies.

6.4 Method of Analysis

CEQA Guidelines Section 15130 provides that the following approaches can be used to adequately address cumulative impacts:

- Regional Growth Projections Method — A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the Lead Agency; or
- List Method — A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency.

For the purpose of this DEIR, both approaches are used. This is due to the localized nature and specific nature of the proposed Project, and also because the Project Site is located in an area that has and will continue to experience some regional growth. This allows for a thorough, project-based cumulative analysis within the relevant geographic areas and timing of the proposed Project activities.

Consistent with CEQA, a two-step approach was used to analyze cumulative impacts. The first step was to determine whether the combined effects from the proposed project and other projects would be cumulatively significant. This was done by adding the proposed project's incremental impact to the anticipated impacts of other probable future projects and/or reasonably foreseeable development. Where the combined effect of the projects and/or projected development was determined to result in a significant cumulative effect, the second step was to evaluate whether the proposed project's incremental contribution to the combined significant cumulative impact would be cumulatively considerable as required by CEQA Guidelines Section 15130, subdivision (a).

It should be noted that CEQA Guidelines Section 15064, subdivision (h)(4) states that "[t]he mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable." Therefore, it is not necessarily true that, even where cumulative impacts are significant, any level of incremental contribution must be deemed cumulatively considerable by the lead agency. If the proposed project's individual impact is less than significant, however, its contribution to a significant cumulative impact could also be deemed cumulatively considerable depending on the nature of the impact and the existing environmental setting. If, for example, a proposed project is located in an air basin determined to be in extreme or severe nonattainment for a particular criteria pollutant, a project's relatively small contribution of the same pollutant could be found to be cumulatively considerable. Thus, depending on the circumstances, an impact that is less than significant when considered individually may still be cumulatively considerable in light of the impact caused by all projects considered in the analysis.

6.4.1 Regional Growth Projections

The proposed Project is located within a region (San Bernardino County, California, and neighboring Mohave County, Arizona) that has experienced recent growth, and is also projected to experience population increases in the future. **Table 6-2** shows growth trends in the two counties as well as the city of Needles, California, and Lake Havasu City, Arizona.

Regional and localized growth has the potential to result in numerous environmental impacts such as traffic congestion, air quality degradation, biological habitat loss, water quality degradation, and other environmental changes. This cumulative analysis considers the regional growth trends shown in Table 6-2 and the more specific individual projects that are discussed in this chapter.

TABLE 6-2
REGIONAL GROWTH PROJECTIONS

	Year				
Jurisdiction	**2010**	**2020**	**2030**	**2040**	**Percent Change (2000–2040)**
California					
San Bernardino County, California[1]	2,038,523	2,273,017	2,626,945	2,988,648	47
Unincorporated San Bernardino County, California[2]	289,400 (2008)*	301,600	372,600 (2035)*	N/A	29 (2010–2030)
City of Needles, California[2]	5,658 (2008)*	6,000	8,000 (2035)*	N/A	41 (2010–2030)
Arizona					
Mohave County, Arizona[3]	200,186	240,998	285,574	322,808	61
Lake Havasu City, Arizona[3]	52,527	58,223	63,669	66,968	28

* NOTE: SCAG dataset is presented for 2008 (instead of 2010) and for 2035 (instead of 2030).

SOURCES:
1 California Department of Finance 2013
2 SCAG 2012
3 Arizona Department of Administration 2013

6.4.2 List of Related Projects in the Vicinity

A summary of the projects identified at or within the general vicinity of the Project Site is provided in **Table 6-3** and shown in **Figure 6-1**. This is not intended to be an all-inclusive list of projects in the region, but rather a list of projects in the vicinity of the Project Site that may have some related environmental impact to the proposed Project and are: (1) recently completed, (2) currently under construction or implementation or beginning construction or implementation, (3) proposed and under environmental review, or (4) reasonably foreseeable.

The proposed Project is located near the Colorado River; thus, projects associated with federal agencies with interests along the river were considered as part of this analysis and included on the project list. While the Project Site is located in an unincorporated area of the County of San Bernardino, it is in the general vicinity of the city of Needles, California; Mohave County, Arizona; and Lake Havasu City, Arizona. For this reason, projects in each of the aforementioned jurisdictions are included in Table 6-3 as well. This analysis is based on information obtained from the U.S. Bureau of Reclamation (BOR); U.S. Bureau of Land Management (BLM); U.S. Fish and Wildlife Service (USFWS); the County of San Bernardino and the city of Needles, California; the County of Mohave and Lake Havasu City, Arizona; and PG&E.

The existing infrastructure within the Project Site, including roads, bridges, railroads, and utilities are not included in the Table 6-3, since these past projects in the vicinity of the proposed Project are part of the baseline/existing conditions that are considered throughout Chapter 4 of this DEIR. Likewise, the marinas in California and Arizona and nearby industrial facilities, such as the six natural gas transmission lines in the vicinity of the Project Site, are part of the baseline/existing conditions of this DEIR. Additionally, PG&E has conducted ongoing maintenance, investigation, and decommissioning projects for the past 10 years on-site, including tests and studies to evaluate technologies to reduce groundwater contamination. These projects are considered part of the existing/baseline conditions in this DEIR and are not included in Table 6-3. In addition, after the completion of the soil sampling that is proposed within this DEIR, which is expected to be completed by October 2015, areas identified as having soil contamination with chemicals of potential concern (COPCs) at concentrations above action levels, surface stains, and hazardous debris within the Station boundary and in the surrounding area may undergo remediation. The soil remedy, if needed, is anticipated to occur from mid-2016 into early-2017 at the Station and surrounding areas. The soil characterization and investigation proposed as part of this DEIR will by nature be completed by the time the soil remedy is identified and implemented and therefore no temporal overlap between the soil investigation Project and the soil remediation would occur. As such, the potential effects of any future soil remediation are not included in this cumulative analysis.

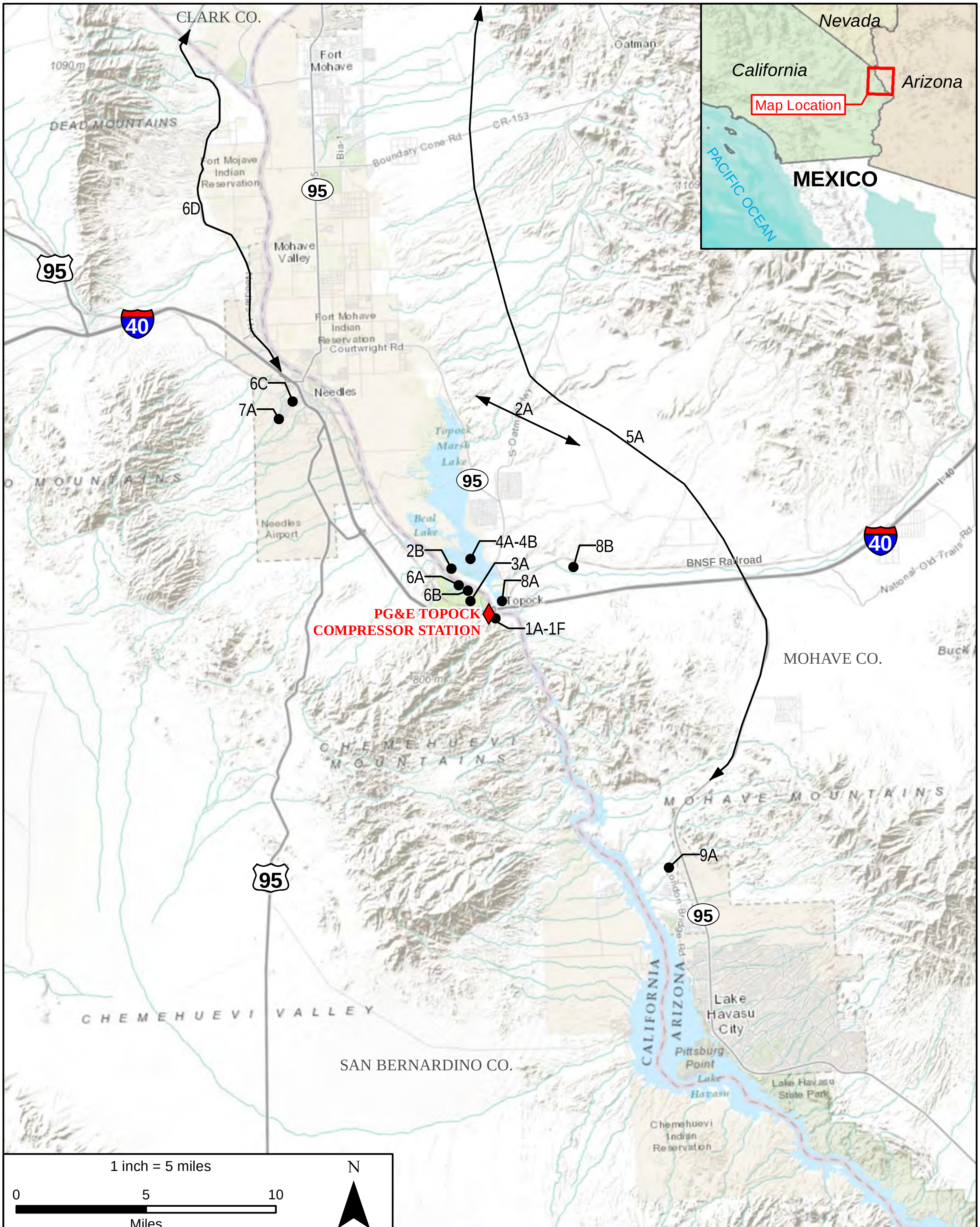
TABLE 6-3
LIST OF PROJECTS LOCATED AT OR WITHIN THE VICINITY OF THE PROPOSED PROJECT

Exhibit 6-1 Map Key	Project Name	Description of Project	Size (Acreage) or Extent	Jurisdiction/ Land Owner	Approximate Distance from Proposed Project (miles)	Implementation Status
1. PG&E						
1A	Site Improvement Projects	Minor annual site improvements based on available budget	Within the Station footprint and surrounding PG&E facilities	PG&E	On-site	2013-2014; Ongoing
1B	Interim Measure 3 Emergency Groundwater Extraction and Management	Provides extraction rate of 130 gallons per minute at TW-2 extraction well during month of highest groundwater discharge rates	Immediate vicinity of the Station	PG&E	On-site	Construction 2005; Ongoing
1C	Groundwater Remediation Project	Remediation of groundwater	Immediate vicinity of the Station	PG&E	On-site	2015–2017
1D	East Ravine Groundwater Investigation Phase 2	Drilling and groundwater investigation to characterize the groundwater flow pathway and groundwater conditions of bedrock formations in the East Ravine and MW-23 area	Immediate vicinity of the Station	PG&E	On-site	2012
1E	Groundwater Monitoring	Monitoring programs, including site-wide surface water monitoring, IM-3 performance monitoring	Immediate vicinity of the Station and on the AZ side of the river, near Topock, AZ	PG&E	On-site	Ongoing (quarterly)
1F	Repair of MW-38S and MW-38D and Old Well/Pipe Reconnaissance	Rehabilitation of the MW-38 well cluster and evaluation of the possible existence of an old well/ pipe in the bottom of Bat Cave Wash	Immediate vicinity of the Station	PG&E	On-site	Ongoing
2. U.S. Bureau of Reclamation						
2A	Lower Colorado River Multi-Species Conservation Program	Program to conserve and work toward recovery of endangered species and protect and maintain habitat along the Colorado River	Extends along Colorado River from Lake Meade to Southerly International Border with Mexico	Multiple federal agencies	Less than 1 mile	2012–2015
2B	Quarry Operations	Stockpiled materials are used by BOR for maintenance and construction of banklines, river control structures, levees, canals, and reservoirs along the Lower Colorado River	Parcel located directly north of the Moabi Regional Park footprint	BOR	Approximately 1 mile	Ongoing
3. U.S. Bureau of Land Management						
3A	Cathodic Protection System	Installation of cathodic protection system for a gas pipeline by Southern California Gas	Approximately 235 feet	BLM	Approximately 2,000 feet	2012

TABLE 6-3
LIST OF PROJECTS LOCATED AT OR WITHIN THE VICINITY OF THE PROPOSED PROJECT

Exhibit 6-1 Map Key	Project Name	Description of Project	Size (Acreage) or Extent	Jurisdiction/ Land Owner	Approximate Distance from Proposed Project (miles)	Implementation Status
4. U.S. Fish and Wildlife Service						
4A	Lower Colorado River National Wildlife Refuges Comprehensive Management Plan	Management plan for refuges along Lower Colorado River, including Havasu National Wildlife Refuge (HNWR)	HNWR: 30 river miles (300 miles of shoreline) between Needles, CA, and Lake Havasu City	USFWS	Less than 1 mile	2012-2014
4B	Topock Marsh Water Infrastructure Improvement Project on the Havasu National Wildlife Refuge	Replacement and rehabilitation of the HNWR main water delivery system for the Topock Marsh unit	Approximately 63 acres	USFWS	Less than 1 mile	Phase I – 2011; Phase II – undetermined
5. Arizona Department of Transportation						
5A	State Route 95 Realignment Project	Realignment of State Route 95	42-mile corridor	Arizona Department of Transportation and Federal Highway Administration	Approximately 2 miles	Environmental review – 2014
6. San Bernardino County						
6A	Moabi Regional Park Improvements	Construction utility hookups, sewer treatment plant facility, pavement, lane widening, and drainage improvements	To be determined	San Bernardino County	1 mile	Sewer treatment plant – 2012; other improvements – undetermined
6B	Pirate Cove Resort	667 additional RV and/or cabin sites; OHV area	To be determined	San Bernardino County	Less than 1.5 miles from the Station	OHV Area – 2013; RV/cabins – undetermined
6C	Verizon Wireless Communication Facility	Installation of an antenna on an existing 157 foot pole and construction of an equipment shelter	To be determined	San Bernardino County	10 miles	Permit Submitted – 2013
6D	Needles Highway Improvement Project	Improvement and/or rehabilitation along 16-mile corridor of the Needles Highway, from "N" Street in City of Needles to California/Nevada state line	16-mile corridor	San Bernardino County, Caltrans, Federal Highway Administration	12 miles	Segment N - 2016; Subsequent Phases – undetermined
7. City of Needles, CA						
7A	I-40 Connection Project	Street improvement project	To be determined	City of Needles	10 miles	2015
8. Mohave County, AZ						
8A	Topock Marina Improvements	Restaurant (Phase I); Hotel (Phase II)	Approximately 5.6 acres	Mohave County	Less than 1 mile	Phase I – 2013; Phase II – undetermined
8B	Sterling Project	Solar power generation site	Approximately 10,000 acres	Mohave County	Approximately 5 miles	Zoning approved – 2012
9. Lake Havasu City, AZ						
9A	Airport Business Park	Light industrial business park development	Approximately 80 acres	Lake Havasu City	Approximately 14 miles	2014

SOURCES: ADOT 2014; BOR 2014; City of Needles Planning Department 2014; County of San Bernardino 2014; Darling 2014; Meier 2014; Miller 2014; Schmeling 2014; Shabazz 2014; Snelgrove 2014; Taylor 2014; Wolff 2014.



Topock Soil Investigation Project EIR
Created By Parus Consulting, Inc.
Map Creation Date: 06/17/2014
Background Sources: ESRI Topographic & Terrain

Location of Cumulative Projects

Figure 6-1

ESA
PARUS CONSULTING, INC.

The following further describes each of the cumulative projects (listed above in Table 6-2) that were considered in this DEIR as part of the cumulative impacts analysis. PG&E activities at the Station are described first, followed by a description of activities by other parties.

6.4.2.1 PG&E Topock Compressor Station Projects

Site Improvement Projects (1A)

PG&E staff regularly develops an annual "wish list" of site improvement projects involving on-site features such as roads, drainage systems, and equipment improvements. These projects are implemented based on the availability of funding and the priority assigned to the projects. The projects are limited to the existing footprint of the PG&E facilities and do not involve new facilities or the expansion of plant operations or capabilities. The following projects were completed in 2013:

- Removed A-Side Gas Scrubbers and installation of a new Filter Separator;
- Replaced and relocated the A-Side Valve Nest blow-off lines;
- Began replacement of control panels for one compressor engine (inside the compressor building); and
- Began replacement of the battery building.

In 2014, PG&E plans to implement the following:

- The hazardous waste storage area will be moved from the upper level to the lower level. This will require movement of the current on-site office and construction trailers to a new location;
- Complete the replacement of the control panels for one compressor engine, and begin the same project for two additional units;
- Complete the replacement of the battery building;
- Upgrade the 24-volt system;
- Replacement of a few sections of the jacket water pipe; and
- Upgrade the gas detectors.

Ongoing Operation of Interim Measure 3 Emergency Groundwater Extraction and Management (1B)

PG&E implemented operation of a groundwater remediation facility to address hydraulic control of contaminated groundwater and prevent contaminated groundwater from entering the Colorado River. The treatment facility, known as Interim Measure 3 (IM-3), was designed to treat 135 gallons per minute (gpm) with a maximum capacity of 150 gpm. Three Board Orders (Board Order No. R7-2004-0080, Board Order No. R7-2004-0103, and Board Order No. R7-2004-0100) were approved by the regional water quality control board addressing the remediation facility.

PG&E is currently operating the IM-3 treatment plant at the Station. IM-3 consists of groundwater extraction for hydraulic control of the groundwater plume boundaries in the Colorado River floodplain treatment of extracted groundwater and reinjection of treated water. Operation of the current groundwater treatment and injection system began in July 2005. The groundwater pumping, transport, and disposal activities are considered an Interim Measure (IM) pursuant to Section IV.A of the Corrective Action Consent Agreement (CACA) entered into by PG&E, and the California Department of Toxic Substances Control (DTSC).

Currently, the IM-3 facilities include a groundwater extraction system (four extraction wells: TW-2D, TW-3D, TW-2S, and PE-1), conveyance piping, a groundwater treatment plant, and an injection well field for the discharge of the treated groundwater. Of the four extraction wells, two are currently in operation (TW-3D and PE-1). The groundwater treatment system is a continuous, multistep process that involves reduction of hexavalent chromium to the less soluble trivalent form, trivalent chromium, precipitation and removal of precipitate solids by clarification and microfiltration, and lowering the naturally occurring total dissolved solids (TDS) using reverse osmosis. Treated groundwater is returned to the aquifer through an injection system consisting of two injection wells, IW-2 and IW-3. The existing groundwater extraction, treatment, and injection systems, collectively, are referred to as IM-3.

Groundwater Remediation Project at the Station (1C)

In January 2011, DTSC adopted a Final Remedy for the groundwater plume based on PG&E’s study of the site and certified final environmental impact report (FEIR). The U.S. Department of the Interior (DOI), as a co-regulatory agency overseeing the site, also adopted a Groundwater Record of Decision, in December 2010, and presented the same selected remedy for the groundwater cleanup. The proposed Remedial Design/Remedial Action Consent Decree (Consent Decree) between PG&E and the DOI regarding implementation of the groundwater remedial action at the PG&E Topock site has been lodged with the federal district court by the U.S. Department of Justice. The notice of availability was published on January 18, 2013, in the Federal Register. The public comment period lasted 30 days ending on February 19, 2013.

The Draft Basis of Design Report/ Preliminary (30%) Design was submitted in November 2011 and presents the preliminary design, design criteria, drawings, and list of specifications as well as additional information required for the final groundwater remedy at the Station. The Basis of Design Report/Intermediate (60%) Design that was submitted in April 2013 is a continuation and expansion of the preliminary (30%) submittal, and contains the intermediate design details, drawings, specifications, and appendices for implementation of the remedy. The Basis of Design Report/Final (90%) Design is expected to be submitted in September 2014. After obtaining the necessary approvals (rights-of-way, easement, access agreements, etc.) remedy implementation is expected to begin in May 2015 with field preparation and surveys, and well installation is proposed to begin August 2015; PG&E will target completion for all systems in October 2017.

It is not anticipated that construction of the Groundwater Remediation Project would overlap with the proposed Project’s soil investigation activities. If overlap occurs, the initial field preparation and surveys for the groundwater remediation may overlap with the permitting and site planning phase of the proposed soil investigation activities.

East Ravine Groundwater Investigation Phase 2 (1D)

After completion of the East Ravine Groundwater Investigation Phase 1, DTSC directed that additional well installation and groundwater investigation were needed to further characterize the groundwater flow pathway and groundwater conditions of bedrock formations in the East Ravine and MW-23 area to inform the remedial system design. As directed by DTSC, additional soil and groundwater characterization activities were conducted as part of the East Ravine Groundwater Investigation Phase 2 to collect supplemental information regarding groundwater occurrence, groundwater quality, and potential contaminant sources.

During the Phase 2 activities, an addition of 20 groundwater monitoring wells were installed within the unconsolidated alluvium and consolidated bedrock using 16 boreholes at 11 investigation sites. Soil samples were collected at six investigation sites in the area of the compressor and at one site in the East Ravine. Hydraulic testing, including flow characterization within three bedrock boreholes and a constant-rate extraction test at one of these locations, was conducted to refine the understanding of groundwater occurrence and flow within the saturated bedrock. Phase 2 field investigation activities were completed in July 2012, and all new monitoring wells have been incorporated into the Topock site-wide groundwater monitoring program and are being sampled quarterly. Results from the East Ravine and Station groundwater investigation have also been incorporated into the design of the groundwater remedy.

Groundwater Monitoring (1E)

PG&E conducts continual monitoring at the Station and surrounding areas, which was initiated as part of a Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) facility investigation/remedial investigation groundwater investigation. The three monitoring programs include a Site-wide Groundwater Monitoring Program, Site-wide Surface Water Monitoring Program, and IM-3 Performance Monitoring Program. Monitoring wells that are part of the Groundwater monitoring Program are sampled at frequencies ranging from monthly (monthly sampling is done only from November through February) to quarterly, semi-annually, annually, and bi-annually. Site-wide Surface Water Monitoring Program samples are collected on a quarterly basis, with an additional winter low river level event.

Repair of Monitoring Wells MW-38S and MW-38D and Old Well/Pipe Reconnaissance (1F)

The MW-38 cluster (MW-38S and MW-38D) is part of the existing monitoring network for the groundwater plume at the Station. The cluster was installed in April 2004 as part of the Soil RCRA Facility Investigation/Remedial Investigation effort. Monitoring wells MW-38S and MW-38D were damaged in storm events the week of January 18, 2010. An implementation plan was prepared in February 2011 for rehabilitation of the MW-38 well cluster. The MW-38S surface completion was completely destroyed during the storms, and the well casing was inundated with stormwater and sediments such that the well casing was blocked. The MW-38D surface completion was damaged such that the aboveground well casing was bent; however, the well was not inundated with stormwater or sediments.

PG&E attempted to salvage the damaged monitoring wells MW-38S and MW-38D from April 1, 2013, through May 29, 2013. The blockage was removed from MW-38S and the surface completion was rebuilt. However, monitoring well MW-38D was not salvageable, so the well casing was overdrilled and a monitoring well was reinstalled within the same borehole. Both monitoring wells were redeveloped and will be sampled during the groundwater monitoring events, which happen every quarter as discussed in the description of project 1F.

6.4.2.2 U.S. Bureau of Reclamation

Lower Colorado River Multi-Species Conservation Program (2A)

The Lower Colorado River Multi-Species Conservation Program (LCR MSCP) is a long-term multiagency effort to conserve and work toward the recovery of endangered species, and protect and maintain wildlife habitat on the Lower Colorado River. This 50-year plan was completed in 2005 and is currently being implemented to create more than 8,100 acres of riparian, marsh, and backwater habitat for 4 listed species and 16 other species native to the Lower Colorado River. The program extends along the Lower Colorado River from Lake Mead to the U.S.–Mexico Southerly International Border and includes the full pool elevations of Lakes Mead, Mohave, and Havasu and the historic floodplain of the river. This program includes various current and planned activities within the reach of the Colorado River (Reach 3) that is located just east of the Station. The Beal Lake Conservation Area is an LCR MSCP project on the Arizona side of the Colorado River northwest of the Project Site within Reach 3. As of 2012, all phases of the conservation project have been completed. Currently, monitoring activities are in place to manage the conservation objectives, including water quality and plankton monitoring, and periodic remote sensing to track the small population of Razorback Sucker, which will continue into 2014. Future monitoring objectives post-2014 will be dictated by management recommendations (BOR 2013). The Insectivore Prey Base Abundance and Diversity on Conservation Areas project includes surveys to determine the presence of insect and arachnid species within the Topock Marsh and Beal Lake Conservation Area. The surveys began in 2013 and are expected to be completed in 2014 (BOR 2013). In 2015 the BOR intends to construct a backwater project on a parcel north of the Park Moabi footprint as part of the LCR MSCP. This project would involve land-based excavation, which would break the levee and run a channel into the Park Moabi footprint, creating habitat along the channel (Rudolph 2014).

Quarry Operations (2B)

The BOR currently utilizes quarry sites along the Lower Colorado River, including one directly north of the Park Moabi footprint, as stockpiles for riprap and other bankline materials (Rudolph 2014). The stockpiled materials are used by BOR for maintenance and construction of banklines, river control structures, levees, canals, and reservoirs along the Lower Colorado River. These quarry sites are considered ongoing BOR operations as of 2014 (Rudolph 2014).

6.4.2.3 U.S. Bureau of Land Management

Cathodic Protection System (3A)

The Southern California Gas Company installed a cathodic protection system along approximately 235 feet of gas pipeline, to control corrosion of the pipeline in 2012 (Wolff 2014). This protection system comprises a 500-foot well that would connect to the gas pipeline. A buried underground anode wire was connected to a small rectifier to relay the electrical current from an existing power pole to the gas pipeline.

6.4.2.4 U.S. Fish and Wildlife Service

Lower Colorado River National Wildlife Refuges Comprehensive Management Plan (4A)

The USFWS, in cooperation with BOR, prepared a comprehensive management plan (CMP) for the four National Wildlife Refuges that are located along the Lower Colorado River. This includes the Havasu National Wildlife Refuge (HNWR), which is located along the Colorado River and is adjacent to the Station. This planning effort integrated three perspectives to result in a holistic management approach for the Lower Colorado River refuges over the 20-year planning period from 1994 to 2014. The plan includes a:

- Broad perspective for the Area of Ecological Concerns;
- Narrower perspective for refuge-related policy issues that affect the four refuges; and
- Focused perspective for management-related activities and strategies that affect defined management units and subunits.

There is no current funding in place to update the CMP; however, components of the plan will likely be used in future management decisions (Miller 2014).

Topock Marsh Water Infrastructure Improvement Project on the Havasu National Wildlife Refuge (4B)

The USFWS plans to replace and rehabilitate approximately 63 acres of the HNWR's main delivery system for the Topock Marsh Unit of the Refuge. The project is located within the historic floodplain of the Colorado River, with a small portion on BLM land. BOR is acting as a cooperating agency under the National Environmental Policy Act (NEPA) for this project. This project would improve the HNWR's capacity to control delivery of water to the Topock Marsh Unit, with environmental benefit to at least 4,000 acres of refuge land. Phase I of the project was completed in the fall of 2011 and includes gravity flow infrastructure consisting of the following components: a fire break canal, fire break canal water diversion structure, fire break canal terminus water control structure, farm ditch water diversion structure, and Topock inlet canal (internal water control structure). Phase II is currently undergoing engineering studies as part of the design phase and will involve non-gravity flow infrastructure (Miller 2014).

6.4.2.5 Arizona Department of Transportation

State Route 95 Realignment Project (5A)

The Arizona Department of Transportation and the Federal Highway Administration are currently evaluating two potential north-south corridors for the future realignment of State Route 95 (SR 95). The realignment project is necessary to better facilitate regional traffic flow through northwestern Arizona. The SR 95 Realignment would begin approximately two miles south of Interstate 40 (I-40) near Topock and extend north to SR 68 near Bullhead City, approximately 42 miles (ADOT 2014). The exact alignment would be evaluated in a Tier 1 EIS expected to begin in 2014. The project is in the environmental review phase and a schedule for implementation has not yet been released.

6.4.2.6 San Bernardino County

Moabi Regional Park Improvements (6A)

San Bernardino County is implementing improvements to the Moabi Regional Park north of the Station. Improvements include full utility hookups at the recreational vehicle campsites, improvements to the existing sewer treatment facility at Moabi Regional Park and replacing existing structures in and around the main entrance including pavement, lane widening, and drainage. The improvements to the sewer treatment facility were completed in 2012; however, the work to the main entrance of the park and utility hookups has been delayed and a schedule for those components is not known at this time (Snelgrove 2014).

Pirate Cove Resort (6B)

Pirate Cove Resort is a vacation resort that features 14 waterfront cabins, a 300-slip marina, commercial and restaurant development (bar and grill), recreational vehicle (RV) hookups, and recreational vehicle sites. The Pirate Cove Resort also has camping sites and offers water activities, including boating, jet and water skiing, kayaking, canoeing, and swimming on the Colorado River. The Pirate Cove Resort is located within the boundary of Moabi Regional Park at 100 Park Moabi Road, in Needles, California, and was opened to the public in May 2009. The Pirate Cove Peninsula Master Plan identifies 667 additional RV and/or cabin sites to be constructed over six phases (County of San Bernardino 2012)[1]. No construction has begun on the facilities proposed as part of the Pirate Cove Master Plan because of leasing issues (Snelgrove 2014). In 2013, the Off-Highway Vehicle (OHV) area was partially opened to the public. When fully opened, the OHV area will not constitute the full 146.5 acres identified in the Pirate Cove Peninsula Master Plan (Snelgrove 2014).

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1 According to the San Bernardino County Moabi Regional Park Initial Study Checklist, even though 667 additional RV and/or cabin sites are proposed, "the total number of RVs and similar recreational vehicles are anticipated to be comparable to the number of RVs and similar recreational vehicles that are accommodated under the existing conditions (i.e. the proposed new RVs spaces do not necessarily increase the capacity for RVs and similar recreational vehicles that are currently using the park)… the Project will in effect increase number of RVs and similar recreational vehicles that can be accommodated on the Project site by only 4 units (663 vs. 667)" (County of San Bernardino 2012).

Verizon Wireless Communication Facility (6C)

In 2013, Verizon Wireless submitted a site plan permit to San Bernardino County to collocate an antenna on an existing AT&T monopole in Needles, California, along the west side of Highway 95. This would involve installation of an antenna on an existing 157-foot pole originally installed by AT&T, and construction of an equipment shelter (Shabazz 2014).

Needles Highway Improvement Project (6D)

The Needles Highway Improvement Project involves the improvement and/or rehabilitation of a 16-mile corridor of the Needles Highway, from Needles north to the California/Nevada state line. The project would accommodate existing and reasonable forecast travel demand as safely as possible. Phase N of the project is anticipated to be implemented in 2016, with subsequent phases implemented thereafter (Meier 2014).

6.4.2.7 City of Needles

I-40 Connection Project (7A)

The I-40 Connection project is a street improvement project that has the goal of better aligning existing streets in the City of Needles with connections to I-40. Site plans are currently in discussion and right-of-way acquisitions are being secured. The project is expected to be implemented in 2015 (City of Needles 2014).

6.4.2.8 Mohave County

Topock Marina Improvements (8A)

Topock Marina is a 20-acre facility located along the Colorado River approximately one-half mile north of I-40. The marina owners submitted a site plan to Mohave County, in August 2010, to develop a 102-room, four-story hotel and a three-story restaurant with retail uses on approximately 5.6 acres of the site. The project was approved on January 11, 2013. The retail and restaurant buildings, and swimming as pool part of Phase I, were constructed in 2013 (Darling 2014). Phase II includes plans for the hotel; however, no site plans for subsequent phases have been submitted to the county for approval, and construction has not yet been implemented (Taylor 2014).

Sterling Project (8B)

The Sterling Project was initially a proposed master-planned community located north of I-40 approximately three miles from the California/Arizona state line. The Sterling Project was replaced by a proposed concentrated solar development on the same property. Conditional zoning approvals were issued in 2012 for this solar development; however, the project has not yet been implemented (Taylor 2014).

6.4.2.9 Lake Havasu City

Airport Business Park (9A)

The Airport Business Park project is an approximately 80-acre light industrial business park development. Phase I was completed in 2013, which consists of approximately 19 acres of retail space. Phase II of the project would include a motor sports facility. A site plan was approved for Phase II in 2013, and with lease agreements underway, the motor sports facility is anticipated to be constructed in 2014 (Schmeling 2014).

6.5 Analysis of Cumulative Impacts

As previously described in Section 6.2, the cumulative scenario under each environmental discipline differs depending upon the potential area of effect. For example, the cumulative conditions for regional air quality account for impacts within the entire Mojave Desert Air Basin (MDAB) because air quality impacts occur on a regional scale, while the cumulative impacts for noise would be limited to a more local scale for activities in the vicinity of the Project Site. The cumulative setting and analysis for each discipline are discussed in the following pages.

Consistent with CEQA, a stepped approach was used to analyze cumulative impacts. The first step was to determine whether the combined effects of the probable projects within the geographic scope of an environmental issue area would result in a cumulatively significant impact. Then, the Project's incremental impact was added to the anticipated effects of these probable projects. The final step was to evaluate whether the proposed Project's incremental contribution to the combined effect would be cumulatively considerable, as required by CEQA Guidelines Section 15130, Subdivision (a).

6.5.1 Aesthetics

The geographic scope for potential cumulative impacts to aesthetics includes the foreground, which is defined as the zone within 0.25 miles to 0.5 miles from the Project Site, and the middleground, which is a zone that extends from the foreground up to 3 to 5 miles. In desert areas, such as the vicinity of the proposed Project, landscape detail is typically most noticeable and objects generally appear most prominent when seen in the foreground. At middleground viewing distances, the texture of landscape features such as of rock outcropping surfaces and vegetation as well as built elements may be noticeable but are increasingly unrecognizable. At background viewing distances, which would extend from about 3 to 5 miles from the Project Site to infinity, visible detail is limited to landscape patterns or visual contrasts.

As described in Section 4.1.1.2, the Project Site occupies approximately 128.5 acres in and around the PG&E Station located west of the Colorado River. The predominant land use in the area consists of undeveloped public land interspersed with concentrated areas of developed infrastructure. In addition to the Station facility, a major gas utility and transportation corridor that includes natural gas transmission pipelines, the Burlington Northern Santa Fe Railway (BNSF) line, and I-40 bisects the Project Site. Additional developed land uses within or near the Project Site include the National Trails Highway, the former Route 66, and various unnamed access roads. A former gravel quarry lies approximately 1,500 feet southwest of the Station. Approximately 3,000 feet west of the Station are evaporation ponds associated with the facility, and an interim remedial measures groundwater treatment plant and numerous groundwater well clusters are located nearby.

Open space near the Station is characterized primarily by sparsely vegetated eroded alluvial deposits and steep, rocky slopes. The dark-colored rocks of the Chemehuevi Mountains, rising to over 2,700 feet a short distance to the south, form the primary backdrop to the Project Site when viewed from the heavily traveled highway corridor, particularly on its eastern approach to the river. The area is bisected by several steep-sided ephemeral streams, including Bat Cave Wash and several unnamed arroyos that flow north to the confluence of the Colorado River.

When combined, projects in the cumulative scenario listed above (Table 6.3) have the potential to affect key views and sensitive aesthetic resources in the geographic scope. In particular, this includes projects at the Station (1A through 1F) and the projects along the Colorado River in San Bernardino and Mohave Counties, which include the Moabi Regional Park Improvements (6A), the Pirate Cove Resort (6B), and the Topock Marina Improvements (8A). Elements of these projects (such as infrastructure, vehicles, equipment, and personnel) would be visible to affected viewers in the geographic scope. Depending on the project element and viewing location, mitigating landscape elements, and other factors, such as the presence of vegetation, screening could minimize the actual visibility. The projects anticipated at the Moabi Regional Park and the Pirate Cove Resort are fairly minimal in the context of existing development. As well, these projects would be expansions or additions to existing development that has a similar visual quality and appearance. These recreational developments are of a nature that is consistent in the region and are not anticipated to result in visual effects that would be significant, either in combination with other projects or individually. While the hotel and restaurant proposed as part of the Topock Marina Improvements would be more significant in nature and of more visual contrast compared to the surroundings, its visual effects would not be compounded by the other projects in the cumulative scenario given the relative separation of the projects from each other. In addition, the effects of the projects at the Station would not likely be visually discernable given the extent of infrastructure and the minimal contribution the projects would have to the existing industrial nature of the Station. Each of these projects is also relatively distant from the other such that the projects would not be within the same viewshed for any individual viewer. For these reasons, the combined visual effects from the projects listed in Table 6-3 within the geographic scope of the visual analysis would not be considered cumulatively significant.

When added to the cumulative scenario described above, the effects of the proposed Project would contribute incrementally to the cumulative impacts on aesthetic resources. As documented in the set of Figure 4.1-6A through 4.1-15B visual simulations, and summarized in Table 4.1-2, the proposed Project would represent a temporary incremental change that would not substantially alter the composition or character of existing landscape views. It would not involve installation of permanent infrastructure, nor would it result in any long-term permanent effects on public views. Therefore, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, the Project's incremental contribution to aesthetic impacts would not be cumulatively considerable (less than significant).

6.5.2 Agricultural Resources

The geographic scope for agricultural resources is Eastern San Bernardino County (i.e., the Desert Regions) where agricultural activities would be similar. The Project would have no impact with respect to Farmland, Williamson Act contracts, land zoned for agricultural use, forest land, or timberland. Therefore, it could not contribute to cumulative effects related to these resources (no impact).

6.5.3 Air Quality

Cumulative air quality impacts must be considered from different perspectives of scale and type of activity depending on the air pollutant being considered. The following discussion describes impacts associated with short-term Project-related activities and greenhouse gas (GHG) emissions.

6.5.3.1 Short-Term Project-Related Impacts

The geographic scope for potential cumulative impacts to air quality from short-term Project-related impacts is the MDAB, which is the air shed the Project Site is located in. The MDAB comprises the eastern portion of Kern County, the northeastern portion of Los Angeles County, all of San Bernardino County, and the eastern portion of Riverside County.

The MDAB is in nonattainment status for ozone and PM10. This is a result of the cumulative development in the basin, as well as transport of pollutants from other basins. The Mojave Desert Air Quality Management District (MDAQMD) has established daily significance thresholds for criteria pollutants and ozone precursors for projects within San Bernardino County. In addition, San Bernardino County is currently designated as a nonattainment area for ozone and Particulate Matter 10 (PM10) due to the cumulative projects in the county. Projects in the cumulative scenario, in particular, projects at the Station (1A through 1F) and the projects along the Colorado River in San Bernardino and Mohave counties, which include the Moabi Regional Park Improvements (6A), the Pirate Cove Resort (6B), and the Topock Marina Improvements (8A) could contribute to air quality impacts in the geographic scope through the generation of criteria pollutants from activities such as vegetation clearing; earth-moving activities; dust entrainment from travel by equipment, trucks, and employee vehicles (especially on unpaved surfaces); and exhaust from equipment, trucks, and employee vehicles. For these reasons, the combined air quality effects within the geographic scope would be considered cumulatively significant.

When added to the cumulative scenario described above, the effects of the proposed Project would contribute incrementally to the cumulative impacts on air quality. As described in Section 4.2, “Air Quality,” the proposed Project would not exceed the MDAQMD daily or annual thresholds of significance for criteria pollutants (volatile organic compounds [VOCs] or ROG; NO_x; PM10; PM2.5; CO; and SO_x). The MDAQMD thresholds are established to determine what level of emissions would potentially violate an air quality standard or contribute substantially to an existing or projected air quality violation. The proposed Project would not violate any air quality standards or contribute substantially to an existing or projected air quality violation, nor would it result in a cumulatively considerable net increase of any nonattainment pollutant. The Project would not result in long-term adverse air quality impacts because of the short duration of the proposed Project. The proposed Project would not emit carbon monoxide in quantities that would pose health effects. Further, the duration of proposed soil investigation activities would constitute a small percentage of the total 70-year sensitive receptor exposure period for toxic air contaminants. Therefore, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, the Project's incremental contribution to air quality impacts would not be cumulatively considerable (less than significant).

6.5.3.2 Greenhouse Gas Emissions

GHG emissions are inherently a cumulative concern, in that the significance of GHG emissions is determined based on whether such emissions would have a cumulatively considerable impact on global climate change; therefore, the geographic scope of cumulative impacts related to GHG emissions and climate change is global. The proposed Project would contribute GHG emissions primarily through exhaust from equipment, trucks, and employee vehicles which would result in an incremental contribution to global climate change, and which, when combined with the cumulative contributions of all other sources of GHGs, contributes to climate change. As discussed in Section 5.3.4, for the worse-case year (2015), the Project would result in 1,137 metric tons per year or 9,735 pounds per day of CO_2e.

As described in Section 5.3.4, MDAQMD has established GHG thresholds for CO_2e of 100,000 tons per year or 548,000 pounds per day for individual actions. The Project is expected to last up to 27 months and could therefore generate up to 2,653 metric tons of CO_2e total for the full duration of Project activities, which is substantially below MDAQMD's significance threshold.In addition, the Project also is in compliance with San Bernardino County's GHG Emissions Reduction Plan's review standard of 3,000 metric tons per year of CO_2e (County of San Bernardino 2011).

Because the Project would not result in a long-term generation source for emissions of GHGs, it would not result in GHG emissions that would conflict with California's ability to achieve 1990 levels of GHG emissions by 2020 as required by AB 32 and would be consistent with all other applicable plans, policies, and regulations. It also would not result in a substantial increase in GHG emissions or exceed a threshold of significance adopted by the Air District. Therefore, the Project's incremental contribution to GHG emissions would not be a cumulatively considerable; thus, it would not present a significant cumulative impact (less than significant).

6.5.4 Biological Resources

The geographic scope for biological resources consists of the Project Site and surrounding lands, along with drainages that are connected to the Project Site, including the Colorado River (Figure 4.3-3). The limits of the geographic scope were determined based on the presence of contiguous habitat types supporting, or capable of supporting, the sensitive biological resources potentially affected by the Project. This setting generally consists of a mix of disturbed and relatively pristine natural landscape that supports a variety of biological communities consisting predominantly of upland desert scrub interspersed with desert washes.

The projects considered in this cumulative analysis have varying effects on biological resources in the geographic scope, ranging from direct adverse impacts on sensitive species and habitat, to beneficial impacts resulting from implementation of conservation measures and land management practices. The PG&E projects at the Station and surrounding areas (1A through 1F), Quarry Operations (2B), the cathodic protection system (3A), Moabi Regional Park Improvements (6A), Pirate Cove Resort (6B), and Topock Marina Improvements (8A) would have a contribution to adverse biological impacts within geographic scope. Impacting activities would include, but are not limited to, soil and groundwater remediation activities at the Station (1A through 1F); maintenance and construction of quarry components along the Lower Colorado River, including banklines, river control structures, levees, canals, and reservoirs (2B); installation of a cathodic protection system for a Southern California Gas pipeline (3A); construction of utility hookups, development of a sewer treatment plant facility, lane widening, and drainage improvements at the Moabi Regional Park (6A); 667 additional RV and/or cabin sites and an OHV area at the Pirate Cove Resort (6B); and development of a hotel and restaurant at the Topock Marina (8A). Because these activities are anticipated to occur within or near naturalized areas or undisturbed habitats, potential impacts to biological resources would include removal and/or disturbance to water, riparian, or sensitive habitats protected by federal or state regulations; removal and/or damage to special-status plants, including indigenous plants of biological and cultural significance; injuring, killing, harassing, or otherwise harming special-status wildlife, including desert tortoise, native fish, Yuma clapper rail, southwestern willow flycatcher, and other nesting birds and raptors; and disruption of wildlife movement corridors. However, it should be noted that within the geographic scope, the aforementioned projects contribute only a limited amount of development and activity compared with the overall amount of undisturbed and available open space (Figure 4.3-3).

Additionally, other projects, such as the LCR MSCP (2A), the CMP at HNWR (4A), and Topock Marsh Water Infrastructure Improvement Project (4B), have contributory beneficial effects to biological resources. The LCR MSCP is a program implemented and overseen by multiple federal agencies to conserve and work toward recovery of endangered species and protect and maintain habitat along the Colorado River. The CMP at HNWR is a management plan overseen by USFWS for wildlife refuges along Lower Colorado River, including the HNWR. The Topock Marsh Water Infrastructure Improvement Project includes the replacement and rehabilitation of the HNWR main water delivery system for the Topock Marsh unit. These projects provide stipulations for habitat restoration, creation of new habitat, augmentation of existing wildlife populations, protection and monitoring of existing habitat for special-status species, and protection of special-status species and their habitats within the geographic scope, among others. Because of the limited amount of development and activity proposed within the geographic scope and the implementation of the aforementioned beneficial projects, the combined effects to biological resources from the projects listed in Table 6-3 would not be considered cumulatively significant.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would contribute incrementally to impacts on biological resources. As described in Section 4.3, "Biological Resources," the proposed Project would have potentially significant impacts, including disturbance or removal of riparian habitats protected by federal or state regulations; crushing, removing, or damaging indigenous plants of biological and cultural significance; and injuring, killing, harassing, or otherwise harming special-status wildlife, including desert tortoise, and nesting birds and raptors. These activities include the proposed soil samples, bench scale testing, and pilot study locations within desert washes, such as Bat Cave Wash (AOC 1), and the riparian habitats around the pore water sampling sites within or near East Ravine (AOC 10). Mitigation measures have been identified for the proposed Project to avoid and/or minimize impacts to biological resources (**Mitigation Measures BR-1, BR-4, BR-5,** and **BR-6**). Developing and following avoidance and minimization measures for the identified impacts to biological resources to ensure, at a minimum, no-net-loss of habitat value or function would reduce impacts to a less than significant level. Therefore, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, the Project's incremental contribution to impacts to biological resources would not be cumulatively considerable (less than significant).

6.5.5 Cultural Resources

The proposed Project's impacts to cultural resources, when considered in combination with other past, present, and future projects at a regional scale, could contribute to a cumulatively significant impact to historical resources (including the Topock Traditional Cultural Property [TCP]), archaeological resources, and human remains. Cumulative projects have the potential to involve ground-disturbing activities that would directly impact significant cultural resources, or that may result in indirect impacts such as vandalism or damage from an increased human presence in the area. These projects may also result in visual, auditory, and other environmental changes that may adversely affect the Topock TCP.

The geographic scope for cumulative impacts to cultural and paleontological resources consists of the Lower Colorado River Valley. This geographic scope of analysis is appropriate because the historical, archaeological, and paleontological resources within this area are expected to be similar to those that occur on the Project Site. The Topock TCP, although its full geographic boundary is currently undefined, likely comprises a large part of the geographic cumulative scoping area, and, as such, there are undoubtedly many archaeological resources, landforms, water sources, and similar features that contribute to the TCP. For paleontological resources, similar geology within this vicinity would likely yield fossils of similar sensitivity and quantity. The temporal scope for cumulative impacts to cultural resources encompasses both short-term and long-term cumulative impacts of the proposed Project, in conjunction with other cumulative projects in the area.

The Project Site and surrounding vicinity contains a significant archaeological and historical record that, in many cases, has not been well documented or recorded. The Lower Colorado River Valley contains a number of important sites of cultural and/or archaeological importance that are integral to the cultural traditions of Native American Tribes located throughout the region. These resources include, but are not limited to, archaeological sites, geoglyphs, rock art, trails, and dance paths/circles. Thus, there is a potential for ongoing and future development projects in the Project vicinity to disturb areas that may contain cultural resources.

Many of the cultural resources within the geographic scope, in particular the Topock TCP and other resources of traditional or cultural significance to Interested Tribes, have already been subjected to impacts as a result of past projects, including the introduction of transportation, energy, and recreational facilities, as well as through construction of the PG&E projects at the Station and within surrounding areas (1A through 1F) and other ground-disturbing activities undertaken in developing the Final Groundwater Remedy. Projects undertaken before environmental laws such as CEQA were in place may not have considered, or mitigated, significant impacts to cultural resources, and may have resulted in damage to important cultural resources such as geoglyphs, trails, and other resources that retain significant cultural value to Interested Tribes. Projects that have already been implemented or may occur in the foreseeable future at or near the Project Site could impact cultural resources. These projects include the CMP at HNWR (4A), State Route 95 Realignment Project (5A), Moabi Regional Park Improvements (6A), Pirate Cove Resort (6B), Topock Marina Improvements (8A), and the Sterling Project (8B). These projects have the potential to involve ground-disturbing activities that would directly impact significant cultural resources and paleontological resources. These projects may also bring additional people (e.g., work crews, residents, tourists) into the area that may result in increased rates of vandalism or OHV use that may directly or indirectly impact resources. These projects may also result in visual, auditory, and other environmental impacts that may adversely affect the Topock TCP. For these reasons, the combined impacts on cultural resources in the geographic scope would be considered cumulatively significant.

When considered in combination with the impacts of other projects in the cumulative scenario, the Project's incremental contribution to impacts on cultural resources including historical resources (i.e., the Topock TCP), unique archaeological resources, and human remains would be cumulatively considerable. Although **Mitigation Measures CR-1**, **CR-2**, and **CR-4**, which are described in detail in Section 4.4, "Cultural Resources," would reduce the significance of the impacts to the degree feasible, the only method to fully mitigate these impacts would be complete avoidance of any future project activity; therefore, no feasible mitigation exists that would reduce the Project's contribution to less than considerable. The Project's contribution to this significant cumulative cultural impact would be cumulatively considerable (significant and unavoidable).

IMPACT CUM-1 **Cumulatively Considerable Impacts to Cultural Resources.** *Implementation of the proposed Project, in combination with other projects in the geographic scope, could cause a substantial adverse change in the significance of the historical resource identified as the Topock Traditional Cultural Property (TCP); cause a substantial adverse change in the significance of unknown historical resources; and disturb human remains, including those interred outside of formal cemeteries. This impact would be **cumulatively significant** and the proposed Project's contribution to this impact would be **cumulatively considerable**.*

Timing:	During Project activities.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	The impact would be **significant and unavoidable** after implementation of Mitigation Measures CR-1, CR-2, and CR-4. The Project in combination with other projects in the area, would contribute considerably to a cumulatively significant impact to the integrity of those physical characteristics that convey the significance of the Topock TCP and to historical resources unique and important to the region.

6.5.6 Energy Resources

The geographic scope of the cumulative impact analysis for energy resources is Eastern San Bernardino County, California where electricity and most of the petroleum fuels for the Project Site are supplied from.

As discussed in Section 5.3.2, the Project Site is currently served by the Needles Public Utility Authority (City of Needles) electrical distribution system. Petroleum supplies for Project equipment and worker vehicles would be purchased by the individual users at fueling stations in nearby communities and in more distant locations including, but not limited to, Los Angeles, CA; Lake Havasu City, AZ; Phoenix, AZ; and Las Vegas, NV. Projects listed in Table 6-3 for the cumulative scenario, namely the PG&E projects (1A through 1F), would obtain electricity and petroleum fuels from the same sources. The current supply of electricity (61.7 million kWh annually in 2011) and petroleum fuel meets current demand. None of the projects in the cumulative scenario are anticipated to result in growth inducing impacts that would impact energy consumption. For these reasons, the combined effects to energy resources in the geographic scope would not be considered cumulatively significant.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would contribute incrementally to impacts on energy resources. PG&E operations at the Station have a baseline energy consumption of approximately 1.8 million kWh of electricity per year, the majority of which is consumed by the Interim Measure 3 (IM-3) facility. This represents approximately 3 percent of the Needles Public Utility Authority's annual power supply (61.7 million kWh; Needles Public Utility Authority Board 2011). The energy consumption of approximately 27,292 kWh as a result of the proposed Project would represent 0.044 percent of the annual power supply for the Needles Public Utility Authority. The Project's energy consumption would not exceed baseline conditions at the Station or have a substantial impact on the Needles Public Utility Authority's annual power supply. Further, the proposed Project would use approximately 52,640 gallons of diesel fuel during Project activities, which would amount to a fraction of San Bernardino County's consumption (approximately 0.037 percent of the 2013 County annual total of 141.6 million gallons of diesel fuel). Therefore, when considered in addition to other projects in the cumulative scenario, the Project's incremental contribution to impacts on energy resources would not be cumulatively considerable (less than significant).

6.5.7 Geology and Soils

The geographic scope of the cumulative impact analysis for geology and soils includes the Project Site and areas immediately adjacent. As described in Section 5.3.3, the Project is not located in proximity to a known earthquake fault; the Project would not cause substantial soil erosion or the loss of topsoil; the Project Site is not located in a geologic unit or soil that is unstable; the Project Site is not located on expansive soil; and the Project does not include construction of septic tanks or alternate waste-water disposal systems. Therefore, the Project would not contribute to or combine with the impacts of other projects in the cumulative scenario to cause significant cumulative impacts related to these criteria (no impact).

6.5.8 Hazards and Hazardous Materials

For hazards and hazardous materials, there would be no routine transport, use, or disposal of hazardous materials; no Project-related activities within 0.25 miles of an existing or proposed school; and no Project-related activities within 2 miles of a private airstrip. In addition, there would be no impact on adopted emergency response or evacuation plans. Therefore, the Project would have no contribution to a cumulative effect related to these criteria.

Depending on the pathway of exposure, the geographic scope for cumulative effects relating to hazards and hazardous materials would be the air basin, watershed boundary, groundwater basin, or extent of affected soil. Cumulative projects in the geographic scope that may cause impacts related to hazards or hazardous materials include the PG&E projects listed in Table 6-3 (1A through 1F), the LCR MSCP (2A), Quarry Operations (2B), CMP at HNWR (4A), the cathodic protection system (3A), Moabi Regional Park Improvements (6A), Pirate Cove Resort (6B), and the Topock Marina (8A). These projects could result in the release of hazardous materials from the use of equipment (fuels, oils and grease, solvents) or the release of contaminated groundwater associated with the ongoing groundwater remediation activities. Those projects that are expected to occur within a similar time frame as the proposed Project would result in an increased potential for the release of hazardous materials.

The PG&E projects are restricted to the area local to the Station, and would not be expected to be compounded by other projects in the area due to the physical separation. Note that the goal of the PG&E groundwater treatment projects (1B and 1C) is to prevent the migration of contaminated groundwater to the Colorado River, thus geographically separating the potential impacts from the potential impacts of other projects in the geographic scope. In addition, the investigation and construction activities are temporary and localized. Only the groundwater remediation projects would be long-term and, once constructed, would reduce the impacts to water quality in the area by treating the COPCs released from the Station. The LCR MSCP (2A) and Quarry Operations (2B) would require the use of vehicles for transport of workers, materials, and equipment but would not include construction activities. The cathodic protection system (3A) would require the use of a drill rig and support truck for the boring to install the cathode protection wiring. The CMP at HNWR (4A) is a management plan that would only require trucks to transport workers and equipment; no construction activities are proposed. The Moabi Regional Park Improvements (6A) would include the construction of roads and utility hookups associated with a previously completed sewer treatment plant improvements. Although not yet scheduled, the work would include asphalt pavement, fuels, lubricants and oils, and paint, and the paving equipment and support trucks for equipment, materials, and workers. The Pirate Cove Resort (6B) would add RV and cabin sites and would include grading and paving equipment using fuels, lubricant cleaners, and paint. The Topock Marina Improvements (8A) would involve construction of a hotel and restaurant. Although no plans have been submitted, the future construction would require construction equipment and support trucks, workers, and materials, including fuels and lubricants, paints, and cleaners.

In all cases, the cumulative projects would be required to meet applicable local, state, and federal laws intended to limit the extent and severity of impacts related to hazardous materials. With proper adherence to these regulations and proper construction site management using Best Management Practices (BMPs), there is no anticipation that concurrent construction of the cumulative projects listed in Table 6-3 would result in cumulative hazardous materials impacts. For these reasons, the combined hazardous materials effects from the projects listed in Table 6-3 within the geographic scope would not be considered cumulatively significant.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would contribute incrementally to the potential for the generation of hazardous materials. As described in Section 4.5.3.3, site preparation, sample collection, and excavation activities associated with the Project could result in the release of hazardous materials from the use of equipment (fuels, oils and grease, solvents) or from the release of chemicals from the sampled media at hazardous levels. Potentially, impacts involving localized exposure to hazardous materials during Project activities could result in localized hazardous material spills or incidents. Because the Station is a listed hazardous waste site, site preparation, sample collection, and excavation activities associated with the proposed soil investigation could create a significant hazard to the public or the environment by the potential release of contaminants known to be present in soil and groundwater at and beneath the Station. As described in Section 4.5.3.3, the Project would include the implementation of Standard Operating Procedures (SOPs) and BMPs, as well as adherence to the substantive provisions of the state Construction General Permit to avoid and/or minimize the potential for impacts related to hazardous materials. These provisions would become Conditions of Approval for the Project if the Project is approved. Therefore, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, the Project's incremental contribution hazardous materials would not be cumulatively considerable (less than significant).

In terms of an increased risk of wildland fire, the California Department of Forestry and Fire Protection fire hazard severity zone map identifies the Project Site and its surroundings in the lowest level of its fire hazard severity zones, which is the lowest possible risk category. Cumulative projects in the geographic scope (see Table 6-3) that involve the use of mechanized equipment with internal combustion engines could cause a wildfire and expose people or structures to wildfire risk. However, the substantive provisions of federal and state regulations and the relative low level of fire hazard severity in the area of these project would ensure that the combined effects of these projects is less than significant. The Project would also adhere to provisions of federal and state regulations that address potential wildland fire impacts, even with the low level of fire risk. Thus, the Project's incremental contribution to wildland fire impacts would not be cumulatively considerable (less than significant).

6.5.9 Hydrology and Water Quality

As discussed in Section 4.6.3.2, there would be no Project-specific impacts related to the on-site treatment or discharge of waste water; the construction of housing within a 100-year flood hazard area; the construction of any structures within a 100-year flood hazard area; the exposure of people or structures to a significant risk involving flooding as a result of the failure of a levee or dam; and the risk of inundation by seiche, tsunami, or mudflow. Therefore, the Project would have no contribution to a cumulative effect related to these criteria.

The geographic scope for potential cumulative impacts to hydrology and water quality is the East Colorado River Basin (focused on downstream areas) for surface water resources and the Needles Valley groundwater basin for groundwater resources. The area around the Station is drained by a network of ephemeral washes that eventually flow into the Colorado River to the east of the Project Site. The maximum depth of drilling associated with the Project is 80 feet below ground surface and is therefore not anticipated that drilling will encounter groundwater or cause any related impacts. The section of the Colorado River in the vicinity of the Project Site is not on the list of impaired water bodies required by Section 303(d) of the federal Clean Water Act and therefore does not have any established Total Maximum Daily Loads (TMDLs). The PG&E projects (1A through 1F), the Quarry Operations (2B), the cathodic protection system (3A), Moabi Regional Park Improvements (6A), Pirate Cove Resort (6B) could result in impacts to hydrology and water quality through ground disturbing activities, infrastructure development, discharge activities, and leaks or spills from equipment and vehicles (fuels, oils and grease, solvents).

The PG&E projects are restricted to the area local to the Station, and would not be expected to be compounded by other projects in the area due to the physical separation. Note that the goal of the groundwater treatment projects (1B and 1C) is to prevent the migration of contaminated groundwater to the Colorado River, thus geographically separating the potential impacts from those of other projects in the geographic scope. In addition, the investigation and construction activities are temporary and localized. Only the groundwater remediation projects would be long-term and, once constructed, would reduce the impacts to water quality in the area by treating the COPCs released from the Station. The Quarry Operations (2B) include the maintenance and construction of improvements to river control structures, which in the long-term will improve water quality of the river. The cathodic protection system (3A), the future hotel and restaurant part of the Pirate Cove Resort (6B), and the paving and utility hookups for the Moabi Regional Park Improvements (6A) would all consist of ground-disturbing activities with limited footprints. All of the cumulative projects would require the short-term use of equipment (e.g., drilling rigs, support trucks) and some chemicals (e.g., fuels, oils, lubricants, paint, cleaners). However, all of the cumulative projects would be required to meet applicable local, state, and federal laws intended to avoid and minimize impacts to hydrology and water quality. With proper adherence to these regulations and proper construction site management using BMPs, there is no anticipation that concurrent construction of the cumulative projects listed in Table 6-3 would result in cumulative impacts.

Water at the Station is supplied by groundwater wells located on the Arizona side of the Colorado River. PG&E's existing Lower Colorado River Water Supply Project (LCRWSP) contracted entitlement is 422 AFY. Water use at the Station varies tremendously by season. The majority of the water is used by the cooling towers, and much higher demand occurs in the summer. The PG&E projects in the cumulative scenario (1A through 1F) typically use up to 100 AFY. The Station's average use is about 70 to 100 AFY. As compared to the contracted entitlement of 422 AFY, the combined effects to groundwater supplies from the projects in the geographic scope would not result in cumulative effects. For these reasons, the combined hydrology and water quality effects from the projects listed in Table 6-3 within the geographic scope would not be considered cumulatively significant.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would contribute incrementally to impacts on hydrology and water quality. As discussed in Section 4.6.3.3, Project-related activities such as site preparation, sample collection, and excavation activities could result in the release of contaminants or sediment from waste soil into the environment. Project related activities could also disturb surface soil, underlying soil, or existing drainage patterns, which could increase erosion, siltation, surface runoff, or flooding. As described in Section 4.6.3.3, the Project would implement SOPs and BMPs, as well as adhere to the substantive provisions of the state Construction General Permit to avoid and/or minimize the potential for impacts related to hydrology and water quality. These provisions would become conditions of approval for the Project if the Project is approved. Further, no new or enlarged water entitlements would be needed as a result of the proposed Project. Up to 2,500 gallons of water (0.006 acre-feet per year [AFY]) would be used for soil sampling and contingency sampling and up to an additional 1,200,000 gallons of water (approximately 3.61 AFY) would be used for pilot studies, which, when combined with the up to 100 AFY of water used at the Station, would not exceed contracted entitlements. Therefore, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, the Project's incremental contribution to hydrology and water quality would not be cumulatively considerable (less than significant).

6.5.10 Land Use and Planning

The geographic scope for land use and planning is San Bernardino County. The Project would have no impact with respect to the physical division of an established community, or any conflict with applicable land use plans or policies or with adopted habitat conservation plans or natural community conservation plans. Therefore, it could not cause or contribute to cumulative effects related to these land use and planning issues (no impact).

6.5.11 Mineral Resources

The geographic scope for cumulative impacts analysis to mineral resources is eastern San Bernardino County (Desert Regions) where the geologic mineral resources and users of the resources are similar.

The Project Site is classified as a Mineral Resource Zone (MRZ)-4, which is defined as an area where geologic information does not rule out either the presence or absence of mineral resources. Sand and gravel, known as "saleable mineral resources" within the MRZ-4 designation are known to exist at the Project Site and surrounding areas. Metallic, rare, and leasable minerals may also be present, but their existence in the Project Site is unknown at this time. No other mineral resource extraction activities occur within the areas adjacent to the Project Site. The BOR currently utilizes quarry sites along the Lower Colorado River, including one directly north of the Park Moabi footprint, as stockpiles for riprap and other bankline materials (2B). The stockpiled materials are used by BOR for maintenance and construction of banklines, river control structures, levees, canals, and reservoirs along the Lower Colorado River. No other saleable mineral resources are mined or anticipated to be mined within the geographic scope. The Quarry Operations (2B) would not impact mineral resources in the area. For these reasons, the combined effects to mineral resources within the geographic scope would not be considered cumulatively significant.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would not contribute incrementally to mineral resource issues. The potential for mineral resources to exist in and around the Project Site is limited and, as described in Section 5.3.6, the proposed Project would not significantly reduce the availability of known mineral resources. There are no mining claims on or immediately adjacent to the Project Site and none permitted on the federal lands located within the Project vicinity. The Project would have very minor to no impact with respect to the loss of availability of a locally important mineral resource recovery site. Therefore, this impact is not cumulatively significant and the proposed Project could not cause or contribute to cumulative effects related to mineral resources (less than significant).

6.5.12 Noise

The geographic scope for cumulative noise impacts are evaluated on the Project Site and areas immediately adjacent, due to the attenuating effects of noise. Noise is generated from an activity that is in turn experienced by receptors close to the noise source. Noise from the Station activities comprises a component of the overall noise environment in combination with other noise sources in the area, such as traffic noise from I-40 and train operations on the Burlington Northern and Santa Fe railway line.

The projects listed in Table 6-3 that have the potential to generate construction and/or operational noise in the geographic scope include the PG&E projects (1A through 1F), Quarry Operations (2B), Topock Marsh Water Infrastructure Improvement Project (4B), Moabi Regional Park Improvements (6A), Pirate Cove Resort (6B), and the Topock Marina Improvements (8A). In particular, work at the Station could result in increased cumulative noise for activities that occur simultaneously and within 500 feet of the Project Site. For these reasons, the combined noise effects from the projects listed in Table 6-3 within the geographic scope of the noise analysis would be cumulatively significant on sensitive receptors.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would contribute incrementally to noise impacts. As described in Section 4.7, “Noise,” the proposed Project would generate noise that could expose the Topock TCP (considered as a place of worship for Native Americans in terms of the County’s noise standards) to levels that exceed the County’s standards or would conflict with the existing relatively quiet average ambient noise environment even after implementation of **Mitigation Measure NOI-1**. Although significant and unavoidable, noise generated from the proposed Project would not be compounded when taken in context with other noise-generating projects in the geographic and temporal scope. This is primarily because of the relative distances and timing (i.e., the majority of other projects would not occur concurrently) of the other cumulative projects and that it would be highly unlikely for noise emanating from more than one construction or noise-generating project to be heard from an individual receptor. Therefore, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, the Project’s incremental contribution to noise impacts would not be cumulatively considerable (less than significant).

6.5.13 Population and Housing

The geographic scope for cumulative impacts to population and housing is the larger region in which the Project is located where Project employees are expected to originate from: San Bernardino County, California, which includes the city of Needles, California, and neighboring Mohave County, Arizona which includes the city of Lake Havasu City, Arizona.

The population in San Bernardino County is anticipated to grow 47 percent by 2040. The City of Needles is anticipated to grow 41 percent by 2030. In Arizona, Mohave County is anticipated to grow 61 percent by 2040 while Lake Havasu City is anticipated to grow 28 percent within the same timeframe. Regional growth projections indicate that the area surrounding the proposed Project will experience significant growth within the next 20-30 years.

The majority of the projects included in the cumulative scenario are infrastructure projects involving a limited permanent employee base. No current projects are planned in the vicinity of the proposed Project that would support population increase. The Moabi Regional Park Improvements (6A) involve infrastructure improvements that would enhance the overall population's experience within the regional park; however no full-time residential structures would be built. The Pirate Cove Resort (6B) would involve 667 RV sites and/or cabin sites. These additions would not support year-round residential units and would not generate the need for new housing. The Topock Marina Improvements (8A) would involve construction of a restaurant and hotel. Similarly, the project would support temporary recreational users and not provide year-round residential units, thereby not inducing substantial population growth. For these reasons, the combined effects to population and housing within the geographic scope would not be considered cumulatively significant.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would not contribute incrementally to population- or housing-related issues. The proposed Project does not involve displacement of existing housing or people. Soil sampling activities are anticipated to last up to 12 months (9 month active field investigation) with a potential extension of up to three months for 25 percent contingency samples. Subsequent activities to support the Soil CMS/FS would be undertaken after the completion of the soil sampling activities in 2016 and are anticipated to last from 13 to 27 months, depending on need for each activity and ability for each activity to be implemented concurrently. The Project would require a minimal number of temporary employees (up to 26) over the lifetime of the Project. Some of these workers would only be at the Project Site for activities lasting 2-3 months. The limited duration of the Project and the low number of temporary employees would not result in population growth, the displacement of housing or people, or the need for new housing. Therefore, this impact is not cumulatively significant and the proposed Project could not cause or contribute to cumulative effects related to population and housing issues (less than significant).

6.5.14 Public Services

The geographic scope for cumulative impacts to public services is the larger region in which the Project is located and services are provided, which is San Bernardino County, California.

Public services in the vicinity of the Project Site and surrounding areas are provided by local agencies. Fire protection is provided by the San Bernardino County Fire Department on a contract basis to the City of Needles which operates as the City of Needles Fire Department. The Needles Fire Department serves the Project Site. Police protection is provided by the San Bernardino County Sheriff's Department. The Needles Unified School District serves approximately 6,000 square miles in eastern San Bernardino County. Moabi Regional Park, the Colorado River, and the National Wildlife Refuge provide recreational opportunities near the Project Site. The majority of the projects included in this cumulative scenario are infrastructure projects involving a limited permanent employee base. None of the projects are commercial or residential projects that would require increased public services to the area. For these reasons, the combined effects to public services within the geographic scope would not be considered cumulatively significant.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would not contribute incrementally to impacts to public services. As described in Section 5.3.8 the proposed Project would not result in significant impacts to public services. Soil sampling activities are anticipated to last up to 12 months (9 month active field investigation) with a potential extension of up to three months for 25 percent contingency samples. Subsequent activities to support the Soil CMS/FS would be undertaken after the completion of the soil sampling activities in 2016 and are anticipated to last from 13 to 27 months, depending on need for each activity and ability for each activity to be implemented concurrently. The Project would require a minimal number of temporary employees (up to 26) over the lifetime of the Project. Some of these workers would only be at the Project Site for activities lasting 2-3 months. The proposed Project does not include residential development and would not bring any new, full-time employees to the Project area that would require the expansion of public facilities. Because the Project would not create impacts with respect to new or physically altered fire protection, police protection, school, parks, or other public service facilities, it would not contribute to or combine with the impacts of other projects in the cumulative scenario to cause significant cumulative impacts related to these services. Therefore, this impact is not cumulatively significant and the proposed Project could not cause or contribute to cumulative effects related to public services (less than significant).

6.5.15 Recreation

The geographic scope for cumulative impacts to recreation is the larger region in which the Project is located where Project where employees are expected to originate from: San Bernardino County, California, which includes the city of Needles, California, and neighboring Mohave County, Arizona which includes the city of Lake Havasu City, Arizona.

The recreational opportunities in the vicinity of the Project Site include the Moabi Regional Park, The Pirates Cove Resort along the Colorado River, the Colorado River itself, and the National Wildlife Refuge. The majority of the projects included in this cumulative scenario are infrastructure projects involving a limited permanent employee base. No current projects are planned in the vicinity of the proposed Project that would increase population in such a way as to induce substantial deterioration of existing recreational facilities. The Moabi Regional Park Improvements (6A) involve infrastructure improvements that would enhance the overall population's use of the regional park; no degradation of the existing park would occur. The Pirate Cove Resort (6B) would involve 667 additional RV sites and/or cabin sites. These additions would provide for planned increase of recreational facilities offered; however the increase would not result in substantial physical deterioration of the site. The Topock Marina Improvements (8A) involves construction of a restaurant and hotel. Similarly, the project would not substantially increase the use of neighborhood and regional parks to the point of substantial degradation. For these reasons, the combined effects to recreation from the projects listed in Table 6-3 within the geographic scope would not be considered cumulatively significant.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would not contribute incrementally to impacts to recreation. As described in Section 5.3.9, the proposed Project would not generate additional residents to the area and would not increase the use of existing neighborhood and regional parks or other recreational facilities. The Project does not propose construction of any new recreational facilities. The proposed Project would not introduce facilities that would preclude existing recreational uses that occur on the Colorado River or the National Wildlife Refuge, which includes boating, wildlife observation and photography, education and interpretation, hunting, and fishing. Therefore, this impact is not cumulatively significant and the proposed Project could not cause or contribute to cumulative effects related to recreation (less than significant).

6.5.16 Transportation and Traffic

The geographic scope for cumulative impacts to transportation and traffic is Park Moabi Road, I-40, and the National Trails Highway. Because the Project does not pose a safety risk to nearby airports or alter traffic control patterns; does not involve elements that would create new hazards or hazardous roadways; does not create impacts with respect to new or physically altered police protection, school, medical, or other public service facilities; does not impact emergency access; and does not conflict with any adopted policies, plans, or programs supporting alternative transportation, it would not contribute to or combine with the impacts of other projects in the cumulative scenario to cause significant cumulative impacts related to these criteria.

Traffic conditions in the geographic scope are operating within an acceptable range. As discussed in Section 5.3.10, the Park Moabi Road segments north and south of I-40 are well below San Bernardino County's threshold of 7,000 ADT. The two Park Moabi Road/I-40 intersections under existing conditions (in Year 2014) are operating within the 0–10 seconds/vehicle range (Level of Service [LOS A]) during the A.M. and P.M. peak hours, and below the County threshold of 15 to 25 seconds (LOS C). The projects in this cumulative scenario are a mixture of infrastructure projects and recreational projects. The infrastructure projects, including the PG&E projects at the Station (1A through 1F), involve a substantial amount of truck trips to and from the Project Site. The majority of those projects are ongoing and contribute to the traffic baseline; however, the Groundwater Remediation Project (1C) anticipated to be constructed between 2015 and 2017 will require daily truck trips throughout project duration as listed in Table 6-4 below.

TABLE 6-4
ESTIMATE OF DAILY TRIPS FOR GROUNDWATER REMEDIATION PROJECT (1C)

Project Phase	Daily Trip Generation
Construction	76
O&M with 50% Construction	78
O&M with 50% Decommissioning	116
Decommissioning with Removal of Remedy	266

Notes: This information is based on information from PG&E regarding construction, operations and maintenance, and decommissioning. The results are based on the assumption that site workers make two daily trips occurring in the peak hour. Trips are presented as passenger-car-equivalent trips.
Source: DTSC 2011.

The Pirate Cove Resort (6B) would involve 667 RV sites and/or cabin sites. Currently, up to 663 RV sites can be utilized on peak weekends. Construction would involve worker and truck trips; however operation of the recreational site would increase the vehicles that can be accommodated by the site by only 4 vehicles, and no additional operational impacts are anticipated (County of San Bernardino 2012). The Topock Marina Improvements (8A) involves construction of a restaurant and hotel. Construction and operational traffic are anticipated to increase as a result of this project. The Sterling Project (8B) would involve construction of solar generating facilities that would increase traffic in Mohave County, AZ. The Airport Business Park (9A) would construct a light industrial business development park which would include construction and operational traffic increases in Lake Havasu City. It is assumed that workers for all projects in the cumulative scenario would drive one vehicle to and from work each day, and would arrive during the morning peak period (7 A.M. to 9 A.M.) and depart during the evening peak period (4:00 P.M. to 6:00 P.M.). Most workers would drive to the Project Site from nearby communities, including Needles, Laughlin, and Lake Havasu City. In addition, three transportation projects, the State Route 95 Realignment Project (5A), the Needles Public Improvement Project (6D), and the I-40 Connection Project (7A) would contribute to the cumulative traffic baseline during construction. Once operational, the State Route 95 Realignment Project would alleviate traffic in northwestern Arizona, and the I-40 Connection Project would alleviate traffic conditions in Needles. For these reasons, the combined effects to transportation and traffic from the projects listed in Table 6-3 within the geographic scope would not be considered cumulatively significant.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would contribute incrementally to transportation and traffic impacts. Soil sampling field investigation activities would occur over approximately five months and would require a maximum of 1,540 trips. Bench scale tests would require approximately 40 worker trips for one month; geotechnical evaluations would require approximately 128 worker and equipment trips for two months; and plant or other biota sampling would require approximately 60 worker trips for 6 weeks. The pilot studies at the bottom of Bat Cave Wash would require approximately 482 trips over 8 months, and the pilot study in the Station would require approximately 354 trips over 8 months. The additional traffic generated as a result of the proposed Project would be short-term, consistent with the length of Project activities, and intersections and roadway segments would continue to operate below County thresholds during Project activities. As a result, the Project would not add traffic to a roadway segment or intersection that would degrade the operation to an unacceptable level, or conflict with any applicable plan establishing measures of effectiveness of performance of the circulation system. Therefore, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, the Project's incremental contribution to transportation and traffic impacts would not be cumulatively considerable (less than significant).

6.5.17 Utilities and Service Systems

The geographic scope for cumulative impacts to utilities and service systems are the local and regional utility service provider service areas in eastern San Bernardino County, California. The Project is not located in an incorporated city; no municipal laws or regulations related to utilities and service systems are applicable to the proposed Project. Therefore, it would not cause or contribute to significant cumulative impacts in these criteria.

The Project Site and vicinity are located within unincorporated San Bernardino County. Solid waste in the Project vicinity is managed by Allied Waste, a refuse handler in Bullhead City, Arizona. The nearest hazardous waste disposal sites are the Kettleman Hills Landfill in Kings County, California, and the Clean Harbors Buttonwillow Landfill in Buttonwillow, California. Water supply in the Project vicinity is provided by a combination of private and municipal groundwater wells. Public utilities serving the Needles area are managed by the Needles Public Utility Authority, which oversees electricity and groundwater supply and the Needles Wastewater Department which oversees wastewater and sewer services. There is no municipal sewer system in the vicinity of the Project Site; the Moabi Regional Park's wastewater treatment facility, which is the largest facility near the Project Site in California, consists of a raw sewage lagoon treatment system. Wastewater at the Project Site is processed on-site at the existing IM-3 treatment facility, or trucked off-site when necessary. Electricity in unincorporated San Bernardino County is supplied by Southern California Edison.

The PG&E projects at the Station (1A through 1F) would utilize any of the three landfills described above. Water would be supplied via existing entitlements specific to the Project Site, and wastewater would be treated using the IM-3 facility on-site. Electricity would be provided by the Needles Public Utility Authority (City of Needles) electrical distribution system. The Moabi Regional Park Improvements (6A) and the Pirate Cove Resort (6B) would utilize the same solid waste disposal services and electricity provider. As stated above, the Moabi Regional Park includes its own wastewater treatment facility and water wells. The cumulative projects listed above would generally be served by individual water and wastewater treatment facilities that would not be affected by other cumulative projects; however solid waste disposal and electricity would be provided by the same utilities, resulting in cumulative impacts to landfills and electricity generation. For these reasons, the combined effects to utilities and service systems from the projects listed in Table 6-3 within the geographic scope would not be considered cumulatively significant.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would contribute incrementally to impacts to utilities and service systems. No new or enlarged entitlements would be needed as a result of the proposed Project, due to the existing allotment attributed to the Project Site. Up to 2,500 gallons of water (0.006 AFY) would be used for soil sampling and contingency sampling and up to an additional 1,200,000 gallons of water (approximately 3.61 AFY) would be used for pilot studies which when combined with up to 100 AFY of water used at the Station would not exceed contracted entitlements.

Nonhazardous incidental wastes from drilling activities, such as trash (e.g., gloves, disposable clothing, food waste) would typically be either hauled off the drill site at the end of the day or placed in dumpsters or roll-off bins that would be hauled off-site periodically by truck to an appropriately permitted municipal solid waste or recycling facility located within approximately 200 miles of the Project Site. The maximum projected waste stream for the Project is 20 cubic yards which would not exceed the available capacity of the Mohave Valley Landfill. Hazardous waste would be disposed of at either Kettleman Hills or Clean Harbors Buttonwillow landfill, both of which have 6,000,000 cubic yards and 9,000,000 remaining capacity (see Table 5-3). Solid waste generated from the proposed Project would not exceed the permitted capacity of relevant landfills.

It is expected that up to 2,500 gallons of wastewater would be generated from soil sampling and contingency sampling and up to an additional 1,200,000 gallons of wastewater would be generated from pilot studies. Wastewater generated from decontamination activities would likely be processed on-site at the IM-3 treatment facility and re-injected into the aquifer, or trucked off-site for disposal if IM-3 treatment facility is off-line or decommissioned in accordance with the groundwater remedy implementation procedures. Based on disposal activities conducted to date at the Station, the off-site facility likely would be in the Phoenix or Los Angeles areas. Because this effluent is disposed of by the wastewater contractor and handled consistent with applicable requirements and regulations, it is assumed that it would not exceed applicable water treatment standards and does not exceed existing treatment capacity. Discharges associated with the proposed Project have been permitted by the Colorado River Basin Regional Water Quality Control Board under Waste Discharge Requirements. The Project would not generate effluent that would exceed applicable standards or capacity, nor would the proposed Project require the construction of new treatment facilities.

Therefore, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, the Project's incremental contribution to impacts to utilities and public services would not be cumulatively considerable (less than significant).

CHAPTER 7
Alternatives to the Proposed Project

7.1 Introduction

The *Soil RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan* (Soil RFI/RI Work Plan or Soil Work Plan) (CH2M HILL 2013; Appendix A to this DEIR) sets out a comprehensive strategy for additional investigation of soil contamination proposed for the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Soil Investigation Project (Project), and the additional actions needed to inform the future *Soil Corrective Measures Study/Feasibility Study* (Soil CMS/FS) process and eventual remedial action plan. The Project reflects the outcome of a multiyear collaboration among the Department of Toxic Substances Control (DTSC), the U.S. Department of the Interior (DOI) and member Bureaus, PG&E, Native American Tribal representatives, and stakeholders to determine how best to move forward with the Project in the least impactful yet most feasible manner.

The proposed Project has been described and analyzed in the previous chapters of this draft environmental impact report (DEIR) with an emphasis on potentially significant environmental impacts and recommended mitigation measures to reduce those impacts. This chapter's purpose is to describe and analyze a range of reasonable alternatives that could feasibly attain most of the objectives of the soil investigation Project while avoiding or substantially lessening one or more of the significant effects of the Project (California Environmental Quality Act [CEQA] Guidelines, Section 15126.6[a]).

7.2 Requirements for Alternatives Analysis

CEQA does not prescribe fixed rules governing the type of alternatives to a project that should be analyzed in an environmental impact report (EIR), and the nature of alternatives varies depending on the context of the project being analyzed. As expressed by the California Supreme Court: "CEQA establishes no categorical legal imperative as to the scope of alternatives to be analyzed in an EIR. Each case must be evaluated on its facts, which in turn must be reviewed in light of the statutory purpose" (*Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564).

Section 15126.6(a) of the CEQA Guidelines provides that:

> [a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of

> potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason.

Under these principles, an EIR needs to describe and evaluate only those alternatives necessary to permit a reasonable choice and "to foster meaningful public participation and informed decision making" (CEQA Guidelines Section 15126.6[f]). Consideration of alternatives focuses on those that can either eliminate significant adverse environmental impacts or substantially reduce them; alternatives considered in this context may include those that are more costly and those that could impede to some degree the attainment of the project objectives (CEQA Guidelines Section 15126.6[b]). CEQA does not require the alternatives to be evaluated at the same level of detail as the proposed project. Rather, the discussion of alternatives must include sufficient information about each alternative to allow "meaningful evaluation, analysis, and comparison with the proposed project" (CEQA Guidelines Section 15126.6[d]).

The range of alternatives required in an EIR is therefore governed by a "rule of reason" that requires an EIR to set forth only those alternatives necessary to permit a reasoned choice (CEQA Guidelines Section 15126.6 [f]). An EIR need not consider every conceivable alternative to a project. Alternatives may be eliminated from detailed consideration in the EIR if they fail to meet most of the basic project objectives, are not feasible, or do not avoid or substantially lessen any significant environmental effects (CEQA Guidelines Section 15126.6[c]). Moreover, under CEQA, a lead agency may structure its alternatives analysis around a reasonable definition of a fundamental underlying purpose, and need not study alternatives that cannot achieve that basic goal (*In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings* [2008] 43 Cal.4th 1143, 1165).

CEQA also requires that alternatives be feasible. Feasible is defined in CEQA as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors" (PRC Section 21061.1). The CEQA Guidelines elaborate that factors that may be taken into account when addressing the feasibility of alternatives include site suitability, economic viability, availability of infrastructure, other plans or regulatory limitations, and jurisdictional boundaries and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site (CEQA Guidelines Section 15126.6[f]). Finally, alternatives should also avoid or substantially lessen one or more significant environmental impacts that would occur under the proposed project.

In addition to the requirements described above, CEQA requires evaluation of the "No Project Alternative," which analyzes the environmental effects that would occur if the project were not to proceed (CEQA Guidelines Section 15126.6[e]). The purpose of describing and analyzing the No Project Alternative is to allow the DTSC to compare the impacts of approving the proposed project with the impacts of not approving the proposed project. Moreover, the EIR is required to identify the environmentally superior alternative. "If the environmentally superior alternative is the No Project Alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives" (CEQA Guidelines Section 15126.6[e]).

7.3 Selection of Alternatives

In developing alternatives that meet the requirements of CEQA, the starting point is the proposed project's objectives.

As described in Chapter 3, the primary and fundamental objective of the soil investigation activities is to gather sufficient soil samples to be able to reliably characterize the nature and extent of soil and sediment contamination within the Project Site. If approved, soil and sediment would be analyzed for chemicals of potential concern (COPCs) previously identified in the Project Site (inside and outside the Station fence line) that resulted from historical Station practices, as informed by prior soil sampling, thereby enabling completion of the Final RFI/RI Report Volume 3 (Soil) and risk assessment as required by the 1996 Corrective Action Consent Agreement as soon as practicable and consistent with applicable state laws and regulations. Additional Project objectives include:

- Finalizing the evaluation of soil properties and contaminant distribution to support preparation of the future Soil CMS/FS, including gathering a sufficient level of information to identify a range of remedial alternatives;
- Assessing whether soil contaminant concentrations pose a threat to groundwater; and
- Assessing whether soil and sediment contamination have the potential to migrate off-site and, if so, gathering sufficient information to assess measures that may be required to prevent and minimize such migration to ensure protection of health, safety, and the environment.

The soil investigation activities do not predetermine remedial design options or alternatives. Rather, the data collected from implementation of the Project would be combined with the existing data sets to address the Data Quality Objectives (DQOs) outlined in the Soil Work Plan and inform DTSC if additional action or remediation is necessary for the identified investigation areas. The investigation of soil would also inform and enable, if necessary, the evaluation and selection of corrective measures in a future Soil CMS/FS.

7.4 Background

The soil investigation locations and the extent of soil testing have been determined through data collection and analyses that have been occurring over the past 30 years. Investigative and remedial activities in and around the Station began in the 1980s, when a Resource Conservation Recovery Act (RCRA) Facility Assessment (RFA) provided the initial research of the Station history and operations as well as the identified Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) that would require soil investigations (Kearney 1987). Subsequent investigations increased the number of SWMUs and AOCs to their current numbers and added Undesignated Areas (UAs), the perimeter area, and the storm drain system. Once identified, an evaluation of each area (SWMU, AOC, UA, or other) was conducted to identify the specific chemicals in soil attributed to Station activities and to delineate the extent of those detected chemicals. In many areas, data gaps have been identified, indicating insufficient data to adequately evaluate the nature and extent of contamination. The proposed Project would continue and complete filling these existing data gaps.

A draft Soil Work Plan was first published in May 2011 (CH2M HILL 2011). The work proposed in the May 2011 document was further refined after comments were received from interested and responsible agencies and other stakeholders, including Native American Tribal representatives. PG&E and DTSC worked together to minimize, to the extent possible, the effects of the proposed soil investigation activities on sensitive resources, particularly within the Topock Traditional Cultural Property (TCP). As explained in Section 4.4, "Cultural Resources," the Topock area and adjacent lands along the Colorado River are the ancestral home of a number of Native American Tribes. Land (including landforms, soil, and clay), water, plants, animals, archaeological manifestations, and the viewshed associated with the Topock TCP, and beyond, are considered by some Native American Tribes to constitute a landscape of significant cultural importance. The area is "embodied with sacred esoteric cultural and traditional values" (HDCR 2010).

Prior to the publication of the draft Soil Work Plan and as part of the soil data gap evaluation process, DTSC held multiple coordination meetings and site walks with Native American representatives and stakeholders in an effort to coordinate on what would be included in the planned soil investigation activities. These efforts (dates and specifics) are documented in the January 2013 Soil Work Plan (CH2M HILL 2013), Appendix A Part A Data Gaps Investigation Program, Section 1.0 Introduction. Prior to and since the publication of the initial draft Soil Work Plan (CH2M HILL 2011), DTSC and PG&E worked with agency and Tribal stakeholders to minimize the footprint and impact of the proposed soil investigation activities. Examples of how PG&E, under the direction of DTSC, was able to refine the design of the investigation and limit the amount of ground disturbance or other intrusion include:

- Approximately 50 sample locations were removed by DTSC/ DOI from the sampling program as a result of the input provided by the Interested Tribes, as detailed further in the Soil Work Plan, Section 1.0 Introduction of Appendix A Part A Data Gaps Investigation Program (CH2M HILL 2013);
- The number of sample locations were minimized by eliminating potentially redundant sample locations, combining and optimizing data from different investigation areas (multi-purpose sample locations), and making assumptions about potential physical barriers that may confine contaminant extent;
- The lesser intrusive X-ray fluorescence (XRF) method was used to reduce and optimize soil sample locations;
- Soil repatriation procedures were developed to assist in the proper handling and potential reuse of displaced soil resulting from the investigation activities.
- A phased approach employing XRF and surface geophysics was used prior to making decisions on drilling and trenching.

The details for these examples are provided in Appendix I of the Soil Work Plan (CH2M HILL 2013).

To assist with focusing the analysis of alternatives, **Table 7-1** summarizes the soil investigation Project's significant impacts (either potentially significant impacts that have been reduced to a level of less than significance with mitigation implementation, or impacts that remain significant and unavoidable even with implementation of mitigation), which have been identified in Sections 4.1 through 4.7 of this DEIR. Table 7-1 also includes impacts resulting from the proposed Project that are cumulatively considerable, which have been identified in Chapter 6.

TABLE 7-1
SUMMARY OF SIGNIFICANT EFFECTS OF THE PROPOSED PROJECT

Impacts	Significant and Unavoidable	Less than Significant with Mitigation
Direct and Indirect Impacts		
Biological Resources		
Impact BR-1: Implementation of the proposed Project could result in disturbance and/or removal of riparian vegetation, wetlands and other waters of the United States under U.S. Army Corps of Engineers and California Department of Fish and Wildlife jurisdiction along the Colorado River; specifically within Bat Cave Wash and East Ravine.		X
Impact BR-4: While the proposed Project could result in the temporary loss of foraging habitat for these species, the loss of foraging habitat would not substantially affect any special-status birds due to the abundance of foraging habitat in the vicinity of the Project Site. Implementation of the proposed Project could affect the active nests of special-status birds. In addition, visual or noise disturbance of active nests could result in nest abandonment and loss of sensitive bird species.		X
Impact BR-5: Implementation of the proposed Project could affect desert tortoises, either directly or through habitat modifications.		X
Impact BR-6: Implementation of the proposed Project could affect ring-tailed cat, either directly or through habitat modifications.		X
Cultural Resources		
Impact CR-1: Implementation of the proposed Project could cause a substantial adverse change in the significance of the historical resource identified as the Topock TCP as a result of the physical destruction and alteration to the characteristics of the property that convey its historical significance and qualify it for inclusion in the CRHR as defined in CEQA Guidelines Section 15064.5. The substantial adverse change to the TCP and its contributing elements would result from ground-disturbing activity that would directly and adversely affect the soil, landforms, and prehistoric archaeological resources; pruning or alteration of the natural growth of native and traditional plant species; and the presence of equipment, workers, and vehicles, which would introduce activities that are inconsistent with the natural setting associated with the Topock TCP. These activities would also materially affect the cultural values ascribed to the TCP by Tribes.	X	
Impact CR-2: Known historical resources would be avoided through Project design. No known unique archaeological resources have been identified within the Project Site. Implementation of the proposed Project could, however, cause a substantial adverse change in the significance of unknown historical resources (other than the TCP) and unknown unique archaeological resources pursuant to CEQA Guidelines Section 15064.5 resulting from ground-disturbing activity.	X	

TABLE 7-1
SUMMARY OF SIGNIFICANT EFFECTS OF THE PROPOSED PROJECT

Impacts	Significant and Unavoidable	Less than Significant with Mitigation
IMPACT CR-3: Implementation of the proposed Project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature as a result of ground disturbing activity.		X
IMPACT CR-4: Implementation of the proposed Project could, through the process of ground-disturbing activities, disturb human remains, including those interred outside of formal cemeteries.	X	
Noise		
Impact NOI-1: Ambient noise levels at existing noise-sensitive land uses may experience increased noise levels due to soil investigation activities for short term periods. The proposed Project would exceed applicable County standards for a place of worship and could result in a temporary substantial increase in ambient noise levels.	X	
Cumulative Impacts		
Cultural Resources		
Impact CUM-1: Implementation of the proposed Project, in combination with other projects in the geographic scope, could cause a substantial adverse change in the significance of the historical resource identified as the Topock Traditional Cultural Property (TCP); cause a substantial adverse change in the significance of unknown historical resources; and disturb human remains, including those interred outside of formal cemeteries.	X	

7.5 Alternatives Considered and Rejected

After completing a review of the proposed Project, as presented in Chapter 4 of this DEIR, along with all of the potentially significant adverse environmental impacts, DTSC identified a reasonable range of alternatives as defined by CEQA. A total of four alternatives, in addition to the No Project Alternative, were initially considered for evaluation. Of these, it was determined that two of the Project alternatives would: (1) meet most of the Project's objectives, (2) be considered potentially feasible, and (3) would avoid or substantially reduce one or more potentially significant impacts of the proposed Project. The alternatives considered but rejected from further consideration are described below. As required by CEQA, the No Project Alternative is described and analyzed in Section 7.6.3.

7.5.1 Tribal Land Use Alternative

On May 3, 2013, the Fort Mojave Indian Tribe (FMIT) submitted a letter that presented a proposed Tribal Land Use Alternative for evaluation in this Soil Investigation Project DEIR. This submittal included an April 11, 2013, Memorandum from Michael J. Sullivan, Consultant to the FMIT (Sullivan 2013). Prior to the submittal of this letter, the Tribal Land Use Alternative was extensively discussed between the FMIT, DTSC, DOI, and PG&E. The discussions occurred at various meetings during the preparation of the Soil Work Plan and also as part of the risk assessment work plan addendum. In addition, numerous letters were exchanged between the

FMIT, DTSC, and DOI regarding consideration of the Tribal Land Use Alternative (DTSC 2013a).

The Tribal Land Use Alternative would limit future land uses within the Project Site to Tribal-use activities and, as explained below, apply Tribal cleanup standards. As described in the April 11, 2013, Sullivan memorandum, the allowed Tribal-use activities included in the Tribal Land Use Alternative would be limited to the following:

- *Tribal Group Activities*. Several times during the year Tribal members would potentially meet at the site for group prayer and reflection. The duration would be short and formal group activities would be expected to last approximately 1 hour.
- *Tribal Educational Activities*. As part of Tribal education programs, students and young people, school or other youth classes, or adults may come to the area to learn about its importance and spiritual significance. These visits would last up to 2 hours and could occur several times during a student's education (elementary school through high school).
- *Tribal Member Individual Visits*. As part of the practice of their religion and cultural, to pay homage to the area and honor their ancestors, individual Tribal members would potentially go to the area for quiet time and reflection.

Under the proposed Tribal Land Use Alternative, the above activities would be the extent of activities that would be anticipated, or allowed, within the Project Site. The harvest or use of plants, digging into the land for removal of any soil or rocks, and the capture or use of animal or animal products are not included in the Tribal Land Use Alternative, consistent with the April 11, 2013, memorandum (Sullivan 2013). No development, recreation, or other permanent or temporary land uses or activities would occur within the Project Site or the surrounding properties.

Under this alternative, future residential use, recreational use, or other uses that would involve people visiting, living, or working at the site, other than the Tribal activities listed above, would not occur. The memorandum (Sullivan 2013) does not address how land use restrictions would be implemented or enforced.

The FMIT proposed the Tribal Land Use Alternative as an alternative that would reduce the amount of sampling and the associated ground-disturbing activities associated with the soil investigation, including drilling or excavation of soil borings (FMIT 2013). This is because the Tribal Land Use Alternative would provide higher screening levels to trigger the need for remediation activities for certain chemicals.

For example, the current screening level determined by DTSC for hexavalent chromium is 0.83 milligrams per kilogram (mg/kg), whereas the Tribal Land Use cleanup level is proposed to be over a thousand times higher at 1,396 mg/kg. The current screening level for benzo(a)pyrene is 38 micrograms per kilogram (ug/kg), whereas the Tribal Land Use cleanup level is proposed to be over three thousand times higher at 138,375 ug/kg. The overall purpose of the Tribal Land Use Alternative is to reduce the disturbance to lands that have Tribal value. If higher screening levels for certain chemicals were accepted by DTSC, the number of samples that would need to be collected during the soil investigation, as well as the areas to be remediated under future cleanup activities, could be reduced. The April 11, 2013, memorandum provides a detailed proposal of particular cleanup standards for chemicals of concern and estimates that soil investigation activities could be reduced by as much as approximately 90% under this alternative (Sullivan 2013).

This alternative was rejected for the following reasons.

Project Objectives. As noted above, the primary and fundamental objective of the soil investigation Project is to gather sufficient soil samples to be able to reliably characterize the nature and extent of soil and sediment contamination within the Project Site, and to inform the Soil CMS/FS and final remedy. Soil and sediments will be analyzed for COPCs previously identified in the Project Site (inside and outside the Station fence line) that resulted from historical Station practices, thereby enabling completion of the Final RFI/RI Report Volume 3 (Soil) and risk assessment as soon as practicable and consistent with applicable state and federal law.

To achieve the Project objectives, DTSC needs to compile the data gathered through this Project, and evaluate what, if any, cleanup should occur. It is DTSC's policy to always include a characterization of the Site to levels of residential/unrestricted land use as the point of departure for evaluation of risk and potential alternatives at the Site. The process for the characterization is based on state and federal laws which require that the investigation and cleanup of hazardous substance sites protect human health and the environment, that this protection be maintained over time, and that selected remedies minimize untreated waste and residual risks (DTSC 2002). The California Health and Safety Code, Sections 25356, 25200.10, and 25187, gives DTSC the authority to require response actions or corrective measures for hazardous substances and hazardous waste releases. One basis for DTSC's goal of remediation derives from the National Oil and Hazardous Substances Pollution Contingency Plan's (40 CFR 300) program goal [300.430(a)(1)(i)] and remedy alternatives evaluation criteria [300.430(e)(7) and 300.430(e)(9)(iii)] (DTSC 2002).

In conjunction with the DTSC Project objectives, DOI must also follow the NCP and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which leads to a conservative approach reflecting an alternative that includes residential cleanup standards. In 2007, DOI finalized the land use assumptions for conducting CERCLA Baseline Human Health Risk Assessment and Development of Remedial Alternatives for the Topock Site (DOI 2007). As described in the 2007 document, and reiterated in several subsequent documents by DOI and DTSC, the National Oil and Hazardous Substance Pollution Contingency Plan and CERCLA guidance emphasize the importance of factoring reasonable but conservative future land use assumptions into both the baseline risk assessment and the development of remedial alternatives. Based on this framework and the analysis contained within these documents, the DOI has stipulated that, for the purposes of the ongoing soil investigation and the baseline risk assessment, the future land use assumptions for the USFWS-managed wildlife refuge be recreational and Tribal uses. Subsequent correspondence to the Tribal Leaders also clarified and summarized this directive (DOI 2011). In a letter to Mr. Sullivan, consultant to the FMIT, on March 26, 2014 (DOI 2014), DOI restates the importance of factoring reasonable but conservative future land use assumptions into both the baseline risk assessment and the development of remedial alternatives.

The Tribal Land Use Alternative approach is based on the assumption that people visiting the site would be exposed to contamination less frequently and for shorter durations than under recreational, residential, or commercial uses. Although not directly addressed by the Tribal Land Use Alternative memorandum (Sullivan 2013), to enforce the limited nature and reduced activities proposed by the Tribal Land Use Alternative, land use restrictions would need to be put in place to prevent people from being exposed. Considering land use restrictions at the investigation stage of a remediation planning effort would be premature.

If DTSC were to pursue a reduced intensity soil investigation alternative that was consistent with the Tribal Land Use Alternative, it would not provide the information necessary to fully evaluate the Soil CMS/FS and potential final remedial activities that may be required to meet residential/ unrestricted land use standards which could hypothetically occur in the future at the Project Site. Having incomplete data, as would occur under the proposed Tribal Land Use Alternative, would affect the accuracy and effectiveness of future remediation planning efforts including, but not limited to, reducing the accuracy of the soil risk assessment, jeopardizing the effectiveness of remedial design and alternatives (should they be warranted), and appropriately reviewing the alternatives. This would also result in PG&E's failure to fully characterize the nature and extent of soil and sediment contamination within the Project Site.

Understanding the nature and extent of contamination is the primary objective of the Project. Without this full characterization, the Final RFI/RI Report Volume 3 (Soil) and risk assessment would not be able to fully anticipate the risks for all potential future users of the land, which would impede the ability for agencies to determine the best risk management for the use of the land, including evaluation of specific technologies in the Soil CMS/FS and potential cleanup of the site. Furthermore, DTSC would not be able to determine if the soil contamination at the Project Site poses a threat to groundwater or whether off-site migration of contamination is occurring. For these reasons, the Tribal Land Use Alternative would not meet the objectives of the proposed Project.

Feasibility. DTSC must give priority for compliance with applicable pollution control laws, standards, and implementation plans. DTSC's requirement to first consider residential/ unrestricted land use for the Project Site is based on state and federal laws that require that remediation protect human health and the environment, and that this protection be maintained over time. Selected remedies (cleanup actions) must minimize untreated waste and residual risks. As such, DTSC's evaluation of cleanup options includes unrestricted use as part of the analysis of options for all remediation projects (DTSC 2002).

At this juncture, DTSC is gathering information that will lead to the investigation of cleanup options. It is DTSC's policy to require adequate data collection, including health and environmental risks assessments, and remedial or corrective action components into remedial action alternatives that will protect human health and the environment (DTSC 2002). In order to have complete data to evaluate possible cleanup scenarios, DTSC must conduct sufficient investigation and data collection to know the extent and nature of contamination.

With respect to the FMIT's request to use the Tribal Land Use Alternative screening levels for the soil investigation rather than the varying use of residential, background, and human-or-ecological based levels, using this approach would go directly against DTSC policy of evaluating remedies that protect human health and the environment (DTSC 2002), which includes ecological receptors and groundwater resources. Site-specific background and human health- and ecological-comparison values are used to assist in characterizing the nature and extent of contamination for the purpose of evaluating the risk to human and ecological receptors, as well as the risk to the underlying beneficial use of groundwater. Using only Tribal Land Use screening levels would be too limited for this Project since it would not take into account potential risk to ecological receptors or the risk to groundwater.

For these reasons, this alternative was determined to not be feasible as it would not be consistent with DTSC's policy to consider residential/unrestricted land use for the Project Site during the investigation stage of the remedial process, which is based on state and federal laws.

7.5.2 Alternative Incorporating Cleanup Actions

In response to the notice of preparation (NOP) for the Project DEIR (Appendix B), a commenter presented an alternative that would go beyond the proposed investigative and data collection activities, and would also incorporate cleanup actions into the proposed Project. Under this alternative, toxins and chemicals of concern would be removed when found, thereby expediting the cleanup process. It was presented that this alternative would speed up the cleanup process, thereby reducing the overall cleanup schedule and minimizing the cumulative impacts of what are currently contemplated as two separate projects.

This alternative was rejected for the following reasons.

Project Objectives. Although this alternative would meet most of the Project objectives of characterizing the nature and extent of soil and sediment contamination within the Project Site, it would not include a full screening and evaluation of remedial action technologies for the Project Site. Furthermore, a presumptive remedial technology may or may not be appropriate for all areas of contamination depending on the location, type, and intensity of contamination yet to be discovered. The objective of this project is to analyze soil and sediment for COPCs previously identified at the Project Site (inside and outside the Station fence line) that resulted from historical Station practices, thereby enabling completion of the Final RFI/RI Report Volume 3 (Soil) and risk assessment as soon as practicable and consistent with applicable state law. The proposed alternative would expand the soil investigation Project to include cleanup actions but bypass a necessary step to evaluate the appropriate cleanup options. Under the proposed alternative, the objectives of the Project would be met, but the Project would be expanded to serve the additional purpose of cleanup, which is beyond the current scope of the Project.

Feasibility. To appropriately identify a final soil remedy, the extent and nature of what was released at the site and the extent of the problem from the release(s) need to be determined first. The proposed Project includes the actions necessary to identify the extent and nature of soil and sediment contamination at the site. Although it may seem more expedient if the contamination is removed as it is identified during the investigation, DTSC has committed to minimizing the intrusion and removing as little of the soil as possible while protecting the people and the environment that may come into contact with the material. Using the currently proposed process where cleanup occurs only after full investigation and data analysis, DTSC may find that there are technologies that can be used to remove the contaminants without actually removing the soil from the site (e.g., through on-site treatment). However, DTSC can only make that determination after it has gathered enough information to fully understand the nature and extent of the contamination at the Project Site. If remediation were to take place concurrently with the investigation, or in-lieu of the investigation, the overall environmental effects would likely be more severe as the most conservative cleanup actions would need to be selected in order to ensure public health and safety.

This suggested alternative would also likely require significantly more disruption to the soil and lands of Tribal significance that comprise the Project Site. Significant soil removal and export would be necessary to provide the most conservative (residential/unrestricted land use) cleanup standards rather than gather a sufficient level of information for the state and federal lead agencies to select the most appropriate final remedy based on the information gathered.

For these reasons, this alternative was determined to not be feasible as it would expand the primary goal of the Project (to successfully gather enough information to fully inform the future Soil CMS/FS and final remedy) and it would also likely require more disruption of the soil and lands of Tribal significance.

7.6 Alternatives to the Proposed Project

The following sections provide a comparative analysis of three alternatives to the proposed Project: (1) Reduction of Project Footprint Alternative (Avoid Mouth of Bat Cave Wash), (2) Reduction of Project Noise Alternative, and (3) No Project Alternative.

7.6.1 Reduction of Project Footprint Alternative (Avoid Mouth of Bat Cave Wash)

Under the Reduction of Project Footprint Alternative, all Project activities at the mouth of Bat Cave Wash would be avoided. As part of the proposed Project, the following parameters are planned to be measured in the heavily vegetated area at the mouth of Bat Cave Wash near the Colorado River: Cr(VI), Title 22 metals, pH, dioxins/furans, pesticides, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs). Proposed Project activities in the mouth of Bat Cave Wash include 23 sampling locations in a grid pattern spaced generally about 100 feet apart (i.e., AOC 1, mouth of Bat Cave Wash, as shown in Figure 3-3). Also, additional boreholes could be added in this area under the contingency allocation of up to 25 percent additional sampling locations (which are included in this DEIR evaluation). Rotosonic drilling would be the primary technique used in this location; in addition, a limited number of samples may be collected by hoe or excavator and hand tools, with an estimated disturbance diameter of less than 50 feet in any one direction from the sample location, and some trimming of the tamarisk for access.

The tamarisk thickets at the mouth of Bat Cave Wash provide one of the primary riparian habitat areas within the Project Site (the other area is located at the confluence of East Ravine and the Colorado River, just south of I-40). This area provides foraging and/or nesting habitat for a variety of special-status bird species, including crissal thrasher, Sonoran yellow warbler, Arizona Bell's vireo, California black rail, Yuma clapper rail, western least bittern, and yellow-breasted chat. Soil investigation activities in the mouth of Bat Cave Wash would result in temporary and short-term disturbances, including temporary loss of foraging and nesting habitat as a result of vegetation trimming, pruning, or clearing; drilling; road improvements; and use of staging areas.

Of particular note, Yuma clapper rail (Federally Endangered) are known to inhabit portions of the Topock Marsh (approximately 3.5 miles north of the Project Site) and the Topock Gorge (approximately 4 miles southeast of the Project Site), and annual surveys conducted by USFWS biologists have indicated that both the Topock Marsh and the Topock Gorge support relatively steady populations. Yuma clapper rail have not been documented on the California side of the River; however, suitable habitat for the species occurs within the emergent freshwater marsh scattered along the western shore of the Colorado River in Arizona and adjacent to the Project Site at the mouth of Bat Cave Wash. Thus, it is expected that Yuma clapper rail may occupy the habitat at the mouth of Bat Cave Wash in subsequent breeding seasons. Soil sampling activities and access road improvements could occur within 300 feet of marsh habitat near the mouth of Bat Cave Wash. Because of the distance to suitable Yuma clapper rail habitat, the proposed Project could cause direct and indirect effects, such as temporary habitat loss, disturbance of active nests (usually built at edge of water), and increasing predation and nest failure.

7.6.1.1 Ability to Meet Most of the Project Objectives

As noted above, the primary and fundamental objective of the soil investigation Project is to gather sufficient information to be able to reliably characterize the nature and extent of soil and sediment contamination within the Project Site. Soil and sediment will be analyzed for COPCs previously identified in the Project Site (inside and outside the Station fence line) that resulted from historical Station practices, thereby enabling completion of the Final RFI/RI Report Volume 3 (Soil) and risk assessment as soon as practicable and consistent with applicable state law. Seven soil borehole and surface sediment samples have been previously collected just within or at the margins of the heavily vegetated area at the mouth of Bat Cave Wash. The following sample results exceeded the indicated background or action levels:

- Total Chromium: Detected at 71 mg/kg in one surface soil sample, which is above the background level of 39.8 mg/kg and the Consensus-Based Threshold Effect concentration of 43.4 mg/kg
- Cr(VI): Detected in two surface soil samples at 2.63 and 1.3 mg/kg, which are above Background Level of 0.83 mg/kg

- Arsenic: Detected in one surface soil sample at 13 mg/kg, which is above the Background Level of 11 mg/kg
- Copper: Detected in one surface soil sample at 22 mg/kg, which is above the Ecological Comparison Value of 20.6 mg/kg
- Lead: Detected in three surface or shallow soil samples at 23, 18, and 9.4 mg/kg, which are above the Background Level of 8.39 mg/kg
- Molybdenum: Detected in one shallow soil sample at 1.5 mg/kg, which is above the Background Level of 1.37 mg/kg
- Zinc: Detected in two surface soil samples at 81 and 61 mg/kg, which are above the Background Level of 58 mg/kg

The existing analytical results indicate that surface soil and sediment in and adjacent to the heavily vegetated area is known to have chemical concentrations above background and action levels. No samples have been collected from within the inner portions of the area. If DTSC were to eliminate sampling in this area, the information necessary to fully evaluate the nature and extent of contamination known to be present in this area would not be collected and the fundamental objectives of the Project would not be met. Having incomplete data would affect the accuracy and effectiveness of future remediation planning efforts, including but not limited to reducing the accuracy of the soil risk assessment and jeopardizing the effective design of remedial alternatives in this area. Characterization of the nature and extent of soil and sediment contamination at the mouth of Bat Cave Wash is fundamental to understanding whether contaminant concentrations in that area pose a threat to groundwater and have the potential to migrate off-site. The alternative of avoidance of soil and sediment sampling at the mouth of Bat Cave Wash would not meet all of the Project objectives.

In addition, without the proposed sampling at the mouth of Bat Cave Wash, the accuracy and effectiveness of future remediation efforts would be affected. Without such data, DTSC can only make assumptions about the risk of soil contaminant concentrations at the mouth of Bat Cave Wash. Moreover, if remediation is deemed necessary at this location, DTSC would be required to verify the assumptions made during the risk assessment as part of the site remediation phase of the effort. The Reduction of Project Footprint Alternative could therefore delay the remediation process if additional sampling is deemed necessary to verify the assumptions of the risk assessment at the mouth of Bat Cave Wash.

7.6.1.2 Comparison of Environmental Impacts

Aesthetics

The Reduction of Project Footprint Alternative would result in reduced visual effects in comparison to the Project by removing investigation activities in the densely vegetated area of Bat Cave Wash, which would also avoid the trimming, pruning, or clearing of vegetation that would be necessary to accomplish this sampling. However, aesthetic effects associated with the Project were determined to be less than significant, so this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Air Quality

The Reduction of Project Footprint Alternative would result in reduced annual air pollutant emissions in comparison to the proposed Project by removing 23 drilling sample activities. The maximum daily emissions would likely be similar to the Project. However, daily and annual air pollutant emissions associated with the Project were determined to be less than significant, so this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Biological Resources

The Reduction of Project Footprint Alternative would result in reduced overall Project-related impacts to biological resources when compared to the proposed Project, including reduced impacts to riparian vegetation, jurisdictional resources, and nesting birds.

Under the proposed Project design for soil sampling, approximately 7.6 acres of Salt Cedar habitat exist within the Project Site; approximately 50 percent (3.8 acres) of which are near the mouth of Bat Cave Wash. Up to 3 acres of salt cedar habitat are anticipated to be temporarily impacted under the current Project design; 50 percent (up to 1.5 acres) of which will be impacted within Bat Cave Wash through trimming, pruning, or clearing of vegetation for access and sampling/drilling. Under the Reduction of Project Footprint Alternative, the Project footprint would be reduced to omit this area in Bat Cave Wash, thereby reducing the impacts to riparian habitat (i.e., salt cedar habitat) by approximately 50 percent. Because this area also falls under the jurisdiction of U.S. Army Corps of Engineers, California Department of Fish and Wildlife, and Regional Water Quality Control Board, implementation of the Reduction of Project Footprint Alternative would also result in an overall reduction (up to 50 percent or more) of impacts to jurisdictional resources.

Bat Cave Wash provides one of two primary foraging and/or nesting areas for both common and special-status bird species within the Project Site (the second area is located at the confluence of East Ravine and the Colorado River, just south of I-40) (GANDA 2009, 2012). While ample foraging and nesting habitat for avian species occurs throughout all habitats within the Project Site, both Bat Cave Wash and East Ravine support a specialized habitat for those species adapted to live in and move through riparian vegetation. Under the current Project design, the soil investigation activities at the mouth of Bat Cave Wash would result in temporary and short-term disturbances, including temporary loss of foraging and nesting habitat as a result of vegetation trimming, pruning, or clearing; drilling; road improvements; and use of staging areas. As described in the Soil Work Plan, sampling at East Ravine is anticipated to be relatively noninvasive and of low impact; therefore, it can be concluded that nearly 100 percent of the potential impacts to nesting riparian birds would occur within Bat Cave Wash. Under the Reduction of Project Footprint Alternative, the Project footprint would be reduced to omit this area in Bat Cave Wash, thereby reducing the impacts to nesting riparian birds by nearly 100 percent.

Under the Reduction of Project Footprint Alternative, impacts to the aforementioned biological resources would be avoided within Bat Cave Wash, significantly reducing the overall impact of the Project. Impacts may still occur to nesting birds, jurisdictional resources, and riparian vegetation in other parts of the Project Site; however, these impacts could be reduced to less than significant levels through implementing fairly standard avoidance mitigation measures, consistent with those presented in this DEIR.

Cultural Resources

CEQA impacts and significance determinations for cultural resources would be the same as previously described for the proposed Project. This alternative would somewhat reduce the extent of impacts within the Topock TCP by reducing the Project footprint. However, the Reduction of Project Footprint Alternative would nevertheless result in a significant and unavoidable impact within the Topock TCP. Significant impacts to soil and vegetation, which are contributors to the TCP, would still occur, as described for the proposed Project in Section 4.4, "Cultural Resources." The temporary presence of equipment, workers, and vehicles during soil sample collection would introduce activities that are inconsistent with the natural setting associated with the Topock TCP and are considered significant disturbances that would materially affect the cultural values ascribed to the TCP by several Interested Tribes.

Implementation of the Reduction of Project Footprint Alternative would not avoid or substantially lessen the impact to known historical resources relative to the proposed Project. As with the proposed Project, 16 known historical resources would be avoided through Project design and an additional 3 historical resources (CA-SBR-2910H, -6693H, and the Topock Station) would not be significantly impacted.

Potential impacts to unknown historical and unique archaeological resources from the Reduction of Project Footprint Alternative would be slightly reduced relative to the Project because the Project footprint would be reduced; however, because there remains a potential to impact unknown historical or unique archaeological resources, this incremental difference would not change the conclusion that the impacts of the Reduction of Project Footprint Alternative to unknown historical and unique archaeological resources would be significant and unavoidable.

Potential impacts to paleontological resources from the Reduction of Project Footprint Alternative would be slightly reduced relative to the Project because the Project footprint would be reduced; however, this incremental difference would not be substantial and impact avoidance mitigation measures would still be required, as recommended in this DEIR.

Potential impacts to human remains from the Reduction of Project Footprint Alternative would be slightly reduced relative to the Project because the Project footprint would be reduced; however, because there remains a potential to impact as yet unknown human remains, this incremental difference would not change the conclusion that the impacts of the Reduction of Project Footprint Alternative to human remains would be significant and unavoidable.

Hazards and Hazardous Materials

The Reduction of Project Footprint Alternative would eliminate the assessment of soil contamination and soil migration in the heavily vegetated area at the mouth of Bat Cave Wash. If the Reduction of Project Footprint were implemented, potentially harmful soil containing COPCs in this area could continue to pose a threat to the protection of health, safety, and the environment; thus, this alternative could result in a potentially significant impact to the environment from hazards and hazardous materials that would not be realized under the proposed Project. Alternatively, DTSC could pursue cleanup of soil in this area based on the limited data they currently have. That future remediation project may, therefore, be more extreme than necessary if it were based on conservative assumptions about the extent of the contamination.

Hydrology and Water Quality

The proposed Project would not exceed water quality standards or increase drainage or erosion potential because the Project Description and Soil Work Plan includes Standard Operating Procedures (SOPs) and Best Management Practices (BMPs) to prevent these types of impacts from occurring. In addition, the Project would require the adherence to the substantive provisions of applicable local, state, and federal laws. The Reduction in Project Footprint Alternative would include similar SOPs and BMPs as the proposed Project. Therefore, the Reduction in Project Footprint Alternative would result in impacts to hydrology and water quality similar to the proposed Project.

Noise

The Reduction of Project Footprint Alternative would result in reduced duration of noise exposure in comparison to the proposed Project by removing 23 sample locations at the mouth of Bat Cave Wash. Although this approach would result in some reduction in the duration of substantial noise, it would not reduce the significant unavoidable noise impact to less than significant because noise levels from other investigative site locations would continue to result in a substantial increase over existing baseline average ambient noise levels.

7.6.2 Reduction of Project Noise Alternative

The noise analysis for the proposed Project assumed the concurrent operation of three pieces of equipment at each site (i.e., hydrovac truck, rotosonic drill rig, backhoe) during the field implementation phase of the Project (which is expected to occur over a 5-month duration). While this is a conservative analysis because there will likely be times where fewer pieces of equipment will be used, it is also possible that there will be some times where all three pieces of equipment are being used concurrently at a particular site. Under the Reduction of Project Noise Alternative, a Project restriction would be put in place such that only one piece of equipment would be allowed to be in operation at any given time. Putting this restriction in place would likely result in an extension of the Project schedule by one month and an extension in the associated noise impacts. However, the potential for upper noise levels at any given point in time may be reduced.

7.6.2.1 Ability to Meet Most of the Project Objectives

As previously noted, the primary and fundamental objective of the soil investigation Project is to gather sufficient information to be able to reliably characterize the nature and extent of soil and sediment contamination within the Project Site. Soil and sediment will be analyzed for COPCs previously identified for in the Project Site (inside and outside the Station fence line) that resulted from historical Station practices, thereby enabling completion of the Final RFI/RI Report Volume 3 (Soil) and risk assessment as soon as practicable and consistent with applicable state law. This primary Project objective could potentially be attained with the Reduction of Project Noise Alternative.

7.6.2.2 Comparison of Environmental Impacts

Aesthetics

Under the Reduction of Project Noise Alternative, the same types of equipment and activities would occur within the Project Site. However, the timing, location, and duration of those activities might change slightly as only one piece of noise-generating equipment could be in operation at any given time. However, this would not substantially affect the visual character of the Project activities. It could, though, result in a visual effect that is longer in duration when compared to the proposed Project. Thus, the Reduction of Noise Alternative would result in slightly worse impacts to aesthetics in comparison to the proposed Project as a result of the longer investigation duration. These impacts would still be considered less than significant.

Air Quality

The Reduction of Project Noise Alternative would result in reduced daily air pollutant emissions in comparison to the proposed Project, although the duration of the field implementation phase would be extended and thus would likely result in similar annual emissions to the Project. However, daily and annual air pollutant emissions associated with the proposed Project were already determined to be less than significant, so this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project in regard to air quality.

Biological Resources

The Reduction of Project Noise Alternative may result in an overall reduction in the magnitude of noise impacts on nesting birds compared to the proposed Project; however, because the noise generated from one drilling rig would be louder than the natural ambient noise levels at the Project Site, disturbance to nesting birds could still occur. The USFWS uses a noise level of 60 A-weighted decibels (dBA) as an unofficial but widely accepted noise threshold for nest disturbance. If located in close proximity, one piece of equipment operating could result in noise levels greater than 60 dBA to nests. Further, the duration of the field implementation phase would be extended under this alternative, thus extending the duration of potential impacts to nesting birds. The Reduction of Noise Alternative would result in similar impacts to biological resources in comparison to the Project.

Cultural Resources

CEQA impacts and determinations of their significance for cultural resources for the Reduction of Project Noise Alternative would be the same as described for the proposed Project. Reduction of Project noise through restrictions on the number of pieces of equipment operating simultaneously would not reduce the level of significant disturbance to the natural setting associated with the Topock TCP. Project activities, regardless of the number of pieces of equipment working at one time, are inconsistent with the TCP's natural setting. In addition, the Reduction of Project Noise Alternative could result in a prolonged duration of the Project, which would increase the duration of significant impacts within the Topock TCP.

CEQA impacts and determinations of their significance for known and unknown historical and unique archaeological resources, paleontological resources, and human remains would be the same as described for the proposed action.

Hazards and Hazardous Materials

The Reduction of Project Noise Alternative would not change the number of boreholes drilled or the number of samples collected. Although the duration of sampling time would be drawn out, there would be no change in the number of samples collected or the overall volume of waste generated. Therefore, the Reduction of Project Noise Alternative would result in similar impacts to hazards and hazardous materials as the proposed Project.

Hydrology and Water Quality

The Reduction of Project Noise Alternative would not change the total number of boreholes drilled or the number of samples collected. Although the duration of sampling time would be drawn out, there would be no change in the total number of samples collected or the overall area of disturbance and erosion potential. Therefore, the Reduction of Project Noise Alternative would result in similar impacts to hydrology and water quality as the proposed Project.

Noise

The Reduction of Project Noise Alternative would result in lessened intensity of noise exposure at nearby sensitive receptors during the field implementation phase of the Project by limiting operation to just one piece of equipment at any time. Thus, the additive noise from multiple pieces of equipment operating concurrently would be eliminated. **Table 7-2** shows the resultant noise levels from the operation of one Vac-Truck (the loudest of potential equipment) under the Reduction of Project Noise Alternative in comparison to the potential noise of three pieces of equipment operating under the proposed Project. These noise levels are based on the Federal Highway Administration (FHWA) Roadway Construction Noise Model and incorporate the relative distance to each sensitive receptor.

As shown in Table 7-2, use of only one Vac-Truck would reduce overall noise by about 1 dBA versus the proposed Project. This noise reduction would be minimal since the Vac-Truck is the primary contributor to the combined noise. If either the drill rig truck or backhoe were only used, however, the resultant noise levels would be about 8 to 11 dBA, less than the overall combined noise of the Project. Even though noise under this alternative would be less than the maximum potential noise from the Project, the duration of the noise exposure would be longer due to the longer time required to conduct the investigation. Although this approach would result in some reduction in noise, it would not reduce the significant unavoidable impact to a less than significant level.

TABLE 7-2
REDUCTION OF PROJECT NOISE ALTERNATIVE COMPARISON

		Reduction of Project Noise Alternative		
Sensitive Land Use	**Project Noise Levels**	**Vac-Truck**	**Drill Rig Truck**	**Backhoe**
Topock Maze Locus A	72	71	62	64
Topock Maze Locus B	78	77	68	70
Topock Maze Locus C	78	77	68	70
Residence (685 ft away)	60	59	49	51
Residence (1,090 ft away)	56	55	45	47
Residence (2,450 ft away)	49	48	38	40

SOURCE: FHWA 2006.

7.6.3 No Project Alternative

Pursuant to Section 15126.6(e)(2) of the CEQA Guidelines, the No Project Alternative shall:

> …discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time the environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.

The existing condition at the time the NOP for the proposed Project was published included ongoing operation of the Station and related PG&E facilities at the Project Site. Reasonably foreseeable future activities are associated with the ongoing operation of the Station as well as groundwater remediation at the Project Site, which will be implemented independently of the proposed Project. A final environmental impact report (FEIR) for the Topock Compressor Station Groundwater Remediation Project was approved on January 31, 2011, and includes implementation of the preferred Alternative E—In Situ Treatment with Freshwater Flushing. DTSC also approved the *Topock Compressor Station Groundwater Remediation Project Environmental Impact Report Addendum No. 1 for Alternative Freshwater Source Evaluation Activities* (DTSC 2013b), which when implemented, will involve additional freshwater sources for consideration in the groundwater remediation project. The preferred groundwater remedy will involve installation of approximately 110 injection and extraction wells, reductant holding tanks and storage facilities, approximately 60 monitoring wells, pipelines and other utilities, and roadways, for in situ treatment of contaminated groundwater. At the time of the NOP, PG&E also installed and tested wells at the East Ravine and Station locations. These activities were conducted to support the groundwater remedy design. In addition, PG&E has been operating and maintaining the Interim Measure (IM)-3 extraction and treatment system at the Project Site since July 2005.

For the No Project Alternative, soil investigation activities identified under the proposed Project would not be implemented. Soil data needed to support the decisions identified in the DQOs for investigation areas located outside the Station fence line and investigation areas located within the Station fence line would not be collected. Under the No Project Alternative, the risk assessment and Soil CMS/FS would not be conducted; therefore, no remedy for soil investigation would be identified. Contaminated soil would continue to exist at undocumented and unexplored capacities and may continue to pose a risk to human health and the environment if the No Project Alternative were implemented.

7.6.3.1 Ability to Meet Most of the Project Objectives

The No Project Alternative would not meet any of the Project objectives. Under the No Project Alternative, soil contamination and soil contamination migration would not be assessed and would continue into the future. The presence of potentially contaminated soil would continue to exist unmitigated. Pursuant to the RCRA, PG&E must investigate all possible hazardous material releases from past waste management activities and mitigate the contamination if necessary; the No Project Alternative would impede the requirement of the law. Therefore, the No Project Alternative would not meet the primary and fundamental project objective.

7.6.3.2 Comparison of Environmental Impacts

Aesthetics

The No Project Alternative would not impact scenic vistas or the visual character of the Project Site. However, because the visual effects of the proposed Project would be minimal and temporal, the aesthetics impacts of the proposed Project were determined to be less than significant. Under the No Project Alternative, the Project Site would not be affected by soil investigation activities that may alter the religious and cultural experience of Native American Tribes on-site. In addition, increases in light and glare would not occur under the No Project Alternative. Thus, the No Project Alternative would result in less aesthetic effects when compared to the proposed Project; however, these differences would not be substantial and would not avoid or substantially lessen the aesthetic impact of the Project. Furthermore, no impacts to aesthetics would result from leaving contaminated soil in place at the Project Site.

Air Quality

The No Project Alternative would not increase air quality impacts from existing conditions. The proposed Project could cause potential air quality impacts, but due to the short term nature of the proposed Project, mitigation measures would not be required to reduce impacts to a less than significant level. Thus, although the No Project Alternative would result in fewer air quality impacts when compared to the proposed Project, these differences would not be substantial and would not avoid or substantially lessen a significant air quality impact of the Project. If the No Project Alternative were implemented, however, potentially harmful soil may become airborne and increase the risk to human health and the environment as a result of weather conditions or other human related disturbances which could (legally or illegally) occur in the Project Site.

Biological Resources

The No Project Alternative would not alter the existing site condition. No soil investigation activities would be conducted, including establishment of physical access to sampling locations, establishment of staging areas, and drilling or excavating soil borings. Therefore, the No Project Alternative would result in fewer biological resource impacts than the proposed Project. Notably, moreover, if the No Project Alternative were implemented, potentially harmful soil at the Project Site would continue to pose a risk to biological resources, including plant and animal species that depend on uncontaminated desert habitat for survival.

Cultural Resources

The No Project Alternative would not involve activities that could impact significant Historical (including archaeological) Resources as defined by CEQA Title 14, Chapter 3, Article 5, Section 15064.5. The proposed Project would result in significant and unavoidable adverse change to historical resources, including the Topock TCP. With the No Project Alternative, contaminated soil would remain in place and would not be characterized, evaluated, or remediated. The No Project Alternative would not alter existing conditions and would therefore not cause impacts to cultural resources. Because the No Project Alternative would cause no adverse change to historical resources, human remains, or paleontological resources, it would not cause or contribute to any cumulative effect on cultural resources. Therefore, the No Project Alternative would avoid the substantial adverse effects that would occur under the Project.

Hazards and Hazardous Materials

The No Project Alternative would not involve the assessment of soil contamination and soil migration on the Project Site. There would be no disruption of soil and no related potential for disruption or exposure of hazardous materials. If the No Project Alternative were implemented, however, potentially harmful soil that remains on the Project Site would remain unmitigated, which could pose a threat to the protection of health, safety, and the environment as the contaminant may spread as a result of weather conditions or other human-related disturbances which could (legally or illegally) occur in the Project Site.

Hydrology and Water Quality

The No Project Alternative would not involve the assessment of soil contamination and soil migration and related ground-disturbing activities on the Project Site. There would be no disruption of soil or water use and therefore no resulting impacts to hydrology or water quality. If the No Project Alternative were implemented, however, potentially harmful contaminants in soil may be transported to groundwater or surface water and increase the risk to water quality in particular as a result of weather conditions or other human-related disturbances which could (legally or illegally) occur in the Project Site.

Noise

The No Project Alternative would not involve activities that would generate noise. The proposed Project would result in significant and unavoidable impacts to ambient noise levels after the implementation of mitigation. As a result, the No Project Alternative would not alter the existing condition and would have fewer noise impacts than the proposed Project. No impacts to noise would result from leaving contaminated soil in place at the Project Site.

7.7 Environmentally Superior Alternative

CEQA requires that an EIR identify the environmentally superior alternative of a project other than the No Project Alternative (*CEQA Guidelines* Section 15126.6(e)(2). As discussed in Section 7.6.1, the Reduction of Project Footprint Alterative would result in minor reductions in environmental effects when compared to the proposed Project and the Reduction of Project Noise Alternative, and is therefore considered the Environmentally Superior Alternative. The Reduction of Project Footprint Alternative would avoid significant impacts to biological resources within the mouth of Bat Cave Wash, thereby reducing the overall biological impacts of the Project. While the Reduction of Project Noise Alternative would reduce noise-related impacts to biological resources within the mouth of Bat Cave Wash, it would not avoid them as with the Reduction of Project Footprint Alternative. In addition, under the Reduction of Project Footprint Alternative potential impacts to cultural resources would be slightly reduced relative to the proposed Project and Reduction of Project Noise Alternative because the Project footprint would be reduced. However, because there remains a potential to impact historical or unique archaeological resources under the Reduction of Project Footprint Alternative, this incremental difference would not avoid the significant and unavoidable impacts identified for the proposed Project.

It is important to note that the Reduction of Project Footprint Alternative would not achieve the fundamental Project objectives. The primary and fundamental objective of the soil investigation Project is to gather sufficient information to be able to reliably characterize the nature and extent of soil and sediment contamination within the Project Site. Characterization of the nature and extent of soil and sediment contamination at the mouth of Bat Cave Wash is fundamental to understanding whether contaminant concentrations in that area pose a threat to groundwater and have the potential to migrate off-site. Without that characterization, the Reduction of Project Footprint Alternative would not meet the objectives of the Project. Furthermore, failure to consistently evaluate the nature and extent of contamination at the mouth of Bat Cave Wash would not adequately characterize the existing risks to human health or the environment, which may lead to significant degradation or irreversible adverse impacts.

CHAPTER 8
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CHAPTER 9
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CHAPTER 10
Glossary

Acre-Foot: An acre-foot is defined as the volume of water that would cover 1 acre to a depth of 1 foot. It is equivalent to about 325,851 gallons.

Aquifer: A water-bearing layer of rock or sediment that is capable of yielding useable amounts of water.

Area of Concern (AOC): Areas in and around a project site that either have shown high levels of contamination or may have been contaminated from past operations, making them focus areas of the site investigation.

Bench Scale Test: Test performed to evaluate the potential for soil washing, soil stabilization/fixation, or solidification to be effective and economical remediation techniques that yield quantitative performance data and rough design and cost information.

Berms: A curb, ledge, wall, or mound made of various materials, used to prevent the spread of contaminants.

Best Management Practice (BMP): A term to describe a type of water pollution control.

Bureau of Land Management (BLM): An agency within the Department of the Interior that administers and manages the subsurface mineral estate underlying federal, state, and private lands.

California Department of Toxic Substances Control (DTSC): A department within the California Environmental Protection Agency in charge of regulating hazardous waste from generation to final disposal and overseeing the investigation and cleanup of hazardous waste sites.

California Environmental Quality Act (CEQA): Enacted in 1970 to provide long-term environmental protection, this law requires that governmental decision makers and public agencies study the environmental effects of proposed activities and that significant adverse effects be avoided or reduced where feasible.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A law enacted by the U.S. Congress on December 11, 1980, as amended on October 17, 1986, to provide broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment.

Chemicals of Potential Concern (COPC): Chemical elements or compounds (e.g., chromium) that may or may not be present at a project area.

Chromium: The additive of concentrations from all forms of chromium, mainly comprising hexavalent and trivalent forms. The California drinking water standard for total chromium is 50 micrograms per liter (or parts per billion), while the Federal standard is 100 micrograms per liter.

Compressor Station**:** A compressor station is a facility which helps the transportation process of natural gas from one location to another

Corrective Action Process: A process designed to evaluate the nature and extent of a release of a hazardous substance and implement appropriate measures to protect public health and the environment.

Corrective Measure Study/Feasibility Study (CMS/FS): A study conducted by the facility owner/operator to identify and evaluate alternative cleanup options to address contamination at a project site.

Cumulative Impacts: Total effect on a natural resource, ecosystem, or human community due to past, present, and future activities or actions of federal, non-federal, public, and private entities.

Data Quality Objectives*:* Systematic planning approach used to prepare plans for environmental data collection activities.

Department of the Interior (DOI): The United States department charged with conservation and development of natural resources. The U.S. Department of the Interior uses sound science to manage and sustain America's lands, water, wildlife, and energy resources, honors our nation's responsibilities to tribal nations, and advocates for America's island communities.

Electromagnetic Induction: The production of an electromotive force across a conductor when it is exposed to a varying magnetic field.

Environmental Impact Report (EIR): A report designed to examine the potential environmental impacts of proposed activities as required by the California Environmental Quality Act.

Extraction Wells: Wells that are used primarily to remove contaminated groundwater from the ground. Water level measurements and water samples can also be collected from extraction wells.

Final Remedy: The final cleanup action proposed for dealing with contaminants at a site.

Geotechnical Evaluation: Study involving geotechnical borings to collect information to evaluate strength characteristics of subsurface soil and slope stability.

Groundwater: Water beneath the earth's surface that flows through soil and rock openings.

Groundwater Plume: A body of contaminated groundwater. The movement of a groundwater plume can be influenced by such factors as local groundwater flow patterns, the character of the aquifer in which the groundwater is contained, and the density of contaminants.

Growth Inducement: The effects of a proposed project could have on economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment.

Hexavalent Chromium: One of several chemical forms of the element chromium. Chromium is a metal naturally found in rocks, soil and the tissue of plants and animals. Hexavalent chromium is used in industrial products and processes and is a known carcinogen when inhaled (i.e., through breathing) and ingested in unsafe concentrations.

Hollow Stem Auger: Drilling rig used extensively for soil sampling and ground water monitoring in industrial and commercial installations.

Hydrovacs**:** A non-destructive method of excavation that uses pressurized water and a powerful vacuum to quickly and safely expose buried pipes and cables.

Independent Utility**:** A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area.

Infiltration Galleries**:** An infiltration gallery is a structure including perforated conduits in gravel to expedite transfer of water to or from a soil aquifer.

In Situ Treatment: Technology that treats contaminants in place within the soil or in groundwater. It typically involves injection of a material such as air, gases, chemical or biological reagents, or solid material (e.g., molasses or lactose) to chemically alter the contaminant or to encourage bacteria in the soil to aid in the treatment.

Interim Measures: Cleanup actions taken to protect public health and the environment while long-term solutions are being developed.

Interested Tribes: The five Native American Tribes that actively participate in the Topock project are the Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, and the Hualapai Indian Tribe.

Investigation Derived Waste: Waste that is generated in the process of investigating or examining an actual or potentially contaminated site. It includes solid and hazardous waste, media (including groundwater, surface water, soils, and sediments) and debris that contain listed hazardous wastes or exhibit a characteristic of a hazardous waste. It includes media and debris that is not hazardous but is contaminated with hazardous constituents.

Lead Agency: A public agency with the principal responsibility for ordering and overseeing site investigation and cleanup.

Mitigation Measures: Actions designed to minimize significant impacts from project-related activities.

Mitigation Monitoring & Reporting Program (MMRP): A MRMP is a document or a matrix identifying mitigation actions to be taken and the outcomes of mitigation measure implementation when significant environmental impacts have been identified.

Molybdenum: A metallic element widely distributed in the Earth's crust and is used in industrial products and processes.

Monitoring Wells: Specially constructed wells used exclusively for testing water quality.

Nitrate: Nitrates and nitrites are nitrogen-oxygen chemical compounds that combine with various organic and inorganic compounds. Once taken into the body, nitrates are converted into nitrites.

Notice of Determination (NOD): A formal notice filed with the California State Clearinghouse after the final EIR has been certified and a project approved.

Notice of Preparation (NOP): A CEQA document to be sent by the lead agency to notify the public, responsible agencies, trustee agencies, and involved federal agencies that the EIR is being prepared.

Parts per Billion (ppb): A unit of measure used to describe levels or concentrations of contamination. (a measure of concentration equaling 0.0000001%). Most drinking water standards are expressed in ppb concentrations.

Percolation: The downward flow or filtering of water or other liquids through subsurface rock or soil layers, usually continuing to groundwater.

Percolation Bed: An unlined bed with built-up sides constructed of soil that collects discharged wastewater and allows it to soak into the ground and/or evaporate.

Pilot Study: A mini version of a full-scale study used to assess the feasibility of a particular cleanup technology in a specific location.

Plume: A body of contaminated groundwater. The movement of a plume in groundwater can be influenced by such factors as local groundwater flow patterns, the character of the aquifer in which the groundwater is contained, and the density of contaminants.

Pore Water: Water located within pore spaces between the grains of sediment beneath the bottom of the river.

Precipitate: A substance separated from a solution or suspension by chemical or physical change usually as an insoluble amorphous or crystalline solid.

Regional Water Quality Control Board (RWQCB): A California agency that maintains water quality standards for a specific geographic jurisdiction and enforces state water quality laws.

Remediation: Cleanup or other methods used to remove or contain a toxic spill or hazardous materials from a site.

Resource Conservation and Recovery Act (RCRA): A federal law that establishes a regulatory system to track and provide safe procedures for management of hazardous wastes from the time of generation to final disposal.

Resource Conservation Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI): An investigation that occurs in the corrective action process following a Facility Assessment under RCRA and/or a Site Inspection under Comprehensive Environmental Response, Compensation, and Liability Act. It is an in-depth study designed to gather data needed to determine the nature and extent of contamination at a site.

Reverse Osmosis: A treatment process used in water and wastewater systems by adding pressure to force water through a semi-permeable membrane. Reverse osmosis removes most drinking water contaminants, including salts.

Risk Assessment: Qualitative and quantitative evaluation of the risk posed to human health and/or the environment by the actual or potential presence and/or use of specific pollutants.

Scoping: A process to gain input from agencies and the public regarding the content of the EIR.

Scoping Meeting: Meeting to gain input from the public, the local community, government agencies, and tribal government agencies regarding selection of the final remedy.

Sediments: The soil, sand, and minerals at the bottom of surface waters, such as streams, lakes, and rivers. The term may also refer to solids that settle out of any liquid.

Selenium: A nonmetallic element abundant in the Earth's crust that is used in industrial products and processes.

Soil Corrective Measures Study/Feasibility Study (Soil CMS/FS): A study that occurs in the corrective action process following a soil investigation study. It is an in-depth study designed to gather data needed to determine the nature and extent of soil contamination at site.

Solid Waste Management Unit (SWMU): Any discernable unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at a facility at which solid wastes have been routinely and systematically released (Title 40 of the Code of Federal Regulations, Section 265.501).

Statement of Basis: A document that describes the basis for DTSC's proposed remedy and cleanup standards.

Subsurface Containment Barrier: Barriers used to contain or control the flow of contaminated groundwater or subsurface liquids. They are constructed by digging a trench around a contaminated area and filling the trench with a material that tends not to allow water to pass through it.

Surface Water: All water naturally open to the atmosphere such as rivers, lakes, reservoirs, ponds, streams, impoundments, seas, and estuaries.

Surfactent: A substance that tends to reduce the surface tension of a liquid in which it is dissolved.

Total Chromium: The additive of concentrations from all forms of chromium, mainly comprising hexavalent and trivalent forms. The California drinking water standard for total chromium is 50 micrograms per liter (or parts per billion), while the federal standard is 100 micrograms per liter.

Trivalent Chromium: A form of chromium and a metal naturally found in rocks, soil, and the tissue of plants and animals. Trivalent chromium is considered an essential nutrient and is relatively harmless. It does not dissolve in groundwater and tends to bind to soil; thus it does not travel readily in the environment.

Work Plan: A document that presents key elements of the approach for a proposed action. These may include health and safety, waste management, data collection, construction activities and methods, the schedule, approvals, a reporting plan and reporting schedule.

X-ray Fluorescence (XRF): A consequence of changes that take place within an atom. XRF is a proven technique for elemental analysis in samples consisting of liquids, solids, or loose powders.