

CHAPTER 1

Summary

1.1 Introduction

This summary provides an overview of the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project or proposed Project) and the environmental analyses that are contained within this draft subsequent environmental impact report (SEIR) as required by the California Environmental Quality Act (CEQA). This SEIR has been prepared according to Public Resources Code, Section 21000 et seq. and California Code of Regulations Title 14 Section 15000 et seq. (CEQA Guidelines) and specifically Public Resources Code Sections 21094, 21166 and CEQA Guidelines Sections 15128, 15152, 15162, 15168, which govern, among other items, tiering from a previously certified EIR and preparation of an SEIR. This SEIR is an informational document prepared by the lead agency, the California Department of Toxic Substances Control (DTSC), which must be considered by decision makers before approving or denying a proposed project.

1.2 Background

In 1951, the PG&E Topock Compressor Station (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 a natural wash 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 Colorado River water.

Remediation of contaminated groundwater 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. This authority under RCRA,

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.

however, can be delegated to states. In California, DTSC implements RCRA under such delegated authority from the federal USEPA through state law. The approval of the Final Groundwater Remedy Project to clean up the contaminated groundwater at the Station is a discretionary action that will be made by DTSC as lead agency. Activities associated with the corrective action would result in direct and/or indirect change in the physical environment. The SEIR is intended to address the potentially significant adverse effects of the proposed Project on the physical environment.

1.3 CEQA Environmental Review Background

The CEQA Guidelines Section 15160 provides for variations in EIRs so that environmental documentation can be tailored to different situations and intended uses, and these variations are not exclusive. This SEIR relies on a prior EIR, the Topock Compressor Station Groundwater Remediation Project Final EIR (Groundwater FEIR), certified on January 31, 2011 (SCH No. 2008051003), which provided analysis for the conceptual technical methods selected for the remedy that would remediate contaminated groundwater at the Station. The proposed remedial options were described in the *Final CMS/FS for Solid Waste Management Unit 1 (SWMU 1)/Area of Concern 1 (AOC 1) and AOC 10* (Final CMS/FS), and Alternative E—In Situ with Freshwater Flushing was identified as the preferred alternative. The Groundwater FEIR provided both a programmatic and, in certain instances, a project-level analysis of the construction, operation, and decommissioning of facilities that would be necessary to implement the preferred remedy (Alternative E from the Final CMS/FS), which had not yet been developed to specific plans and designs. On January 31, 2011, DTSC adopted Alternative E after certifying the Groundwater FEIR. DTSC also adopted an Addendum to the Groundwater FEIR in 2013, which expanded the Project Area and considered the potential environmental effects of alternate well locations for a freshwater source in Arizona (DTSC 2013).

1.4 Summary of the Proposed Project

This SEIR evaluates the reasonably foreseeable and potentially significant adverse environmental effects associated with modifications or changes to the Final Groundwater Remedy Project since the certification of the Groundwater FEIR that were identified through completion of the *Basis of Design Report/Pre-Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California, November* (Final Remedy Design; CH2M Hill 2015a). The Final Remedy Design and its associated appendices A through L; the *Construction/Remedial Action Work Plan for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California* (C/RAWP) (CH2M Hill 2015b) and its associated Appendices A through X; and the Supplemental and Errata to the Final Remedy Design are incorporated by reference throughout this SEIR and are found collectively as Appendix BOD as an electronic appendix to this SEIR (C/RAWP; CH2M Hill 2015b). This SEIR evaluates, at a project level, the environmental effects associated with the construction, operation and maintenance, and decommissioning of the Final Groundwater Remedy Project, based on the Final Remedy Design and as further described in Chapter 3 of this SEIR, relative to the program-level impact analysis in the certified Groundwater FEIR.

1.4.1 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. In addition to lands owned by PG&E, property adjoining the Station and within the Project Area continue to be owned and/or managed by a number of government agencies and private entities, including 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), Bureau of Land Management (BLM); U.S. Bureau of Reclamation (BOR) managed by the BLM; the Burlington Northern Santa Fe Railway (BNSF); California Department of Transportation (Caltrans)-leased land; Arizona Department of Transportation (ADOT); lands owned by the FMIT; lands owned by San Bernardino County (and managed by BLM); and privately owned lands.

The Groundwater FEIR identified a 779.2-acre Project Area within which all activities were anticipated to occur. The Addendum to the Groundwater FEIR resulted in an additional 74.5 acres to the Project Area, on the Arizona side of the Colorado River, to account for the additional freshwater supply source. The combined area of the Groundwater FEIR and Addendum totals 853.7 acres. After completion of the Final Remedy Design and to support the analysis of Project impacts for this SEIR, DTSC in coordination with DOI, further refined the Project Area to reflect the refined area that would be used for the Final Groundwater Remedy Project (see Figure 2-1 in Chapter 2, “Introduction”). This process resulted in including additional areas that may be needed for construction, access improvements, long-term Project operation and maintenance, decommissioning, and the removal of several areas that were determined no longer needed to support the Final Groundwater Remedy Project. The resulting Project Area that is the basis for the analysis presented in this SEIR is the area in which the Final Groundwater Remedy Project would occur, including construction, long-term operation and maintenance, and decommissioning phases, and encompasses 762 acres.

1.4.2 Project Objectives

The fundamental objective of the proposed Project as presented in the Groundwater FEIR certified in January 2011, is to clean up the groundwater contamination related to the historical release of chemicals at the Station, including into Bat Cave Wash and the East Ravine near the Station, in a manner that would be consistent with all applicable regulatory requirements and to do so within a reasonable period of time when compared between viable alternatives. The Remedial Action Objectives (RAOs) are developed by considering the conclusions of the Ground Water Human Health and Ecological Risk Assessment and identification of applicable or relevant and appropriate requirements (ARARs), which established specific cleanup goals for Cr(VI) and Cr(T), as well as addressing the COPCs (molybdenum, selenium, and nitrates) through monitoring and institutional controls. The RAOs were used for remedy selection in the Groundwater FEIR.

The following are the Project RAOs for groundwater:

- Reduce the mass of Cr(T) and Cr(VI) in groundwater at the Project Area to achieve compliance with the ARARs,² which will be achieved through the cleanup goal of the regional background concentration of 32 µg/L of Cr(VI).
- Ensure that the geographic location of the target remediation area (contaminated groundwater plume) does not permanently expand following completion of the final remedy.
- Prevent ingestion of groundwater as a potable water source having Cr(VI) in excess of the regional background concentration of 32 micrograms per liter (µg/L).
- Prevent or minimize migration of Cr(T) and Cr(VI) in groundwater to ensure concentrations in surface water do not exceed water quality standards that support the designated beneficial uses of the Colorado River (11 µg/L Cr[VI]).

In addition to the objectives stated above, the following objectives are defined by DTSC pursuant to CEQA Guidelines Section 15124(b):

- Provide consistency with the Remedial Design/Remedial Action Consent Decree between PG&E and the United States which was approved by the U.S. District Court for the Central District of California (November, 2013), the DOI/DTSC Memorandum of Understanding concerning the coordination in overseeing the implementation of the groundwater response action (November 22, 2011), and any other legal agreements applicable to the Project, including the 2006 and 2012 Settlement Agreements entered into between DTSC and the Fort Mojave Indian Tribe (FMIT).
- Achieve the cleanup levels or performance goals delineated in the DTSC's Statement of Basis and the DOI's Record of Decision for the final groundwater remedy.
- Protect biological, historical, and cultural resources by minimizing ground disturbance to the extent feasible.
- Minimize aesthetic impact to the extent feasible by limiting the amount of aboveground infrastructure.
- Consider public safety, ensuring efficiency, and compliance with health and safety standards.
- Ensure remedy achieves compliance with RAO's within a reasonable time frame as required by California State Water Resources Control Board Resolution No. 92-49.

² CERCLA Section 121 requires cleanups to meet ARARs: any "legally applicable or relevant and appropriate standard, requirement, criteria or limitation" that has been promulgated under federal or state environmental laws. The ARARs include such things as the federal and state "Safe Drinking Water Act" and the Solid Waste Control Act's land disposal restrictions.

1.4.3 Abbreviated Description of the Proposed Project

As described and considered in the Groundwater FEIR, the Final Groundwater Remedy Project involves in situ treatment of contaminated groundwater with freshwater flushing. In situ treatment of groundwater refers to the reduction in mass, toxicity, mobility, volume, and concentration of the chromium plume using treatment technologies that treat groundwater in place, as opposed to pumping and circulating water through a separate aboveground treatment plant. In situ treatment would be performed by placing a degradable food-grade organic compound (termed a carbon substrate or carbon amendment) in the groundwater to create reducing conditions to convert Cr(VI) dissolved in groundwater to relatively insoluble trivalent chromium [Cr(III)]. The reduced chromium would precipitate or become adsorbed onto soils below the water table and thereby be removed from groundwater. The organic carbon substrate would be released into the aquifer by injection after mixing on-site with a water source, such as extracted contaminated groundwater or clean water. The Final Groundwater Remedy Project includes the following primary components, which are described in detail in Chapter 3, “Project Description,” subsection 3.6.1:

- Development of an in situ reactive zone (IRZ) along National Trails Highway (NTH IRZ) using a line of injection and extraction wells to distribute groundwater amended with a carbon substrate for treatment of Cr(VI).
- Implementation of an inner recirculation loop (IRL) composed of injection wells upgradient of the NTH IRZ plume and extraction wells along the Colorado River that would induce groundwater flow through the NTH IRZ, capture contaminated groundwater downgradient of the NTH IRZ, and control NTH IRZ-generated byproducts.
- Installation of freshwater injection wells upgradient (west and south) of the NTH IRZ to further induce groundwater flow through the NTH IRZ and prevent westward migration of the plume.
- Installation of extraction and injection wells on and near the Station referred to as the Topock Compressor Station Recirculation Loop (TCS Recirculation Loop). This system would capture contaminated groundwater and circulate that groundwater after amendment with a carbon substrate creating an IRZ for the treatment of Cr(VI).
- Construction of a Remedy-Produced Water Conditioning System to treat and condition and reuse water from construction and maintenance activities including well backwashing and rehabilitation, purge water from monitoring well sampling, equipment decontamination wastewater, and rainfall that collects in remedy facility secondary containment. The system includes a contingency Dissolved Metals Removal System to remove scale-forming ions from the remedy-produced water prior to injection, if needed.
- Construction of a Clean-In-Place system for routine maintenance of the NTH IRZ water conveyance pipelines.
- Acquisition of freshwater for injection into the wells included to assist in flushing contaminated groundwater through the treatment zones. The source of the freshwater would be from existing Well HNWR-1A and possibly secondary contingent wells, all located in or near the Havasu National Wildlife Refuge in Arizona. The freshwater flushing system

includes the Contingent Freshwater Pre-Injection Treatment System to reduce the concentrations of arsenic, if needed.

- Construction of monitoring wells to augment the existing monitoring well network to further evaluate site conditions, monitor contaminant levels, and assess the performance of the remediation system.
- Construction of fluid conveyance, utilities, buildings, and roadways in support of the Final Groundwater Remedy Project, including the following facilities (in addition to those mentioned in the bullets above):
 - TW Bench - operations building and decontamination pad,
 - MW-20 Bench - carbon substrate building, carbon storage tank, reused frac tanks, and truck containment pad,
 - Near Moabi Regional Park - Construction Headquarters, Long-Term Remedy Support Area, Temporary Construction Laydown Area, and the Soil Processing/ Clean Soil Storage Area.
 - PG&E Topock Compressor Station - improvements to the Topock Compressor Station Evaporation Ponds (TCS Evaporation Ponds), and the shared use of the Station's Hazardous Material Storage Building.
- Implementation of monitored natural attenuation as a long-term component to address residual Cr(VI) that may remain in recalcitrant (difficult-to-treat) portions of the aquifer after optimization of IRZ treatment and flushing.
- Institutional controls to restrict surface land uses and prevent the use of groundwater until the RAOs are achieved.

In addition to the Project features described above, there may be a need for additional facilities and associated activities beyond the parameters set forth in the Final Remedy Design. A Future Activity Allowance has been included in the Project Description and the SEIR to ensure that a comprehensive environmental analysis is included should additional activities be warranted over the decades long Project implementation. More information can be found in Chapter 3 “Project Description,” Section 3.6. **Table 1-1** and **Table 1-2** provide a summary of the main components that comprise the Project, and that are evaluated in this SEIR.

**TABLE 1-1
SUMMARY OF REMEDIATION AND MONITORING WELL BOREHOLES**

Proposed Well Boreholes for the Final Remedy Design¹	Remediation Wells	Monitoring Wells	Total Wells
Known Project Components (Based on Final Remedy Design)			
Groundwater FEIR Limit	110	60	170
Installed Boreholes	2	16	18
Planned Boreholes to Be Installed	47	56	103
Future Provisional Boreholes that Might Be Installed	46	24	70
Total Boreholes Identified in the Final Remedy Design	95	96	191
Future Activity Allowance (Locations Unknown at this Time)			
25 Percent Potential Allowance	24	24	48
Additional Monitoring Well Boreholes	0	10	10
Totals			
Total SEIR Boreholes	119	130	249
Difference Between FEIR Limit and Total New SEIR Boreholes ³	7	54	61

NOTES:

1 Boreholes may have multiple wells installed within the same borehole

2 Remediation wells include injection and extraction wells

3 Difference equals Total SEIR Boreholes minus Groundwater FEIR Limit boreholes minus Installed Boreholes.

SOURCE: CH2M Hill 2015a.

**TABLE 1-2
SUMMARY OF NON-WELL INFRASTRUCTURE**

Infrastructure Component	Groundwater FEIR Estimate	Final Remedy Design	25 Percent Potential Allowance
Fluid Conveyance Piping and Trenches	50,000 linear feet	127,500 linear feet of piping in 43,200 linear feet of trenches	31,875 linear feet of piping in 10,800 linear feet of trenches
Electrical/Communications Conduits and Trenches	50,000 linear feet	124,000 linear feet of conduits in 43,200 linear feet of trenches	31,000 linear feet in the same 10,800 linear feet of trenches listed above
Natural Gas Pipeline at TCS Evaporation Pond	Not envisioned at that time	670 feet	None needed
Buildings and Structures	100,000 square feet	42,000 square feet	10,500 square feet
Roadway Improvements	6,000 linear feet	8,150 linear feet (new) and 4,060 linear feet (improvements to existing)	2,038 linear feet (new) and 1,015 linear feet (improvements to existing)

SOURCE: CH2M Hill 2015a.

The Final Groundwater Remedy Project is a long-term remediation effort anticipated to last over 50 years (approximately 30 years of active remediation followed by approximately 10 years of long term monitoring, and up to approximately 20 years of arsenic monitoring). Construction of the proposed Project is estimated occur over a 5-year period, following DTSC and DOI approval of the Final Remedy Design and C/RAWP, which is anticipated to occur in 2017. Construction would occur in two phases, one to construct the NTH IRZ and infrastructure, and the second to construct the remaining systems (IRL, TCS Recirculation Loop, and injection of freshwater). Operation and maintenance would begin following the start-up of the various remedy systems, and would consist of approximately 30 years of active remediation followed by up to approximately 10 years of long-term monitoring and up to approximately 20 years of arsenic monitoring. Decommissioning and restoration would begin following the attainment of the cleanup objectives and/or the determination that the remedy facilities are no longer needed.

1.5 Summary of Project Alternatives

The alternatives analysis included in this SEIR is focused on specifically reducing the identified significant environmental impacts of the proposed Project (per the intent of CEQA Guidelines Section 15126.6), and does not revisit the remedial technology alternatives previously considered in the Groundwater FEIR or those suggested during the Project's design phase which are not potentially feasible or which would involve substantially redesigning the Project.

The following provides a summary of the three alternatives that are considered in this SEIR. In addition to these three viable Project alternatives, four alternatives were considered but rejected from further consideration because they would not meet the basic objectives of the proposed Project. For a full discussion of the alternatives selected for evaluation, evaluations of their potential environmental effects, and a discussion of the reasons for rejection, refer to Chapter 7, "Alternatives to the Proposed Project."

1.5.1 Aboveground Pipeline Infrastructure Alternative

The proposed Project includes an extensive network of fluid conveyance pipelines to implement the remediation system, the vast majority of which would be located underground in subsurface trenches. The Aboveground Pipeline Infrastructure Alternative would place piping aboveground in three upland segments east and west of the IM-3 Facility, instead of belowground. The preference for aboveground pipelines was presented to DTSC and DOI from Interested Tribes who explained that further subterranean intrusion into the land resulting from belowground pipelines was objectionable. Accordingly, the intent of this alternative is to reduce the amount of overall ground disturbance and subsurface excavation. The Final Remedy Design includes approximately 43,200 linear feet of trenches for fluid conveyance piping (about 8.2 miles) with most of the conveyance piping placed belowground in trenches. The Aboveground Pipeline Infrastructure Alternative would include 4,800 linear feet of aboveground fluid conveyance piping and 800 linear feet of underground trenching (less than 1 mile) which is substantially less trenching than the 43,200 linear feet of underground trenching that would be required by the proposed Project. All other wells/boreholes, and Project infrastructure would be located in the same locations as described in the proposed Project. While overall ground disturbance and

subsurface excavation would be achieved, increased worker safety risks and maintenance requirements, and potentially increased impacts on wildlife movement corridors and linkages, could result.

1.5.2 Elimination of On-site Soil Storage Alternative

Under the Elimination of On-site Soil Storage Alternative, soil storage would be eliminated entirely at the Soil Processing Area/Clean Storage Area, and all, or a significant majority of, excavated soil would be exported off-site. While this alternative would eliminate the need for soil storage, a location near the Project Area would still be required for temporary soil staging for import soil, reusable site soil, and soil to be disposed of off-site. For purposes of this alternative, the existing BOR quarry area, which is located between the Station and the TCS Evaporation Ponds, could be used. The intent of this alternative is to minimize construction-related impacts to sensitive receptors at the nearby Moabi Regional Park, and to potentially reduce overall construction-related efforts. The use of the BOR quarry location for temporary management of site soil would increase soil transit time to work areas within the Project Area compared to use of the Soil Processing Area/Clean Soil Storage Area near Moabi Regional Park under the proposed Project. In addition, the use of the BOR quarry as a temporary soil staging area would likely increase consumption of construction water for dust control along unpaved roads, whereas the Soil Processing Area/Clean Soil Storage Area proposed for the Project is accessed primarily via paved roads.

1.5.3 Freshwater Supply in California Alternative

Under the Freshwater Supply in California Alternative, freshwater supply well(s) would be installed in California instead of in Arizona, which is the location proposed in the Final Remedy Design. The intent of this alternative is to avoid potential water quality impacts related to injection of Arizona freshwater in California that exceeds the maximum contaminant levels (MCL) of arsenic. Data from existing wells in the vicinity of the remedy suggest the aquifer near Moabi Regional Park is much less productive than that on the Arizona side of the river. Due to the less productive aquifer conditions, the volume of water obtained for use in the remedy would be greatly reduced, which would lengthen the amount of time it would take to clean up groundwater contamination. Moreover, the installation of freshwater supply wells on the California side of the Colorado River would require locating the wells far enough from the contaminated groundwater plume so that the drawdown created by freshwater pumping would not adversely affect the operation of the remedy. As a result, a California freshwater supply well must be located a sufficient distance away from the groundwater remedy; therefore, the length of freshwater pipelines in California to be installed would result in more ground disturbance than the proposed Project pipeline in Arizona.

1.6 Summary of Known Controversial Issues

CEQA Guidelines require that the summary of an 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 May 5, 2015, and is included in

this SEIR as Appendix NOP. The NOP and the scoping process are described in Chapter 2, “Introduction,” of this SEIR. Agency and public scoping meetings were held on May 19 and 20, 2015, to receive oral comments on the scope and content of the SEIR. The following is a summary of the known controversial issues that have been received regarding the Project:

- **Issue:** Concerns regarding the appropriateness of proceeding with Alternative E – Freshwater with Flushing as the preferred remedial approach.
 - **Where Addressed in the SEIR:** The consideration of potential remedial alternatives is considered in Section 7.5.1 of this SEIR.
- **Issue:** Concerns regarding the need for assessment of potential impacts to cultural resources and appropriate involvement of the Tribes in the SEIR process.
 - **Where Addressed in the SEIR:** Cultural resources are discussed Section 4.4, “Cultural Resources.” Tribal involvement is documented in subsection 4.4.3.2, “Native American Heritage Resources.”
- **Issue:** Questions regarding the appropriateness of an SEIR as the appropriate CEQA document for the Project.
 - **Where Addressed in the SEIR:** The appropriateness of an SEIR to address environmental impacts of the Final Groundwater Remedy Project are discussed in Section 2.2.
- **Issue:** Requests for future updates about the Final Groundwater Remediation Project and SEIR process.
 - **Where Addressed in the SEIR:** All commenters on the NOP and SEIR will receive future updates on the environmental review process associated with the Final Groundwater Remedy Project.
- **Issue:** Concerns about public health risks associated with potential exposure to contaminated water.
 - **Where Addressed in the SEIR:** Potential environmental effects associated with potential exposure to contaminated water are addressed in Section 4.6, “Hydrology and Water Quality.”
- **Issue:** Questions about incorporating biological studies included in the Partially Recirculated Draft EIR for the Soil Investigation Project into the Final Groundwater Remediation Project SEIR.
 - **Where Addressed in the SEIR:** All biological resource studies and reports completed to date have been included and analyzed in Section 4.3, “Biological

Resources,” including studies associated with bat species which were the subject of the Soil Investigation Project Recirculated Draft EIR.

- **Issue:** Concerns regarding the water source to be used in the remedy and naturally occurring arsenic in the water.
 - **Where Addressed in the SEIR:** Water supply proposed to be used as part of the Final Groundwater Remedy Project is discussed in Chapter 3, “Project Description,” Section 4.6, “Hydrology and Water Quality,” and Section 4.9, “Water Supply.”

1.7 Issues to Be Resolved

DTSC has prepared this SEIR using the review of available technical information regarding potential alternatives to the remediation of the groundwater. As required by CEQA, DTSC must evaluate the material in this SEIR, 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.

1.8 Summary of Impacts and Mitigation

Information in **Table 1-3**, “Summary of Impacts and Mitigation,” has been organized to correspond with the environmental issues discussed in Chapter 4, “Environmental Analysis.”

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Aesthetics			
Impact AES-1: Substantial Adverse Effects on Scenic Vistas. The proposed Project could introduce additional wells, roads, pipelines, and other associated infrastructure, including the Future Activity Allowance, which could have a substantial adverse effect on a scenic vista.	Potentially Significant	Mitigation Measure AES-1: Substantial Adverse Effects on Scenic Vistas (Groundwater FEIR Measure with Revisions). The proposed Project, including the Future Activity Allowance, shall be designed and implemented to adhere to the design criteria presented below: <ul style="list-style-type: none"> a) Existing mature plant specimens (i.e., medium- to large-sized trees, large or prominent shrubs, and tall predominately herbaceous) shall be protected in place during construction, operation, and decommissioning phases consistent with CUL-1a-5. The identification of plant specimens that are determined to be mature and retained shall occur as part of the design phase and mapped/identified by a qualified plant ecologist or biologist and integrated into the final design and project implementation consistent with CUL-1a-5. b) Revegetation of disturbed areas within the riparian vegetation along the Colorado River shall occur concurrently with construction operations. Plans and specifications for revegetation shall be developed by a qualified plant ecologist or biologist before any riparian vegetation is disturbed and shall be implemented consistent with CUL-1a-5. The revegetation plan shall include specification of maintenance and monitoring requirements, which shall be implemented for a period of 5 years after project construction or after the vegetation has successfully established, as determined by a qualified plant ecologist or biologist. c) Plant material shall be consistent with surrounding native vegetation. d) The color of the wells, pipelines, reagent storage tanks, control structures, and utilities shall consist of muted, earth-tone colors that are consistent with the surrounding natural color palette. Matte finishes shall be used to prevent reflectivity. Integral color concrete should be used in place of standard gray concrete. e) The final revegetation plans and specifications shall be reviewed and approved by an architect, landscape architect, or allied design professional licensed in the State of California to ensure that the aesthetic mitigation design objectives and criteria are being met. Planting associated with biological mitigation may contribute to, but may not fully satisfy, visual mitigation. f) The requirements of the Aesthetics and Visual Resources Protection and Revegetation Plan (C/RAWP Appendix N) shall be implemented throughout the construction, operation and maintenance, and decommissioning phases of the Project, including 	Less than Significant

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		but not limited to replacement planting procedures (see Section 4.3), maintenance and adaptive management (see Section 5.2), and photo-monitoring (see Section 5.3). These measures apply to new Project components added as part of the Future Activity Allowance, should they be visible from Key View 5 or any of the other key views identified in the SEIR.	
Impact AES-2: Substantial Damage to Scenic Resources within a Scenic Corridor. The proposed Project could introduce new features in the Colorado River floodplain, at the TCS Evaporation Ponds, and near the existing HNWR-1A well site in Arizona that could adversely impact scenic resources within a scenic corridor.	Potentially Significant	Mitigation Measure AES-2: Substantial Damage to Scenic Resources within a Scenic Corridor (Groundwater FEIR Measure with Revisions). The proposed Project shall be designed and implemented to adhere to the design criteria presented below: <ul style="list-style-type: none"> a) A minimum setback requirement of 20 feet from the water (ordinary high water mark or OHWM) shall be enforced, except with regard to any required river intake facilities, to prevent substantial vegetation removal along the river bank. b) Existing mature plant specimens (i.e. medium- to large-sized trees, large or prominent shrubs, and tall predominately herbaceous plants) shall be protected in place during construction, operation, and decommissioning phases. The identification of plant specimens that are determined to be mature and retained shall occur as part of the design phase and mapped/identified by a qualified plant ecologist or biologist and integrated into the final design and project implementation consistent with CUL1a-5. c) Revegetation of disturbed areas within the riparian vegetation along the Colorado River shall occur concurrently with construction operations. Plans and specifications for revegetation shall be developed by a qualified plant ecologist or biologist before any riparian vegetation is disturbed. The revegetation plan shall include specification of maintenance and monitoring requirements, which shall be implemented for a period of 5 years after project construction or after the vegetation has successfully established, as determined by a qualified plant ecologist or biologist. d) Plant material shall be consistent with surrounding native vegetation. e) The color of the wells, pipelines, reagent storage tanks, control structures, and utilities shall consist of muted, earth-tone colors that are consistent with the surrounding natural color palette. Matte finishes shall be used to prevent reflectivity. Integral color concrete should be used in place of standard gray concrete. f) The final revegetation plans and specifications shall be reviewed and approved by an architect, landscape architect, or allied design professional licensed in the State of California to ensure that the 	Less than Significant

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>aesthetic mitigation design objectives and criteria are being met. Planting associated with biological mitigation may contribute to, but may not fully satisfy, visual mitigation.</p> <p>g) The requirements of the Aesthetics and Visual Resources Protection and Revegetation Plan (C/RAWP Appendix N) shall be implemented throughout the construction, operation and maintenance, and decommissioning phases of the Project, including but not limited to replacement planting procedures (see Section 4.3), maintenance and adaptive management (see Section 5.2), and photo-monitoring (see Section 5.3). These measures apply to new Project components added as part of the Future Activity Allowance, should they be visible from Key View 11 or any of the other key views identified in the SEIR.</p>	
Impact AES-3: Substantial Degradation of Existing Visual Character or Quality. The proposed Project could introduce additional wells, roads, pipelines, and other associated infrastructure, including the Future Activity Allowance, which could substantially degrade existing visual character or quality.	Potentially Significant	Implement Mitigation Measures AES-1 and AES-2.	Less than Significant
Substantial Light and Glare. The proposed Project would not create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.	Less than Significant	No mitigation measures required.	N/A
Air Quality and Greenhouse Gas Emissions			
Impact AIR-1: Short-term Construction-Related Emissions of Criteria Pollutants and Precursors. The proposed Project could violate the MDAQMD air quality standards for NO _x during construction activities.	Potentially Significant	<p>Mitigation Measure AIR-1: Short-Term Construction-Related Emissions of Criteria Air Pollutants (Groundwater FEIR Measure). PG&E shall implement the fugitive dust control measures below for any construction and/or demolition activities:</p> <ul style="list-style-type: none"> • Use periodic watering for short-term stabilization of disturbed surface area to minimize visible fugitive dust emissions during dust episodes. Use of a water truck to maintain moist disturbed surfaces and actively spread water during visible dusting episodes shall be considered sufficient; • Cover loaded haul vehicles while operating on publicly maintained paved surfaces; • Stabilize (using soil binders or establish vegetative cover) graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than 30 days, except when such delay is caused by precipitation that dampens the disturbed surface sufficiently to eliminate visible fugitive dust emissions; 	Less than Significant

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<ul style="list-style-type: none"> Cleanup project-related track out or spills on publicly maintained paved surfaces within twenty-four hours; and Curtail nonessential earth-moving activity under high wind conditions (greater than 25 miles per hour) or develop a plan to control dust during high wind conditions. For purposes of this rule, a reduction in earth-moving activity when visible dusting occurs from moist and dry surfaces due to wind erosion shall be considered sufficient to maintain compliance. <p>Mitigation Measure AIR-1a: Short-Term Construction-Related Emissions of Criteria Air Pollutants and Precursors (New Measure). PG&E's construction contractor shall ensure that all off-road equipment with a horsepower greater than 50 horsepower have USEPA certified Tier 4 interim engines or engines that are certified to meet or exceed the NO_x emission ratings for USEPA Tier 4 engines. This measure excludes specialty construction equipment where Tier 4 interim engines cannot currently be obtained within the industry, or older equipment cannot be retrofitted to meet Tier 4 emissions standards. During construction and decommissioning, the construction contractor shall maintain a list of all operating equipment in use on the Project site. The construction equipment list shall state the makes, models, and numbers of construction equipment on-site. For specialty equipment where Tier 4 interim engines are not available, documentation supporting this conclusion shall be included in the equipment files. Once Tier 4 equipment is available for a piece of specialty equipment, it shall be incorporated into the construction fleet, replacing the existing non-Tier 4 piece of equipment. Equipment shall be properly serviced and maintained in accordance with the manufacturer's recommendations. Construction contractors shall also ensure that all nonessential idling of construction equipment is restricted to five minutes or less in compliance with California Air Resources Board's Rule 2449.</p>	
The proposed Project would not violate MDAQMD air quality standards for PM ₁₀ or other criteria pollutants during construction activities.	Less than Significant	No mitigation measures required.	N/A
Long-term Operational-Related (Regional) Emissions Criteria Pollutants and Precursors. The proposed Project would not violate the MDAQMD air quality standards for any criteria pollutant during operational activities.	Less than Significant	No mitigation measures required.	N/A
Long-term (Regional Emissions of Greenhouse Gases. The proposed Project would not generate greenhouse gas emissions that would have a significant impact on the environment, nor would it conflict with applicable plans, policies, or regulations adopted for the purposes of reducing	Less than Significant	No mitigation measures required.	N/A

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
GHG emissions.			
Impact AIR-2: Result in a Cumulatively Considerable Net Increase. The proposed Project could result in a cumulatively considerable net increase in criteria pollutant emissions with respect to NOx emissions during construction activities.	Potentially Significant	Implement Mitigation Measure AIR-1a.	Less than Significant
The proposed project would not result in a cumulative considerable net increase in any other criteria pollutant emissions.	Less than Significant	No mitigation measures required.	N/A
Long-Term Operations Related to (Local) CO Emissions. The proposed Project would not expose sensitive receptors to substantial pollutant concentrations.	Less than Significant	No mitigation measures required.	N/A
Short-Term Construction-Related and Long-Term Operational-Related Emissions of TACs. The proposed Project would not expose sensitive receptors to substantial TAC pollutant concentrations.	Less than Significant	No mitigation measures required.	N/A
Biological Resources			
Impact BIO-1: Potential Fill of Wetlands and Other Waters of the United States/California, and Disturbance or Removal of Riparian Habitat. Implementation of the proposed Project could result in disturbance to ephemeral waters under USACE and CDFW jurisdiction.	Potentially Significant	<p>Mitigation Measure BIO-1: Potential Fill of Wetlands and Other Waters of the United States and Disturbance or Removal of Riparian Habitat (Measure Completed – no longer applicable).</p> <p>Mitigation Measure BIO-1a: No-net-loss of Jurisdictional Wetlands/Waters Function or Value (New Measure). Unavoidable direct impacts to jurisdictional areas shall be documented by a wetland specialists or Field Contact Representative (FCR) during implementation of the proposed Project. To document unavoidable direct impacts, the extent of work areas near jurisdictional areas shall be delineated in the field using GPS technology and pre- and post-impact conditions of jurisdictional areas documented with photographs. The nature of construction within work areas shall also be described, including the Project facilities installed, equipment utilized, and duration of construction activities. Documentation of unavoidable impacts shall be submitted to CDFW and DTSC to ensure adequate mitigation is provided consistent with the requirements below.</p> <p>Unavoidable direct impacts to non-disturbed jurisdictional ephemeral waters (estimated at up to approximately 1.61 acres including direct impacts resulting from planned facilities and additional facilities constructed under the Future Activity Allowance) shall be mitigated to ensure no-net-loss of function or value. Mitigation shall include both (a) and (b) detailed below. Mitigation for ground disturbance associated with restoration and enhancement activities shall not be required.</p> <p>a) In-place restoration of jurisdictional areas directly impacted by</p>	Less than Significant

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>construction at a 1:1 ratio (i.e., 1 acre of restoration for each acre of direct impact to non-disturbed jurisdictional area) shall occur. In-place restoration of areas directly impacted during construction will occur in two phases. The first phase will involve restoration within the areas directly impacted by construction where it will not interfere with continued operation and maintenance of the proposed Project (e.g., restoration of temporary construction work areas). The first phase of restoration shall begin within 1 year of completing construction. The second phase will involve restoration of areas that will be occupied by Project facilities to occur following decommissioning of the proposed Project. Restoration of jurisdictional areas following decommissioning of the proposed Project will be guided by a Final Habitat Restoration Plan (refer to Mitigation Measure BIO-1b).</p> <p>b) To address temporal loss of jurisdictional areas directly impacted by construction, PG&E shall provide compensatory mitigation at a minimum 2:1 ratio (2 acres of compensation for each acre of direct impacts to non-disturbed jurisdictional area). Compensatory mitigation to address temporal loss shall be agreed upon with CDFW prior to the start of construction, involve the same amount and quality of jurisdictional area(s) disturbed, and include one or more of the following approaches: 1) acquisition and preservation in perpetuity; 2) restoration; and/or 3) enhancement. Acquisition and preservation may include establishment of a conservation easement or purchase of credits from a CDFW-approved mitigation banking program. Restoration may include conversion of non-wetland habitat to functioning wetland habitat. Enhancement may include removal of non-native species in existing wetland habitat. As summarized in the technical memorandum, <i>Assessment of Proposed Mitigation Planting Areas for Final Groundwater Remedy Impacts</i>, included as Appendix V to the C/RAWP (CH2M Hill 2015b), PG&E has identified restoration areas within the historical floodplain of the Colorado River. The historical floodplain no longer functions as a riparian habitat with hydrologic connectivity to the river; therefore, restoration in the historical floodplain may qualify as compensatory mitigation to address temporal loss if hydrologic function can be restored. PG&E shall prepare a mitigation plan prior to the start of construction to specify methodology, success criteria, and monitoring and reporting for compensatory mitigation. The plan shall be subject to CDFW approval and in conformance with the identified performance standards, and submitted to DTSC, BLM, BOR, USFWS, and DOI for review, as appropriate based on location of impacts.</p>	

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>Restoration of jurisdictional areas within the Project Area shall be guided by the <i>Havasu National Wildlife Refuge Habitat Restoration Plan</i> (Appendix G to the C/RAWP [CH2M Hill 2015b]) and <i>Habitat Restoration Plan for Riparian Vegetation and Other Sensitive Habitats</i> (Appendix O to the C/RAWP [CH2M Hill 2015b]), as approved by CDFW, USFWS, and DOI. Implementation of these plans will be informed by the technical memorandum, <i>Assessment of Proposed Mitigation Planting Areas for Final Groundwater Remedy Impacts</i>, included as Appendix V to the C/RAWP (CH2M Hill 2015b), which provides preliminary information on the condition within fourteen proposed mitigation planting areas.</p> <p>The habitat restoration plans also specify on-site restoration success criteria, monitoring and reporting requirements, and adaptive management guidelines for salvage and replanting of trees, shrubs, and perennial species. In accordance with the habitat restoration plans, removal of riparian trees (e.g., palo verde trees) shall be replaced at a 3:1 ratio (i.e., planting 3 trees in restoration areas for each tree removed during construction). The success criteria for mitigation plantings shall be a final minimum plant replacement ratio of 2.25:1 (75% overall survival rate) of mitigation plantings at the end of a minimum 5-year monitoring period. Adaptive management guidelines outline modifications to restoration approaches, as appropriate, to ensure successful establishment of native vegetation and desired density of cover of plants. As required by the plans, the following adaptive management actions shall be implemented if success criteria are not being met: weed control, irrigation modification, herbivory protection, and additional plantings. Reporting to DTSC, CDFW, and USFWS shall be completed within 90 days of completing each monitoring year.</p> <p>The habitat restoration plans also specify design and construction avoidance and minimization measures, including:</p> <ul style="list-style-type: none"> • Locating pipelines, wells, and staging and storage areas along roadways, pipeline rights-of-way, and other previously disturbed areas to avoid impacts to vegetation to the extent feasible. • Performing pre-activity surveys prior to ground disturbance to identify and demark with flagging, fencing, and/or signage areas of native vegetation and sensitive habitats in the immediate vicinity of the construction areas. • Providing construction workers with environmental awareness training regarding biological resources including sensitive species and habitats. <p>Mitigation Measure BIO-1b: Final Habitat Restoration Plan (New Measure). A final habitat restoration plan shall be developed and implemented following decommissioning of the proposed Project. The final habitat restoration plan will address restoration of areas that were impacted</p>	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		during construction, operation and maintenance, and decommissioning of the proposed Project, specifying salvage/replanting measures, as well as success criteria, monitoring, and adaptive management requirements for restored areas. Success criteria for restoration areas will be similar to that identified in the existing habitat restoration plans (i.e., 75% overall survival rate of mitigation plantings at the end of a minimum 5-year monitoring period). Adaptive management actions to ensure successful establishment of native vegetation and desired density of cover of plants will include weed control, irrigation modification, herbivory protection, and additional plantings. The plan shall be submitted to DTSC, CDFW, BLM, BOR, USFWS, and DOI for review.	
<p>Impact BIO-2: Direct Disturbance of and Loss of Habitat for Special-Status Birds, Desert Tortoise, Ring-Tailed Cat, Nelson's Bighorn Sheep, Special-Status Bats, Northern Mexican Gartersnake, and Special-Status Plants. Implementation of the proposed Project could affect special-status species either directly or through habitat modifications.</p>	Potentially Significant	<p>Mitigation Measure BIO-2a: Disturbance of Special-Status Birds and Loss of Habitat (Groundwater FEIR Measure with Revisions). The proposed Project has been designed to minimize removal of habitat for special-status birds. Impact avoidance and minimization measures required by the BIAMP shall be implemented (refer to Appendix S of the C/RAWP [CH2M Hill 2015b]). Avoidance and minimization measures required by the BIAMP include prohibiting construction near or in special-status bird habitat; limiting construction during the breeding seasons; requiring an on-site biological monitoring during field activities; implementing buffers around active nests to the extent practical and feasible to limit noise and visual disturbances; and conducting worker awareness training and monitoring to assess the activity effect, ambient activities, site conditions, and bird behavior to determine the efficacy of nest avoidance buffers.</p> <p>Mitigation Measure BIO-2b: Disturbance of Desert Tortoise and Loss of Habitat (Groundwater FEIR Measure with Revisions). To the extent feasible, project construction (including planned facilities and those potentially constructed as part of the Future Activity Allowance) shall be designed to minimize removal of habitat for the desert tortoise. Before any ground-disturbing project activities begin, a qualified desert tortoise biologist shall identify potential desert tortoise habitat in areas that could be affected. Through coordination with the designated qualified biologist, PG&E shall ensure that the footprints of Project elements and construction zones, staging areas, and access routes are designed to avoid direct or indirect effects on potential desert tortoise habitat to the extent feasible. Through coordination with the designated qualified biologist, PG&E shall ensure that the footprints of Project facilities and construction zones, staging areas, and access routes are designed to avoid direct or indirect effects on potential desert tortoise habitat to the extent feasible. In areas where impacts to potential desert tortoise habitat are unavoidable, measures outlined in the PBA and in the USFWS letter concurring with the PBA, shall be implemented, as described below.</p> <p>A qualified desert tortoise biologist shall conduct pre-activity desert tortoise clearance surveys immediately prior to activities that would result in</p>	Less than Significant

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>unavoidable impacts to tortoise habitat. The pre-activity survey will occur immediately prior to ground-disturbance. Pre-activity clearance surveys shall be in full accordance with the substantive requirements of USFWS protocols. Any desert tortoise burrows and pallets outside of, but near, work areas shall be flagged 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. To the extent feasible, tortoises shall not be handled. PG&E will have a USFWS-approved desert tortoise handler available if and when a tortoise requires active relocation. USFWS shall be contacted prior to handling any live tortoises. All encounters of desert live desert tortoises shall be reported to USFWS, BLM, CDFW, and DTSC. 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.</p> <p>PG&E shall designate a field contact representative (FCR) who will be responsible for overseeing compliance with proper execution of the mitigation measures. The FCR will be on-site during implementation of all ground disturbing activities. The FCR shall be trained by the qualified desert tortoise 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 and may be a project manager, PG&E representative, or qualified biologist. All employees and contractors shall be required to attend a worker awareness training prior to working on the proposed Project. The FCR shall maintain record of all employees and contractors who have completed the worker awareness training.</p> <p>USFWS may identify additional conservation measures should Project plans change, or if new information regarding the distribution or abundance of desert tortoise becomes available. PG&E shall implement any additional conservation measures identified by USFWS through the Section 7 consultation process.</p> <p>Mitigation Measure BIO-2c: Disturbance of Special-Status Species and Loss of Habitat Caused by Decommissioning (Groundwater FEIR Measure with Revisions). To avoid impacts on special-status species that may occur within the project area as a result of decommissioning activities, an Avoidance and Minimization Plan shall be developed and implemented through consultation with CDFW, BLM, and USFWS. The Avoidance and Minimization Plan will specify species-specific measures, including seasonal restrictions for decommissioning activities (i.e., avoidance of the avian breeding season and maternity roosting season for bats where habitat exists) as needed, as well as avoidance buffers around known locations of special-</p>	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>status species or their habitats. Avoidance and minimization measures identified in the plan shall be based on surveys conducted prior to decommissioning, and during the breeding season (as previously defined in the Groundwater FEIR for each species or suite of species). To the extent appropriate, the Avoidance and Minimization Plan for decommissioning activities will include applicable measures identified in the existing BIAMP and PBA. Restoration of any disturbed areas shall include measures to achieve no net loss of habitat functions and values existing before project implementation. These measures shall be achieved by developing and implementing a final habitat restoration plan (refer to Mitigation Measure BIO-1b). The plan shall include a revegetation seed mix or plantings design, a site grading concept plan, success criteria for restoration, a monitoring plan for achieving no net loss of habitat values and functions, and an adaptive management plan. Success criteria for restoration areas will be similar to that identified in the existing habitat restoration plans (i.e., 75% overall survival rate of mitigation plantings at the end of a minimum 5-year monitoring period). Adaptive management actions to ensure successful establishment of native vegetation and desired density of cover of plants will include weed control, irrigation modification, herbivory protection, and additional plantings. The final habitat restoration plan shall be submitted to DTSC, CDFW, BLM, BOR, USFWS, and DOI for review.</p> <p>Mitigation Measure BIO-2d: Disturbance to Ring-Tailed Cat Individuals and Habitat (New Measure). The following measures shall be implemented to avoid and minimize impacts to ring-tailed cat:</p> <ul style="list-style-type: none"> i. Pre-activity surveys for ring-tailed cats shall be conducted by a qualified biologist with species-specific experience prior to the start of ground disturbing activities (including during construction, operation and maintenance, and decommissioning phases) where suitable denning habitat is present. No activities that will result in disturbance to dens or individual ring-tailed cats will proceed prior to completion of the surveys. If no active dens are found, no further action is needed. If a ring-tailed cat den is present, additional measures shall be implemented as outlined below, and the CDFW shall be notified of any active dens within the proposed disturbance area. ii. If an active ring-tailed cat den is found during pre-activity surveys, Project facilities that may result in direct impacts to the active den shall be reconfigured to avoid the loss of the den if feasible. If Project facilities cannot be modified to avoid a den, activities with the potential to disturb the den shall cease and CDFW shall be contacted immediately. If approved by CDFW, demolition of the den site shall commence only outside of the breeding season (February 1 to August 30) when the den has been confirmed to be vacated. If 	

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>an occupied non-breeding den is found in an area scheduled to be impacted, prior to disturbance, the CDFW shall be notified to review and approve the proposed procedures to ensure that no take of the species occurs as a result of the action. Areas with unoccupied dens that need to be removed shall first be disturbed at dusk, just prior to removal that same evening, to allow adult ring-tailed cats to escape during the darker hours.</p> <p>Mitigation Measure BIO-2e: Disturbance of Nelson's Bighorn Sheep (New Measure). If a Nelson's bighorn sheep is observed during ground-disturbing activities (including during construction, operation and maintenance, and decommissioning phases), work within 125 feet of individuals shall be halted (CDFW 2016). Project activities can recommence after the bighorn sheep moves more than 125 feet away on its own. If proximity of Nelson's bighorn sheep to a proposed construction area may result in construction delays, PG&E shall contact CDFW prior to proceeding with ground disturbing activities to determine an appropriate course of action.</p> <p>Mitigation Measure BIO-2f: Disturbance or Loss of Special-status Bat Species (New Measure). Bats occupying Roost 9 (refer to Figure 4.3-7) shall be safely excluded after the maternity season (which ends August 31) and before bats go into hibernation or torpor (which begins October 31) through the use of a one-way door. Exclusion of bats shall be performed by a biologist holding a Memorandum of Understanding from CDFW to handle bats in California or a biologist otherwise licensed by the State of California to do so. After bats are safely excluded, fast drying foam shall be used to fill the void to prevent bats from re-entering the cavity.</p> <p>To the extent possible, ground disturbance within proximity of suitable maternity roosting habitat for special-status bat species as shown in Figure 4.3-7 should occur outside the maternity season (March 15 through August 31). If activities critical to meeting the Project objectives are determined necessary during the maternity season, measures (i) through (v) below will be implemented. Measures (i) through (v) are not required for activities implemented outside the maternity season.</p> <ul style="list-style-type: none"> i. High- and low-frequency noise disturbance shall be minimized by establishing avoidance buffers around known roost locations. Required buffer distance will vary by roost site and noise source. Table 4.3-5 provides buffer requirements for known roosting sites and noise source. Note, vehicles and heavy equipment may travel under the railroad bridges on National Trails Highway as these vehicles are generally moving quickly and are not expected to create much frequency noise while passing under the bridges. ii. To minimize potential effects to bats during nighttime activities, the Project must reduce or eliminate light levels at night. If artificial 	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>lighting at night is needed, floodlights shall be adjusted so that the angle of the beam is less than 70 degrees and directed away from roost sites. All nighttime lights shall be directed downward if possible. If lighting is required for minimum safety and security purposes, light barriers shall be used to reduce the potential for light to reach roosts. For example, if lights are needed to ensure safety of a work area, the light could be positioned so that a hillside blocks the light reaching the roosts sites. Smaller barriers, such as plywood sheeting, can be used, but lighting shall not surround a roost within the given buffer zones. Lights with high blue-white or ultraviolet content shall be avoided. When using nighttime lighting a buffer of 250 feet shall be maintained between every light source near roost sites 2 through 9, and a buffer of 400 feet shall be maintained near roost sites 1 and 10 (Table 4.3-5).</p> <p>iii. To minimize effects of increased human activities, pedestrians shall not approach active roosts during the maternity season, and a 65-foot buffer shall be maintained between roosts and foot traffic.</p> <p>iv. To minimize air quality degradation near roosts, stationary heavy equipment vehicles, large generators, and large idling trucks producing diesel exhaust shall not operate for more than 2 minutes within 250 feet of a bat roost (Table 4.3-5). Vehicles shall not idle their engine while under a bridge.</p> <p>v. A biological monitor shall be on-site during ground disturbing activities within proximity of roosts to ensure avoidance and minimization measures (including avoidance buffers) are properly implemented.</p> <p>Because roosting bats, including maternity colonies, switch roosts especially on a season-by-season basis, roost locations shall be identified by a qualified biologist specializing in bats at least once each for the spring and summer periods of the maternity season once every 3 years. Additionally, because western red bats could potentially breed in the large tamarisk groves located in Arizona, acoustic surveys for a minimum of three consecutive nights during fair weather (above 50 degrees Fahrenheit, no rain or high winds) during the summer maternity season shall occur once every 3 years. If western red bats are recorded acoustically, an attempt to locate active roost sites shall occur to establish appropriate buffer zones around each roost. If known roost sites do not change locations after three sets of surveys (over the course of 9 years) roosts shall be surveyed for spring and summer periods once every 5 years thereafter. Avoidance and minimization measures described (i) through (v) shall be implemented when activities are planned near newly discovered roosting locations between March 15 and August 31.</p>	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation																																																																																										
		<div>Table 4.3-5 Bat Roost Buffer Distances Per Equipment Category¹</div> <table><tr><th rowspan="2">Roost Site</th><th colspan="6">Buffer Distance (feet) by Equipment Category²</th></tr><tr><th>Construction Trucks and Heavy Equipment</th><th>Small Vehicles</th><th>Drilling, Trenching, and Light Equipment</th><th>Light Source</th><th>Pedestrian Traffic and Water Sampling Equipment</th><th>Stationary Diesel Sources > 2 minutes</th></tr><tr><td>1</td><td>120</td><td>90</td><td>150</td><td>400</td><td>65</td><td>250</td></tr><tr><td>2</td><td>90</td><td>65</td><td>150</td><td>250</td><td>65</td><td>250</td></tr><tr><td>3</td><td>90</td><td>65</td><td>150</td><td>250</td><td>65</td><td>250</td></tr><tr><td>4</td><td>90</td><td>65</td><td>150</td><td>250</td><td>65</td><td>250</td></tr><tr><td>5</td><td>90</td><td>65</td><td>150</td><td>250</td><td>65</td><td>250</td></tr><tr><td>6</td><td>90</td><td>65</td><td>150</td><td>250</td><td>65</td><td>250</td></tr><tr><td>7</td><td>90</td><td>65</td><td>150</td><td>250</td><td>65</td><td>250</td></tr><tr><td>8</td><td>90</td><td>65</td><td>150</td><td>250</td><td>65</td><td>250</td></tr><tr><td>9</td><td>90</td><td>65</td><td>150</td><td>250</td><td>65</td><td>250</td></tr><tr><td>10</td><td>90</td><td>65</td><td>150</td><td>250</td><td>65</td><td>250</td></tr><tr><td>Hypothetical Towns and's big-eared bat roost</td><td>400</td><td>200</td><td>200</td><td>400</td><td>200</td><td>250</td></tr></table> <div><p>¹ Roost buffers shall be implemented when ground disturbing activities are scheduled to occur during the maternity season (March 15 through August 31). Roost buffers are not needed for activities occurring outside the maternity season.</p><p>² Equipment Categories (see Appendix BOD for more detail): <u>Construction Trucks and Heavy Equipment/Stationary Diesel Exhaust Sources</u>: e.g., dump trucks, 18-wheeled flatbed trucks, front-end loaders, water trucks. <u>Small Vehicles</u>: e.g., pick-up trucks, UTVs. <u>Drilling, Trenching, and Light Equipment</u>: e.g., excavators, backhoes, road graders, drill rigs, trenching machines. <u>Pedestrian Traffic and Water Sampling Equipment</u>: e.g., hand tools, water quality instruments. Source: H.T. Harvey & Associates 2016</p><p>Mitigation Measure BIO-2g: Disturbance of Northern Mexican Gartersnake (New Measure). The following measures shall be implemented for activities undertaken within 600 feet of potential northern Mexican gartersnake habitat at the southern end of Topock Marsh in Arizona. These measures are additional to the general measures required by Section 3.4 of the PBA (included as Appendix U to the C/RAWP).</p><p>1. Workers shall exercise caution when traveling near potential gartersnake habitat along the southern margin of Topock Marsh.</p></div> <td></td>	Roost Site	Buffer Distance (feet) by Equipment Category ²						Construction Trucks and Heavy Equipment	Small Vehicles	Drilling, Trenching, and Light Equipment	Light Source	Pedestrian Traffic and Water Sampling Equipment	Stationary Diesel Sources > 2 minutes	1	120	90	150	400	65	250	2	90	65	150	250	65	250	3	90	65	150	250	65	250	4	90	65	150	250	65	250	5	90	65	150	250	65	250	6	90	65	150	250	65	250	7	90	65	150	250	65	250	8	90	65	150	250	65	250	9	90	65	150	250	65	250	10	90	65	150	250	65	250	Hypothetical Towns and's big-eared bat roost	400	200	200	400	200	250	
Roost Site	Buffer Distance (feet) by Equipment Category ²																																																																																												
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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>During the most-active season for northern Mexican gartersnakes (February 1st to November 30th), workers will not exceed 10 mph when traveling off-road to maximize the likelihood that gartersnakes would be seen and avoided by drivers. During the inactive season (December 1st to January 31st) workers will not exceed 25 mph when traveling off-road. Construction personnel will abide by the posted speed limit while traveling on the Oatman-Topock Highway.</p> <ol style="list-style-type: none"> 2. Work will stop if a gartersnake is found within the immediate area to be disturbed and the gartersnake will be allowed to leave the site on its own volition. 3. A qualified biologist shall perform preconstruction surveys prior to ground disturbing activities with the intention of identifying potential microhabitat sites (artificial or natural cover such as debris, wood, or rock piles, wildcat dump sites, high rodent burrow densities, etc.) favorable to gartersnakes in the disturbance area to focus search effort for potential gartersnakes. 4. When possible, ground disturbing activities should be avoided when snakes may be inactive and underground, in order to avoid injury to snakes. Construction will be completed when the northern Mexican gartersnake is active (February 1st through November 30th). 5. Material stockpiles located near the southern margin of Topock Marsh shall be limited to designated storage areas that are more than 600 feet from potentially suitable northern Mexican gartersnake habitat or on the opposite side of the Oatman Highway. 6. All open holes and trenches shall be inspected for trapped gartersnakes at the beginning, middle, and end of the work day, at a minimum. During excavation of trenches and to the extent possible, earthen ramps or wooden planks shall be provided to facilitate the escape of any wildlife species that may inadvertently become entrapped and to leave the site on its own volition (adapted from General Project Management Measure Number 17 of the PBA [Appendix U to the C/RAWP (CH2M Hill 2015b)]). <p>Mitigation Measure BIO-2h: Disturbance of Special-Status Plants (New Measure). To reduce potential construction-related impacts to populations of mousetail suncup and other potentially occurring special-status plant species, at least one pre-construction survey shall be conducted prior to the start of any ground-disturbing activities in areas of suitable habitat. The survey shall be conducted in areas where construction is planned and during the blooming period of those species which are either known to occur or likely to occur in the area (i.e., generally March through May but dependent on rainfall patterns). The survey shall be conducted by a qualified botanist skilled at identification of the plant species in the region. The qualified botanist shall</p>	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>determine where pre-construction surveys are required based on existing habitat conditions. The locations of identified special-status plants shall be flagged and mapped using GPS, and an avoidance buffer of at least 50 feet shall be established identified locations to ensure no direct or indirect impacts occur.</p> <p>To the maximum extent feasible, additional Project facilities to be constructed under the Potential Future Activity Allowance shall be sited to avoid suitable habitat for special-status plant species. If additional Project facilities to be constructed under the Potential Future Activity Allowance cannot be sited to avoid suitable habitat, one of the following measures shall apply.</p> <ul style="list-style-type: none"> Assume suitable habitat is occupied by special-status plant species and provide mitigation (as prescribed in (i) through (iii) below); or Verify absence or avoidance of individuals by performing focused presence/absence surveys within the suitable habitat to be impacted. Verification of presence/absence shall require data from at least 2 years of focused surveys within the previous 5 years. Focused presence/absence surveys shall be performed by a qualified botanist during the blooming period of potentially occurring species (i.e., generally March through May but dependent on rainfall patterns). If special-status plant species are observed and avoidance cannot be achieved, mitigation shall be provided (as prescribed in (i) through (iii) below). <p>Results of all surveys performed following construction of the Proposed Project shall be incorporated onto a comprehensive map of suitable habitat and known rare plant populations within the Project Area.</p> <p>If disturbance within 50 feet of a special-status plant species cannot be avoided, PG&E shall contact CDFW prior to removing individuals to determine appropriate minimization and mitigation measures. Such measures may include, but may not be limited to, the approaches listed below. PG&E shall not proceed with ground disturbing activities that may directly or indirectly impact areas within 50 feet of special-status plants without first conferring with CDFW. The appropriate means to mitigate unavoidable impacts shall be determined based on coordination with CDFW while taking into account the nature and extent of unavoidable impacts and the species' rarity and known distribution within the Project Area. Mitigation may include a combination of the approaches outlined below, or other approaches determined by CDFW to sufficiently mitigate the impact. To the extent possible, mitigation of unavoidable impacts to special-status plants may occur in conjunction with mitigation for temporal loss of jurisdictional wetlands and waters.</p>	

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>i. <i>Seed Collection for Restoration:</i> Seed from individuals to be impacted would be collected prior to ground-disturbing activities. The seed would be collected following the protocols set forth by the Center for Plant Conservation and, if long-term storage is necessary, placed in a secure seed bank facility such as the Agricultural Research Service National Center for Genetic Resources Preservation in Fort Collins, Colorado. Collected seed would be applied to restoration areas within the Project Area. Restoration plans developed for the proposed Project would be revised to include success criteria for restoration of the special-status plant species to ensure successful re-establishment of the impacted species. Success criteria for impacted special-status plants would be developed through coordination with CDFW.</p> <p>ii. <i>Enhancement of Known Populations:</i> Known populations of the species to be impacted would be enhanced by undertaking actions to increase the size of the known population. Such actions may include improving the quality of occupied habitat (e.g., invasive species removal) and/or seeding to facilitate population expansion. Enhancement of known populations may occur at off-site populations that are currently conserved or within the occupied portions of the Project Area that can be conserved. An enhancement plan for impacted special-status plants would be developed through coordination with CDFW. The plan shall be approved by CDFW and submitted to DTSC, BLM, BOR, USFWS, and DOI for review.</p> <p>iii. <i>Preservation of Occupied Habitat:</i> Habitat occupied by the species to be impacted would be permanently protected by establishing a conservation easement. PG&E would coordinate with CDFW to determine the conditions of the conservation easement, including the required acreage of occupied habitat to be conserved and requirement monitoring and management of the conserved population. The agreed upon conditions would be detailed in a mitigation plan for impacted special-status plants. The plan shall be approved by CDFW and submitted to DTSC, BLM, BOR, USFWS, and DOI for review.</p>	
Impact BIO-3: Fish Mortality, Interference with Spawning Habitat, and Other Adverse Aquatic Effects. Increased sedimentation and turbidity, the release of contaminants, and standing during construction activities could also adversely affect fish habitat and movement in the Colorado River.	Potentially Significant	Implementation of Mitigation Measure HYDRO-1.	Less than Significant
Impact BIO-4: Substantial Interference with Fish or Wildlife Movement Corridors or Nursery Sites. The Project	Potentially Significant	Implementation of Mitigation Measure BIO-2f.	Less than Significant

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
could impede the use of bat maternity roosts, which are considered a type of native wildlife nursery site. Modifying, destroying or impeding the use of active maternity roosts of special-status bat species could result in substantial interference to the species reproduction and distribution.			
Cultural Resources			
Impact CUL-1: Cause Substantial Adverse Change in the Significance of a Historical Resource as Defined in CEQA Guidelines Section 15064.5. Construction, operation and maintenance, and decommissioning activities of the proposed Project could result in substantial adverse changes to historical resources in the Project Area, including the (1) the Topock TCP; (2) other historical resources listed in Table 4.4-2, and (3); historical resources that could be identified during construction. Impacts could occur through ground disturbance and other Project-related activities or through the introduction of out-of-character visual or auditory intrusions to historical resources that gain their significance in part because historical associations or aesthetic values. This impact would be potentially significant , as previously identified in the Groundwater FEIR.	Potentially Significant	<p>CUL-1a-1: Avoidance and Preservation in Place (Groundwater FEIR Measure with Revisions). During the construction, operation and maintenance, and decommissioning phases of the Project, PG&E shall carry out and require all subcontractors to carry out all Project activities in ways that avoid, minimize, and mitigate significant impacts resources associated with the Topock TCP, consistent with the CEQA Guidelines and with Stipulation I.B of the PA and Section 7.1 of the CHPMP, and to the maximum extent feasible as determined by DTSC, in coordination with PG&E, Interested Tribes, and respective landowners.</p> <p>CUL-1a-2: Develop Tribal Access Plan (Measure Completed – Tribal Access Plan attached as Appendix P of the C/RAWP).</p> <p>CUL-1a-2a: Implement Tribal Access Plans (New Measure). During the construction, operation and maintenance, and decommissioning phases of the Project, on non-federal land, Tribal access shall be permitted in a manner consistent with Section 2.1 “<i>Protocols for Continued Tribal Coordination</i>” of the CIMP (as described below in Mitigation Measure CUL-1a-8q) and “<i>Protocol to Preserve Tribal Member’s Access to, and Use of, the Project Area</i>” as included in Appendix P of the C/RAWP, and on federal land, Tribal access will be governed by the provisions of Appendix B “<i>Tribal Access Plan</i>” of the CHPMP.</p> <p>Procedures required by Appendix P of the C/RAWP include protocols and timelines for requesting access for religious, spiritual, or other cultural purposes and notification procedures (for additional details on requirements of the CIMP see below Mitigation Measure CUL-1a-8q, Section 2.11).</p> <p>Procedures required by Appendix B of the CHPMP include allowing Interested Tribes to access federal lands without specific authorization for the purposes of collecting materials (such as plants and minerals) or for traditional or ceremonial noncommercial uses; protocols for obtaining access permission for other purposes (such as larger or overnight gatherings); privacy measures that prohibit recording Tribal activities; and closure of some areas and roads to public access.</p> <p>CUL-1a-3: Site Security (Groundwater FEIR Measures with Revisions). During construction, operation and maintenance, and decommissioning of the Project, PG&E shall enhance existing measures to prevent and reduce incursions from recreational and/or other outside users from affecting unique</p>	Significant and Unavoidable

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>archeological and historically significant resources, including resources within the Topock TCP, by implementing Measures CUL-1a-3a, -3c, -3d, and -3e:</p> <p>CUL-1a-3a: Professional Qualifications and Annual Historical Resource Condition Inspection (Groundwater FEIR Measure with Revisions). PG&E's approved Qualified Cultural Resource Consultant shall carry out all cultural resources work associated with the Project and implement the Mitigation Monitoring and Reporting Program (MMRP). Cultural resources consulting staff shall meet, or be under the direct supervision of individuals meeting, the minimum professional qualifications standards set forth by the Secretary of the Interior (codified in 36 CFR Part 61; 48 FR 44739), as provided in Stipulation XI.A of the PA. In the event that PG&E needs to retain a new Qualified Cultural Resource Consultant, or additional cultural consultants, DTSC shall have approval authority over PG&E's selection of cultural resources consultants.</p> <p>During construction, operation and maintenance, and decommissioning of the Project, the Qualified Cultural Resources Consultant shall conduct yearly condition inspections of documented historical resources (as identified in Table 4.4-2 of this SEIR, as well as any future resources identified within the Project Area, and any additional resources that the BLM requests be included in the annual condition inspections), including inspections of the Topock TCP, to determine if substantial adverse changes have occurred relative to the condition of the historical resources during the past year. Inspections may occur less frequently or may be limited in geographic scope upon approval by DTSC and in coordination with PG&E, Interested Tribes, and BLM. PG&E shall offer to retain a Tribal monitor at historic rates of compensation or Tribal representatives designated by the Tribal Council or chairperson, if so requested, to accompany the Qualified Cultural Resources Consultant during the condition inspections. Historical resources condition inspection reports in the established format shall be prepared documenting the results of the inspection. PG&E shall provide reports to DTSC and the Interested Tribes for review and comment in accordance with Section 6.6.5 "Periodic Site Monitoring" of the CHPMP. Based on the results of the report, DTSC may request that PG&E initiate a meeting with agencies and Interested Tribes to discuss the findings within 30 days of submittal of the reports.</p> <p>CUL-1a-3b: Develop Site Security Plan (Measure Completed – Site Security Plan attached as Appendix Q of the C/RAWP).</p> <p>CUL-1a-3c: Coordination with BLM and San Bernardino County (Groundwater FEIR Measure with Revisions). PG&E shall continue to coordinate with BLM and San Bernardino County to facilitate outreach to the staff at Moabi Regional Park, requesting that they communicate to visitors the parts of the Project Area that are off limits to off-road vehicle usage because of health and safety concerns, public lands management plans, or landowner requests. PG&E shall make a good faith effort to involve Interested Tribes in</p>	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>this outreach effort, providing Interested Tribes with the opportunity to comment on outreach materials or provide a Tribal representative the opportunity to participate in the outreach activities. As part of this outreach effort, PG&E shall work with Moabi Regional Park and offer to design, develop, and fund the installation of an informational display (e.g., bulletin board, kiosk) within Moabi Regional Park that informs visitors of the work being done in connection with the Project.</p> <p>As provided in Appendix P of the C/RAWP, PG&E shall use information gathered during previous meetings with BLM, San Bernardino Regional Parks Department, Moabi Regional Park concessionaires, and Interested Tribes to facilitate the execution of visitor outreach materials. PG&E shall develop draft visitor outreach materials; develop a draft training session for Moabi Regional Park visitor-contact employees; develop display design concepts and draft informational content; and develop a draft plan for executing other outreach ideas identified during meetings. Once initial materials and plans are drafted, PG&E shall consult with the BLM, San Bernardino Regional Parks Department, Moabi Regional Park concessionaires, and Interested Tribes and provide these stakeholders an opportunity to review and comment on any outreach plan prior to its implementation. PG&E shall initiate conversations with key stakeholders (i.e., BLM, San Bernardino County, Moabi Regional Park, and Interested Tribes) within six months of approval of the Final Remedy Design.</p> <p>In addition to Appendix P of the C/RAWP, PG&E shall complete and implement outreach materials and plans prior to the start of construction. Materials shall be reviewed by PG&E at each phase of the Project and may be updated with input from Interested Tribes and with approval by DTSC, as the Project progresses.</p> <p>CUL-1a-3d: Signage (Groundwater FEIR Measure with Revisions). PG&E shall post signage to indicate those parts of the Project Area that are off limits to off-road vehicle usage due to possible health and safety concerns and to reduce potential damage to environmental resources. If agreed to by land owners and/or local, state, or federal management entities within the Project Area, PG&E shall work with the relevant land owner or land management entity to develop, design, and fund the installation of easily visible and clear signage. This may include coordination with BLM to install signage noting the designation of the area as an Area of Critical Environmental Concern owing to its biological and cultural resources, while ensuring that signs are placed in a way that does not draw unwanted attention to specific resources.</p> <p>As provided in Appendix P of the C/RAWP, PG&E shall initiate conversations with key stakeholders (i.e., BLM, San Bernardino County, Park Moabi) within six months of the final approval of the Final Remedy Design.</p> <p>In addition to requirements set forth in Appendix P of the C/RAWP, PG&E</p>	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>shall install signage prior to the start of construction, if possible, dependent on cooperation and input from land owners and land management entities.</p> <p>CUL-1a-3e: Site Security (New Measure). Site security procedures shall be implemented in a manner consistent with the Site Security Plan (C/RAWP Appendix Q). The Site Security Plan includes, but is not limited to, protocols for regular inspections of the Project Area during working and non-working hours; ensuring construction zones and protective measures are being maintained; ensuring personnel use designated travel routes and parking areas; notification and reporting of outside disturbances to the environment; worker cultural resources sensitivity training; and visitor access controls.</p> <p>CUL-1a-4: Technical Review Committee (Groundwater FEIR Measure with Revisions). PG&E shall work with representative members of the Interested Tribes to convene and retain a multidisciplinary panel of independent scientific and engineering experts as part of a Technical Review Committee (TRC). TRC may be called upon by the Interested Tribes to review Project-related documents and attend Project-related meetings. TRC efforts must be specific to that person's area of expertise and with the objective of advising interested tribal members on technical matters relating to the remedy design and its construction. The TRC shall be made up of not more than five multidisciplinary experts. The TRC shall include only persons with technical expertise limited to geology, hydrology, water quality, engineering, paleontology, toxicology, chemistry, or biology. TRC members shall be retained at rates comparable to those paid historically to tribal experts by PG&E. TRC members shall be selected by majority vote amongst participants from the Interested Tribes. For the purposes of contracting, this grant may be awarded to one tribal government to manage or, alternatively, PG&E may reimburse the tribe or TRC members directly. The entirety of the monies shall be used to fund the scientific and engineering team exclusively, and shall not be used to fund other tribal government expenses or used to support legal counsel. A stipulation of the contract shall be that the scientific and engineering team shall provide all deliverables and results to all involved tribes, despite a possible contract agreement with only one tribe or with PG&E. Activities shall be reported to DTSC for review and to ensure PG&E is in compliance at least annually. Upon conclusion of the construction phase of the Project, the necessity of the TRC shall be assessed by DTSC, at which time the provision of the TRC may be extended, reduced, or terminated. During the operation and maintenance and decommissioning phases, the necessity of the TRC shall be periodically evaluated by DTSC. This is the same committee referenced by CR-1e-8 in the Topock Soil Investigation Project EIR and MMRP.</p> <p>CUL-1a-5: Avoidance of Indigenous Plants of Biological and Cultural Significance (Groundwater FEIR Measure with Revisions). During construction, operation and maintenance, and decommissioning of the</p>	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>Project, should any indigenous plants of traditional cultural significance and listed in Appendix PLA of the Groundwater FEIR be identified within the Project Area, PG&E shall avoid, protect, and encourage the natural regeneration of the identified plants. In the event that impacts to the identified plants cannot be avoided and such plants are displaced, provisions included in the Plan for Culturally Significant Plants (Appendix A of the CIMP) shall be implemented. This mitigation measure is not meant to replace or subsume any actions required by state or federal entities with regard to the protection of species listed as rare, threatened, or endangered. Appendix A of the CIMP requires preconstruction surveys of works areas, staging areas, and access routes to identify and demarcate culturally significant plants; protocols for transplanting culturally significant trees and plants; protocols for salvaging topsoil for re-use during site rehabilitation to encourage regrowth of desert annuals; collecting seeds for future planting; protocols for replacement planting by container grown plants/trees; and future monitoring of transplanted trees and shrubs.</p> <p>CUL-1a-6: Noise (Groundwater FEIR Measure with Revisions). During construction, operation and maintenance, and decommissioning of the Project, all phone calls and alarms associated with remediation activities or facilities shall not be routed through PG&E's existing alarm system utilized at the Station. The notification system for remediation-related alerts and/or phone calls shall not introduce additional noise to the Project Area, to the maximum extent feasible, provided there is ongoing compliance with applicable safety regulations or standards of the Federal Energy Regulatory Commission, Occupational Safety and Health Administration, and other agencies.</p> <p>CUL-1a-7: Nighttime Lighting (Groundwater FEIR Measure with Revisions). During construction, operation and maintenance, and decommissioning of the Project, nighttime construction-related activities shall be limited to circumstances that require the continuation of work into the nighttime periods because it cannot be disrupted or suspended (including but not limited to conditions during drilling or concrete pouring) or work may require an early morning start to ensure completion within 1 day or because of heat constraints including with regard to personnel health and safety. To minimize lighting impacts, lighting shall include shrouding or shielding for portable lights, the use of the lowest allowable height and fewest feasible numbers of lights consisting of downward-facing fixtures fitted with cutoff shields to reduce light diffusion. No permanent light poles shall be installed. However, lighting would also be required to comply with the minimum county, state, and federal security and safety standards (as described in Appendix P – Cultural Resources Protocols).</p> <p>CUL-1a-8 (a through p): Develop Cultural Impact Mitigation Program (CIMP) (Measure Completed – Cultural Impact Mitigation Program</p>	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>attached as Appendix H of the C/RAWP).</p> <p>CUL-1a-8q: Implement Cultural Impact Mitigation Program (New Mitigation Measure).</p> <p>All activities related to the Final Remedy Design, as well as implementing the Future Activity Allowance, long-term operation and maintenance, and future decommissioning activities, shall be implemented consistent with provisions of the Cultural Impact Mitigation Program (CIMP). In addition to the parties listed in Section 2.15 of the CIMP as requiring consultation regarding discoveries and review of draft documents, DTSC shall also be included in these processes. PG&E, in consultation with the Interested Tribes, may amend the CIMP if protocols or procedures require modification due to unforeseen circumstances, as deemed necessary by DTSC. The CIMP, which is based upon Groundwater FEIR measures CUL-1a-8 (a through p), is summarized below. The text below is intended to provide a brief summary of the primary impact-reducing components of the CIMP, some of which reference the federal requirements of the PA and CHPMP (the CIMP, PA, and CHPMP may be amended or revised from time to time). Where this summary text differs from the CIMP (or the PA or CHPMP) or subsequent revision, the language of the CIMP (or PA or CHPMP) shall govern.</p> <p>Section 2.1 - Protocols for Continued Tribal Communication: This provides methods for facilitating open communication with Interested Tribes; documenting the Interested Tribes' preferences for method of open communication; and reporting Tribal outreach to DTSC. This protocol incorporates reference to Section 6.7 "Protocols for Tribal Notification and Consultation in Advance of Certain Activities" of the CHPMP, which requires the BLM to establish email and mail distribution lists for all Points of Contact (POCs) and distribution of documents in accordance with Appendix B of the PA.</p> <p>Section 2.2 - Protocols for Appropriate Treatment of Archaeological Materials: This describes how PG&E will continue to collaborate with Interested Tribes, respecting their preferences for avoidance and other treatment of archaeological discoveries; pre-construction field verifications; implementing procedures in Section IX of the PA and Section 8.1 and Appendix C of the CHPMP (i.e., cease work measures, notification protocols, inspecting and evaluating significance of discoveries, avoiding discoveries if possible and establishing protective measures, and treatment of discoveries that cannot be avoided). This section also outlines collection and curation protocols and data recovery procedures.</p> <p>Section 2.3 - Protocols for the Review of Cultural Resource-Related Documents: This describes the dissemination and review of cultural resource-related documents; outlines types of documents available for review and comment; provides a timeframe for review and comment; and provides an</p>	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>opportunity for Interested Tribes to present their unique perspectives on cultural significance of the area, including natural and cultural resources, Tribal beliefs, religions, customs, and current practices. This protocol incorporates reference to Section XI of the PA.</p> <p>Section 2.4 - Protocols for the Review of Project Design Documents: This documents the procedures for dissemination and Tribal review and comment on the completed groundwater remedy design documents prior to the beginning of construction. The Final Remedy Design document was completed and submitted to DTSC on November 18, 2015.</p> <p>Section 2.5 - Protocols for Restoring the Environment to Its Preconstruction Conditions Upon Decommissioning: This protocol includes a description of the general approach to restoring areas affected by the Final Remedy Design (e.g., backfill and compaction; grading and contouring; habitat restoration and revegetation; and consideration/accommodating requests for Tribal ceremonies); completion of a restoration plan within 120 days of the Department of the Interior's (DOI's) certification of the completion of the remedy; development of the restoration plan in consultation with land owners and managers; and consultation with Signatories, Interested Tribes, and Invited Signatories to the PA. (Mitigation Measure CUL-1a-17, described below, requires implementation of the restoration plan.)</p> <p>Section 2.6 - IM-3 Decommissioning Plan (Appendix B of the CIMP): The IM-3 Decommissioning Plan includes procedures for IM-3 system lay-up; procedures for decommissioning and removing the IM-3 system; waste management procedures; best management practices and mitigation measures compliance; soil confirmation sampling; a general approach for restoring areas originally affected by IM-3 operations; approvals and reporting requirements during the phases of IM-3 system closure; and a proposed work schedule.</p> <p>Section 2.7 - Protocols for Repatriation of Clean Soils During Construction: The approach and management to soil displacement was documented in "Revised Management Protocol for Handling and Disposition of Displaced Site Material" (Appendix B of the Soil Management Plan) and outlines the procedures and measures to minimize the amount of displaced material that leaves the Project Area and to provide for the eventual return, reuse, or restoration of the material onto the lands from which it was displaced. The management protocol was incorporated into the Soil Management Plan (Appendix L of the C/RAWP) – see Mitigation Measure CUL-1a-18 below for additional details on the procedures in the Soil Management Plan.</p> <p>Section 2.8 - Noise Protocol: This protocol includes establishing a disturbance coordinator for Project-related noise concerns; implementing</p>	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>engineering controls to minimize construction-related noise (e.g., install temporary noise barriers such as berms, stockpiles, dumpsters, bins, and/or engineered acoustical barriers) within identified noise buffers; selecting noise monitoring locations in coordination with Interested Tribes; maintaining all construction equipment according to manufacturer guidelines and fitting equipment with the best available noise suppression devices; shrouding or shielding impact tools; muffling or shielding exhaust ports on power equipment; limiting idling of construction equipment; procedures for addressing Project-related noise concerns; and communication/notification with Interested Tribes.</p> <p>Section 2.9 - Protocols for the Appropriate Methods, Consistent with Mitigation Measures AES-1 and AES-2, to Reduce Visual Intrusions: This protocol includes the measures listed in SEIR Mitigation Measures AES-1 and AES-2, including a minimum setback of 20 feet from the water to prevent substantial vegetation removal along the riverbank; protecting mature plants; revegetation of disturbed areas within the riparian vegetation along the Colorado River; using plant material consistent with surrounding native vegetation; construction wells, pipeline, and utilities in muted, earth-tone colors consistent with the surrounding natural color palette. The protocol also summarizes the design concepts that PG&E incorporated into the Project, including locating final aboveground facilities within existing facilities when appropriate; building designs that are harmonious with existing buildings and nearby landforms; flush-mount or below-ground installations whenever feasible; construction within existing transportation corridors; working within previously disturbed sites whenever possible; placing aboveground facilities away from traffic where feasible; and designing lighting to minimize glare. The protocol also describes the opportunities afforded to agencies, Interested Tribes, and other stakeholders to provide their input on visual aspects of the Project design, such as providing visuals in design packages and allowing reviewing parties to request additional visualizations or key views. The protocol also provides notification procedures to address temporary visual intrusions during Project implementation.</p> <p>Section 2.10 - Protocols for Tribal Notification in Advance of Project-Related Activities: Whenever possible, PG&E will notify Interested Tribes at least two weeks in advance of project-related ground-disturbing activities (such as grading, trenching, boring, drilling, or other excavation) whenever possible. Methods of notification may include, but are not limited to: through workplans and Project schedules; formal presentation or announcements at meetings; posting schedules online; email; telephone when advance notification was not possible; monthly schedules of field activities; weekly look-ahead schedules; and/or daily information sheets during times of intensive Project activity.</p> <p>Section 2.11 - Protocols to Accommodate Tribal Ceremonies or</p>	

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		<p>Activities Involving Topock Cultural Area: The first step in the protocol is a request for access by Interested Tribes to conduct Tribal ceremonies by phoning, emailing, or writing to PG&E's Site Manager. PG&E will consider the request and decide if the request can be accommodated as is, with modifications, or not at all, and will notify the requestor by phone or in person as soon as possible. PG&E staff, consultants, contractors or subcontractors will conduct themselves appropriately and, if invited to participate, will be respectful, turn off cell phones, and refrain from photography without permission. PG&E will maintain confidentiality of documents and sensitive information to the maximum extent allowed by the law.</p> <p>Section 2.12 - Protocols for Tribal Monitors to Observe Ground-Disturbing Activities: PG&E will notify Interested Tribes of planned ground-disturbing activities and other scientific surveying within a minimum of one week and in the event of schedule changes. Tribal monitors will prepare and submit Daily Monitoring Logs. This protocol references Section 6.6.4 "Construction Monitoring" of the CHPMP, which requires advance notification and inviting Tribal monitors to observe ground-disturbing activities in accordance with Appendix C of the PA.</p> <p>Section 2.13 - Provision of Reasonable Compensation for Tribal Monitors: PG&E will provide reasonable compensation for Tribal monitors who work on the Project consistent with historic rates.</p> <p>Section 2.14 - Protocols for Protective Measures for Archaeological/Historical Sites During Construction: This protocol provides for identifying protective measures cultural sites, to the extent feasible, prior to construction; modifying construction zones to avoid discoveries identified during construction; implementing protective measures (such as covering, flagging, or fencing); if needed, modifying exclusion zones in consultation with the parties in the field; providing for archaeological and Tribal monitoring of implementation and removal of protective measures; periodic inspection of protective measures during construction; inspection, documentation, evaluation, and protection of discoveries; notification to Tribal monitors of discoveries; and restoration of areas to pre-constructions conditions after removal protective measures.</p> <p>Section 2.15 - Protocols for Reporting Discoveries of Cultural Importance: This protocol outlines how PG&E will notify DTSC and BLM of discoveries of previously unidentified or suspected historic or archaeological resources (including human remains and/or associated funerary objects or graves), as well as Interested Tribes if the resource is Native American in origin; will cease work within the vicinity of the discovery until the discovery has been evaluated and treatment developed; implement protective measures, if necessary; choose avoidance as the preferred method for the treatment of cultural resources, particularly for human remains, items of cultural patrimony, or funerary objects; and document discoveries in a</p>	

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>culturally sensitive manner, and invite Interested Tribes to assist with documentation to identify Tribal cultural values. If further studies are required for any discovery, PG&E will consult with BLM, who will consult with Interested Tribes. Documentation will be provided to BLM and Interested Tribes (for Native American resources) for review and comment and final documents will be distributed to DTSC, BLM, Interested Tribes, and PG&E, and to ASM or CHRIS as appropriate.</p> <p>Section 2.16 - Protocols for Inspecting Remediation Facilities and/or Staging Areas During Construction: The locations of remediation facilities and staging area will be examined for cultural resources throughout the construction phase. Interested Tribes will receive notice at least 2 weeks in advance whenever possible. Previously impacted land will be selected wherever feasible for re-use as staging areas and/or the siting of remediation facilities and direct physical impacts to the Topock Maze as it is manifested archaeologically will be completely avoided when siting any staging area or remediation facility. Any resources present will be avoided to the extent feasible. This protocol also provides for archaeological and Tribal monitoring of earth-disturbing activities at remediation facilities and/or staging areas during construction, and states that these monitors will at all times comply with Project-wide and job site-specific safety requirements.</p> <p>CUL-1a-9: Preference for Previously Disturbed Areas (Groundwater FEIR Measure with Revisions). During the design of areas to be used as part of the Future Activity Allowance, PG&E shall, in communication with the Interested Tribes (and subject to their review), and to the maximum extent feasible, as determined by DTSC, give: (1) priority to previously disturbed areas for the placement of new physical improvements; and (2) priority to re-use of existing physical improvements, such as but not limited to wells and pipelines, but not including the IM-3 Facility. "Disturbed" areas in this context means those areas outside of documented archaeological site boundaries that have experienced ground disturbance in the last 50 years.</p> <p>CUL-1a-10: Avoidance of Topock Maze (Groundwater FEIR Measure with Revisions). During construction, and operation and maintenance, and decommissioning activities, as well as activities associated with the Future Activity Allowance, PG&E shall consider the location of Loci A, B, and C of the Topock Maze during the design of Project components and is prohibited from creating any direct physical impact on the Topock Maze, as it is manifested archaeologically. The design of facilities as part of the Future Activity Allowance shall also prevent all indirect (e.g. noise, aesthetics) impacts on the Topock Maze, to the maximum extent feasible as determined by DTSC.</p> <p>CUL-1a-11: Open Grant Funding (Groundwater FEIR Measure with Revisions). During the construction phase of the Project, PG&E shall provide an open grant for one part-time cultural resource specialist/project manager position for each of the five Interested Tribes: Chemehuevi, Cocopah, CRIT,</p>	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>FMIT, and Hualapai. The award of the grants is for the timely review of Project documents, participating in project-related meetings, coordinating and managing input and interests for the Tribe on the Project, and to act as a Tribal liaison with PG&E and regulatory agencies. The part-time cultural resources specialist/project manager shall be compensated at rates of historic compensation. The payment of grant monies shall be timed to the awarded tribes' fiscal cycles so that the tribes are not forced to front funds for long periods of time. These positions shall act as cultural resources contacts and project managers for interactions between the tribes, PG&E, and DTSC to ensure coordination during construction of the remedy to avoid, reduce, or otherwise mitigate impacts on resources qualifying as historical resources under CEQA. This funding is separate from provisions for tribal monitor positions and shall not be used for routine tribal business or legal counsel. For review and approval, PG&E shall provide DTSC with the names of the selected grant recipients and a report that summarizes activities associated with the grant program, at least annually. Upon conclusion of the construction phase of the Project, the necessity of the cultural resource specialist/project manager positions shall be assessed by DTSC, at which time the positions may be extended, reduced, or terminated. During the operation and maintenance and decommissioning phases, the necessity of the positions shall be periodically evaluated by DTSC. These positions shall be inclusive of those referenced by CR-1e-9 in the Topock Soil Investigation Project EIR and MMRP.</p> <p>CUL-1a-12: Tribal Ceremonies (Groundwater FEIR Measure with Revisions). PG&E shall provide reasonable opportunity, as determined by DTSC, for Interested Tribes to conduct a traditional healing/cleansing ceremony (or ceremonies) before and after the construction phase. Accommodations for Tribal ceremonies shall be implemented consistent with Section 2.11 "<i>Protocols to Accommodate Tribal Ceremonies or Activities Involving Topock TCP</i>" of the CIMP (as described above in Mitigation Measure CUL-1a-8q) and Section 7.2 "<i>Accommodation of Tribal Activities and Ceremonies Involving the Topock Maze/TCP</i>" (see below) and Appendix B of the CHPMP (as described above in Mitigation Measure CUL-1a-2a).</p> <p>As described in Section 7.2 of the CHPMP, the BLM will continue to work with the Interested Tribes to identify Tribal activities and ceremonies that are associated with the Topock TCP and to consult with the Interested Tribes and PG&E to develop treatment measures to accommodate them.</p> <p>CUL-1a-13: Develop Worker Education Training Program (Measure Completed – Worker Education Training Program is attached in Appendix P of the C/RAWP).</p> <p>CUL-1a-13a: Implement Worker Education Training (New Measure). During construction, operation and maintenance, and decommissioning of the Project, worker education training procedures shall be implemented consistent</p>	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>with the protocols identified in Appendix P of the C/RAWP. The following provides a summary of the worker education training procedures as identified in Appendix P of the C/RAWP. The worker education program will be implemented prior to commencement of any ground-disturbing activities and as personnel are added. The program includes, but is not limited to: mandatory training for PG&E employees, consultants, contractors, and subcontractors who are involved with construction or ground disturbing activities (including decommissioning and restoration); cultural sensitivity training to familiarize personnel with the sacred nature of the area; providing for participation of Interested Tribes, Tribal monitors, archaeological monitors, and Federal agency staff as appropriate; and non-tolerance of any disrespectful behavior in the field and removal of any staff, workers, or contractors who do not comply. Personnel engaged in field activities will be trained prior to conducting fieldwork and personnel engaged in design work will be trained as soon as practicable after being assigned to the Project. Training will be conducted at each Field Project Orientation meeting prior to each substantial Project work phase and at additional opportunities as identified by PG&E in collaboration with the Interested Tribes. Training will include, but is not limited to discussion topics such as: the significance and sensitivity of the Topock TCP; appropriate on-site behavior; protection of significant cultural resources; worker responsibilities (avoidance of sensitive areas, staying on designated routes and work areas, etc.); and consequences of noncompliance. Presentation materials that may be developed will be shared with Interested Tribes for their input. PG&E will maintain training records that will be dated and signed by the trainee and trainer.</p> <p>CUL-1a-14: Tribal Notification of Potential Future Activities (New Measure). For any potential future activities that the agencies will require PG&E to prepare a work plan, interested Tribes shall be notified and afforded the opportunity to provide input consistent with the general process described in Section 2.3 and Section 2.4 of the CIMP as defined in CUL-1a-8q. In circumstances where only one design cycle is deemed necessary by DTSC for the potential future work, steps A through H of Figure 2-1 MMRP CUL-1a-8d Design Review Protocol Flow Chart will be followed. PG&E shall, likewise, notify Interested Tribes at least two weeks in advance of project related ground-disturbing activities whenever possible in accordance with Section 2.10 of the CIMP.</p> <p>CUL-1a-15: Future Activity Allowance Cultural Resources Survey (New Measure). During the planning phase of any designed Future Activity Allowance activities, all areas that may be subject to construction or operation and maintenance activities as part of the Future Activity Allowance, plus a 50-foot buffer, and have not been surveyed in the past 5 years, shall be subject to archaeological resources survey prior to any ground disturbing activity. The survey shall be conducted by the Qualified Cultural Resources Consultant and</p>	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>shall document resources potentially qualifying as historical resources under CEQA (both as contributors to the Topock TCP and as individual historical resources). Tribal monitors shall be invited to participate in the survey. PG&E's Qualified Cultural Resources Consultant shall document the results of the survey in a <i>Future Activity Allowance Cultural Resources Survey Report</i> that follows the "Archaeological Resource Management Reports guidelines and Department of Parks and Recreation" guidelines. PG&E's Qualified Cultural Resources Consultant shall also prepare Department of Parks and Recreation 523 forms and file them with the South Central Coastal Information Center (for resources in California) and Arizona State Museum site cards shall be prepared and filed with the Arizona State Museum (for resources in Arizona). PG&E shall distribute draft reports to DTSC, BLM, and the Interested Tribes for review and comment consistent with Section 2.3 "Protocols for the Review of Cultural Resources-Related Documents" of the CIMP and Section 6.7 "Protocols for Tribal Notification and Consultation in Advance of Certain Activities" of the CHPMP (as described above in Mitigation Measure CUL-1a-8q). PG&E shall submit final reports to DTSC, BLM, and the Interested Tribes no less than 2 weeks prior to the start of ground disturbance in an area.</p> <p>In the event that resources potentially qualifying as historical resources under CEQA (either as contributors to the Topock TCP or as individual historical resources) are identified during the survey, avoidance and preservation in place shall be the preferred manner of mitigating impacts to the resources. If avoidance of the identified resources is determined by DTSC, in coordination with respective landowners, Interested Tribes, and PG&E, to be infeasible because, for example, it would impede the fundamental Project objective of implementing the Final Remedy Design, procedures provided in Section 2.2 "Protocols for the Appropriate Treatment of Archaeological Materials" of the CIMP, Section 8 "Discoveries" and Appendix C "Discovery Plan" of the CHPMP (as described above in Mitigation Measure CUL-1a-8q), and Appendix D "Plan of Action" of the CHPMP (as described below in Mitigation Measure CUL-4) shall be implemented.</p> <p>If DTSC determines that an expedited action is necessary in order to respond to the changing needs of the remedy, pre-construction inspection protocols identified in Section 2.16, "Protocols for Inspecting Remediation Facilities and or Staging Areas During Construction" of the CIMP shall then be followed. This section requires tribal notification in advance of the pre-construction inspection, archaeological and tribal inspection of the area, avoidance of identified resources if possible, or treatment if necessary, and monitoring of any ground disturbance.</p> <p>In instances where Future Activity Allowance activities are proposed in the field due to the need for immediate deviation from a planned activity from unforeseen circumstances, PG&E shall conduct the activity in consultation</p>	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>with an archaeological monitor and Tribal Monitor on the ground, and notify DTSC and the appropriate DOI agency of the activity within 24 hours.</p> <p>CUL-1a-16: Implement Restoration Plan (New Measure). Restoration following decommissioning of the Project shall be implemented in a manner consistent with Section 2.5 <i>"Protocols for Restoring the Environment to its Preconstruction Conditions Upon Decommissioning"</i> of the CIMP (as described above in Mitigation Measure CUL-1a-8q) and the Havasu National Wildlife Refuge Restoration Plan (C/RAWP Appendix G; see Mitigation Measure BIO-1a in this SEIR). Additionally, consistent with requirements of Section 6.3 <i>"Environmental Restoration"</i> of the CHPMP, a Remedy Decommissioning Plan will be submitted by PG&E to DOI within 120 days of DOI's certification of completion of the CERCLA Remedial Action and determination by DOI that removal of such facilities is protective of human health and the environment. The Remedy Restoration Plan shall be provided to DTSC and Interested Tribes for review and comment.</p> <p>CUL-1a-17: Displaced Soil Procedures (New Measure). Procedures for the management and handling of displaced soils resulting from activities associated with construction, operation and maintenance, and decommissioning of the Project shall be treated in a manner consistent Section 2.7 <i>"Protocols for Repatriation of Clean Soils Cuttings Generated During Construction"</i> of the CIMP (as described above in Mitigation Measure CUL-1a-8q) and the Soil Management Plan (C/RAWP Appendix L). The following provides a summary of the Soil Management Plan procedures as identified in Appendix L of the C/RAWP. Where this summary text differs from the Soil Management Plan or subsequent revision, the language of the Soil Management Plan shall govern. As indicated in the Soil Management Plan, clean soil (material that is determined to have a representative concentration that is equal to or less than the interim screening level or project-specific cleanup goal) will be labeled and stored on-site in 55-gallon drums/small containers, roll-off bins, and/or stockpiles for return, re-use, and/or restoration. Soil classified as RCRA and non-RCRA hazardous waste, and non-hazardous soil that is unsuitable for final disposition on-site because contaminants are present above the interim screening level or Project-specific cleanup goal, will be labeled and stored temporarily on-site and transported off-site for disposal. Options for return, re-use, and/or restoration on-site that have been identified include: replacement of original material into original or other borings, trenches, or excavations; creation of topographical or landscape barriers to protect sensitive areas; creation of berms or other structures to prevent erosion; on-site road maintenance; and stockpiling in designated areas.</p> <p>CUL-1a-18: Aesthetics (New Measure). During construction, operation and maintenance, and decommissioning, protocols for the protection of visual resources shall be implemented in a manner consistent with Section 2.9 <i>"Protocols for the Appropriate Methods, Consistent with Measures AES-1 and</i></p>	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p><i>AES-2 [of the Groundwater FEIR] to Reduce Visual Intrusions</i>" of the CIMP (see also Mitigation Measures AES-1 and AES-2 of this SEIR).</p> <p>CUL-1a-19: Implement Treatment Plan for the Topock TCP (New Measure). All activities associated with construction, operation and maintenance, and decommissioning of the Final Remedy Design shall be implemented consistent with provisions of the <i>Cultural and Historical Property Treatment Plan for the Topock Compressor Station</i> (Hanes and Price <i>in progress</i>), which is being prepared pursuant to requirements of the Stipulation VII.B and Appendix B of the PA and mitigation measure CUL-1b/c-3 of the Groundwater FEIR. The Treatment Plan shall address treatment to the Topock TCP and its contributors, in addition to historical resources other than the Topock TCP (this is the same Treatment Plan referenced in Section 7 "Cultural Property-Specific Treatment Measures" of the CHPMP, which can be used to satisfy the requirements of this mitigation measure). PG&E shall submit the Treatment Plan to DTSC for review and approval. PG&E shall submit the Treatment Plan to DTSC for review and approval. PG&E shall also distribute the Treatment Plan to the Interested Tribes for tribal review consistent with Section 2.3 "Protocols for the Review of Cultural Resources-Related Documents" of the CIMP and Section 6.7 "Protocols for Tribal Notification and Consultation in Advance of Certain Activities" of the CHPMP (as described above in Mitigation Measure CUL-1a-8q). The Treatment Plan may be amended in the future in the event of new discoveries or greater than anticipated impacts. Treatment Plan amendments shall be required in instances where the current content of the Treatment Plan is insufficient to address necessary treatment measures and shall be determined in coordination amongst PG&E, BLM, DTSC, and Interested Tribes.</p> <p>CUL-1b/c-1: Consider Locations of Historical Resources during Design (Groundwater FEIR Measure with revisions). PG&E shall consider the locations of the identified historical resources during the design of the physical improvements necessary for the proposed Project and avoid, minimize, or mitigate impacts on historical and archaeological resources to the maximum extent feasible, as determined by DTSC. Future design plans for the Project, in relation to known cultural resources, shall be submitted to DTSC for review and approval.</p> <p>CUL-1b/c-2: Prepare a Cultural Resources Study (Measure Completed – several cultural resources studies were completed, including "Geoarchaeological Assessment for the Topock Remediation Project" [Appendix T of the C/RAWP] and "Results of Pre-Construction Field Verification Inspections for the Topock Compressor Station Groundwater Remedy" [Moloney and Price 2014, confidential report on file at DTSC]).</p> <p>CUL-1b/c-3: Prepare and Implement a Treatment Plan for Historical Resources other than the Topock TCP (Groundwater FEIR Measure with</p>	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>Revisions). Prior to the start of construction, PG&E shall prepare and implement a Treatment Plan that identifies measures to lessen impacts to historical resources other than the Topock TCP that cannot be avoided by the Project and that will be subject to significant impacts (this is the same Treatment Plan - <i>Cultural and Historical Property Treatment Plan for the Topock Compressor Station</i> [Hanes and Price <i>in progress</i>] - described above in Mitigation Measure CUL-1a-19 and is currently being prepared). The Treatment Plan shall identify which criteria for listing on the NRHP/CRHR contribute to the affected resource's significance and which aspects of significance would be materially altered by construction, operation and maintenance, or decommissioning and shall provide for reasonable efforts to be made to permit the resource to be preserved in place or left in an undisturbed state consistent with the CEQA Guidelines and with Stipulation I.B of the PA and Section 7 of the CHPMP, and to the maximum extent feasible as determined by DTSC, in coordination with PG&E, Interested Tribes, and respective landowners. PG&E shall submit the Treatment Plan to DTSC for review and approval. PG&E shall also distribute the Treatment Plan to the Interested Tribes for tribal review consistent with Section 2.3 "<i>Protocols for the Review of Cultural Resources-Related Documents</i>" of the CIMP and Section 6.7 "<i>Protocols for Tribal Notification and Consultation in Advance of Certain Activities</i>" of the CHPMP (as described above in Mitigation Measure CUL-1a-8q). The Treatment Plan may be amended in the future in the event of new discoveries or greater than anticipated impacts. Treatment Plan amendments shall be required in instances where the current content of the Treatment Plan is insufficient to address necessary treatment measures and shall be determined in coordination amongst PG&E, BLM, DTSC, and Interested Tribes.</p> <p>CUL-1b/c-4: Cultural Resources Monitoring Program and Inadvertent Discovery Measures (Groundwater FEIR Measure with Revisions).</p> <p>CUL-1b/c-4a: Cultural Resources Monitoring Program. All ground-disturbing activities associated with construction, operation and maintenance, and decommissioning phases of the Project, including the Potential Future Activities, shall require archaeological monitoring and PG&E shall invite Native American monitors to participate. The Cultural Resources Monitoring Program shall be implemented in a manner consistent with Sections 2.10 "<i>Protocols for Tribal Notification in Advance of Project-Related Activities</i>" and 2.12 "<i>Protocols for Tribal Monitors to Observe Ground Disturbing Activities</i>" of the CIMP, Appendix C "<i>Topock Remediation Project Programmatic Agreement Tribal and Archaeological Monitoring Protocol</i>" of the PA, and Section 6.6.4, "<i>Construction Monitoring</i>," of the CHPMP (as described above in Mitigation Measure CUL-1a-8q). In addition to the parties that require notification and coordination as listed in Appendix C of the PA, PG&E shall also notify DTSC. During construction, PG&E shall document monitoring activities in the monthly</p>	

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>progress reports or quarterly compliance reports described in Section 2.6.3.3 “<i>Additional Reporting During Remedy Construction</i>” and Table 2.3-1 “<i>Communication Framework During Construction and Startup</i>” of the C/RAWP. During operation and maintenance, PG&E shall document monitoring activities in the quarterly progress reports or annual compliance reports described in Section L2.2 “<i>Summary of Communication Procedures and Protocols</i>” and Table L2.2-1 “<i>Communication Framework During Operation and Maintenance</i>.” During decommissioning, PG&E shall document monitoring activities in monthly progress reports or quarterly monitoring compliance reports consistent with those described in Section 2.6.3.3 “<i>Additional Reporting During Remedy Construction</i>” and Table 2.3-1 “<i>Communication Framework During Construction and Startup</i>” of the C/RAWP. Documentation of monitoring shall generally include dates of monitoring, monitoring participants, activities observed, and descriptions of any archaeological resources encountered (resource location information shall be kept separate and confidential). Department of Parks and Recreation 523 forms, following the Office of Historic Preservation’s <i>Instructions for Recording Historical Resources</i>, shall be prepared and filed with the South Central Coastal Information Center (for resources in California) and Arizona State Museum site cards shall be prepared and filed with the Arizona State Museum (for resources in Arizona) for all newly identified and updated resources, and shall be compiled and provided to DTSC as they become available.</p> <p>CUL-1b/c-4b: Inadvertent Discoveries. During construction, operation and maintenance, and decommissioning phases of the Project, procedures for the treatment of inadvertent discoveries of resources potentially qualifying as historical resources under CEQA shall be implemented in a manner consistent with Section 2.2 “<i>Protocols for the Appropriate Treatment of Archaeological Materials</i>” of the CIMP, and Section 8 “<i>Discoveries</i>” and Appendix C “<i>Discovery Plan</i>” of the CHPMP (as described above in Mitigation Measure CUL-1a-8q), and Appendix D “<i>Plan of Action</i>” of the CHPMP (as described below in Mitigation measure CUL-4). In addition to the parties listed in Section 2.15 of the CIMP as requiring consultation regarding discoveries and review of draft documents, DTSC shall also be included in these processes.</p> <p>CUL-1b/c-5: Avoidance and Preservation in Place (New Measure). During the construction, operation and maintenance, and decommissioning phases of the Project, PG&E shall carry out and require all subcontractors to carry out all activities in ways that avoid, minimize, and mitigate significant impacts to historical resources other than the Topock TCP and unique archaeological resources consistent with the CEQA Guidelines and with Stipulation I.B of the PA and Section 7.3 of the CHPMP, and to the maximum extent feasible as determined by DTSC, in coordination with PG&E, Interested Tribes, and respective landowners.</p> <p>CUL-1b/c-6: Implementation of Additional Protective Measures (New</p>	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>Measure). Mitigation Measures CUL-1a-3 (Site Security); CUL-1a-3a (Professional Qualifications and Annual Historical Resource Condition Inspection); CUL-1a-3c (Coordination with BLM and San Bernardino County); CUL-1a-3d (Signage) CUL-1a-3e (Site Security); CUL-1a-8q (Implement Cultural Impact Mitigation Program); CUL-1a-9 (Preference for Previously Disturbed Areas); CUL-1a-13a (Implement Worker Education Training Program); and CUL-1a-15 (Future Activity Allowance Cultural Resources Survey) shall be implemented to further reduce impacts to historical resources other than the Topock TCP and/or unique archaeological resources prior to and during construction, operation and maintenance, and decommissioning, as prescribed in each measure which are described in detail above.</p> <p>CUL-1b/c-7: Compliance with SOI Standards (New Measure). Prior to the start of decommissioning activities, PG&E shall retain a qualified architectural historian who meets the Secretary of the Interior's professional qualification standards for architectural history. The qualified architectural historian shall review the decommissioning plan to ensure that removal of the pipeline from the Old Trails Arch Bridge (36-027678), if proposed, would not materially impair the bridge. The architectural historian shall prepare a technical memorandum documenting the results of the review, and provide any recommendations to reduce impacts to less than significant, if necessary, prior to start of decommissioning activities.</p>	
<p>Impact CUL-2: Cause a Substantial Adverse Change in the Significance of a Unique Archaeological Resource. Many of the cultural resources listed in Table 4.4-3 may meet the CEQA criteria for a unique archaeological resource. Construction, operation and maintenance, and decommissioning activities of the proposed Project could result in substantial adverse changes to one or more unique archaeological resource in the Project Area through ground disturbance and other project-related activities.</p>	Potentially Significant	Implement Mitigation Measures CUL-1b/c-1, CUL-1b/c-3, CUL1b/c-4, CUL-1b/c-5, and CUL-1b/c-6.	Significant and Unavoidable
<p>Impact CUL-3: Directly or Indirectly Destroy a Unique Paleontological Resource or Site or Unique Geologic Feature. proposed Project could result in substantial adverse changes to a unique paleontological resource or unique geologic feature in the Project Area through ground disturbance and other project-related activities.</p>	Potentially Significant	<p>Mitigation Measure CUL-3: Implement the Paleontological Resources Management Plan (PRMP) and Paleontological Monitoring (Groundwater FEIR Measure with Revisions). PG&E shall comply with all requirements of the <i>Paleontological Resources Management Plan</i> (Arcadis 2015) related to paleontological resources prior to and during construction, operation and maintenance, and decommissioning. The following is a summary of the procedures in the PRMP, which includes: retention of a Principal Paleontologist to oversee paleontological monitoring and to be on-call in the event of discovery; paleontological resources awareness training; future survey of any areas ranked PYFC 3a or above if additional work is planned and they were not previously surveyed; paleontological monitoring of grading and trenching in known sensitive areas and also in the event that sensitive</p>	Less than Significant

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		sediments are encountered elsewhere (monitoring of borings, regardless of depth or diameter, is not required); cease work measures and notification protocols in the event of a discovery; recovery of discovered fossils; documentation, preparation, identification, and analysis of recovered fossils; reporting; and curation of paleontological resources of scientific value at an accredited repository.	
<p>Impact CUL-4: Disturb Any Human Remains, Including Those Interred Outside of Formal Cemeteries. Ground-disturbing activities required for all project phases may disturb as-yet undiscovered human remains, including Native American burial remains (i.e., human remains and grave goods).</p>	Potentially Significant	<p>Mitigation Measure CUL-4: Discovery of Human Remains (Groundwater FEIR Measure with Revisions). In the event of the discovery of human remains, PG&E shall implement the requirements of Section 2.2 “<i>Protocols for Appropriate Treatment of Archaeological Materials</i>” and Section 2.15 “<i>Protocols for Reporting Discoveries of Cultural Importance</i>” the CIMP (as described above in Mitigation Measure CUL-1a-8q) and Section 8.2 “<i>Treatment of Any Human Remains, Funerary Objects, Ceremonial Objects, and Items of Cultural Patrimony</i>” and Appendix D “<i>Plan of Action</i>” of the CHPMP (see below). Consistent with Section D.4 of the CHPMP, the determination of whether remains are human or non-human will be made by qualified personnel, such as a physical or forensic anthropologist. In accordance with the CHPMP Appendix D (D.3.3), the BLM is responsible for notifying the appropriate Interested Tribes regardless of land ownership. Discoveries on federal land shall follow the procedures outlined in sections D.3.3.1 and D.3.9.1 of Appendix D of the CHPMP. Discoveries on non-federal land in Arizona shall follow the procedures outlined in Sections D.3.3.2 and D.3.9.2 of Appendix D CHPMP. Discoveries on non-federal land in California shall follow the procedures outlined in Sections D.3.3.3 and D.3.9.3 of Appendix D of the CHPMP. The following provides a summary of the plans, procedures, and requirements that govern actions to be taken in the event of the discovery of human remains.</p> <p>CHPMP Appendix D – Sections D.3.3.1 and D.3.9.1 (discoveries on Federal land): Additional requirements of this section include:</p> <ul style="list-style-type: none"> • Complying with the Native American Graves Protection and Repatriation Act (NAGPRA) and its Federal implementing regulations outlined in 43 Code of Federal Regulations (CFR) Part 10, which requires establishing a chain of command for the remains, identifying and notifying lineal descendants, and consultation with the appropriate Tribe(s) to identify and implement appropriate treatment. • Following California Health and Safety Code 7050.5 et seq., which includes notifying the San Bernardino County coroner for discoveries in California and contacting the California Native American Heritage Commission (NAHC). • Following Public Resources Code 5097.98, which includes designation of a Most Likely Descendant by the NAHC and consultation with the MLD. <p>CHPMP Appendix D - Sections D.3.3.2 and D.3.9.2 (discoveries on non-</p>	Significant and Unavoidable

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>Federal land in Arizona): Additional requirements of this section include:</p> <ul style="list-style-type: none"> • Contacting the Director of the Arizona State Museum (ASM) for discoveries in Arizona on “lands, other than lands owned or controlled by this state, any agency or institution of this state or any county or municipal corporations within this state.” • Complying with ARS 41-865, which includes consultation with the ASM, identifying the group with cultural affinity for the remains and/or objects, and consultation with the governing body of the group with cultural affinity to determine appropriate treatment and disposition of the remains and/or objects. <p>CHPMP Appendix D - Sections D.3.3.3 and D.3.9.3 (discoveries on non-Federal land in California): Additional requirements of this section include:</p> <ul style="list-style-type: none"> • Complying with California Health and Safety Code 7050.5 et seq., which requires notifying the San Bernardino County coroner for discoveries in California and contacting the NAHC. • Complying with Public Resources Code 5097.98, which includes designation of a MLD by the NAHC and consultation between the landowner and MLD to identify and implement appropriate treatment. 	
Hazards and Hazardous Materials			
<p>Impact HAZ-1: Spills or Releases of Contaminants during Construction, Operation and Maintenance, and Decommissioning Activities from Routine Transport, Use, and Disposal or the Reasonably Foreseeable Accidental Release of Hazardous Materials that could Expose Workers, the Public, or the Environment. Construction, operation and maintenance, and decommissioning of the proposed Project could result in the potential release of hazardous materials during use or delivery of hazardous materials as a result of component failure (e.g., valve, flange, or pipe), tank failure, or human error (e.g., tank overfilling).</p>	Potentially Significant	<p>Mitigation Measure HAZ-1a: Spills or Releases of Contaminants during Operation and Maintenance Activities (Groundwater FEIR Measure with Revisions)</p> <ul style="list-style-type: none"> a) PG&E shall store, handle, and transport hazardous materials in compliance with applicable local, state, and federal laws. b) All chemical storage and loading areas shall be equipped with proper containment and spill response equipment. BMPs to be implemented may include, but are not limited to, use of secondary containment in mixing and storage areas; availability of spill kits and spill containment booms, and appropriate storage containers for containment of the materials generated during the spill response. The Final Remedy Design provides engineering drawings of chemical storage and loading areas in Appendix D, specifications in Appendix E, and the Contingency Plan in Appendix L (Operation and Maintenance Manual), Volume 3 (CH2M Hill 2015a), which shall all be implemented during construction, and operation and maintenance, and decommissioning of the Project. c) A project-specific Hazardous Materials Business Plan (HMBP), chemical standard operating procedure (SOP) protocols and contingency plans shall be developed to ensure that proper response procedures would be implemented in the event of spills or releases. Specifically, the HMBPs and SOPs shall describe the 	Less than Significant

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>procedures for properly storing and handling fuel on-site, the required equipment and procedures for spill containment, required personal protective equipment, and the measures to be used to reduce the likelihood of releases or spills during fueling or vehicle maintenance activities. BMPs to be implemented may include, but are not limited to, use of secondary containment in mixing and storage areas; availability of spill kits and spill containment booms, and appropriate storage containers for containment of the materials generated during the spill response. The field manager in charge of operations and maintenance activities shall be responsible for ensuring that these procedures are followed at all times. SOPs are provided in Appendix B to the C/RAWP (CH2M Hill 2015b); the HMBP in Appendix L to the Final Remedy Design (Operation and Maintenance Manual), Volume 1, Appendix E; and the Contingency Plan in Appendix L (Operation and Maintenance Manual), Volume 3 (CH2M Hill 2015a), shall all be implemented during construction, and operation and maintenance, and decommissioning of the Project.</p> <p>Mitigation Measure HAZ-1b: Spill or Release of Contaminants during Construction and Decommissioning Activities (Groundwater FEIR Measure with Revisions)</p> <ul style="list-style-type: none"> a) Fueling areas and maintenance areas would be supplied with proper secondary containment and spill response equipment. The Final Remedy Design provides engineering drawings of chemical storage and loading areas in Appendix D, specifications in Appendix E, and the Contingency Plan in Appendix L (Operation and Maintenance Manual), Volume 3 (CH2M Hill 2015a), which shall all be implemented during construction, and operation and maintenance, and decommissioning of the Project. b) PG&E shall develop fueling SOP protocols and a contingency plan that would be implemented at all fueling areas on-site. The SOPs shall describe the procedures for properly storing and handling fuel on-site, the required equipment and procedures for spill containment, required PPE, and the measures to be used to reduce the likelihood of releases or spills during fueling or vehicle maintenance activities. Potential measures include but are not limited to, fuel storage in bermed areas, performing vehicle maintenance in paved and bermed areas, and availability of spill kits for containment and cleanup of petroleum releases. The field manager in charge of construction and decommissioning activities shall be responsible for ensuring that these procedures are followed at all times. SOPs are provided in Appendix B (CH2M Hill 2015b); the HMBP in Appendix L (Operation and Maintenance Manual), 	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>Volume 1, Appendix E; and the Contingency Plan in Appendix L (Operation and Maintenance Manual), Volume 3 (CH2M Hill 2015a)), shall all be implemented during construction, and operation and maintenance, and decommissioning of the Project.</p> <p>c) PG&E shall comply with local, state, and federal regulations related to the bulk storage and management of fuels. The Final Remedy Design provides engineering drawings of chemical storage and loading areas in Appendix D; specifications in Appendix E (Operation and Maintenance Manual), Volume 3; the HMBP in Appendix L (Operation and Maintenance Manual), Volume 1, Appendix E; and the Contingency Plan in Appendix L (Operation and Maintenance Manual), Volume 3 (CH2M Hill 2015a), which shall all be implemented during construction, and operation and maintenance, and decommissioning of the Project.</p> <p>Mitigation Measure HAZ-2: Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil (Groundwater FEIR Measure with Revisions)</p> <p>Subsequent to the Groundwater FEIR and in compliance with Groundwater FEIR Mitigation Measure HAZ-2, PG&E developed a Final Construction Health and Safety Plan provided in C/RAWP, Appendix D, and a Draft Operation and Maintenance Health and Safety Plan in the Final Remedy Design, Appendix L, Volume 5. A final Operation and Maintenance Health and Safety Plan will be submitted to DTSC and DOI during the start-up phase of the remedy, and should include any separate plans provided by contractors. The health and safety plans include procedures to mitigate potential hazards, which include the use of PPE, measures that provide protection from physical and chemical hazards that may be present at the site, decontamination procedures, and worker and health and safety monitoring criteria to be implemented during construction. The worker health and safety plans includes protective measures and PPE that are specific to the conditions of concern and meet the requirements of the U.S. Occupational Safety and Health Administration's (OSHA's) construction safety requirements and Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120). In accordance with OSHA requirements, appropriate training and recordkeeping shall also be a part of the health and safety program. The health and safety plans shall be certified by a Certified Industrial Hygienist in accordance with OSHA regulations. The worker health and safety plan shall be provided to the construction workers for review and all workers shall be required to sign the plan, which will be kept on the construction site at all times. Contractors and subcontractors may also provide their own health and safety plans, providing the contractors and subcontractors health and safety plans are compliant with OSHA requirements and have been provided to PG&E and DTSC for review.</p> <p>Worker safety training shall occur prior to initiation of ground- disturbing</p>	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>activities. Training shall include the review of all health and safety measures and procedures. All workers and engineering inspectors at the site shall provide written acknowledgement that the soils management plan (discussed below), worker health and safety plan, and any existing community health and safety plan were reviewed and training was received prior to commencement of construction activities.</p> <p>The following are specific elements and directives that shall be included in the health and safety plan and implemented by PG&E during construction, operation and maintenance, and decommissioning of this project:</p> <ul style="list-style-type: none"> a) Vehicles traveling on unpaved roadways or surfaces would be directed to avoid traveling in areas where contaminated soils are known to be present; vehicle speeds shall be controlled (e.g., limited to 15 mph or slower) to limit generation of dust; measures, such as wetting of surfaces, will be employed to prevent dust generation by vehicular traffic or other dust-generating work activities. b) Pre-mobilization planning shall occur during which the likelihood of encountering contaminated soils shall be reviewed along with the Hazardous Materials Business Plan, site-specific health and safety plan, and SOPs so that the procedures are followed and the contingencies for handling contaminated soils are in-place prior to implementing the field operations. c) Should evidence of contaminated soil be identified during ground-disturbing activities (e.g., noxious odors, discolored soil), work in this area will immediately cease until soil samples can be collected and analyzed for the presence of contaminants as directed by the site supervisor or the site safety officer. Contaminated soil shall be managed and disposed of in accordance with the Project-specific health and safety plan and soil management plan. The health and safety plan and soil management plan shall be reviewed by DTSC before beginning any ground-disturbing activities. While the Project is exempt from the requirements of the San Bernardino County Division of Environmental Health, the health and safety plan shall be prepared in general accordance with the substantive requirements of this agency. d) In the event that drilling sites must be located within areas of suspected soil contamination, the appropriate PPE shall be worn by all personnel working in these areas and methods specified in the health and safety plan used to control the generation of dust. When working in these areas, personnel shall be required to follow all guidance presented in the site-specific health and safety plan and soil management plan. The site-specific health and safety plan shall 	

**TABLE 1-3
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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>include provisions for site control such as, but not limited to, delineation of the exclusion, contaminant reduction and support zones for each work area, decontamination procedures, and procedures for the handling of contaminated soils and other investigation derived wastes. Soil that is excavated shall be loaded directly into containers such as roll-off bins; dust suppression methods shall be used prior to and during loading of soils into the bins. Suspected contaminated soils shall be segregated from suspected uncontaminated soils.</p> <p>e) Personnel working at the site shall be trained in Hazardous Waste Operations.</p> <p>f) All soil excavated and placed in roll-off bins or trucks for transportation off-site shall be covered with a tarp or rigid closure before transporting, and personnel working in the area shall be positioned upwind of the loading location, as practicable.</p> <p>Mitigation Measure HAZ-3: Final Groundwater Remedy Decommissioning Plan (New Measure)</p> <p>Upon achieving the Remedial Action Objectives for the groundwater remedy, PG&E shall provide a written request with documentation to the DTSC and DOI requesting approval for decommissioning the groundwater remedy. Upon approval from DTSC and DOI, PG&E shall then prepare and submit a Final Groundwater Remedy Decommissioning Plan within 120 days to DTSC and DOI for their review and approval. This plan shall comply with the requirements in the Programmatic Agreement (BLM 2010), the Cultural and Historic Properties Management Plan (BLM 2012), the Consent Decree and Appendix C, Scope of Work, to Consent Decree (DOI 2013) (or functional equivalent if those document names change in the future), and the mitigation measures included within this SEIR. This plan shall include the decommissioning specifications and procedures currently described in the Final Remedy Design, but shall be updated to incorporate technology and regulatory changes, if any. In particular, the updated Final Groundwater Remedy Decommissioning Plan shall check for updates to waste disposal acceptance criteria to identify the appropriate disposal or recycling facilities for the Final Groundwater Remedy infrastructure to be removed, and for changes in well abandonment procedures by regulatory agencies (the States of California and Arizona, and the Counties of San Bernardino [California] and Mohave [Arizona]).</p>	
Hydrology and Water Quality			
Impact HYDRO-1: Exceedance of Water Quality Standards, Violation of Waste Discharge Requirements, or Degradation of Water Quality. The ground disturbing	Potentially Significant	Groundwater FEIR Mitigation Measure HYDRO-1, Exceedance of Water Quality Standards (Groundwater FEIR Measure with Revisions). Mitigation Measures HYDRO-1a/2a/3a: Construction Best Management	Less than Significant

**TABLE 1-3
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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
<p>activities associated with constructing the Final Groundwater Remedy Project, use of carbon substrate to be injected into the aquifer or the use of Arizona freshwater, the generation of byproducts above water quality objectives, the discharge of remedy-produced water to the TCS Evaporation Ponds, and runoff associated with the soils stockpiling could result in the exceedance of water quality standards, violation of waste discharge requirements, or substantial degradation of water quality.</p>		<p>Practices Plan (Groundwater FEIR Measure with Revisions). Subsequent to the Groundwater FEIR and as noted in the Regulatory Background, the Construction General Permits were updated for California (2014) and Arizona (2013). In compliance with the Groundwater FEIR Mitigation Measures HYDRO-1, HYDRO-2, and HYDRO-3, and incorporating the construction general permit updates, PG&E prepared a BMP Plan for construction activities (C/RAWP, Appendix M; CH2M 2015b). The BMP Plan complies with the substantive requirements of the California and Arizona Construction General Permits, as well as all other applicable federal, state, and local permit and regulatory requirements, even if a permit is not required pursuant to CERCLA, for purposes of ensuring the protection of receiving water quality. Details of the BMPs are provided in the BMP Plan and are summarized below. Site workers shall be trained in the implementation of these BMPs.</p> <p><u>Erosion Control BMPs:</u> The following measures shall be used to reduce erosion and control sediment:</p> <ul style="list-style-type: none"> • <u>Preservation of Existing Vegetation</u> – Existing vegetation will be preserved to the maximum extent practicable to facilitate protection of surfaces from erosion and help control sediments. To the extent practical, remedy facilities have been located on previously disturbed areas. In the event that existing vegetation needs to be disturbed, areas that need to be preserved will be identified by a qualified biologist and marked with temporary fencing. Site workers will be informed of the limits of disturbance within the construction site and will be instructed to keep clear of delineated areas. • <u>Geotextiles and Mats</u> – Natural (e.g., excelsior, straw, coconut) or synthetic (usually polyethylene) materials will be used to reduce soil erosion by wind or water. • <u>Road Preparation and Maintenance</u> – During road preparation activities, loose sediment will be uniformly compacted, consistent with the substantive San Bernardino County Building and Land Use Services Department requirements, to aid in reducing wind erosion. Ongoing road maintenance will include: (1) visual inspections to identify areas of erosion, (2) localized road repair and regrading, installation, and maintenance of erosion control features such as berms, silt fences, or straw wattles, (3) grading for road smoothness, and (4) measures to reduce water erosion, such as clearing ditches and culverts of debris. <p><u>Sediment Control BMPs</u> – The following materials would be used to retain sediment in place where soil is being disturbed by construction processes, to intercept runoff and reduce flow velocity, and to allow sediment to settle from runoff before water leaves the construction site.</p> <ul style="list-style-type: none"> • <u>Silt Fences</u> – Silt fences are typically used in combination with 	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>sediment basins and sediment traps as erosion control measures.</p> <ul style="list-style-type: none"> • <u>Fiber Rolls/Sediment Wattles</u> – These consist of aspen wood excelsior, straw, flax, or other similar materials rolled and bound into tight tubular rolls and placed on the face of slopes at regular intervals, depending on steepness of slopes. Fiber rolls/sediment wattles will be inspected prior to a forecasted rain event and after rain events to ensure the fiber rolls are working properly. Sediment accumulated by the fiber rolls will be removed to maintain the effectiveness of the fiber rolls. • <u>Gravel Bag Berms</u> – Gravel bag berms can be used as an alternative to fiber rolls and sediment wattles. If used, they will be installed prior to rain events to form a barrier to intercept runoff or reduce its velocity. Gravel bags will also be used, if necessary, during trenching activities when stockpiles are on-site. In the event that gravel bag berms are used as perimeter erosion control, bags will be stacked, one on top of the other (two high). When used to anchor stockpiles, the bags will be placed one high. • <u>Sandbag Berms</u> – Sandbag berms can also be used as an alternative to fiber rolls and sediment wattles. If used, they will be installed prior to rain events to form a barrier to intercept runoff or reduce its velocity. Sandbags will also be used, if necessary, during trenching activities when stockpiles are left overnight. In the event that sandbag berms are needed, they will be placed around the staging area and trenching area. • <u>Straw-Bale Barriers</u> – Straw-bale barriers can also be used as an alternative to fiber rolls, gravel bag berms, and sandbag berms. <p><u>Material Delivery and Storage</u> – Proper management practices for delivery and storage of materials will be implemented to ensure minimal discharge or elimination of discharge of these materials to the storm drain systems or waterways. Construction materials and equipment will be parked and stored in the staging area. Materials subject to erosion from rain events within the storage area will be covered during nonworking days and prior to and during rain events. Storage and transfer of toxic or hazardous materials (e.g., ethanol, acids for well cleaning) will be on impervious surfaces appropriate to the stored materials.</p> <p><u>Material Use</u> – Proper use of materials will be implemented to ensure minimal or complete elimination of discharge to the storm drain systems or waterways. Spill cleanup materials will be kept near the construction and staging areas. Leaks and spills will be cleaned up immediately using proper absorbent materials, which will then be disposed of as hazardous waste, unless determined to be non-hazardous waste.</p>	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p><u>Stockpile Management</u> – Stockpile management was discussed above in “Runoff from Soil Stockpile at Soil Processing Area.”</p> <p><u>Spill Prevention and Control</u> – Spill prevention and control procedures and practices will be implemented in conjunction with the Waste Management Plan to prevent and control spills anytime chemicals and/or hazardous materials are stored on the construction site. Leaks and spills will be immediately cleaned up to the extent possible using absorbent materials, which will then be disposed of properly. Leaks and spills shall not be covered and/or buried or washed with water. Kits with appropriate spill response equipment will be kept near the construction and staging areas. The materials used for cleaning will not be allowed to enter storm drains or watercourses and will be collected and disposed of in accordance with BMPs. In particular, absorbents used to clean up spills of hazardous materials or waste must be managed as hazardous waste unless characterized as non-hazardous.</p> <p><u>Solid Waste Management</u> – Solid waste management procedures and practices will be implemented at the beginning and throughout the Project. Solid waste, consisting primarily of asphalt concrete waste, shall be loaded directly onto trucks for off-site disposal. Loose debris will be picked up daily. Trash and scrap receptacles shall be placed at convenient locations to promote proper disposal of solid wastes. Receptacles shall be provided with lids or covers to prevent windblown litter. Hazardous wastes shall be accumulated at appropriate collection locations following appropriate labeling and management requirements pursuant to Title 22, California Code of Regulations.</p> <p><u>Concrete Waste Management</u> – Concrete waste management procedures will be implemented where concrete is used as a construction material or where concrete dust and debris result from demolition activities. The concrete waste containers will be placed a minimum 50 feet from any drainage ways. Washouts will include secondary containment so that there is no discharge into the underlying soil and onto the surrounding areas. Watertight containers with lids and secondary containment, manufactured for the expressed purpose of containing waste concrete and its liquid residue, may be used. Containers will be emptied or removed from the project site when 75 percent of the full capacity has been reached.</p> <p><u>Sanitary/Septic Waste Management</u> – Sanitary/septic waste management procedures and practices are implemented at construction sites when a temporary or portable sanitary/septic waste system exists. Sanitary facilities will be located away from Staging Areas 6 and 7 (due to proximity to culturally sensitive areas), drainage facilities, waterways, and from traffic circulation. In the event of high winds or a risk of high winds, temporary sanitary facilities will be secured with spikes or weighed down to prevent overturning. The sanitation subcontractor will monitor on-site sanitary/septic waste storage and disposal procedures on a weekly basis in accordance with the sanitary/septic</p>	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>waste management BMPs. Wastewater will not be discharged or buried. Waste will be removed and disposed off-site. Regular waste collection should be arranged before facilities overflow. The sanitary facility will be located a minimum of 50 feet away from drainage facilities and away from waterways and traffic circulation.</p> <p><u>Liquid Waste Management</u> – Liquid waste management procedures will be employed to prevent the discharge of pollutants from liquid waste to the storm drain systems or watercourses. Liquid waste management will be applied if non-hazardous residuals or wastes are generated by construction activities.</p> <p><u>Tracking Control BMPs</u> – A temporary construction entrance is defined as a stabilized point of entrance/exit to a construction site to reduce the tracking of mud and dirt onto private or public paved roads by construction vehicles. A temporary construction entrance will be established at applicable paved intersections and entry points to prevent sediment tracking. The temporary construction entrance will be inspected routinely.</p> <p><u>Good Housekeeping BMPs</u> – Good housekeeping measures will be implemented on-site for the duration of the project and include the following:</p> <ul style="list-style-type: none"> • Store chemicals in watertight containers (with appropriate secondary containment) in a completely enclosed storage cabinet, trailer, or sealed drums shed to prevent spillage and leakage. • Minimize exposure of construction materials to precipitation. • Cover waste disposal containers at the end of every business day and during rain events. • Prevent discharges from waste disposal containers to the stormwater drainage system or receiving water. • Prevent oil, grease, or fuel from leaking into the ground, storm drains, or surface waters. • Immediately clean up leaked material and dispose of properly. • Establish and maintain effective perimeter controls and stabilize construction entrances and exits to control erosion and sediment discharges from the site. • Conduct regular stormwater tailgate meetings with the workforce when the project is staffed and work is under way. <p>Mitigation Measure HYDRO-1b/2b/3b: O&M SWPPP (Groundwater FEIR Measure with Revisions). Subsequent to the Groundwater FEIR and in compliance with the Groundwater FEIR Mitigation Measures HYDRO-1, HYDRO-2, and HYDRO-3, PG&E prepared a SWPPP for operation and maintenance activities (O&M SWPPP; Final Remedy Design, Appendix L, Volume 1, Appendix D; CH2M Hill 2015a) to comply with the substantive</p>	

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>requirements of the 2015 California General Industrial Storm Water Permit. The O&M SWPPP requires the BMPs summarized below. Site workers shall be trained in the implementation of these BMPs.</p> <p>Good Housekeeping, including:</p> <ul style="list-style-type: none"> • Observe all outdoor areas associated with industrial activity; including storm water discharge locations, drainage areas, conveyance systems, waste handling/disposal areas, and perimeter areas impacted by off-facility materials or storm water run-on to determine housekeeping needs. Clean and dispose of properly any identified debris, waste, spills, tracked materials, or leaked materials • Minimize or prevent material tracking • Minimize dust generated from industrial materials or activities • Ensure that all facility areas impacted by rinse/wash waters are cleaned as soon as possible • Cover all stored industrial materials that can be readily mobilized by contact with storm water • Contain all stored non-solid industrial materials or wastes that can be transported or dispersed by the wind or contact with storm water • Prevent disposal of any rinse/wash waters or materials into the storm water conveyance system • Minimize stormwater discharges from non-industrial areas (e.g., stormwater flows from employee parking area) that contact industrial areas of the facility • Minimize authorized non-storm water discharges from non-industrial areas (e.g., potable water, fire hydrant testing) that contact industrial areas of the facility <p>Preventive Maintenance, including:</p> <ul style="list-style-type: none"> • Identify all equipment and systems used outdoors that may spill or leak pollutants • Observe the identified equipment and systems to detect leaks, or identify conditions that may result in the development of leaks • Establish inspection schedule and maintenance schedule of identified equipment and systems • Establish procedures for prompt maintenance and repair of equipment, and maintenance of systems when conditions exist that may result in the development of spills or leaks <p>Material Handling and Waste Management, including:</p> <ul style="list-style-type: none"> • Prevent or minimize handling of industrial materials or wastes that 	

**TABLE 1-3
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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>can be readily mobilized by contact with stormwater during a storm event</p> <ul style="list-style-type: none"> • Contain all stored non-solid industrial materials or wastes that can be transported or dispersed by the wind, erosion or contact with stormwater during handling • Cover industrial waste disposal containers and industrial material storage containers that contain industrial materials when not in use • Divert run-on and stormwater generated from within the facility away from all stockpiled materials • Clean all spills of industrial materials and/or wastes that occur during handling • Observe and clean as appropriate, any outdoor material/ or waste handling equipment or containers that can be contaminated by contact with industrial materials or wastes <p>Erosion and Sediment Controls, including:</p> <ul style="list-style-type: none"> • Implement effective wind erosion controls • Provide effective stabilization for inactive areas, finished slopes, and other erodible areas prior to a forecasted storm event • Maintain effective perimeter controls and stabilize all site entrances and exits to sufficiently control discharges of erodible materials from discharging or being tracked off the site • Divert run-on and storm water generated from within the facility away from all erodible materials <p>The Industrial General Permit requires that the site, to the extent feasible, implement and maintain any advanced BMPs necessary to reduce or prevent discharges of pollutants in its stormwater discharge in a manner that reflects best industry practice considering technological availability and economic practicability and achievability. Advanced BMPs may include:</p> <ul style="list-style-type: none"> • Exposure Minimization BMPs (such as storm resistant shelters that prevent the contact of stormwater with the industrial materials or areas of industrial activity) • Storm Water Containment and Discharge Reduction BMPs that divert, infiltrate, reuse, contain, retain, or reduce the volume of stormwater runoff • Treatment Control BMPs (the implementation of one or more mechanical, chemical, biologic, or any other treatment technology) • Storm resistant shelters (i.e., buildings) for Operations at the TW Bench, Hazardous Materials storage at the TCS, and Carbon 	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>Amendment facilities at the MW-20 Bench</p> <ul style="list-style-type: none"> Storm water drainage at the TW Bench to divert stormwater run on and reduce the volume of stormwater runoff Features in access roads to reduce erosion and divert storm water from remedy facilities such as wells and associated control equipment <p>Mitigation Measure HYDRO-4: Manganese Treatment System (New Measure). Sampling as described in the Final Remedy Design, specifically in the Sampling and Monitoring Plan provided in the Operation and Maintenance Manual (CH2M Hill 2015a, Appendix L), shall be implemented throughout the duration of the groundwater remedy and shall include groundwater monitoring for manganese. If manganese exceeds concentrations as specifically identified in Table 2.2-1 of Appendix L, O&M Volume 2 (e.g., 1 to 2.5 mg/L at California wells downgradient of the IRZ, or above baseline concentrations in Arizona wells), then PG&E shall evaluate and implement operational modifications to control the manganese in accordance with Section 2, O&M Volume 2. If operational modifications are unsuccessful at decreasing manganese concentrations to below the action levels cited on the above-referenced Table 2.2-1 and as determined by DTSC, then the contingency measure of manganese treatment shall be implemented. As described in the Project Description (Section 3.6.3.1) of this SEIR and in Appendix J of the Final Remedy Design, PG&E shall install an adsorptive or greensand filtration treatment system (or equivalent), located at the TW Bench, MW-20 Bench, and/or the Station. A manganese treatment system shall remain operational until the manganese concentrations remain below concentrations identified in Table 2.2-1 and DTSC approves of the cessation of the system.</p> <p>Mitigation Measure HYDRO-5: Contingent Freshwater Pre-Injection Treatment (New Measure). To implement the Final Groundwater Remedy such that PG&E will be able to respond to the triggering conditions described below, PG&E shall implement the following measures.</p> <p>Mitigation Measure HYDRO-5a: Incorporate Arsenic Monitoring of Freshwater Injection into the Sampling and Monitoring Plan (New Measure). Sampling as described in the Final Remedy Design, specifically in the Sampling and Monitoring Plan provided in the Operation and Maintenance Manual (CH2M Hill 2015a, Appendix L), shall be implemented throughout the duration of the groundwater remedy, even after injection ceases. Wells used to monitor freshwater supply injection shall be sampled and analyzed in accordance with the Project monitoring program for arsenic and other chemicals as described in the Sampling and Monitoring Plan. PG&E shall install and monitor wells designated in the Final Remedy Design for arsenic monitoring located approximately 150 feet and 225 feet from each freshwater injection well to comply with the SWRCB's requirements for freshwater</p>	

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>injection with arsenic concentrations above the California MCL. Monitoring shall commence prior to freshwater injection and continue until observed arsenic concentrations return to pre-injection levels pursuant to Mitigation Measure HYDRO 5d. Monitoring wells for the freshwater injection area shall initially be sampled monthly for the first two quarters, then quarterly thereafter, unless the monitoring interval is modified with prior DTSC approval. The results of this monitoring shall determine whether Mitigation Measures HYDRO-5b and 5c are implemented.</p> <p>Mitigation Measure HYDRO-5b: Assessment and Implementation of Interim Action if the California MCL is Exceeded 150 Feet Radially from Freshwater Injection Point (New Measure). If, as a result of the monitoring required in Mitigation Measure HYDRO-5a, the concentration of arsenic at the leading edge of the arsenic plume is found to exceed the arsenic water quality objective (California MCL) 150 feet radially from the freshwater injection point, PG&E shall immediately reassess their groundwater modeling and identify interim actions to limit the migration of the arsenic plume. PG&E shall submit the assessment and proposed action to DTSC within 60 days (or other timeframe directed by DTSC) of confirmed detections above water quality objectives.</p> <p>Mitigation Measure HYDRO-5c: Implementation of Alternatives if California MCL is Exceeded for Arsenic 225 feet from any Freshwater Injection Point (New Measure). If the concentration of arsenic at the leading edge of the plume migrates and exceeds the water quality objective (California MCL) at 225 feet radially from the freshwater injection point, PG&E shall promptly notify DTSC and resample within 30 days. If the expedited resample confirms the exceedance, PG&E shall immediately cease fresh water injection. The injection shall not recommence until PG&E either blends the water source to below the California MCL at the point of injection; constructs and re-routes any contingent freshwater supply lines and appurtenances to the Contingent Freshwater Pre-Injection Treatment System to pre-treat the water and remove arsenic before injection; or proposes a new water source that will comply with the California water quality objectives for injection. PG&E shall obtain approval from DTSC prior to implementation of the options identified above. Pre-injection treatment of the freshwater shall continue until further monitoring indicates that pre-treatment is no longer needed and DTSC approves of cessation of pre-treatment.</p> <p>Mitigation Measure HYDRO-5d – Post-Remedy Arsenic Monitoring (New Measure). The SWRCB provided remedy requirements associated with injection of groundwater containing naturally occurring arsenic in a 2013 position letter (SWRCB 2013). To ensure that water quality objectives are not exceeded in groundwater within freshwater injection areas after completion of the remedy, sampling of the arsenic monitoring wells and possibly other wells (as directed by DTSC) would continue under the Sampling and Monitoring</p>	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>Plan for an estimated 20 years and possibly longer after completion of active treatment to ensure that arsenic concentrations are within and remain at pre-remedy background levels. The sampling would cease after results demonstrate that the concentrations of arsenic remain within water quality objectives and DTSC approves of ceasing the monitoring for arsenic.</p> <p>Mitigation Measure HYDRO-6, Protection of Non-Project Water Supply Wells (New Measure). To minimize any potential impacts to non-Project water supply wells associated with the long-term operation and maintenance of the Final Groundwater Remedy Project, PG&E shall implement the mitigation measure described below.</p> <p>Mitigation Measure HYDRO-6a: Incorporate Non-Project Water Supply Wells and/or Additional Monitoring Wells into the Monitoring Program (New Measure).</p> <ul style="list-style-type: none"> For water supply wells located within about one mile of HNWR-1A (currently Topock-2, Topock 3, Marina-1, Sanders, Smith, PGE-9N, PGE-9S, MTS-1, MTS-2, and GSRV-2), PG&E shall request well construction information and access to sample, test and assess current well conditions. If access is granted, PG&E shall add the non-Project water supply wells to the monitoring program (Appendix L, O&M Volume 2, Sampling and Monitoring Plan, Section 5.4). If access is denied, PG&E will alert DTSC of such response in a timely manner and provide associated documentation. If the well owner does not otherwise respond within 60 days, PG&E shall initiate a second request. If the well owner still does not respond, PG&E will alert DTSC of such response in a timely manner and provide documentation of both attempts to contact the owner. If new water supply non-Project wells are installed or discovered in the general area in the future, DTSC may direct PG&E to take additional action for access and add them to the wells listed above at any time. PG&E shall submit a well installation work plan to DTSC describing installation of a new nested monitoring well located between HNWR-1 and wells Topock-2/Topock-3 since wells Topock-2/Topock-3 are currently the largest producing non-Project supply wells in the area. The work plan shall also propose the installation of any additional monitoring wells that are needed to ensure protection of the water resource in the vicinity of the non-Project water supply wells. PG&E shall submit the well installation work plan to DTSC within four months of DTSC's approval of the remedy design and would be implemented only after DTSC's review and approval. Up to ten well locations from the total borehole count evaluated in this SEIR can be allocated for the monitoring of water 	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>quality to protect non-Project water supply wells. Overtime, wells may be added to or removed from the monitoring program (with prior DTSC approval) based on accumulated data or lack thereof.</p> <ul style="list-style-type: none"> Monitoring of wells identified in this mitigation measure shall initially be quarterly for the first two years of operation and include groundwater levels and chemical constituents to establish baseline conditions and assess seasonal variations in the area of the non-Project water supply wells and monitoring wells. Pressure transducers shall be fitted to monitoring wells, Well HNWR-1, Site B, and the above-listed non-Project water supply wells (some which are not currently pumping) to track and evaluate pumping effects over time and to assist with assessments required below in Mitigation Measure HYDRO-6b and 6c. Chemical testing shall include, at a minimum, Title 22 metals, Cr(VI), stable isotopes of hydrogen and oxygen, general minerals, and TDS. After the second year of monitoring, sampling frequencies may be reduced to semi-annually for two additional years and annually thereafter with DTSC approval. The well network, monitoring frequency, pressure transducer monitoring, and chemical constituents may be modified with DTSC approval. <p>Mitigation Measure HYDRO-6b: Water Supply Mitigation (New Measure).</p> <ul style="list-style-type: none"> If non-pumping groundwater elevations substantially decrease from baseline conditions established under HYDRO-6a in a monitored non-Project water supply well (e.g., below top of well screen, below pump depths, or causes significant decrease in well yield) or a similar groundwater elevation decrease is observed in a water resource protection monitoring well described in HYDRO-6a, PG&E shall inform DTSC as soon as practicable and no longer than two weeks (unless modified with DTSC approval) after receipt of data documenting such an event. Additionally, PG&E will assess well and aquifer conditions to evaluate if the Project has caused a substantial decrease in groundwater elevations/well yield. PG&E shall promptly provide its assessment to DTSC for review. At a minimum, the assessment shall consider the following conditions: <ul style="list-style-type: none"> Historical well usage Well condition Anticipated drawdown effects Regional groundwater level trends If PG&E or DTSC determines that the Project has adversely impacted a non-Project water supply well to the extent that the Project is determined to be the primary cause, or one of the primary 	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>contributing causes, of the reduction in well yield or elevation such that the well does not provide sufficient water, PG&E shall promptly notify the well owner. PG&E shall coordinate with the well owner(s) to arrange for an interim drinking water supply if necessary, and develop a plan (for DTSC approval) which will assist in restoring the water resource by using measures that may include:</p> <ul style="list-style-type: none"> ○ Lowering the well pump ○ Rehabilitating the well ○ Deepening the existing well ○ Providing short and/or long term replacement of water supply ○ Constructing a new replacement well, ○ Modifying remedy operations (e.g., placing a packer in HNWR-1A) <p>An alternate course of action may be considered, provided it is mutually agreeable to DTSC, PG&E, and the well owner.</p> <p>Unless an alternative period is approved by DTSC, the plan/alternate course of action should be provided to DTSC for approval within 30 days of determining that the Project adversely impacted a non-Project water supply well.</p> <p>Mitigation Measure HYDRO-6c: Water Quality Mitigation (New Measure).</p> <ul style="list-style-type: none"> • If the groundwater quality of a non-Project water supply well deteriorates by exceeding water quality objectives (e.g., MCLs for drinking water wells) and baseline conditions established pursuant to HYDRO-6a, PG&E will immediately notify DTSC and DOI and take steps to collect confirmation samples from the well within 60 days of original sample collection unless modified with DTSC approval. PG&E shall identify/confirm the specific uses of the well and inform DTSC, DOI, the Arizona Department of Environmental Quality, and the well owner of the deterioration as soon as possible (e.g., within 7 days of receiving confirmation samples results). This shall include PG&E providing both the initial and confirmation sample data to agencies and well owner even if the initial exceedance is not confirmed. • If PG&E or DTSC determines that the Project has adversely impacted a non-Project water supply well to the extent that the Project is determined to be the primary cause, or one of the primary contributing causes, of the reduction in water quality, PG&E shall immediately notify the well owner. PG&E shall coordinate with the well owner(s) to arrange for an interim drinking water supply if 	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>necessary, and develop a plan (for DTSC approval) which will assist in restoring the water resource by using measures which may include:</p> <ul style="list-style-type: none"> ○ Deepening the existing well ○ Providing short and/or long term replacement of water supply ○ Constructing a new replacement well ○ Conducting water treatment, ○ Modifying remedy operations (e.g., placing a packer in HNWR-1A) ○ An alternate course of action may be considered, provided it is mutually agreeable to DTSC, PG&E and the well owner. <p>The plan/alternate course of action should be provided to DTSC for approval within 30 days, unless modified with DTSC approval, of determining that the Project adversely impacted a non-Project water supply well.</p> <ul style="list-style-type: none"> • If the groundwater quality of any well installed as part of HYDRO-6a deteriorates by exceeding water quality objectives (e.g., MCLs for drinking water wells) and baseline conditions, PG&E shall conduct confirmation sampling and promptly assess aquifer conditions to evaluate if the Project has adversely impacted the well. PG&E shall promptly inform DTSC, DOI, and the Arizona Department of Environmental Quality of any adverse impacts and provide an assessment with any recommendations for review and approval. 	
<p>Impact HYDRO-2: Drainage Pattern Alterations. The proposed Project would require the construction of wells, piping corridors, buildings, and associated infrastructure that could alter the existing drainage system that could result in a substantial increase of erosion and siltation or flooding on and off the Project Area.</p>	Potentially Significant	Implement Mitigation Measures HYDRO-1 and HYDRO-2.	Less than Significant
<p>Impact HYDRO-3: Polluted Stormwater Runoff. The proposed Project does not include discharge to an existing or planned stormwater drainage system. The Project does have the potential to contribute substantial additional sources of polluted runoff if materials and operations are not properly handled.</p>	Potentially Significant	Implement Mitigation Measure HYDRO-1.	Less than Significant

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Noise			
Impact NOISE-1: Long-Term Operational-Related Non – Transportation Noise and Vibration Impacts. Operation-related non-transportation noise sources involve activities such as water filtration pumps, generators, off-road mobile sources such as forklifts, etc. This equipment would not expose sensitive receptors to noise levels in excess of the applicable noise standards and/or result in a substantial increase in ambient noise levels.	Less than Significant	No mitigation measures required.	N/A
Construction activities associated with the Additional Activity Allowance that could occur during long-term operation and maintenance could result in noise levels that exceed applicable standards.	Potentially Significant	Mitigation Measure NOISE-2: Potential Impacts to Noise Levels and Noise Standards (Groundwater FEIR Measure with Revisions). <ul style="list-style-type: none"> Construction equipment shall be properly maintained per manufacturer specifications and fitted with the best available noise-suppression devices (e.g., mufflers, silencers, wraps). All impact tools shall be shrouded or shielded, and all intake and exhaust ports on power equipment shall be muffled or shielded. Construction equipment shall not idle for extended periods of time (more than 15 minutes) when not being utilized during construction activities. A notable exception is when a support vehicle is needed to remain running for health and safety reasons (i.e., air conditioning), consistent with health and safety procedures. Construction activities shall include, but not limited to, the use of berms, stockpiles, dumpsters, and/or bins to shield the nearest noise-sensitive receptor adjacent to construction activities to within acceptable non-transportation noise level standards. When construction activities are conducted within the distances outlined earlier (i.e., 1,850 feet and 5,830 feet from California receptors and 330 feet and 735 feet from Arizona receptors for daytime and nighttime noise, respectively) relative to noise-sensitive uses in the project area, noise measurements shall be under the supervision of a qualified acoustical consultant at the nearest noise-sensitive land use relative to the construction activities with a sound level meter that meets the standards of the American National Standards Institute (ANSI Section S14 1979, Type 1 of Type 2) to ensure that construction noise associated with the project component complies with applicable daytime and nighttime noise standards. Coordination with the Tribes and appropriate landowner(s) shall occur to allow opportunity for input in determining noise monitoring locations. If noise levels are still determined to exceed noise standards, temporary engineered acoustical barriers shall be erected as close to the construction activities as feasible, breaking 	Significant and Unavoidable

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		<p>the line of sight between the source and receptor where noise levels exceed applicable standards. Coordination with the Tribes shall occur in a manner consistent with the Cultural Impact Mitigation Program (CIMP; see Appendix H to the C/RAWP) throughout all Project phases, including input in determining constraints in locating temporary noise barriers to avoid or minimize physical impact to cultural resources. All acoustical barriers shall be constructed with material having a minimum surface weight of 2 pounds per square foot or greater and a demonstrated Sound Transmission Class (STC) rating of 25 or greater as defined by the American Society for Testing and Materials' Test Method E90. Placement, orientation, size, and density of acoustical barriers shall be specified by, or under the direct supervision of, a qualified acoustical consultant.</p> <ul style="list-style-type: none"> • A disturbance coordinator shall be designated by the PG&E, which will post contact information in a conspicuous location near groundwater project activity areas so that it is clearly visible to nearby noise-sensitive receptors as identified in Figure 4.7-1 and Interested Native American Tribes (Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, and the Hualapai Indian Tribe). The coordinator will manage and thoroughly investigate complaints resulting from the Project-related noise to ensure resolution. Reoccurring disturbances will be evaluated by a qualified acoustical consultant retained by PG&E to ensure compliance with applicable standards. Noise complaints shall be reported to DTSC as soon as practicable and no more than 72 hours upon receipt of complaint. Resolutions will be recorded, tracked, and reported to DTSC on a monthly basis. The disturbance coordinator will contact nearby noise-sensitive receptors as labeled in Figure 4.7-1 and Interested Tribes, advising them of the Project activity schedule. The disturbance coordinator will also consider the timing of Project activities in relation to Tribal ceremonial events that are sensitive to noise, which will be accommodated by PG&E to the extent practicable. • This shall be achieved in part through annual project update mailings (could be combined with other annual project mailings) to potentially impacted owners/occupants of sensitive land uses to give notice of possible disturbances and impacts. The mailing shall also identify the disturbance coordinator's contact information. 	

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Long-Term Operational-Related Transportation Noise Impacts. Operation of the proposed Project would not result in any transportation noise sources (material/equipment delivery, truck trips for off-site waste disposal, etc.) that would generate noise levels that would result in a noticeable, permanent increase in ambient noise levels at nearby sensitive receptors or vibration impacts in excess of applicable levels.	Less than Significant	No mitigation measures required.	N/A
Impact NOISE-2: Groundborne Vibration Impacts Caused by Construction Activities. Implementation of the proposed Project would result in the exposure of sensitive receptors to groundborne vibration levels that exceed the applicable standards of the San Bernardino County Development Code (83.01.090) and the Mohave County Zoning Ordinance. These groundborne vibration levels could result in annoyance or architectural/structural damage.	Potentially Significant	Mitigation Measure NOISE-1: Short-Term Groundborne Vibration Levels Caused by Project Activities near Sensitive Receptors. (Groundwater FEIR Measure with Revisions) <ul style="list-style-type: none"> New wells shall be constructed a minimum of 45 feet from vibration-sensitive receptors, as feasible. Constructing new wells within 30 feet of vibration-sensitive land uses located in California and 275 feet of vibration-sensitive land uses located in Arizona shall be avoided. A disturbance coordinator shall be designated by PG&E, which will post contact information in conspicuous locations near Project activity areas such as on construction fencing or trailers, but with consideration to culturally sensitive areas such as the Topock Maze. Signage will be clearly visible to nearby vibration-sensitive receptors as identified in Figure 4.7-1. The coordinator will manage complaints resulting from the construction vibration. Reoccurring disturbances will be evaluated by a qualified acoustical consultant retained by the project applicant to ensure compliance with applicable standards. The disturbance coordinator will contact nearby vibration-sensitive receptors, advising them of the construction schedule. This shall be achieved in part through annual project update mailings (could be combined with other annual project mailings) to owners/occupants of potentially impacted sensitive land uses to give notice of possible disturbances and impacts. The mailing shall also identify the disturbance coordinator's contact information. 	Less than Significant
Impact NOISE-3: Project-Generated Construction-Related Noise Levels. Implementation of the proposed Project would result in intermittent construction activities associated with the installation of new wells, roadways, water conveyance, utilities, water filtration facilities, and structures. These construction activities could potentially expose sensitive receptors to noise levels in excess of the applicable noise standards and/or result in a substantial increase in ambient noise levels.	Potentially Significant	Implementation of Mitigation Measure NOISE-2.	Significant and Unavoidable

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Impact NOISE-4: Land Use Compatibility of Future Project Noise Levels with the Topock Traditional Cultural Property. Implementation of the proposed Project could result in future noise (construction, operation and maintenance, and decommissioning activities) that could result in conflicts with land use compatibility that exceed San Bernardino County standards for Places of Worship or conflict with Native American values associated with the Topock Traditional Cultural Property (TCP).	Potentially Significant	Implementation of Mitigation Measures NOISE-1 and NOISE-2.	Significant and Unavoidable
Utilities, Service Systems, and Energy			
Impact UTIL-1: Potential to Exceed Wastewater Treatment Requirements or Require a New Wastewater Facility. The proposed Project includes several wastewater improvements in order to operate successfully that would not exceed requirements or require new facilities.	Less than Significant	No mitigation measures required.	N/A
The proposed Project does, however, include two new septic tank systems that could exceed requirements or require new facilities.	Potentially Significant	Implement Mitigation Measure HYDRO-1 (specifically WM-9).	Less than Significant
Impact UTIL-2: Potential to Exceed Landfill Capacity. The Project would generate incidental non-hazardous waste and hazardous waste during construction and operation activities, which would not exceed the available daily capacity of relevant landfills.	Less than Significant	No mitigation measures required.	N/A
Decommissioning of the Project, including the IM-3 Facility, would generate a variety of construction debris, including concrete, metal sheeting, and pipe, which could exceed the available daily capacity of relevant landfills.	Potentially Significant	Implementation of Mitigation Measure HAZ-3.	Less than Significant
Result in wasteful, inefficient, or unnecessary consumption of energy, during Project construction or operation or did not incorporate renewable energy or energy efficiency measures into building design, equipment use, transportation or other Project features. The Project would consume energy, including electricity, natural gas, and fuels during Project construction, operation and maintenance, and decommissioning activities, which would not result in wasteful, inefficient, or unnecessary	Less than Significant	No mitigation measures required.	N/A

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
consumption of energy.			
Water Supply			
Increased Demand for Water Supplies. Although the Project would require the use of freshwater supplies from certain Arizona wells for injection upgradient of the Cr(VI) contaminant plume as well as for use during construction activities, the project would not substantially increase overall demand for water supplies.	Less than Significant	No mitigation measures required.	N/A
Impact WATER-1: Depletion of Groundwater Supplies. The Project would require the use of freshwater from water supply wells in Arizona. Localized effects on the groundwater table and the availability of groundwater supplies to other groundwater users near the freshwater water supply wells are possible.	Potentially Significant	Implementation of Mitigation Measure HYDRO-6.	Less than Significant
Cumulative Impacts			
Impact CUM-1: Cumulatively Considerable Impacts to Aesthetic Resources. Implementation of the proposed Project, in combination with other projects in the geographic scope, could cause a substantial adverse change to scenic vistas, scenic resources, and the existing visual character and quality of the site and its surroundings.	Potentially Significant	Implement Mitigation Measures AES-1 and AES-2.	Significant and Unavoidable
Impact CUM-2: 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 or unique archaeological resources; result in a substantial adverse change to a unique paleontological resource or unique geologic feature; and disturb human remains, including those interred outside of formal cemeteries.	Potentially Significant	Implement Mitigation Measures CUL-1 through CUL-4.	Significant and Unavoidable
Impact CUM-3: Cumulatively Considerable Impacts Related to Noise and Vibration. Implementation of the proposed Project, in combination with Soil Remediation Activities in the Project Area that are in the geographic scope, could cause a substantial adverse increase related to short-term construction-related noise and vibration, as well as compatibility with noise levels at the Topock TCP.	Potentially Significant	Mitigation Measure NOISE-3: Cumulative Noise Increases from Remedial Activities (New Measure). Coordination between teams implementing soil remedial activities (including investigation, pilot testing, and remediation) and groundwater remediation shall occur as to avoid cumulative noise impact to any sensitive receptor. If concurrent activities must occur near common sensitive receptors, real time noise measurements of representative activities shall be conducted by a qualified acoustical consultant (or contractor trained	Significant and Unavoidable

**TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		by an appropriate qualified acoustical consultant) at the nearest noise-sensitive land use with a sound level meter that meets the standards of the American National Standards Institute (ANSI Section S14 1979, Type 1 of Type 2). If exceedances are not observed, monitoring can be discontinued. If exceedances are experienced, temporary barriers shall be erected as close to the construction activities as feasible, breaking the line of sight between the source and receptor where noise levels exceed applicable standards. If noise cannot be effectively mitigated, one or more of the concurrent activities shall be modified to result in appropriate noise levels.	

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CHAPTER 2

Introduction

This draft subsequent environmental impact report (SEIR) 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]). This SEIR evaluates the reasonably foreseeable and potentially significant adverse environmental effects associated with the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project, or proposed Project) as specifically defined in the *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California, November* (Final Remedy Design; CH2M Hill 2015a). The Final Remedy Design and its associated appendices A through L; the *Construction/Remedial Action Work Plan for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California* (C/RAWP) (CH2M Hill 2015b) and its associated Appendices A through X; and the Supplemental and Errata to the Final Remedy Design are incorporated by reference throughout this SEIR and are found collectively as Appendix BOD as an electronic appendix to this SEIR.

Under CEQA and consistent with the terms of the various Settlement Agreements entered into by DTSC and PG&E with the Fort Mojave Indian Tribe (FMIT), DTSC must identify and consider the potentially significant adverse environmental effects of the proposed Project before making a final decision to certify the Final Groundwater Remedy Project SEIR and approve the Final Remedy Design. This SEIR 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 SEIR. A detailed description of the proposed Project can be found in Chapter 3, “Project Description,” and is based on the Final Remedy Design (CH2M Hill 2015a) and the C/RAWP (CH2M Hill 2015b) and associated appendices, which DTSC will consider adopting. The proposed Project evaluated in this SEIR is, therefore, the Final Groundwater Remedy Project.

2.1 Purpose of This SEIR

This SEIR provides environmental review and analysis of the Final Groundwater Remedy Project. This chapter provides background information and an explanation of how this SEIR

satisfies the requirements of CEQA. Details of the Groundwater Remedy Project, including the Project's location, objectives, and characteristics that form the basis of the SEIR environmental analysis, are presented in Chapter 3, "Project Description."

Remediation of contaminated groundwater at the Topock Compressor Station (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. This 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. The approval of the Groundwater Remedy Project to clean up the contaminated groundwater at the Station, which includes the Final Remedy Design and associated manuals and work plans, is a discretionary action that will be made by DTSC. Activities associated with the corrective action may result in direct or indirect change in the physical environment. The SEIR is intended to address the potentially significant adverse effects of the proposed Project on the physical environment.

This SEIR has been prepared in compliance with CEQA (California Public Resources Code, Sections 21000 et seq.) and the CEQA Guidelines. It is an informational document for use by governmental agencies, Native American Tribal groups, and the public to aid in the planning and decision-making process by disclosing the physical environmental effects of the Project and identifying possible ways of reducing or avoiding its potentially significant impacts.

Before a lead agency exercises its discretion to approve a project that could result in reasonably foreseeable and potentially significant adverse effects on the environment, an environmental impact report (EIR) must be prepared that fully describes the environmental effects of the project. The EIR is a public information document that identifies and evaluates potentially significant environmental impacts of a project, recommends mitigation measures to avoid or substantially lessen significant adverse impacts, and examines feasible alternatives to the project. The information contained in the EIR must be reviewed and considered by DTSC and by any responsible agencies (as defined in CEQA) prior to a decision to approve, disapprove, or modify the proposed project.

The CEQA Guidelines help define the role and content of an EIR as follows:

- **Informational Document.** An EIR is an informational document that will inform public agency decision-makers and the public of the significant environmental effect(s) of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project. The public agency shall consider the information in the EIR along with other information that may be presented to the agency (Section 15121[a]).
- **Standards for Adequacy of an EIR.** An EIR should be prepared with a sufficient degree of analysis to provide decision-makers with information that enables them to make an informed decision that takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an

EIR is to be reviewed in light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure (Section 15151).

The CEQA Guidelines, Section 15382, define a significant effect on the environment as “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....” Therefore, in identifying the significant impacts of the Project, this SEIR describes the potential for the Project to result in substantial physical effects within the area affected by the Project (the Project Area) and identifies mitigation measures that would avoid, reduce, or otherwise alleviate those effects.

2.2 CEQA Environmental Review

The CEQA Guidelines Section 15160 provides for variations in EIRs so that environmental documentation can be tailored to different situations and intended uses, and these variations are not exclusive. As described below, this SEIR relies on a prior EIR, which was a project- and program-level EIR.

CEQA authorizes lead agencies to prepare a program-level or “first-tier” analysis for some approval of a series of actions that are related geographically or as part of a suite of activities (Pub. Resources Code Section 21094; 14 CCR Sections 15152, 15168). A program EIR is a type of EIR that allows a public agency to consider broad policy alternatives and program-wide mitigation measures at the early stages of planning. By contrast, a project-level EIR typically involves specific project-related plans and a discretionary approval that may result in significant adverse environmental effects (14 CCR Sections 15168, 15161).

The Topock Compressor Station Groundwater Remediation Project Final EIR (Groundwater FEIR; DTSC 2011), certified on January 31, 2011 (SCH No. 2008051003), provided both a programmatic and, in certain instances, a project-level analysis for the conceptual technical methods selected for the final remedy that would remediate contaminated groundwater at the Station. The proposed final remedy was described in the *Final CMS/FS for Solid Waste Management Unit 1 (SWMU 1)/Area of Concern 1 (AOC 1) and AOC 10* (Final CMS/FS) as Alternative E—In Situ with Freshwater Flushing. The Groundwater FEIR provided a program-level analysis of the construction of physical facilities that would be necessary to implement the final remedy (Alternative E from the Final CMS/FS), which had not yet been developed to specific plans and designs. In 2011, DTSC adopted Alternative E after certifying the Groundwater FEIR. DTSC also adopted an Addendum to the Groundwater FEIR in 2013, which expanded the Project Area and considered the potential environmental effects of alternative well locations for a freshwater source (DTSC 2013).

The Final Remedy Design and related infrastructure needed to complete cleanup are geographically related to the area considered within the 2011 Groundwater FEIR, and involve consideration of the In Situ with Freshwater Flushing project. Although no specific site locations

for remedial facilities were known at the time the Groundwater FEIR was prepared, the ultimate development of those facilities was recognized as the logical progression for cleanup. The Groundwater FEIR therefore included a mostly programmatic level of analysis to ensure that the effects of developing the final remedy, and implementation of the final remedy, were considered for purposes of: avoiding duplicative reconsideration of basic policy considerations, ensuring consideration of cumulative impacts that might be slighted in a case-by-case analysis, and to allow DTSC to consider broad policy alternatives and program-wide mitigation measures at an early time, while recognizing that the components are at different stages of planning. (See CEQA Guidelines, Section 15168, subd. (b).)

This SEIR tiers from the Groundwater FEIR and Addendum. This SEIR also evaluates, at a project level, the environmental effects associated with the construction, operation, and decommissioning of the Groundwater Remedy Project, based on the Final Remedy Design and as further described in Chapter 3 of this SEIR, relative to the program-level impact analysis in the certified Groundwater FEIR. CEQA Guidelines Sections 15152, subdivision (f), 15168, subdivisions (c)-(d), and 15162, among others, provide that when an EIR has been certified for a project, a SEIR shall not be prepared unless the lead agency determines that one or more of the following has occurred:

1. Substantial changes are proposed in the project which will require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified effects.
2. Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects.
3. New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete, shows the project would result in one or more significant effects not discussed in the prior EIR, or that significant effects previously identified may be substantially more severe.

(See also Pub. Resources Code, Sections 21094, 21166.)

DTSC has prepared a Modified Initial Study (Appendix IS to this SEIR) to provide an initial evaluation of Final Remedy Design as compared to the analysis conducted in the Groundwater FEIR (see CEQA Guidelines Section 15128). The purpose of the Modified Initial Study is to determine whether certain impacts of the Final Remedy Design were sufficiently covered in the Groundwater FEIR or otherwise do not require additional analysis, and whether the criteria set forth in CEQA Guidelines Section 15162 were triggered. DTSC determined that modifications and/or new levels of specificity contained within the Final Remedy Design, as compared to the Groundwater FEIR and Addendum, trigger the provisions above for requiring preparation of an SEIR. Specifically, the lead agency has determined that several aspects of the Final Remedy Design, including the following, have resulted in the need for this SEIR:

- Use of a freshwater source, Havasu National Wildlife Refuge (HNWR) Well 1A in Arizona as the source for freshwater, that contains levels of arsenic that are elevated above the State of California background levels.
- Inclusion of a new construction headquarters and soil processing/storage area in Moabi Regional Park, in an area that was anticipated to only provide one or more freshwater supply wells in the Groundwater FEIR.
- An overall increase in the total amount of ground disturbance associated with remedy construction and long-term operation. The Groundwater FEIR assumed a maximum of 13,400 cubic yards of soil disturbance. The Final Remedy Design anticipates 45,200 cubic yards of soil disturbance.
- The need to further evaluate potential impacts to cultural resources, specifically related to new information, regarding resources, that has become available since the Groundwater FEIR was prepared. This includes historic, archaeological, and Tribal resources.
- The need to further evaluate potential impacts to sensitive wildlife species based on new information that has become available since the Groundwater FEIR was prepared. This includes but is not limited to sensitive bat species and bighorn sheep.
- An overall increase in the amount of energy that would be used to operate the Final Remedy Design. The Groundwater FEIR estimated a demand of 1.6 million kilowatt hours (KWh) of electricity annually. The Final Remedy Design estimates a higher demand of electricity of up to 7.82 million KWh annually.

In addition, there may be a need for additional facilities and associated activities beyond the parameters set forth in the Final Remedy Design. A Future Activity Allowance has been included in the Project Description and the SEIR to ensure that a comprehensive environmental analysis is included should additional activities be warranted over the decades-long project implementation. More information can be found in Chapter 3, “Project Description,” Section 3.6.

The Final Remedy Design is therefore a subsequent activity under the Groundwater FEIR. This SEIR for the Groundwater Remedy Project tiers from the prior analysis in accordance with the above cited Public Resources Code and CEQA Guidelines Sections. A Modified Initial Study has been prepared consistent with CEQA Guidelines in order to limit the content of the SEIR, or incorporate by reference, the content of the Groundwater FEIR on those topics that were previously covered and for which no additional analysis is necessary, and is included as Appendix IS to this SEIR. Consequently, the Modified Initial Study identifies which of the Final Remedy Design’s effects were adequately examined in the Groundwater FEIR and which topics warrant more detailed environmental analysis. This SEIR therefore concentrates the environmental analysis on those topics identified in the Modified Initial Study with the potential to have either new significant effects or substantially more severe significant impacts than were previously identified in the Groundwater FEIR. The remaining environmental topics, as documented in the Modified Initial Study, were determined not to have new or more severe significant environmental effects than what was previously identified in the Groundwater FEIR, and these topics are therefore not analyzed in detail in this SEIR. (See *Mission Bay Alliance v. Office of Community Investment and Infrastructure* (2016) ___ Cal.App.5th ___.)

The impacts analysis contained in the Groundwater FEIR (including its Errata) and 2013 Addendum also serve as the baseline for DTSC’s consideration in this SEIR of the potential effects of the Final Remedy Design as required by CEQA. Although the general rule under CEQA is that the environmental setting in an EIR corresponds to physical conditions at the time the agency undertakes its analysis, the California Supreme Court has acknowledged that subsequent review under Section 21166 is an exception to this rule. (See *Communities for a Better Environment v. South Coast Air Quality Management Dist.* (2010) 48 Cal.4th 310, 326 [acknowledging the “only limited CEQA review under Section 21166 and CEQA Guidelines Section 15162”]; see also *ibid.* at fn. 11 [citing (2010) 48 Cal.4th 310 (1999) 70 Cal.App.4th 238, 242-243; *Benton v. Board of Supervisors* (1991) 226 Cal.App.3d 1467, 1477-1484.]

Under these cases, the SEIR’s analysis need not revisit those impacts already disclosed in the Groundwater FEIR and 2013 Addendum; rather, the impacts disclosed in the Groundwater FEIR, Errata, and 2013 Addendum become the “baseline” against which the impacts of the Final Remedy Design are measured. The focus is therefore on whether the refinements to the Project give rise to new, or substantially more severe, environmental impacts. (CEQA Guidelines, Sections 15162–15164.)

2.3 Groundwater FEIR Environmental Review Process

This section presents an overview of the Groundwater FEIR, including the Errata that was adopted in 2011, and the 2013 Addendum, from which this SEIR is tiered, and which is incorporated by reference.

2.3.1 Environmental Review for the 2011 Groundwater FEIR and 2013 Addendum

The Groundwater FEIR considered the potentially significant adverse environmental impacts of adopting the preferred remedy, determined to be the In Situ Treatment with Freshwater Flushing (known as Alternative E) through the Final Corrective Measures Study/Feasibility Study (CMS/FS) process that was completed in December 2009. The In Situ Treatment with Freshwater Flushing remedy alternative, as discussed in the Groundwater FEIR and final project approval documents, involves manipulation of subsurface water flow to move a contaminated groundwater plume with hexavalent chromium Cr(VI) and other chemicals of potential concern (COPCs), originating from past operations, through a treatment zone.

The Groundwater FEIR provides a program-level analysis of the conceptual technical methods and construction of physical facilities that would be necessary to implement the In Situ Treatment with Freshwater Flushing remedy alternative, which at the time of the FEIR had not yet been developed to specific plans and designs. While the Final CMS/FS explains the types of facilities that would be required and are included in the In Situ Treatment with Freshwater Flushing remedy, it does not identify the exact location or quantity of these facilities. The exact location of project facilities was not determined until the future design phase of the project (i.e., Final Remedy Design, which is the subject of this SEIR). As discussed in the Groundwater FEIR, it was anticipated that future environmental review may be needed upon completion of the Final

Remedy Design to determine if the impacts associated with the project-level designs are generally consistent with the significance conclusions in the Groundwater FEIR (see the Groundwater FEIR, page 3-12).

The Groundwater FEIR concluded that there would be significant and unavoidable impacts, even after implementation of mitigation measures, to cultural resources and noise. It concluded that impacts would be reduced to less than significant after the implementation of mitigation measures for aesthetics, air quality, biological resources, geology and soils, hazardous materials, hydrology and water quality, noise, and water supply.

In 2013, DTSC adopted an Addendum to the Groundwater FEIR (referred to as the 2013 Addendum) that considered the potential effects of the Final Implementation Plan for the Evaluation of Alternative Freshwater Sources. That plan allowed for water well installation, testing, and sampling at two exploratory borehole sites (Site B and the HNWR-1 well) located outside the FEIR project boundary on the Arizona side of the Colorado River. The addendum was focused on the testing activities needed to determine the suitability of these borehole locations for use as a freshwater source for the remedy. It did not, however, select a well to be used for the remedy or evaluate environmental impacts associated with infrastructure needed to connect and operate the selected freshwater supply well with the larger remedy system.

2.3.2 Alternatives Considered in the FEIR

In accordance with Section 15126.6 of the CEQA Guidelines, a range of reasonable alternative remedy options that could feasibly accomplish most of the basic project objectives was considered in the Groundwater FEIR. The Final CMS/FS presented 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—Solid Waste Management Unit (SWMU) 1/Area of Concern (AOC) 1—and within AOC 10 (East Ravine) at the Station. The Final CMS/FS examined a total of nine remedy alternatives (Alternatives A through I). This SEIR includes the following summary of the alternatives considered in the FEIR to provide background to the reader. By doing so, however, DTSC does not mean to imply that it is revisiting the policy decision to adopt Alternative E.

The rationale for DTSC's consideration of alternatives was based on DTSC's review and participation in the Final CMS/FS process, which provided an exhaustive consideration of potential options and technologies for remediation of the contaminated groundwater plume while meeting the Remedial Action Objectives (RAOs) and other requirements, including the applicable statutory requirements of RCRA/CERCLA and the associated Corrective Action Consent and Administrative Consent Agreements for Topock. As such, the range of alternatives considered in the FEIR was based on feasible remediation alternatives to the proposed project that fell within the parameters of the RAOs for the project identified in the Final CMS/FS.

DTSC selected Alternative E – In Situ Treatment with Freshwater Flushing because it would achieve the RAOs while substantially reducing, through chemical change and physical precipitation, the amount of Cr(VI) in the groundwater (which is the principal threat in groundwater at the site). The selected technology will complete cleanup in a reasonable time

frame while achieving best balance with the adverse effects to cultural resources and biological resources than other alternatives considered. Furthermore, Alternative E met both the threshold criteria of (1) protecting human health and the environment, attaining media cleanup goals (over a reasonable timeframe), and controlling sources of releases, and (2) compliance with the identified chemical-, location-, and action-specific applicable or relevant and appropriate requirements (ARARs). Alternative E also was found to provide a sufficient degree of long-term effectiveness, permanence, and reliability; is implementable; is relatively cost-effective; and provides a sufficient degree of protectiveness to the community, workers, and environment during implementation.

The alternatives considered but ultimately rejected in the Groundwater FEIR are summarized in the following pages (Groundwater FEIR, Volume 2, Section 8).

Monitored Natural Attenuation (Alternative B)

Although using the same basic chemistry principles as the selected remedy, under Alternative B in the Groundwater FEIR, no active treatment to reduce Cr(VI) concentrations in groundwater would have occurred. This alternative would have relied only on the naturally reducing conditions, where present, to remove Cr(VI) from groundwater in the Project Area's shallow floodplain. These reducing conditions were derived from naturally occurring organic carbon in the fluvial deposits associated with the Colorado River. Wherever the natural reducing capacity of the fluvial material is present, Cr(VI) would be converted to its stable and less toxic form of Cr(III), which is essentially immobile and binds to the subsurface soil matrix. The reducing conditions in the fluvial sediments provide a natural geochemical zone that limits or prevents the movement of Cr(VI) through the fluvial sediments adjacent to and beneath the Colorado River. However, there is some degree of uncertainty as to whether the natural geochemical zone occurs throughout the area of interest. While Alternative B was found to be the environmentally superior alternative among the alternatives analyzed and generally meets most of the objectives stated in the Groundwater FEIR, it did not meet a fundamental project objective of achieving compliance with RAOs within a reasonable time frame, as required by California State Water Board Resolution 92-49. DTSC therefore rejected Alternative B as infeasible per CEQA Guidelines Section 15126.6(f)(1) because it could not achieve remediation within a reasonable time frame.

High-Volume In Situ Treatment (Alternative C)

Alternative C would have involved active in situ groundwater treatment by distributing an organic carbon substrate across the entire plume through high-volume pumping of wells installed primarily in previously disturbed areas. This alternative would have had the largest amount of remediation wells and infrastructure, and therefore the largest amount of associated ground disturbance. Alternative C proposed to locate injection wells within the center of the plume and extraction wells at the plume margin. An organic carbon substrate would have been injected to create geochemically reduced conditions and convert the harmful and soluble Cr(VI) to the insoluble form of chromium, Cr(III). Since the reduced chromium would be deposited in the soil formation instead of dissolved in groundwater, Cr(VI) would be removed from groundwater. While this alternative was found to meet the objectives stated in the Groundwater FEIR, DTSC rejected Alternative C for environmental and policy reasons. As described in the Groundwater

FEIR, this alternative would have had more severe significant adverse environmental impacts (e.g., to biological resources, aesthetics) when compared to Alternative E and was therefore less desirable. Thus, it would not have met the requirements for selection under CEQA and was rejected as infeasible per CEQA Guidelines Section 15126.6(f)(1).

Sequential In Situ Treatment (Alternative D)

Under Alternative D, treatment of Cr(VI) would have occurred by injecting an organic carbon substrate throughout the plume to create geochemically reduced conditions to convert Cr(VI) to insoluble Cr(III). Since the reduced chromium would be deposited in the soil formation instead of groundwater, Cr(VI) would be removed from groundwater in a manner similar to Alternative C. Treatment would be implemented in several sequential phases involving construction of approximately 12 lines of injection and extraction wells to distribute the carbon food source over the entire plume. Alternative D was found to be environmentally inferior to Alternative E. While this alternative met most of the objectives stated in the Groundwater FEIR, DTSC rejected Alternative D for environmental and policy reasons. As described in the Groundwater FEIR, this alternative would have had greater environmental impacts when compared to the proposed Project's biological impacts from ground disturbance, etc.). Therefore, it did not meet the requirements for selection under CEQA and was rejected as infeasible per CEQA Guidelines Section 15126.6(f)(1).

Pump and Treat (Alternative F)

Alternative F would have involved pumping groundwater, ex situ treatment in an aboveground treatment plant to remove chromium from the groundwater, and reinjection of the treated water back to the aquifer (a process known as pump and treat). The pump and treat process was contemplated to include chemical reduction by addition of ferrous iron; oxidation, pH adjustment, and settling in a clarifier; and final filtration for a process that is essentially similar to the ex situ treatment processes at the current Interim Measure 3 Groundwater Extraction and Treatment Facility (IM-3 Facility), with the exception that it would not include reverse osmosis, as it is assumed salinity removal would not be needed. Alternative F would have included a 1,280 gallons per minute (gpm) treatment plant to remove Cr(VI) from groundwater prior to injection into injection wells. The treatment plant would have been considerably larger than the existing IM-3 Facility. Alternative F was found to be environmentally inferior to Alternative E. While this alternative met most of the objectives stated for Groundwater FEIR, DTSC rejected Alternative F for environmental and policy reasons. As described in the Groundwater FEIR, this alternative would have had greater environmental impacts when compared to Alternative E. Therefore, it did not meet the requirements for selection under CEQA and was rejected as infeasible per CEQA Guidelines Section 15126.6(f)(1).

Combined Floodplain In Situ/Pump and Treat (Alternative G)

Alternative G would have combined floodplain cleanup by in situ treatment with treatment of the upland portion of the plume by extraction and reinjection with ex situ treatment. The floodplain cleanup would have involved construction of in situ reactive zone (IRZ) lines at National Trails Highway and between National Trails Highway and the Colorado River, as described in the initial phase of Alternative C. Chromium in the upland portions of the Project Area would have been

addressed by pumping groundwater, ex situ treatment to remove chromium from the groundwater, and reinjection of the treated water back to the aquifer. Concurrent with the floodplain cleanup, treatment of the plume in the upland portions of the site would have been completed by an ex situ process similar to the treatment processes at the current IM-3 Facility: chemical reduction by addition of ferrous iron; oxidation, pH adjustment, and settling in a clarifier; and final filtration. Alternative G would have included a treatment plant of the same dimensions and at the same potential locations as defined under Alternative F. Alternative G was found to be environmentally inferior to Alternative E. While this alternative met most of the objectives stated in the Groundwater FEIR, DTSC rejected Alternative G for environmental and policy reasons. As described in the EIR, this alternative would have had greater environmental impacts when compared to Alternative E. Therefore, it did not meet the requirements for selection under CEQA and was rejected as infeasible per CEQA Guidelines Section 15126.6(f)(1).

Combined Upland In Situ/ Pump and Treat (Alternative H)

Alternative H would have combined in situ treatment in the upland portions of the plume with pump and treat technology in the floodplain. While both Alternative G and Alternative H would have included a combination of in situ treatment and pump and treat, this alternative differed from Alternative G by relying on in situ as the dominant feature of the cleanup rather than pump and treat. The upland in situ cleanup would have involved construction of several IRZ lines across the length and width of the plume. Organic carbon would have been injected in the IRZ lines to treat the existing Cr(VI) in the alluvial zone of the aquifer. IRZ lines would have been constructed by recirculating between adjacent wells within each line or by use of vertical circulation wells. The ex situ process would have been similar to the treatment processes at the existing IM-3 Facility. Alternative H was found to be environmentally inferior to Alternative E. While this alternative met most of the objectives stated in the Groundwater FEIR, DTSC rejected Alternative H for environmental and policy reasons. As described in the Groundwater FEIR, this alternative would have had greater environmental impacts when compared to Alternative E. Therefore, it did not meet the requirements for selection under CEQA and was rejected as infeasible per CEQA Guidelines Section 15126.6(f)(1).

No Project Alternative/Continued Operation of Interim Measure (Alternative I)

Alternative I would have involved continued operation of the IM-3 Facility as the final remedial action at the site. The IM-3 Facility would have operated with the existing equipment with existing procedures using the existing process at the existing flow rate until cleanup goals were attained. As a continuation of existing operations with no new remediation facilities, this alternative was considered the No Project Alternative in the FEIR. While Alternative I was found to generally meet most project objectives, it did not meet a fundamental project objective of achieving compliance with RAOs within a reasonable time frame, as required by California State Water Board Resolution 92-49. DTSC therefore rejected Alternative B as infeasible, per CEQA Guidelines Section 15126.6(f)(1), because it could not achieve remediation within a reasonable time frame.

2.3.3 Project Area of Impacts

The Groundwater FEIR identified a 779.2-acre Project Area within which all activities were anticipated to occur. The Addendum to the Groundwater FEIR resulted in an additional 74.5 acres to the Project Area, on the Arizona side of the Colorado River, to account for the additional freshwater supply source. The combined area of the Groundwater FEIR and Addendum totals 853.7 acres. After completion of the Final Remedy Design and to support the analysis of Project impacts for this SEIR, DTSC, in coordination with the U.S. Department of the Interior (DOI), further refined the Project Area to reflect the actual area that would be used for the Final Groundwater Remedy Project (see **Figure 2-1**). This process resulted in including additional areas that may be needed for construction, access improvements, and long-term Project operation, and the removal of several areas that were determined no longer needed to support the Final Groundwater Remedy Project. The resulting Project Area that is the basis for the analysis presented in this SEIR is the area in which the Final Groundwater Remedy Project would occur, including both construction and long-term operational needs, and encompasses 762 acres.

2.4 Background

2.4.1 Station History

In 1951, the 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 a natural wash 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. 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 2013a).

2.4.2 Station Investigation Activities

Investigative activities at and in the vicinity of the Station date back to the late 1980s with the identification of SWMUs through an RCRA Facility Assessment (RFA). Closure activities of former hazardous waste management facilities at the Station were performed from 1988 to 1993. In 1988, as documented in the Administrative Consent Agreement, executed in 2005 (see Section 5.3, page 6), PG&E also completed a soil investigation in the Bat Cave Wash area that documented the presence

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.

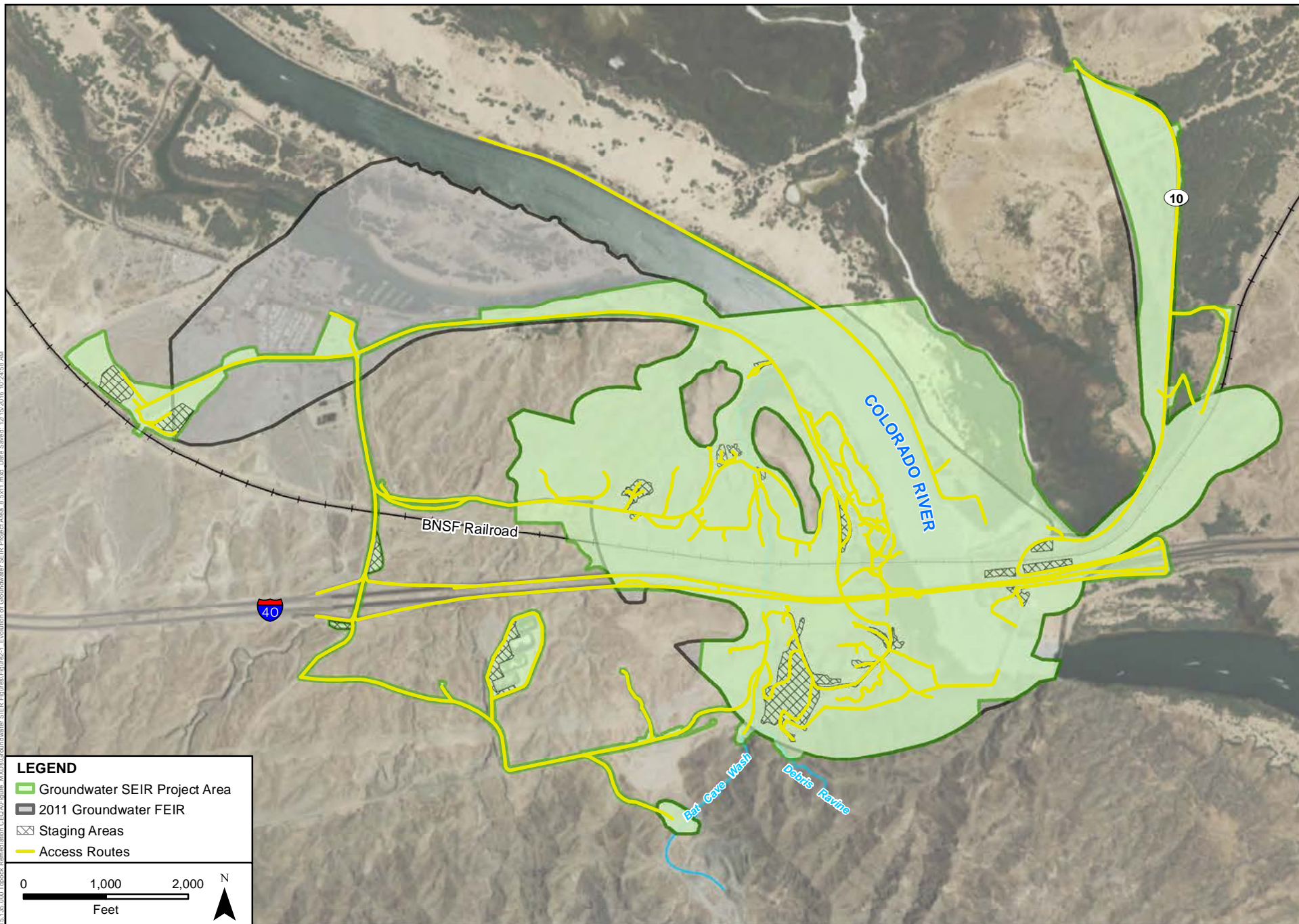
of chromium in the environment around the former percolation bed. The RCRA Facility Investigation (RFI) began in 1996 when DTSC and PG&E executed a Corrective Action Consent Agreement, summarized later in this chapter in Section 2.4.5. Since that time, additional data collection and evaluation has been 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 DOI approved it later in 2007. The RFI/RI Report Volume 1 contains information on Station operations and history, and descriptions of SWMUs, 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 IM-3 Facility 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 MW-20 bench, IM-3 Facility, 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), 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. The RFI/RI Report Volume 2 concluded that past releases of contamination have affected groundwater. The data show no effects on surface water, pore water, or river sediment in the vicinity of the Project Area.

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), dated June 29, 2009; DTSC and DOI approved it later in 2009. The RFI/RI Report Volume 2 Addendum supplements the RFI/RI Report Volume 2 regarding nitrate, molybdenum, and selenium and presents the results of the Arizona groundwater investigation, which verified that nitrate, molybdenum, and selenium are COPCs, and indicated that Cr(VI) and Cr(T) were not present above background levels in eight Arizona wells.

PG&E completed the *Final Groundwater Corrective Measures Study/Feasibility Study Report for SWMU 1/AOC 1 and AOC 10* (Final Groundwater CMS/FS), 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.

Path: G:\Projects\15_135_000_Topeka Remediation\CD\A\Figure_MXD\Groundwater SEIR Figures\Figure-1 Evolution of Groundwater SEIR Project Area 8.5x11.mxd, Data Sheet: 12/15/2016 10:24:58 AM



2.4.3 Interim Measures

As part of the corrective action process, in 2004 DTSC determined that action (an Interim Measure) was necessary at the Station as a precautionary measure to ensure that Cr(VI)-contaminated groundwater would not reach the Colorado River. Interim Measures (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 Interim Measure,” or “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 Facility, 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.

Notices of exemption were prepared pursuant to CEQA for IM-2 (February 2004) and IM-3 (June 2004). It was determined that the notice of exemption was the appropriate level of CEQA review for IM-2 and IM-3 because the project activities were necessary to prevent or mitigate an emergency situation wherein the waters of the Colorado River may be impacted with a hazardous constituent, chromium. Action was necessary to contain the chromium plume near the river and reverse the flow of groundwater from going toward the Colorado River. Litigation ensued and a settlement agreement was ultimately reached with FMIT in 2006 (see *Fort Mojave Indian Tribe v. Department of Toxic Substances Control et al.* (Superior Court of the State of California, Sacramento County [Case No. 05CS00437])).

As described in Chapter 3, “Project Description,” Section 3.8, once the Groundwater Remedy Project is constructed and is determined by the agencies to be “Operating Properly and Successfully,” PG&E will decommission and remove the IM-3 Facility after receipt of approval for decommissioning by DTSC with concurrence from DOI.

2.4.4 Evaluation of Soil Contamination

Investigation activities conducted to date within and in the vicinity of the Station indicate that contaminants have been released to soils through past management practices such as those associated with hazardous materials handling/disposal, waste discharges, spills, and leaks of cooling water and other fluids at the Station. Investigation and any potential cleanup of contaminated soils associated with the long-term operation of the Station are currently being conducted under both RCRA and CERCLA.

PG&E prepared the *Soil RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan* (Soil RFI/RI Work Plan, or Soil Work Plan) 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. A revised version of the Draft Soil RFI/RI Work Plan was circulated for public review and comment in September 2012. Comments were submitted by DTSC, DOI, and multiple Native American Tribes. Responses to these comments were provided by PG&E. The Soil Work Plan

was then revised and presented to DTSC and DOI in a final document dated January 2013 (CH2M Hill 2013a). 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 2014a).

On August 24, 2015, DTSC approved the Topock Soil Investigation Project based on the Topock Compressor Station Soil Investigation Project FEIR. The primary purpose 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. The soil investigation project includes soil sampling and analysis as described in the Soil Work Plan (CH2M Hill 2013a) and the potential need for bench scale tests, pilot studies, and geotechnical evaluations to support a future Soil CMS/FS and plant or other biota sampling activities to support an ecological risk assessment within, and in the vicinity of, the Station. The Soil Work Plan sampling began in October 2015 and continued through April 2016; additional activities described above associated with investigation have not yet been completed. Implementation of the soil investigation project will provide DTSC with sufficient data for the completion of the RCRA Facility Investigation/Remedial Investigation (RFI/RI) process that is consistent with state and federal guidance for site investigations and would support evaluation of possible soil cleanup action(s) if determined necessary. The results of the investigation activities will be compiled and combined with past Station investigation data sets for the preparation of the Final RFI/RI Report Volume 3 (Soil), which will enable the evaluation and selection of corrective measures, if necessary, in a future Soil CMS/FS. If any soil remedy is proposed, it would be implemented following completion of the Soil CMS/FS and associated environmental review as required by CEQA.

As described in both the Groundwater FEIR and the Soil Investigation FEIR, the Groundwater Remedy Project and the activities associated with soil investigation and cleanup have independent utility. The Soil Investigation Project will not change the scope of the Groundwater Remedy Project. The Soil Investigation Project is therefore not an expansion of the Groundwater Remedy Project and does not change the nature or scope of the Groundwater Remedy 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.

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 Soil Investigation Project effort is a separate project from the Groundwater Remedy Project and has independent utility. In addition, if the soil investigation activities indicate that soil remediation is necessary, future environmental review would be required before initiating any remediation of contaminated soil. Input received from the public on a proposed soil remedy will be considered by DTSC prior to approval. This will be followed by remedy design, if required.

2.4.5 Corrective Action Process

As discussed, and at the present time, the Station and surrounding vicinity are undergoing investigation of soils and review and approval of the Final Remedy for groundwater remediation under both RCRA and CERCLA. In 1996, PG&E and DTSC entered into a Corrective Action Consent Agreement 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. 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 Station other than the remedial action addressing contaminated groundwater.

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 groundwater remedy 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 collecting/sampling to determine the nature and extent of any contamination present at the site; and (3) if needed, conducting remedial activities to cleanup identified contamination that poses excessive risk. The following 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 that may be required to undergo some form of corrective action under RCRA.

- An RFI/RI work plan is prepared to gather and sample for possible contamination. Data collected from implementation of the work plan defines the nature and extent of site contamination. An RFI/RI Report is submitted with conclusions and recommendations based on the work plan sampling results.
- A human and ecological risk assessment is completed. A risk assessment is a qualitative and quantitative evaluation of the risks to human health and/or the environment by the actual or potential presence of the COPCs detected during the RFI/RI work plan sampling phase. If necessary, the risk assessment will define the recommended cleanup levels based on anticipated future use of the land. If risks identified are acceptable, no further action may be taken. If unacceptable risks are identified, a CMS/FS is completed. A CMS/FS develops and evaluates alternatives that can be used to remediate/clean up 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.

2.4.6 Groundwater Design Process

The Final Remedy Design is a culmination of an extensive preliminary, intermediate, pre-final, and final design process, undertaken by PG&E as directed by DTSC and DOI with review and comment by stakeholders, including Native American Tribes. Tribal involvement was integral to the design process in all stages. The design review process began in 2011 after DTSC and DOI approved the Final Groundwater EIR. A record of all Tribal communication undertaken for the proposed Project (and others associated with cleanup activities at the Station) is included in the PG&E Topock Tribal Communications Summary Table (Appendix COM to this SEIR). In addition, documentation of all stakeholder comment and response on the various design documents is captured in Appendix I of the Final Remedy Design and Appendix X of the C/RAWP (both of which can be found in the electronic Appendix BOD to this SEIR).

On November 18, 2011, PG&E submitted the Draft Basis of Design Report/Preliminary (30%) Design Submittal (CH2M Hill 2011) for review and comment. More than 300 comments were received. Comment resolution occurred from late February through mid-May 2012. Technical Working Group (TWG) meetings were held to discuss the responses to comments.

On April 5, 2013, PG&E submitted the revised 60% Basis of Design (BOD) (CH2M Hill 2013b) for review and comment. The comment period was approximately 4.5 months, from April 8 through August 23, 2014. More than 800 comments were received. Comment resolution occurred over a 7.5-month period from early September 2013 through mid-April 2014. Multiple venues for discussion and resolution of comments were held, including monthly TWG meetings, site walks, and ad hoc meetings.

On September 8, 2014, PG&E submitted the revised 90% BOD (CH2M Hill 2014b) for review and comment. Based on DTSC direction, a supplement to the 90% BOD (Supplemental 90% BOD; CH2M Hill 2015c) was submitted on February 5, 2015, to present additional information regarding certain items included in the 90% BOD. The comment period for the 90% BOD and Supplemental 90% BOD was approximately 6.5 months, from September 10, 2014, through April 2, 2015. More than 1,210 comments were received. Discussion and resolution of comments occurred over a 4-month period from early April 2015 through end of August 2015.

After DTSC and DOI issued final design directives (i.e., directives for proceeding with the final design) to PG&E, on November 18, 2015, PG&E submitted the Final BOD, referred to as the Final Remedy Design (which includes the Operation & Maintenance Manual), and the C/RAWP to DTSC and DOI for approval consideration. Supplemental and Errata to the Final Remedy Design was provided in November 2016, which corrected minor inconsistencies and clarifications. This SEIR is based on the Final Remedy Design and C/RAWP, which reflect modifications and clarifications by PG&E as a result of the collaborative and iterative design process. This Final Remedy Design and C/RAWP form the Project that is described in Chapter 3 and is analyzed in detail in this SEIR.

2.4.7 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 homes 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 Hualapai Indian Tribe, and the Fort-Yuma Quechan Indian Tribe, have actively participated in Topock projects in the past. Based on recent engagement, Tribes that are actively participating in the Final Groundwater Remedy Project are hereafter referred to as “Interested Tribes,” which includes the first five Tribes. The Fort-Yuma Quechan Indian Tribe is no longer actively participating in the process. 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 five Interested Tribes is found in Section 4.4, “Cultural Resources,” subsection 4.4.3.2 of this SEIR.

2.5 Environmental Review Process for SEIR

As required by CEQA Guidelines Section 15375, a Notice of Preparation (NOP) is a notice sent by the lead agency to notify the responsible agencies, trustee agencies, the State of California Office of Planning and Research, and involved federal agencies that the lead agency plans to prepare an EIR for a project. The purpose of the notice is to solicit information, guidance, and recommendations regarding the scope, focus, and content of the EIR. An NOP was prepared for the proposed project and is included as Appendix NOP of this SEIR. The NOP identified the general area in which the Project is located, 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 May 5, 2015, and concluded on June 4, 2015, providing a 32-day comment period.

Concurrent with the issuance of the NOP, two public scoping meetings were held during the public comment period. Agency and public scoping meetings were held on May 19 and 20, 2015, to receive oral comments on the scope and content of the SEIR. The meetings were open to the agencies mentioned earlier and to any interested organizations and individuals and Native American Tribes that have expressed interest in the potential effects of the proposed Project on cultural resources located on the Project Area.

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. This included a Tribal-focused Scoping Meeting on May 19, 2015. A Tribal outreach meeting was additionally held on October 5, 2015, and Tribes were afforded additional time to comment on the scope and content of the SEIR until March 11, 2016. Information obtained through the Tribal meetings and the subsequent communication program has been incorporated into this SEIR.

Public and agency review of the project will be further facilitated by DTSC through distribution of this SEIR for a 47-day public review period. The public review period will extend from January 12, 2017 to February 27, 2017. This Draft SEIR, as well as appendices and all supporting materials and references, can be found at the project website (www.dtsc-topock.com) and the following locations:

Needles Branch Library

1111 Bailey Avenue
Needles, CA 92363

Colorado River Indian Tribes Public Library

26600 Mohave Road
Parker, AZ 85344

**Chemehuevi Indian Reservation
Environmental Protection Office**

2000 Chemehuevi Trail
Havas Lake, CA 92363

Parker Public Library

1001 Navajo Avenue
Parker, AZ 85344

Golden Shores Community Library
13136 South Golden Shores Parkway
Topock, AZ 86436

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 Draft SEIR 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 Draft SEIR, and a public hearing that will give the public opportunity to provide oral public comments to DTSC. Following the close of the Draft SEIR public review period, DTSC will prepare and publish a second document that contains responses to comments received on the Draft SEIR. The Draft SEIR, comments, and responses together constitute the Final SEIR, 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
January 31, 2017
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
February 1, 2017
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 Draft SEIR, with the subject line “Topock Draft SEIR Comments,” postmarked or dated (for emails) no later than February 27, 2017, to:

Aaron Yue
Project Manager
California Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630
aaron.yue@dtsc.ca.gov
Phone: 714-484-5439

2.5.1 Consultation and Coordination

Notice, outreach, and consultation were conducted with trustee and responsible agencies, federal agencies, Native American Tribal representatives, and members of the public and relevant communities during the CEQA scoping process. The results of the scoping process, including received comments, are summarized in the Scoping Report for the Groundwater Remedy Project SEIR, which is incorporated by reference as provided for in the CEQA Guidelines (CCR Section 15150), and is included as Appendix SCO to this SEIR. The report is also available for inspection at the offices of DTSC (5796 Corporate Avenue, Cypress, California 90630). Consultation and coordination with federal, state, and local agencies that would issue permits, approvals, or access to the Project Area are ongoing.

2.6 Scope of This SEIR

The scope of the analysis contained within this SEIR is focused on the following environmental issues:

- Aesthetics
- Air Quality/Greenhouse Gas
- Biological Resources
- Cultural Resources
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Noise
- Utilities, Service Systems, and Energy
- Water Quality

DTSC prepared a Modified Initial Study on the Groundwater Remedy Project, based on CEQA Guidelines Appendix G, which is included as Appendix IS to this SEIR. The Modified Initial Study identifies which of the Project's effects were adequately examined in the Groundwater FEIR and which topics warrant more detailed environmental analysis. This SEIR concentrates the environmental analysis on those topics identified in the Modified Initial Study with the potential to have either new significant effects or substantially more severe significant impacts than were previously identified in the Groundwater FEIR, or those areas for which substantially modified or new mitigation measures have been provided.

Based on the scope and nature of the proposed Project, and as identified in the Modified Initial Study, it was determined that several resource areas do not warrant a detailed analysis in the SEIR. These issue areas include: Agriculture, Geology and Soils, Land Use and Planning, Minerals, Population and Housing, Public Services, Recreation, and Transportation and Traffic.

2.7 SEIR Organization

This SEIR is organized into chapters, as identified and briefly described below and in the following pages. 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 SEIR; 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 SEIR.

Chapter 3, "Project Description": This chapter provides a detailed description of the Groundwater Remedy Project consistent with CEQA Guidelines Section 15124, including the project objectives.

Chapter 4, “Environmental Analysis”: For each environmental issue listed in Section 2.6, this chapter provides a summary of the 2011 Groundwater FEIR setting, conclusions reached for the impacts analysis, and any mitigation measures that had been approved to reduce impacts at that time. The section then identifies the existing setting for this proposed Project, focusing on new information since 2011 and/or features included in the Final Remedy Design that have been revised or added since certification of the Groundwater FEIR in 2011. The chapter then provides a current review of the regulatory framework for each environmental topic analyzed. Each section then evaluates the potential environmental impacts associated with the proposed Project as described in Chapter 3, “Project Description,” compared to the impacts identified in the Groundwater FEIR, and identifies mitigation measures for significant impacts (identifying whether mitigation measures have been revised from those included in the Groundwater FEIR). Lastly, each section within Chapter 4 discusses the level of significance after implementation of those mitigation measures, and compares the significance conclusions to those reached in the Groundwater FEIR.

Chapter 5, “Other CEQA Sections”: This chapter identifies those areas where environmental impacts are considered significant and unavoidable based on changes or modifications included in this SEIR based on the Final Remedy Design. 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 that could cause related environmental impacts. 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 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 potentially feasible alternatives that may reduce environmental impacts associated with implementation of the Final Groundwater Remedy Project included in the Final Remedy Design and evaluated in this SEIR (not the remedy itself, for which alternatives were considered and evaluated in the Groundwater FEIR certified in 2011). 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 SEIR.

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

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

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

2.8 Terminology Used in This SEIR

This SEIR 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 SEIR 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 SEIR 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.

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CHAPTER 3

Project Description

3.1 Introduction

As required by the California Environmental Quality Act (CEQA), this chapter provides a description of the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project, or proposed Project) at the PG&E Topock Compressor Station (Station) and surrounding area (Project Area). This chapter is prepared for purposes of the Department of Toxic Substances Control's (DTSC's) consideration and approval of the final groundwater remedy design, including approval of the *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California, November* (CH2M Hill 2015a) (Final Remedy Design), which includes the *Operation and Maintenance Manual Final (100%) Design Submittal* (O&M Manual) and the *Construction/Remedial Action Work Plan for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California* (CH2M Hill 2015b) (C/RAWP). In November 2016, the *Supplemental and Errata Information for the Final (100%) Groundwater Remedy* was provided to DTSC, which corrected minor inconsistencies and clarifications to the Final Design. The Final Remedy Design, including the errata, is included in its entirety as Appendix BOD to this SEIR. This chapter includes: a general description of the location and boundaries of the proposed Project (also referred to as the Project Area); a statement of the objectives sought by the applicant (PG&E) and DTSC and reflecting the underlying purpose of the Project; a general description of the Project's technical, economic, and environmental characteristics; and a statement describing the intended uses of the subsequent environmental impact report (SEIR) as identified in Section 3.12 (see California Code of Regulations [CCR], Title 14, Chapter 3, Section 15000 et seq. [CEQA Guidelines] 15124).

3.2 Background

Groundwater beneath and near the Station has been contaminated through the discharge and release of hexavalent chromium [Cr(VI)], and total chromium [Cr(T)] in the areas known as Bat Cave Wash and East Ravine. Other chemicals of potential concern (COPCs) that might be associated with historical releases from the Station are molybdenum, selenium, and nitrate.¹ In 2004, DTSC determined that immediate actions were necessary within the Project Area as precautionary measures to ensure that Cr(VI)-contaminated groundwater did not reach the Colorado River. Interim Measures (IMs) were therefore instituted to protect the Colorado River.

¹ Although the Final Groundwater Remedy Project is focused on the Cr(VI), the Final Groundwater Remedy Project is also expected to reduce the concentrations of selenium or nitrate and not affect molybdenum.

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 Interim Measure,” or “the IM.”

In 2011, as described in detail in Chapter 2 of this Draft SEIR, DTSC evaluated the potentially significant adverse environmental effects of various potentially feasible remedies associated with cleanup of groundwater contamination at the Station. As a result, DTSC certified the Topock Compressor Station Groundwater Remediation Project Final EIR (Groundwater FEIR), adopted the CEQA Findings of Fact and Statement of Overriding Considerations, and adopted the Mitigation Monitoring and Reporting Program (MMRP) (DTSC 2011). Based on these documents, as well as all other information obtained through the administrative process, DTSC approved a groundwater remedy design that consists of in situ treatment with freshwater flushing (referred to as “Alternative E” in the Groundwater FEIR) (DTSC 2011). In 2013, DTSC adopted an Addendum to the Groundwater FEIR, which expanded the Project Area and considered the potential environmental effects of alternate well locations for a freshwater source located in Arizona (DTSC 2013).

Following certification of the Groundwater FEIR, PG&E initiated an iterative design process by preparing the preliminary (30%), interim (60%), pre-final (90%), and supplemental pre-final 90% designs for the selected groundwater remedy in accordance with the Consent Decree and the Corrective Action Consent Agreement process. DTSC provided Interested Tribes² with a public review and comment period at each design phase. Over a 3-year period, PG&E worked with DTSC, as well as the U.S. Department of the Interior (DOI), Interested Tribes, landowners, and other stakeholders to address comments and questions, collect new data, and develop the Final Remedy Design. PG&E prepared and completed the Final Remedy Design (which included the O&M Manual and the Construction/Remedial Action Work Plan (C/RAWP) pursuant to the requirements of the Corrective Action Consent Agreement entered into by PG&E and the DTSC in 1996 and the Remedial Design/Remedial Action Consent Decree, executed by PG&E and the United States, on behalf of the DOI, which was approved by the U.S. District Court for the Central District of California in November 2013. Supplemental and Errata Information for the Final Groundwater Remedy was provided to DTSC in November 2016, which corrected minor inconsistencies and clarifications to the Final Design. PG&E designed the groundwater remedy to comply with the Groundwater FEIR mitigation measures and applicable regulations, and throughout the design period PG&E submitted quarterly mitigation measure compliance reports documenting actions taken to comply with these mitigation measures. This Draft SEIR for the Final Groundwater Remedy Project is based on the Final Remedy Design and the C/RAWP, which reflect modifications and clarifications by PG&E as a result of the collaborative and iterative design process.

² Six Native American Tribes, the Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, Hualapai Indian Tribe, and the Fort-Yuma Quechan Indian Tribe, have participated in Topock project activities in the past. Based on recent engagement, Tribes that are actively participating in the Topock project and are hereafter referred to as “Interested Tribes.” The first five Tribes mentioned are considered “Interested Tribes,” as the Fort-Yuma Quechan Indian Tribe is no longer actively participating in the process.

The Groundwater FEIR included a general description of the elements that would make up the selected groundwater remedy (e.g., remediation wells, monitoring wells, pipelines, freshwater intake locations, and associated infrastructure) and considered the potentially significant adverse environmental impacts that would result, to the extent such impacts were reasonably foreseeable given the level of detail known at the time. The Project described herein provides more detail on the ultimate number and specific locations of the remedy elements reflected in the Final Remedy Design. This SEIR will consider the differences in environmental impacts of the Final Remedy Design in comparison to the effects identified in the Groundwater FEIR and the 2013 Addendum to the Groundwater FEIR. The analysis will focus on the new design details that were not yet known at the time the Groundwater FEIR was certified.

3.3 Project Purpose

Past activities at the Station have resulted in contamination of groundwater with Cr(VI) and Cr(T) (referred herein as the “plume”). Molybdenum, selenium, and nitrates are additional COPCs from past operational practices. Protection of California’s groundwater resources and the Colorado River, which is adjacent to the contaminated groundwater plume, is one of DTSC’s highest priorities. Under the requirements of the Resource Conservation and Recovery Act (RCRA), DTSC has concurred with PG&E and selected what was known as In Situ Treatment with Freshwater Flushing, identified as Alternative E in the Final Corrective Measures Study/Feasibility Study (CMS/FS)³ and Groundwater FEIR as the technology to be used during the final groundwater plume cleanup, which would ensure the long-term effectiveness of the treatment system and protection of human health and the environment, as required under the RCRA and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

3.4 Project Objectives

The fundamental objective of the proposed Project as presented in the Topock Compressor Station Groundwater Remediation Project Final Environmental Impact Report (Groundwater FEIR), certified in January 2011, is to clean up the groundwater contamination related to the historical release of chemicals at the Station, including into Bat Cave Wash and the East Ravine near the Station, in a manner that would be consistent with all applicable regulatory requirements and to do so within a reasonable period of time when compared between viable alternatives. The Remedial Action Objectives (RAOs) are developed by considering the conclusions of the Ground Water Human Health and Ecological Risk Assessment and identification of applicable or relevant and appropriate requirements (ARARs), which established specific cleanup goals for Cr(VI) and Cr(T), as well as addressing the COPCs (molybdenum, selenium, and nitrates) through monitoring and institutional controls. The RAOs were used for remedy selection in the Groundwater FEIR.

³ Final Groundwater Corrective Measures Study/Feasibility for Solid Waste Management Unit (SWMU) 1/Area of Concern (AOC) 1 and AOC 10 (Final CMS/FS) (CH2M Hill 2009, and included as Appendix CMS to the Groundwater FEIR).

The following are the Project RAOs for groundwater:

- Reduce the mass of Cr(T) and Cr(VI) in groundwater at the Project Area to achieve compliance with the ARARs,⁴ which will be achieved through the cleanup goal of the regional background concentration of 32 µg/L of Cr(VI).
- Ensure that the geographic location of the target remediation area (contaminated groundwater plume) does not permanently expand following completion of the final remedy.
- Prevent ingestion of groundwater as a potable water source having Cr(VI) in excess of the regional background concentration of 32 micrograms per liter (µg/L).
- Prevent or minimize migration of Cr(T) and Cr(VI) in groundwater to ensure concentrations in surface water do not exceed water quality standards that support the designated beneficial uses of the Colorado River (11 µg/L Cr[VI]).

In addition to the objectives stated above, the following objectives are defined by DTSC pursuant to CEQA Guidelines Section 15124(b):

- Provide consistency with the Remedial Design/Remedial Action Consent Decree between PG&E and the United States which was approved by the U.S. District Court for the Central District of California (November, 2013), the DOI/DTSC Memorandum of Understanding concerning the coordination in overseeing the implementation of the groundwater response action (November 22, 2011), and any other legal agreements applicable to the Project, including the 2006 and 2012 Settlement Agreements entered into between DTSC and the Fort Mojave Indian Tribe (FMIT).
- Achieve the cleanup levels or performance goals delineated in the DTSC's Statement of Basis and the DOI's Record of Decision for the final groundwater remedy.
- Protect biological, historical, and cultural resources by minimizing ground disturbance to the extent feasible.
- Minimize aesthetic impact to the extent feasible by limiting the amount of aboveground infrastructure.
- Consider public safety, ensuring efficiency, and compliance with health and safety standards.
- Ensure remedy achieves compliance with RAO's within a reasonable time frame as required by California State Water Resources Control Board (SWRCB) Resolution No. 92-49.

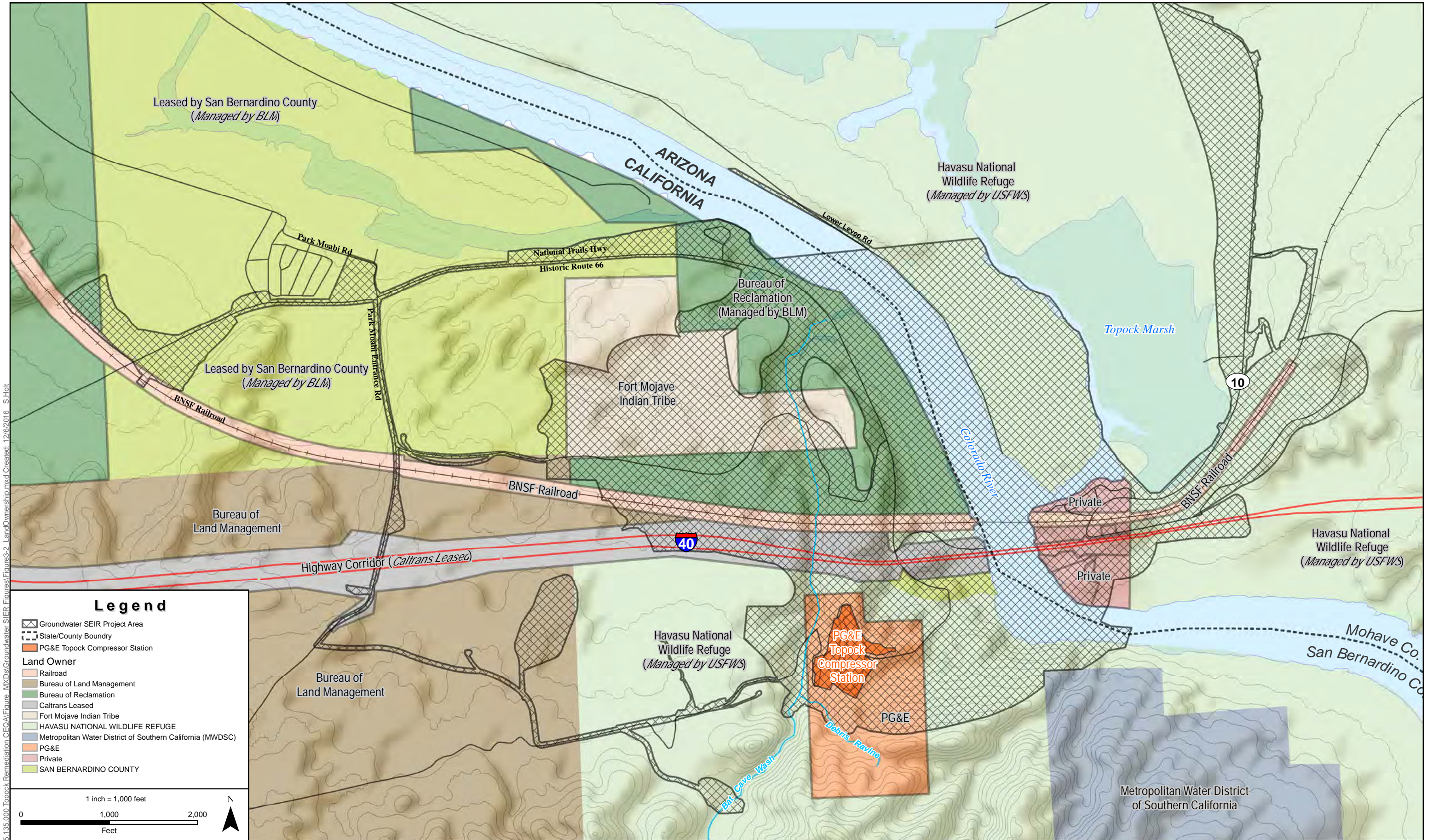
⁴ CERCLA Section 121 requires cleanups to meet ARARs: any "legally applicable or relevant and appropriate standard, requirement, criteria or limitation" that has been promulgated under federal or state environmental laws. The ARARs include such things as the federal and state "Safe Drinking Water Act" and the Solid Waste Control Act's land disposal restrictions.

3.5 Project Location

The Project Area encompasses the Station, located in the Mojave Desert approximately 12 miles southeast of the city of Needles, California, and 1 mile southeast of the Moabi Regional Park in California (**Figure 3-1**). The Station itself is located within a 66.8-acre parcel of land owned by PG&E and is approximately one-half mile west of, and directly across the Colorado River from, the community of Topock, Arizona (which is 5 miles south of Golden Shores, Arizona). The Station is approximately 1,500 feet west of the Colorado River and less than 1 mile south of Interstate 40 (I-40).

The Groundwater FEIR identified a 779.2-acre Project Area within which all activities were anticipated to occur. The Addendum to the Groundwater FEIR resulted in an additional 74.5 acres to the Project Area, and largely on the Arizona side of the river, to account for the additional freshwater source. Based on the Final Remedy Design, DTSC, in consultation with DOI, further refined the Project Area to include additional areas that may be needed for construction, road improvements, and long-term Project operation. The Project Area also reflects the removal of areas originally included in the Groundwater FEIR, but determined as not necessary for the proposed Project. The resulting Project Area that is the basis for the analyses presented in this Draft SEIR is the area in which the Final Groundwater Remedy Project would occur, including construction and long-term operational, restoration, and decommissioning needs. This area encompasses approximately 762 acres. Figure 2-1 in Chapter 2, “Introduction” shows the Project Area for the Final Groundwater Remedy Project Draft SEIR compared to the Project Area that was analyzed in the Groundwater FEIR and the Addendum to the Groundwater FEIR.

The Project Area includes a 40.3-acre portion of land owned by PG&E as well as additional surrounding areas that could be affected by construction, operation, restoration, and/or decommissioning activities associated with the proposed groundwater remediation activities. As shown in **Figure 3-2**, the lands within the Project Area in California and Arizona continue to be owned and/or managed by a number of government agencies and private entities, including the Havasu National Wildlife Refuge, which is managed by the U.S. Fish and Wildlife Service (USFWS); lands managed by DOI, Bureau of Land Management (BLM); U.S. Bureau of Reclamation (BOR) managed by the BLM; the Burlington Northern Santa Fe Railway (BNSF); California Department of Transportation (Caltrans)-leased land; Arizona Department of Transportation (ADOT); lands owned by the FMIT; lands leased by San Bernardino County (and managed by BLM); and privately owned lands.



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3.6 Description of the Final Groundwater Remedy Project

This section describes the proposed Project based on implementation of the Final Remedy Design to meet the project objectives stated in Section 3.4. The Final Remedy Design reflects modifications and clarifications made by PG&E as a result of an iterative design, comment, and response to comments process.

As described and considered in the Groundwater FEIR, the Final Groundwater Remedy Project involves in situ treatment of contaminated groundwater with freshwater flushing. In situ treatment of groundwater refers to the reduction in mass, toxicity, mobility, volume, and concentration of the chromium plume using treatment technologies that treat groundwater in place, as opposed to pumping and circulating water through a separate aboveground treatment plant. In situ treatment would be performed by placing a degradable food-grade organic compound (termed a carbon substrate or carbon amendment) in the groundwater to create reducing conditions to convert Cr(VI) dissolved in groundwater to relatively insoluble trivalent chromium [Cr(III)]. The reduced chromium would precipitate or become adsorbed onto soils below the water table and thereby be removed from groundwater. The organic carbon substrate would be released into the aquifer by injection after mixing on-site with a water source, such as extracted contaminated groundwater or clean water. In situ pilot tests demonstrated that ethanol and other acceptable carbon substrates for the remedy, such as emulsified vegetable oil, could also be used for certain situations that may arise over the life of the Project (e.g., during the late operational stages when a low-dosage, slow-release reservoir of carbon is preferred).

The Final Groundwater Remedy Project includes the following primary components, which are described in detail in Section 3.6.1:

- Development of an in situ reactive zone (IRZ) along National Trails Highway (NTH) using a line of injection and extraction wells to distribute groundwater amended with a carbon substrate for treatment of Cr(VI). See Section 3.6.1.1.
- Implementation of an inner recirculation loop (IRL) composed of injection wells upgradient of the NTH IRZ plume and extraction wells along the Colorado River that would induce groundwater flow through the NTH IRZ, capture contaminated groundwater downgradient of the NTH IRZ, and control NTH IRZ-generated byproducts. See Section 3.6.1.2.
- Installation of freshwater injection wells upgradient (west and south) of the NTH IRZ to further induce groundwater flow through the NTH IRZ and prevent westward migration of the plume. See Section 3.6.1.3.
- Installation of extraction and injection wells on and near the Station referred to as the Topock Compressor Station Recirculation Loop (TCS Recirculation Loop). This system would capture contaminated groundwater and circulate that groundwater after amendment with a carbon substrate creating an IRZ for the treatment of Cr(VI). See Section 3.6.1.4.
- Construction of a Remedy-Produced Water Conditioning System to treat and condition and reuse water from construction and maintenance activities (including well backwashing and

rehabilitation), purge water from monitoring well sampling, equipment decontamination wastewater, and rainfall that collects in remedy facility secondary containment. The system includes a contingency Dissolved Metals Removal System to remove scale-forming ions from the remedy-produced water prior to injection, if needed. See Section 3.6.1.5.

- Construction of a Clean-In-Place (CIP) system for routine maintenance of the NTH IRZ water conveyance pipelines. See Section 3.6.1.6.
- Acquisition of freshwater for injection into the wells included to assist in flushing contaminated groundwater through the treatment zones. The source of the freshwater would be from existing Well HNWR-1A and possibly secondary contingent wells, all located in or near the Havasu National Wildlife Refuge in Arizona. The freshwater flushing system includes the Contingent Freshwater Pre-Injection Treatment System (FWPTS) to reduce the concentrations of arsenic, if needed. See Section 3.6.1.7.
- Construction of monitoring wells to augment the existing monitoring well network to further evaluate site conditions, monitor contaminant levels, and assess the performance of the remediation system. See Section 3.6.1.8.
- Construction of fluid conveyance, utilities, buildings, and roadways in support of the Final Groundwater Remedy Project, including the following facilities (in addition to those mentioned in the previous bullets):
 - Transwestern Bench (TW Bench) – operations building and decontamination pad.
 - Monitoring Well (MW)-20 Bench – carbon substrate building, carbon storage tank, reused frac tanks, and truck containment pad.
 - Near Moabi Regional Park – Construction Headquarters, Long-Term Remedy Support Area, Temporary Construction Laydown Area, and the Soil Processing Area/Clean-Soil Storage Area.
 - PG&E Topock Compressor Station – improvements to the Topock Compressor Station Evaporation Ponds (TCS Evaporation Ponds), and the shared use of the Station's Hazardous Material Storage Building. See Section 3.6.1.9.
- Implementation of monitored natural attenuation as a long-term component to address residual Cr(VI) that may remain in recalcitrant (difficult-to-treat) portions of the aquifer after optimization of IRZ treatment and flushing. See Section 3.6.1.10.
- Institutional controls to restrict surface land uses and prevent the use of groundwater until the RAOs are achieved. See Section 3.6.1.10.

The Final Groundwater Remedy Project is a long-term remediation project anticipated to last over 50 years (approximately 30 years of active remediation followed by approximately 10 years of long-term monitoring, and up to approximately 20 years of arsenic monitoring). Construction of the proposed Project is estimated occur over a 5-year period, following DTSC and DOI approval of the Final Remedy Design and C/RAWP, which is anticipated to occur in 2017. Construction would occur in two phases, one to construct the NTH IRZ and infrastructure, and the second to construct the remaining systems (IRL, TCS Recirculation Loop, and injection of freshwater).

Operation and maintenance would begin following the start-up of the various remedy systems, and would consist of approximately 30 years of active remediation followed by up to approximately 10 years of long-term monitoring and up to approximately 20 years of arsenic monitoring. Decommissioning and restoration would begin following the attainment of the cleanup objectives and/or the determination that the remedy facilities are no longer needed.

PG&E and its consultants and contractors have made their best estimates as to the quantities of wells, soil volumes, buildings, equipment and materials, access roads, and other supporting components, as well as their best modeling efforts to predict the response of the contaminant plume to the final remedy over many years in the future. Nonetheless, it is possible that there may be unanticipated variations in the conditions encountered and the plume response, hence the inclusion of provisional wells and associated infrastructure (well vaults, pumps, instrumentation, electrical/communication conduits, etc.) to address response variations. In addition to certain contingencies that are specifically set forth in the Final Remedy Design and C/RAWP, the Project evaluated as part of this Final Groundwater Remedy Project SEIR also includes a general contingency or allowance for future activities that may be carried out as part of the Project (the "Future Activity Allowance"). The Future Activity Allowance is included in the Project Description and the SEIR to ensure that a comprehensive environmental analysis is included should additional activities be warranted over the decades long project implementation.

The Future Activity Allowance includes two components, the locations of which are not specifically known at this time: (1) an additional allowance for all Project infrastructure, established at up to 25 percent of the parameter set forth in the Final Remedy Design, and (2) up to 10 additional monitoring well boreholes to be installed in Arizona to assess groundwater levels and chemical constituents changes as a result of continued freshwater pumping to protect private groundwater users. The 25 Percent Potential Allowance is intended to apply generally to the development and implementation of the Final Remedy Design, even if a particular parameter or aspect of the Project is not listed in one of the examples set forth in the following subsections.

The Future Activity Allowance could result in construction of additional Project features during the initial 5-year construction phase of the Project and/or during the approximate 30-year operation and maintenance phase that constitutes active remediation. There are a variety of factors that could lead to use of the Future Activity Allowance throughout the duration of the Project. Generally, as information is collected from the construction and operation of the remedy, and as subsurface conditions evolve, it may be necessary or desirable from the viewpoint of maximizing remedy efficiency, to add facilities or equipment, such as utility lines, access roads, wells and associated vaults and structures, and conveyance pipelines, in an amount that would exceed the specific parameters in the Final Remedy Design. The need for additional facilities and equipment may also be necessary for the implementation of the monitored natural attenuation phase of the Project. Furthermore, additional activities could result from the actions of third parties, such as the refusal of a private property owner to allow piping to be installed across its land, necessitating a longer route. Also, the need for additional facilities and activity could result from the discovery of unanticipated contamination or subsurface obstacles in connection with construction. In the case of contaminated soil that is discovered during construction, the C/RAWP calls for PG&E to evaluate and remedy the contamination. These factors are listed as examples of

the wide range of factors that could result in a need for additional facilities and associated activities such as ground disturbance beyond the parameters set forth in the Final Remedy Design.

Nevertheless, particular developments in the future may not necessarily result in a need for additional facilities; in many instances, it may lead to a reduction of facilities. If fewer facilities are needed, that reduced amount would inherently be within the scope of the Project as set forth in the Final Remedy Design. If additional facilities are needed, however, that could be beyond the scope of the facilities specifically described in the Final Remedy Design, and thus the Future Activity Allowance has been included in the Project Description and in the environmental impact analysis in this SEIR. Any activities conducted under the Future Activity Allowance will be tracked by PG&E and DTSC to ensure that development of individual components is within the scope of this SEIR.

It should also be noted that additional facilities beyond those specifically described in the Final Remedy Design may require approval from DTSC and perhaps other agencies. Consideration by DTSC of any such future approvals would be consistent with its existing and ongoing duties under the Settlement Agreements with the FMIT and duty to confer, as may be needed, with Interested Tribes. The purpose of including the Future Activity Allowance is therefore to be sure that this SEIR evaluates all the potential effects of the Project, including those that may be needed in the future.

3.6.1 Final Groundwater Remedy Project Components

This section provides detailed information on the Final Groundwater Remedy Project system components, much of which was not available for the Groundwater FEIR. New or changed information developed since the Groundwater FEIR is as noted further in this chapter. **Figure 3-3** provides an overview of the location of known Project facilities and **Figures 3-3a** through **3-3h** provide detailed maps showing the location of proposed Project features.

The proposed Project includes installation of remediation wells that would consist of extraction and injection wells to create and control groundwater treatment zones and monitoring wells to evaluate remedy performance. The Groundwater FEIR considered a maximum of up to 110 boreholes for remediation wells (extraction and injection) and 60 boreholes for monitoring wells, with exact locations not known at the time. Note that some boreholes may have multiple individual wells constructed within the same borehole such that the total number of boreholes can be minimized.

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Groundwater SEIR Project Area

Existing Wells:

- Extraction Well
- Injection Well
- Monitoring Well
- Water Supply Well

Provisional Wells:

- Extraction Well
- Injection Well
- Monitoring Well
- Area for East Ravine Well (ER-7 to ER-11)
- Area for Potential Slant Well Screens
- Area for Inner Recirculation Loop (IRL) Wells
- Area for River Bank Extraction Wells

Planned Wells:

- Extraction, East Ravine
- Extraction, National Trails Highway (NTH) In-situ Reactive Zone (IRZ)
- Extraction, Riverbank
- Extraction, Transwestern Bench
- Injection, Freshwater
- Injection, Inner Recirculation Loop
- Injection, NTH IRZ
- Injection, Topock Compressor Station
- Recirculation Well
- Remedy Monitoring Well
- Alternate Monitoring Well Locations for MW-X, MW-Y and MW-U

Pipeline Corridor for Remedy

- Aboveground Pipe
- Underground Pipe/Conduit

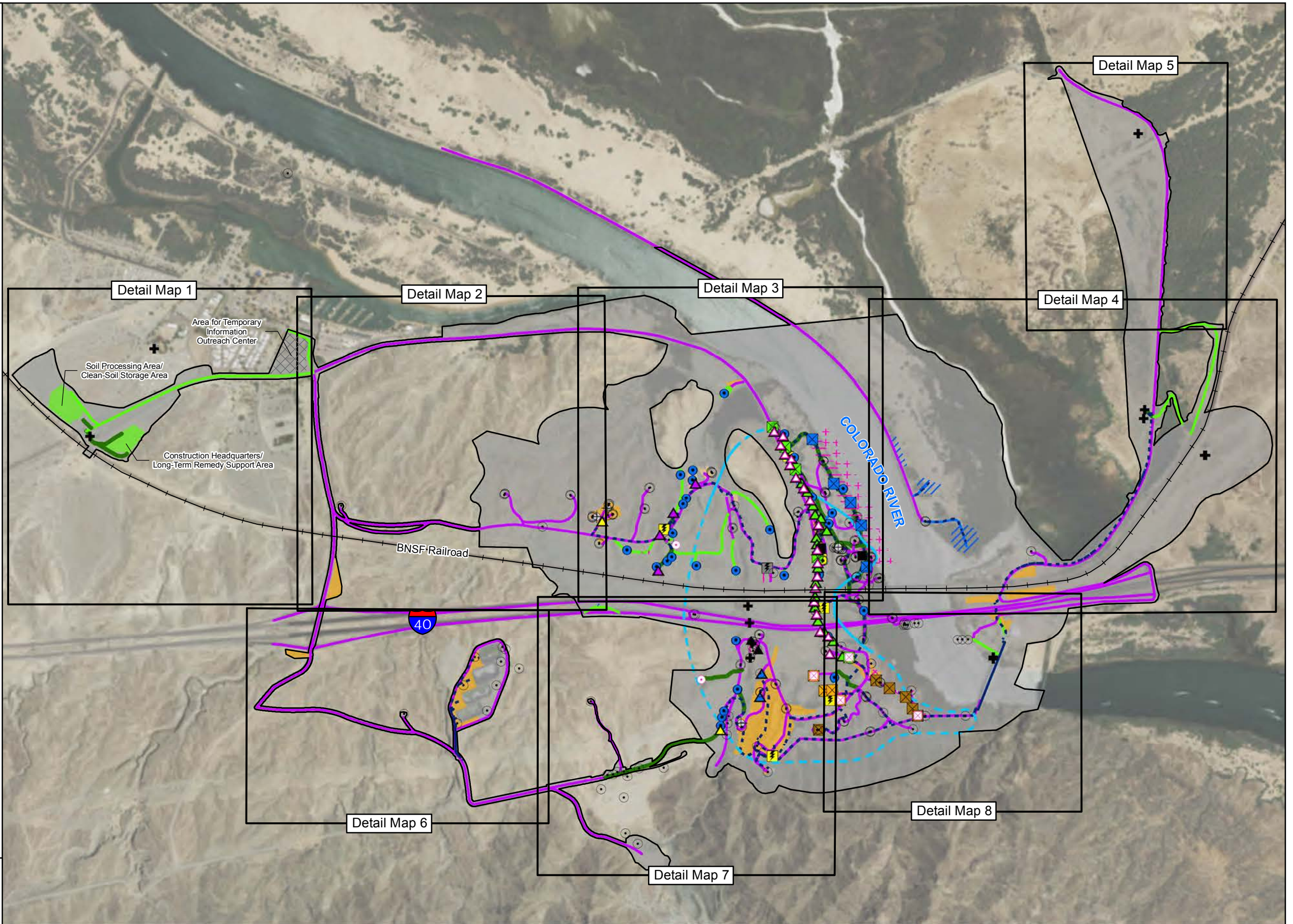
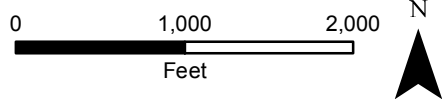
Remedy Facilities

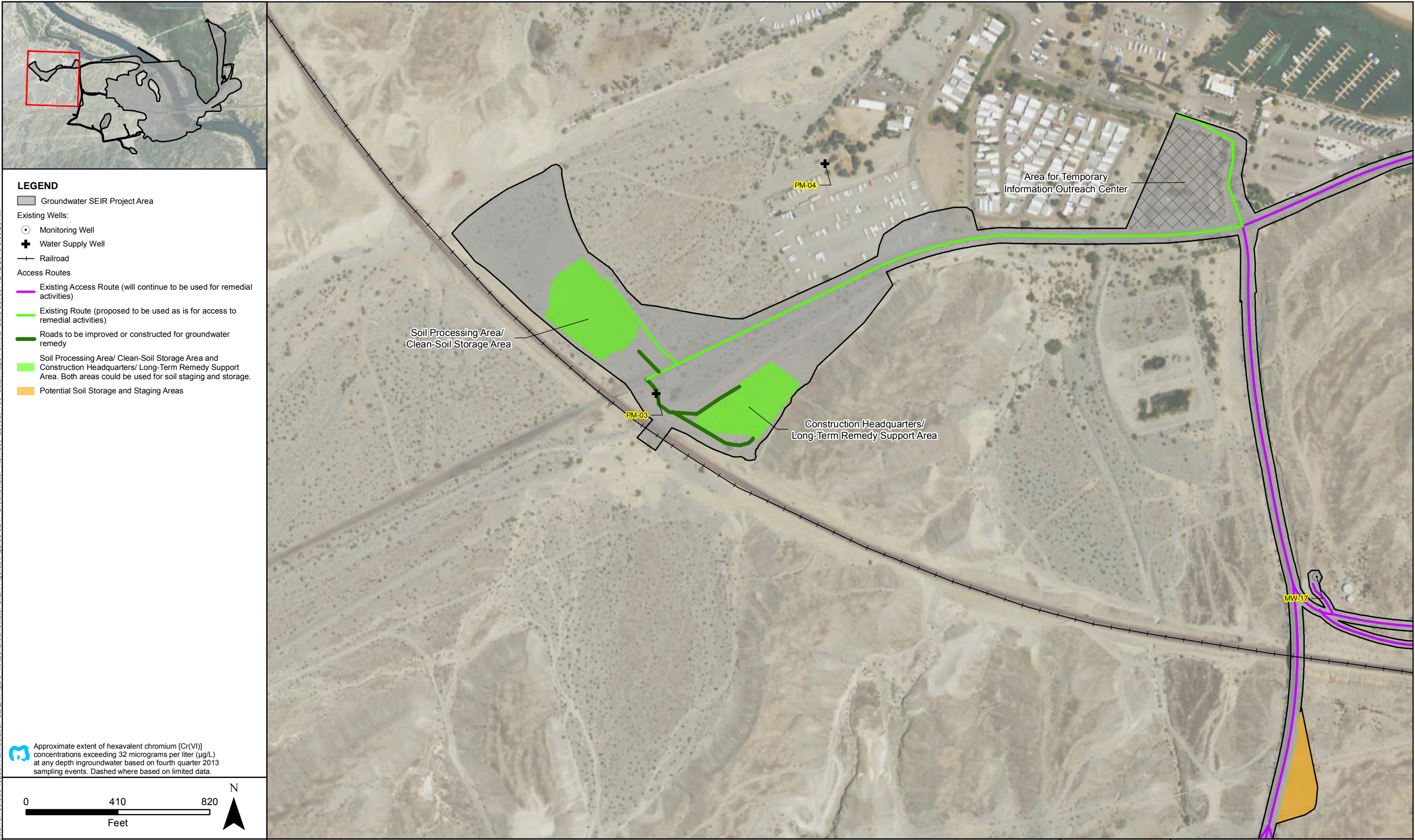
- Planned Transformer
- Future Provisional Transformer

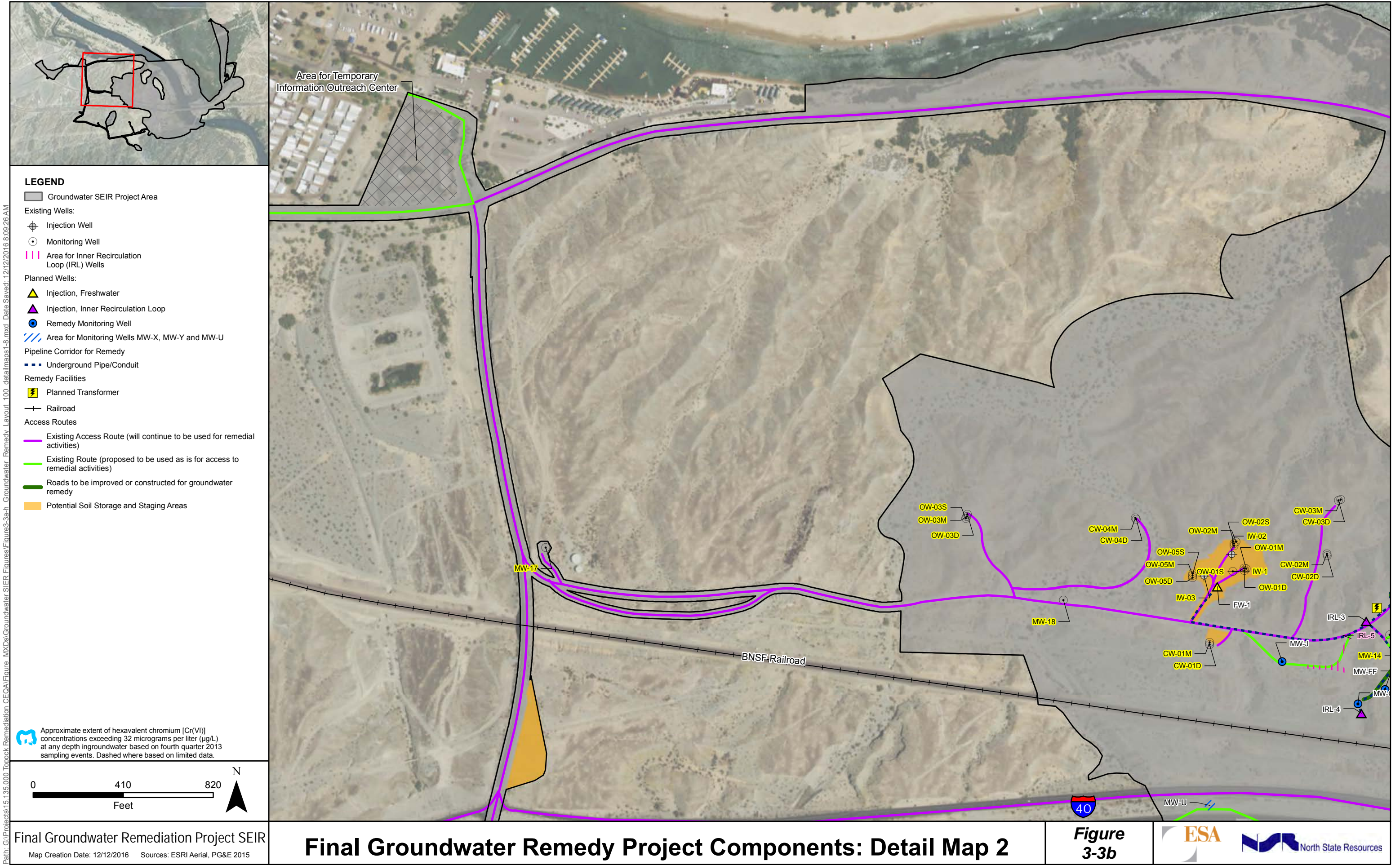
Access Routes

- Existing Access Route (will continue to be used for remedial activities)
- Existing Route (proposed to be used as is for access to remedial activities)
- Roads to be improved or constructed for groundwater remedy
- Temporary Construction Access
- Proposed Staging Areas
- Soil Processing Area/ Clean-Soil Storage Area and Construction Headquarters/ Long-Term Remedy Support Area. Both areas could be used for soil staging and storage.
- Potential Soil Storage and Staging Areas

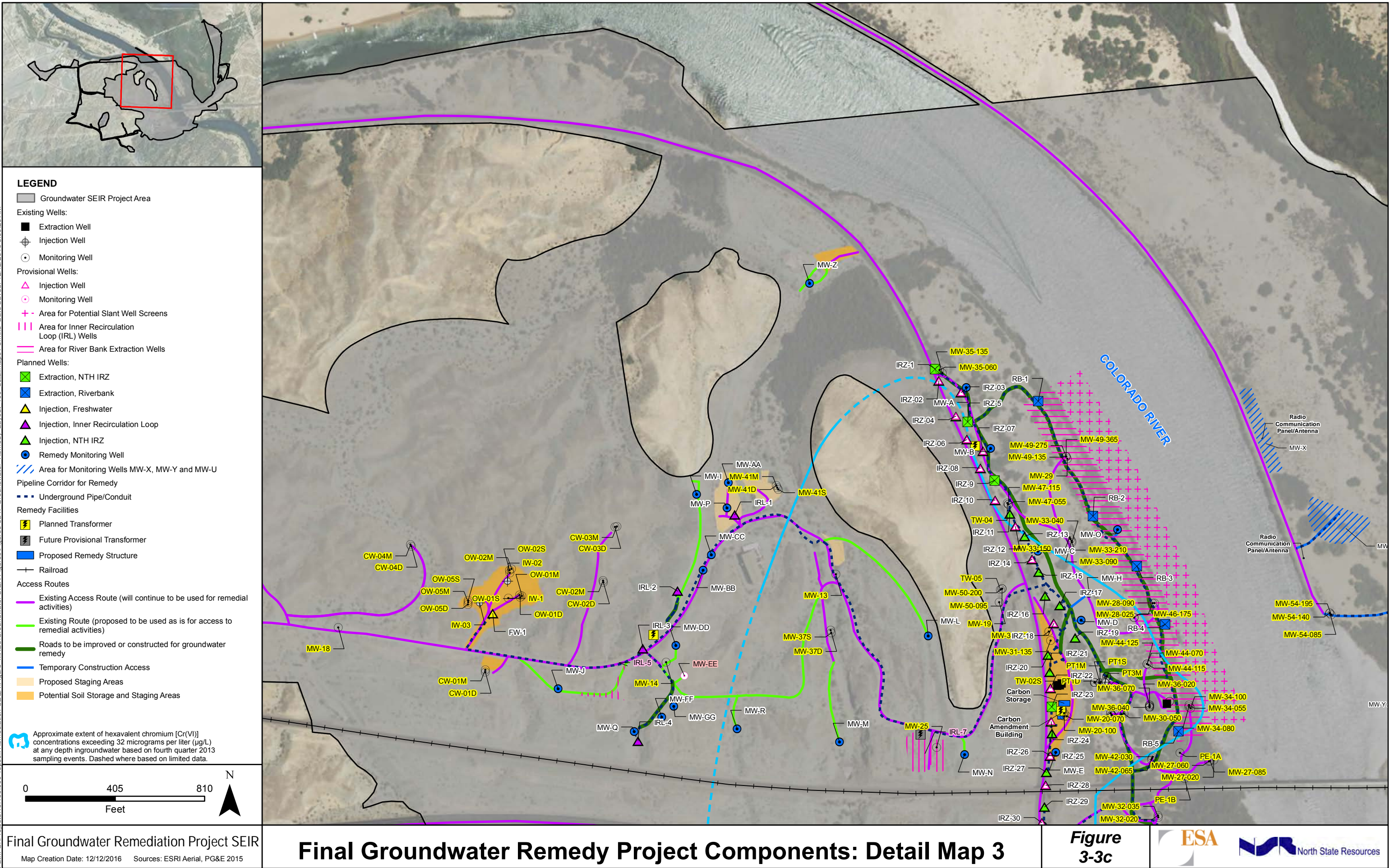
Approximate extent of hexavalent chromium [Cr(VI)] concentrations exceeding 32 micrograms per liter (µg/L) at any depth ingroundwater based on fourth quarter 2013 sampling events. Dashed where based on limited data.



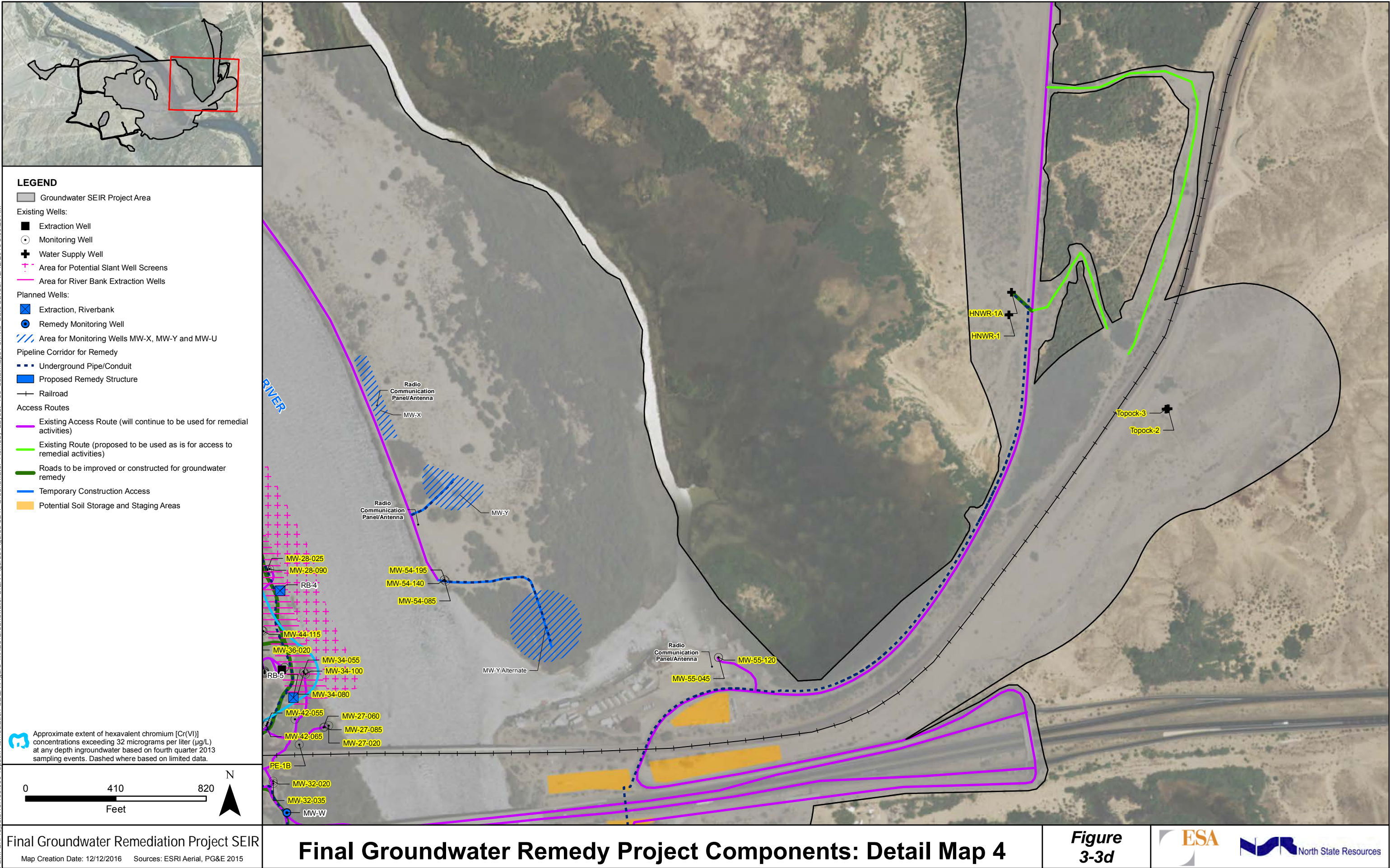




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LEGEND

Groundwater SEIR Project Area

Existing Wells:

Water Supply Well

Railroad

Access Routes

Existing Access Route (will continue to be used for remedial activities)

Existing Route (proposed to be used as is for access to remedial activities)



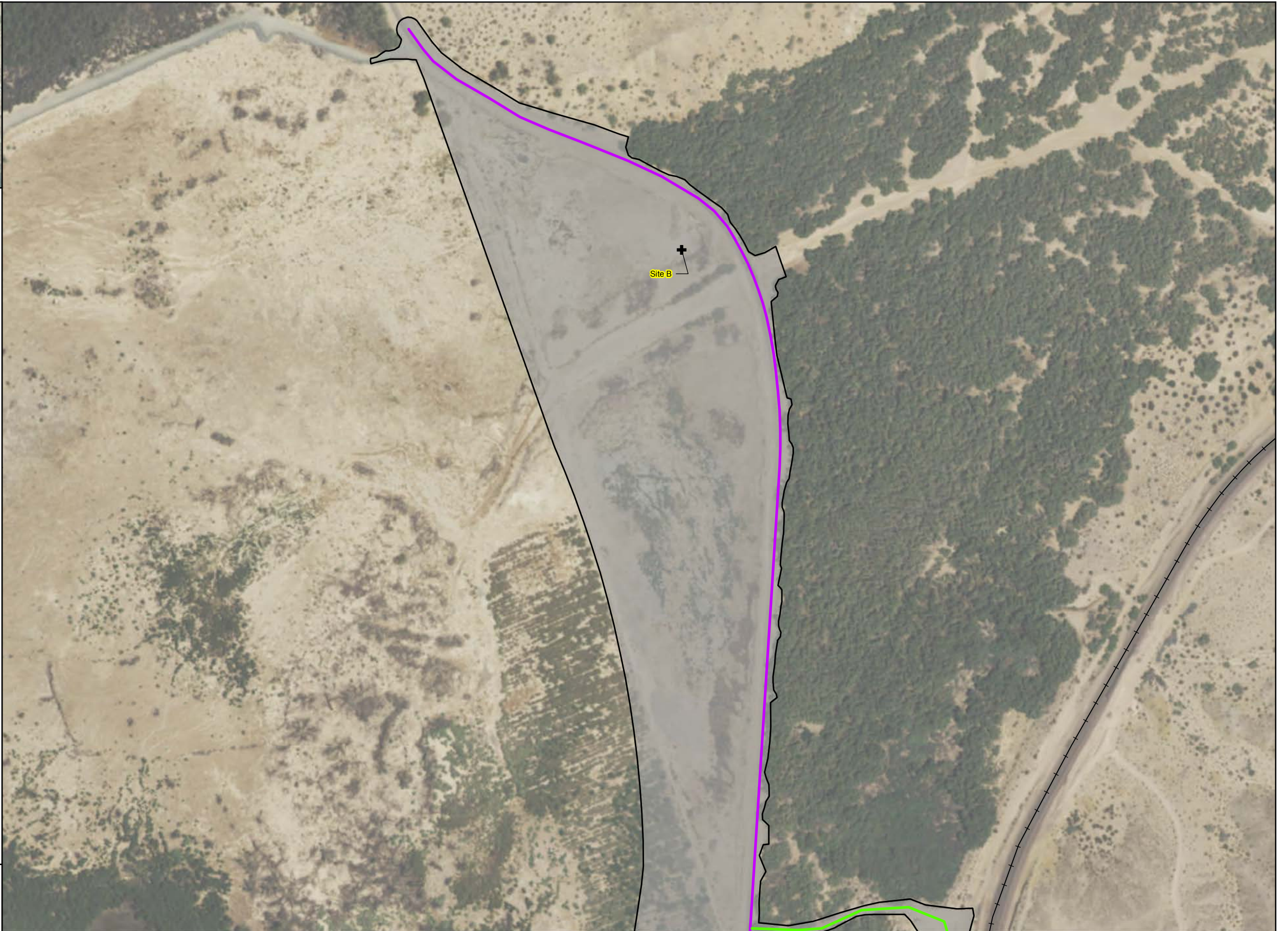
Approximate extent of hexavalent chromium [Cr(VI)] concentrations exceeding 32 micrograms per liter ($\mu\text{g/L}$) at any depth ingroundwater based on fourth quarter 2013 sampling events. Dashed where based on limited data.

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Feet



Final Groundwater Remediation Project SEIR

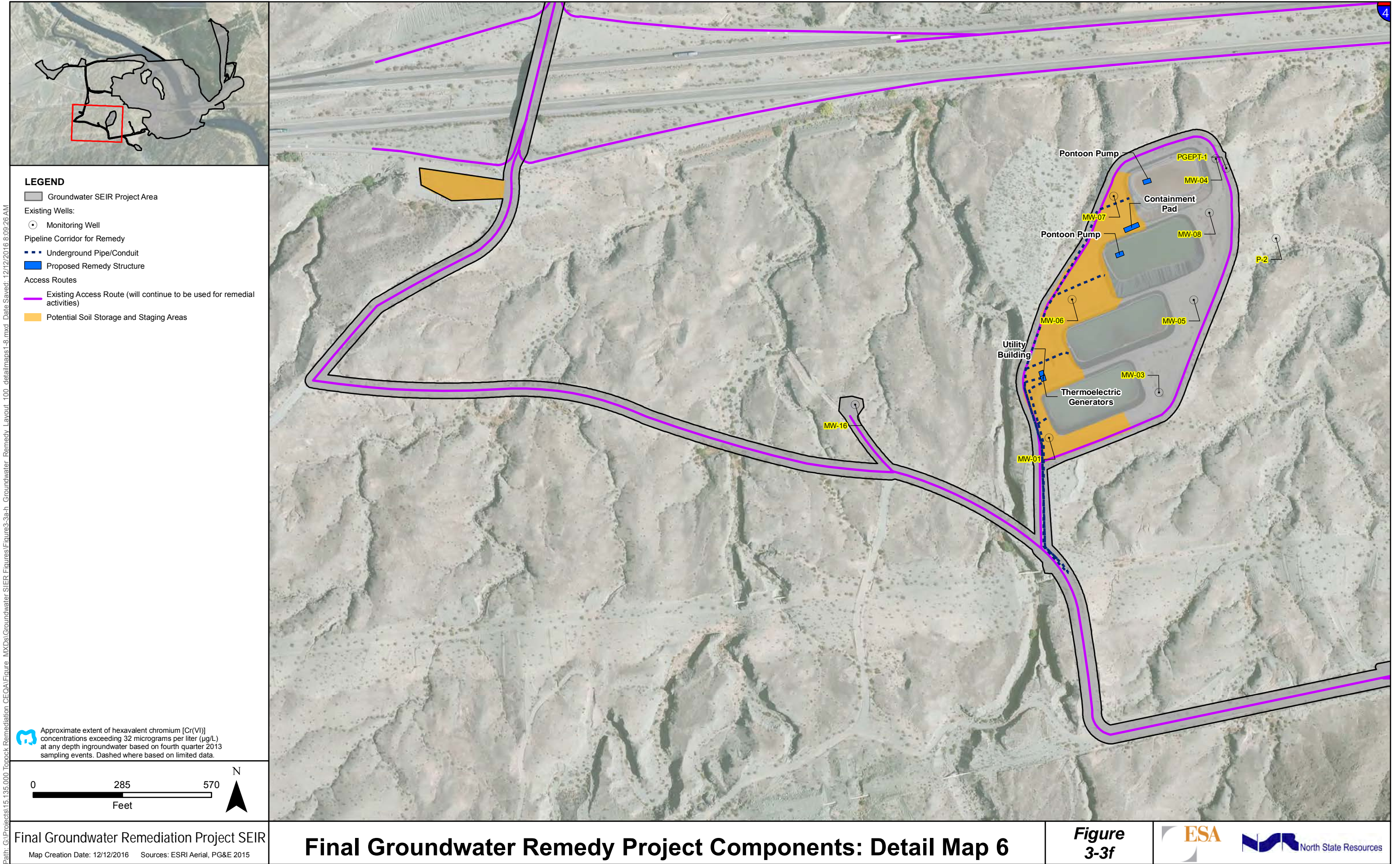
Map Creation Date: 12/12/2016 Sources: ESRI Aerial, PG&E 2015



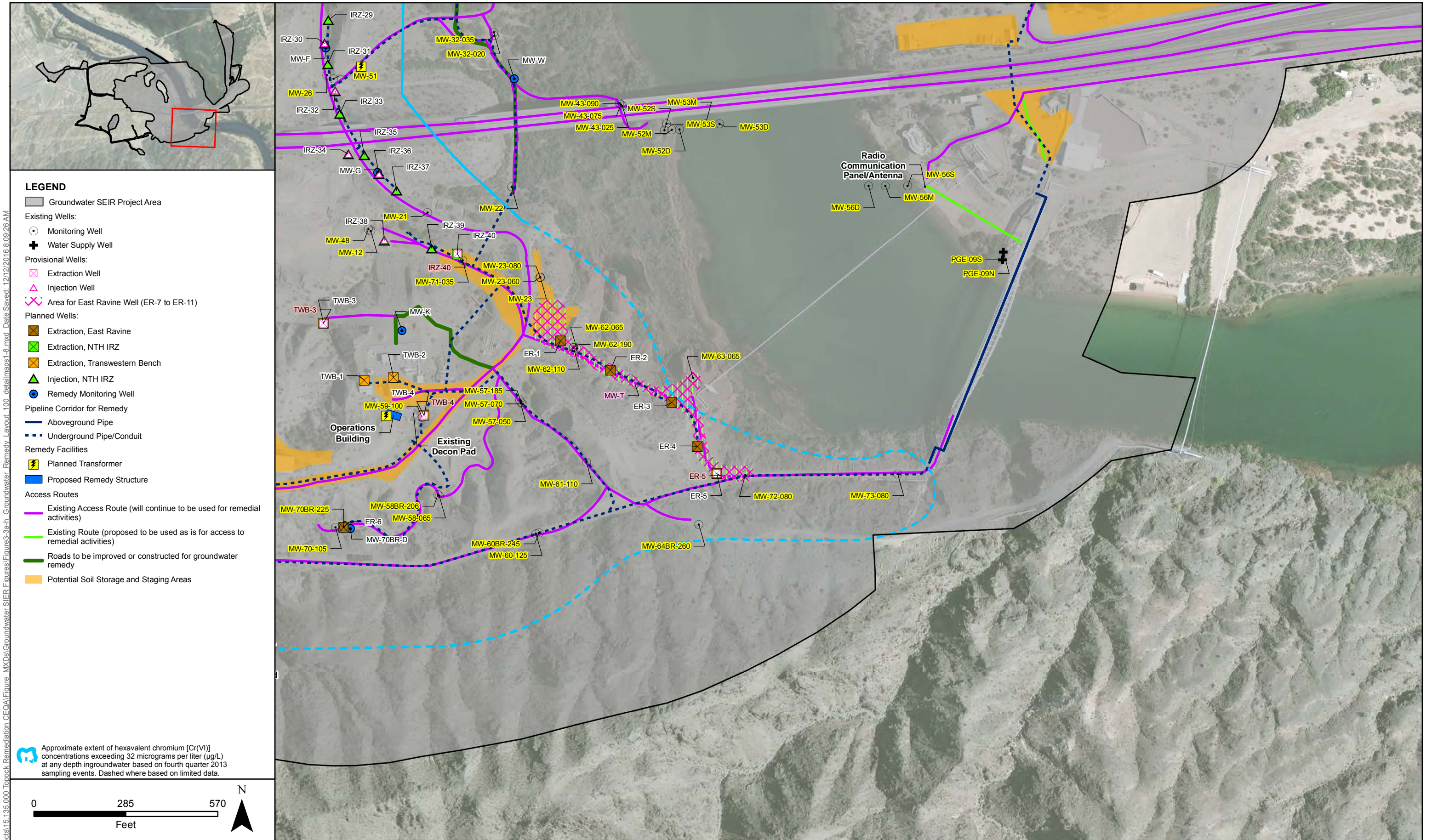
Final Groundwater Remedy Project Components: Detail Map 5

Figure
3-3e





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Approximately 165 wells exist within the Project Area and are being used as part of the monitoring program for the proposed Project (see Table 2.1-2 of the O&M Manual, Volume 2). Most these wells were installed prior to 2011, and thus were considered “existing wells” in the Groundwater FEIR. Of these 165 wells, 20 monitoring wells (constructed in 16 boreholes) were installed subsequent to 2011 and are accounted for in Table 3-1 as “installed boreholes.” Also subsequent to 2011, two remediation wells (freshwater supply wells HNWR-1A and Site B) were installed within two separate boreholes. Additional monitoring and remediation wells that are “planned” for installation as part of the groundwater remedy would require an estimated 56 and 47 boreholes, respectively. “Future provisional” monitoring and remediation wells that might be installed would require up to an estimated 24 and 46 boreholes, respectively. The future provisional wells would be used dependent on the monitored performance of the groundwater remedy over time; thus, some or all of the future provisional well boreholes would be needed depending on future monitoring results. A summary of remediation well boreholes considered in the Groundwater FEIR compared to those proposed in the Final Remedy Design is presented in **Table 3-1**.

Based on this accounting, an estimated total of up to 96 boreholes would be drilled for monitoring well construction and an estimated total of up to 95 boreholes would be drilled for remediation well construction, for a total of 191 boreholes. In addition to these estimated totals, and as part of the Future Activity Allowance, this SEIR considers an additional allowance of 25 percent overage for each of the monitoring and remediation boreholes. Also included as part of the Future Activity Allowance are up to 10 additional monitoring well boreholes to be installed in Arizona as part of the monitoring program to assess groundwater levels and chemical constituents as a result of freshwater pumping. This accounting system, which provides a total number of boreholes to be installed, and a difference between what was analyzed in the Groundwater FEIR and new wells proposed as part of this SEIR, is explained in Table 3-1.

In addition to the remediation and monitoring well network, the proposed Project also includes supporting infrastructure such as roads, pipelines, utility connections, freshwater supply and conveyance infrastructure, storage areas, buildings, and other necessary support structures to ensure long-term effectiveness. These infrastructure components were considered at a general level with anticipated maximum build estimates in the Groundwater FEIR (exact locations were not known with precision) and are now known with a higher level of detail, as described in the Final Remedy Design and herein.

**TABLE 3-1
SUMMARY OF REMEDIATION AND MONITORING WELL BOREHOLES**

Proposed Well Boreholes for the Final Remedy Design^a	Remediation Wells^b	Monitoring Wells	Total Wells
Known Project Components (Based on Final Remedy Design)			
Groundwater FEIR Limit	110	60	170
Installed Boreholes	2	16	18
Planned Boreholes to Be Installed	47	56	103
Future Provisional Boreholes that Might Be Installed	46	24	70
Total Boreholes Identified in the Final Remedy Design	95	96	191
Future Activity Allowance (Locations Unknown at this Time)			
25 Percent Potential Allowance	24	24	48
Additional Monitoring Well Boreholes	0	10	10
Totals			
Total SEIR Boreholes	119	130	249
Difference Between FEIR Limit and Total New SEIR Boreholes ^c	7	54	61

NOTES:

^a Boreholes may have multiple wells installed within the same borehole^b Remediation wells include injection and extraction wells^c Difference equals Total SEIR Boreholes minus Groundwater FEIR Limit boreholes minus Installed Boreholes.

SOURCE: CH2M Hill 2015a.

3.6.1.1 National Trails Highway In Situ Reactive Zone (NTH IRZ)

The NTH IRZ area is located in the area north of the Station and along the Colorado River, as shown in Figure 3-3 (in particular detailed maps in Figures 3-3c and 3-3h). The NTH IRZ would be constructed using a series of wells that could be used either as injection or extraction wells to circulate groundwater and distribute the carbon substrate. The water with the carbon substrate would be injected under pressure into the aquifer using a network of wells to form the treatment zone. The final number and specific locations of injection wells were developed subsequent to the Groundwater FEIR in the Final Remedy Design. The Groundwater FEIR envisioned 18 injection/extraction wells at conceptual locations, whereas the Final Remedy Design includes up to a maximum of 59 well boreholes, some with two screen intervals. The design parameters and quantities are summarized below and in the following pages.

- Wells (NTH IRZ wells are labeled as IRZ-## in Figure 3-3):
 - Total of 24 injection well boreholes (plus up to 30 future provisional well boreholes) spaced along the IRZ well line to ensure adequate lateral distribution of organic carbon, prevent potential breakthrough of the Cr(VI) plume and minimize byproduct formation.
 - Total of four extraction well boreholes (plus 1 future provisional well borehole) located at the ends and in the central portion of the IRZ well line to provide hydraulic control of the northern end of the Cr(VI) plume and maintain eastern flow component of groundwater. According to PG&E's modeling, the location of these extraction wells would minimize the potential for extraction of reduced water containing organic carbon or dissolved minerals. Minimizing the extraction of reduced water containing organic carbon or dissolved minerals would aid in reducing well and pipeline fouling. Minimizing well and pipeline fouling would maintain operational efficiency, reducing operation and maintenance requirements for the extraction wells, pipelines, and injection wells. The final number and specific locations of extraction wells were developed subsequent to the Groundwater FEIR during the Final Remedy Design.

The IRZ wells would be constructed of 6- to 12-inch nominal diameter well casing with one or two screened intervals to target specific intervals of the unconsolidated alluvial sediments with up to two IRZ wells installed per borehole. Electric-motor-operated submersible pumps would be installed in each extraction well, and the pump intakes would be positioned above the screens to prevent dewatering of the screen and subsequent fouling. Control/monitoring devices (e.g., flow meters, leak-detection sensors, and submersible-pump controls) would be contained within below-grade concrete vaults. The IRZ well vaults and control/monitoring vaults would be belowground vaults that would be 6 feet wide by 5, 6, or 8 feet long. The Groundwater FEIR assumed the well diameters would range from 4 to 12 inches in diameter and that the well vaults would be up to 6 feet wide and 8 feet long. The type and location of pumps and associated equipment was developed subsequent to the Groundwater FEIR during the Final Remedy Design.

- For flexibility in managing the movement of fluids through the NTH IRZ, many wells would be constructed such that they could be used for the injection of carbon substrate-dosed water or extraction of treated groundwater for re-injection along the up-gradient edges of the plume. The NTH IRZ system would be designed using the rates summarized below. Extraction and injection flow rates⁵:
 - Total nominal injection rate of 300 gallons per minute (gpm) with an anticipated range of 200 to 400 gpm. The Groundwater FEIR assumed 500 gpm, although the Groundwater FEIR did not differentiate between the NTH and Recirculation Loop wells.
 - Total nominal extraction flow rate is 300 gpm with a range of 200 to 400 gpm. The Groundwater FEIR assumed 640 gpm, although the Groundwater FEIR did not differentiate between the NTH and Recirculation Loop wells.

⁵ The flow rate is the volume of water flowing through the well pipe over a unit of time, in this case gallons per minute. Note that some wells can be used for either the injection or extraction of water, to achieve the desired direction of groundwater movement.

- Carbon substrate dosing:
 - The system would be initiated with an anticipated initial carbon substrate amendment dosing concentration, measured as total organic carbon (TOC), of 100 milligrams per liter (mg/L) in the amended water pumped to the NTH IRZ injection wells to achieve sufficient lateral distribution of organic carbon to complete the IRZ while minimizing byproduct generation. This information was developed based on the solute transport model subsequent to the Groundwater FEIR during the Final Remedy Design.

The carbon substrate amendment facility for the NTH IRZ would be located at the Monitoring Well (MW)-20 Bench (see Figure 3-3c) and would consist of the following proposed and existing components. The new carbon substrate amendment facility additions' (tank and building) footprint of approximately 2,400 square feet is less than the 35,000-square-foot area analyzed in the Groundwater FEIR.

- One proposed above-grade, double-walled 15,000-gallon, horizontal saddle storage tank with secondary containment and a maximum footprint area of about 400 square feet. The total tank storage capacity is less than the 100,000-gallon tank storage capacity analyzed in the Groundwater FEIR. The height of the tank is approximately 15 feet (including the catwalk), as was assumed in the Groundwater FEIR.
- One proposed Carbon Amendment Building that would be about 14 feet high with a foundation pad of 36 feet by 53 feet for about approximately 1,910 square feet. This information was not available at the time of the Groundwater FEIR.
- Three existing aboveground 20,000-gallon frac tanks in an approximately 1,350-square-foot area to be used as clean-in-place (pipeline cleaning), backwash (wells and pipelines), and conditioned water holding tanks.
- One proposed 960-square-foot truck unloading containment pad designed to hold 7,700 gallons (which is 110% of the volume contents of one tanker truck), which will replace an existing pad of similar size at that location.
- The NTH IRZ injection well design would include manual addition ports to accommodate the potential use of portable tanks (5- to 1,000-gallon capacity) for the direct injection of dilute carbon substrate solution at the wellheads for added flexibility in long-term system operation and for specific targeted injections on an as-needed basis.

3.6.1.2 Inner Recirculation Loop

The purpose of the IRL is to induce a hydraulic gradient that would flush the plume toward the NTH IRZ, facilitate the cleanup of the Colorado River floodplain, and provide secondary protection for the Colorado River by controlling the migration of potential byproducts generated by the NTH IRZ. The discussion of the components of the IRL was included with the NTH IRZ components in the Groundwater FEIR, and the IRL wells were included within the 110 maximum remediation wells. Details of the IRL were further developed subsequent to the Groundwater FEIR during the Final Remedy Design. The IRL would consist of the following system components:

- Wells (IRL wells are labeled as IRL-## or RB-## in Figure 3-3):
 - Five River Bank (RB) extraction well boreholes (plus up to four future provisional well boreholes) along the Colorado River to induce groundwater flow through the NTH IRZ, capture Cr(VI) located downgradient of the NTH IRZ, and control NTH IRZ-generated byproducts.
 - Four IRL injection well boreholes (plus up to three future provisional well boreholes) near the western margin (upgradient) of the groundwater plume north of I-40 to induce groundwater flow through the NTH IRZ.

The IRL wells would be constructed of up to 12-inch nominal diameter well casings with one or two screened intervals to target specific intervals of the unconsolidated alluvial sediments. Electric-motor-operated submersible pumps would be installed in each extraction well, and the pump intakes would be positioned above the screens to prevent dewatering of the screen and subsequent fouling. The Control/monitoring devices (e.g., flow meters, water-level sensors, leak-detection sensors, and submersible-pump controls) would be contained within a below-grade concrete vault. The IRL well vaults and control/monitoring vaults would be belowground vaults that would be 6 feet wide by 5, 6, or 8 feet long. The Groundwater FEIR assumed the well diameters would range from 4 to 12 inches in diameter and that the well vaults would be up to 6 feet wide and 8 feet long. The type and location of pumps and associated equipment was not available at the time of the Groundwater FEIR.

The IRL wells would be designed using the rates summarized below.

- Extraction and injection flow rates:
 - Total nominal extraction flow rate is 150 gpm with a range of 0 to 500 gpm. The Groundwater FEIR assumed 640 gpm, although the Groundwater FEIR did not differentiate between the NTH and Recirculation Loop wells.
 - Total nominal injection flow rate is 450 gpm average with a range of 150 to 900 gpm. The Groundwater FEIR assumed 500 gpm, although the Groundwater FEIR did not differentiate between the NTH and Recirculation Loop wells.
- Carbon substrate dosing:
 - The anticipated TOC amendment concentration range is from 0 to 50 mg/L. The minimum of 0 mg/L TOC is applicable when Cr(VI) concentrations in the extracted groundwater do not exceed the cleanup level of 32 µg/L. Low concentrations of carbon substrate would be added if Cr(VI) treatment is required. The maximum of 50 mg/L TOC was established to allow for: (1) additional consumption of TOC by microbiological activity, (2) promotion of reducing conditions in the subsurface, and (3) accommodation of uncertainties in field implementation. This information was developed subsequent to the Groundwater FEIR during the Final Remedy Design.

The carbon substrate would be added to the IRL wells using the IRZ carbon substrate amendment facility at the MW-20 Bench described for the NTH IRZ.

3.6.1.3 Freshwater Injection Wells

The purpose of the freshwater injection wells are to assist with flushing the contaminated groundwater toward and through the NTH IRZ, to constrain the westward spread of the plume, and to constrain the westward spread of the carbon substrate amended water and in situ byproducts from the IRL. Two freshwater injection wells would be constructed in areas west and south of the plume. The freshwater injection system would consist of the following proposed components. Detailed information on the number and location of freshwater injection wells was not available at the time of the Groundwater FEIR.

- Well location/number of wells:
 - Two freshwater injection wells (FW-1 and FW-2) west and south of the groundwater plume to induce groundwater flow through the NTH IRZ and prevent westward migration of the Cr(VI) plume (see Figures 3-3c and 3-3g). The Groundwater FEIR assumed a third freshwater injection well north of the plume.
 - Wells IRL-1 through IRL-7 (IRL-5, -6, and -7 are future provisional wells) would have the flexibility to be used as freshwater injection wells, if needed. This concept of having the flexibility to use other wells for the injection of freshwater was developed during the Final Remedy Design.

The freshwater wells would be constructed of up to 12-inch nominal diameter well casing with one or two screened intervals to target specific intervals of the unconsolidated alluvial sediments. The freshwater well vaults would be 5- by 7-foot belowground vaults. The control/monitoring devices (e.g., flow meters and water-level sensors) would be contained within 9-foot by 11-foot below-grade concrete vaults. These specific well vault details were developed subsequent to the Groundwater FEIR during the Final Remedy Design.

- Injection flow:
 - Total nominal injection flow rate for the freshwater wells would be 150 gpm, with a range of 75 to 300 gpm. The Groundwater FEIR assumed an injection rate of about 500 gpm.
 - Total nominal injection flow rate for the IRL wells would be 450 gpm, with a range of 150 to 900 gpm. This concept of having the flexibility to use other wells for the injection of freshwater was developed during the Final Remedy Design.

3.6.1.4 Topock Compressor Station Recirculation Loop

The TCS Recirculation Loop would be located in the area of the Station, the East Ravine, and the Transwestern Bench (TW Bench), as shown in Figure 3-3g. The TCS Recirculation Loop would be constructed using a series of extraction and injection wells to circulate groundwater and distribute carbon substrate to treat contaminants. The water with the carbon substrate would be injected under pressure into the aquifer using a network of wells to form a localized treatment zone. The design parameters and quantities are summarized in the following pages. The discussion of the components of the TCS Recirculation Loop was included with the NTH IRZ components in the Groundwater FEIR, and was assumed to be included within the maximum of

110 remediation wells. Details of the TCS Recirculation Loop were further developed subsequent to the Groundwater FEIR during the Final Remedy Design.

- Well location/number of wells:
 - Five East Ravine extraction well boreholes (plus up to six future provisional well boreholes) east of the Station in the southeast portion of the plume that exists in the bedrock to extract Cr(VI)-impacted groundwater located in the bedrock. East Ravine wells are labeled as ER-## in Figure 3-3h. The exact location of these wells was not yet envisioned at the time of the Groundwater FEIR.
 - Two TW Bench extraction well boreholes (plus two future provisional well boreholes) in the area northeast of the Station to accelerate capture and treatment of Cr(VI)-impacted groundwater immediately downgradient of the Station. TW Bench wells are labeled as TWB-## in Figure 3-3h. The Groundwater FEIR assumed a total of four extraction wells.
 - Two injection well boreholes in the northern area of the Station to directly treat Cr(VI)-impacted groundwater in the immediate vicinity and accelerate groundwater flow toward the TW Bench extraction wells to the east and the NTH IRZ to the north. Wells located in the Station are labeled as TCS-## in Figure 3-3g. These wells were not envisioned at the time of the Groundwater FEIR.

The TCS Recirculation Loop wells would be constructed of up to 12-inch nominal diameter casing with one or two screened intervals to target specific intervals of the unconsolidated alluvial sediments. Control/monitoring devices (e.g., flow meters, water-level sensors, leak-detection sensors, and submersible-pump controls) would be contained within below-grade concrete vaults. The TCS Recirculation Loop well vaults and control/monitoring vaults would be belowground vaults that would be 5 feet wide by 6 or 7 feet long. The Groundwater FEIR assumed the well diameters would range from 4 to 12 inches in diameter and that the well vaults would be up to 6 feet wide and 8 feet long. The type and location of pumps and associated equipment was determined subsequent to the Groundwater FEIR during the Final Remedy Design.

- Extraction/injection flow:
 - Total nominal East Ravine extraction flow rate is 5 gpm, with a range of 4 to 9 gpm, to provide hydraulic capture of Cr(VI)-impacted groundwater in the East Ravine bedrock. These wells were not yet envisioned at the time of the Groundwater FEIR.
 - Total nominal TW Bench extraction flow rate is 22 gpm with a range of 2 to 30 gpm, to provide hydraulic capture of Cr(VI)-impacted groundwater.
 - A total extraction flow rate that includes both TW Bench and East Ravine extraction is predicted to range from 10 to 75 gpm. The flow rate for these wells was developed subsequent to the Groundwater FEIR during the Final Remedy Design.
 - Total nominal injection flow rate is 27 gpm, with a range of 10 to 75 gpm, to allow for adequate lateral distribution of organic carbon. The flow rate for these wells was developed subsequent to the Groundwater FEIR during the Final Remedy Design.

- Carbon substrate dosing:
 - The system would be initiated with an anticipated initial TOC amendment concentration of 100 mg/L to achieve sufficient lateral distribution of organic carbon while minimizing byproduct generation. This information was developed subsequent to the Groundwater FEIR during the Final Remedy Design.

The TCS Recirculation Loop would use the carbon substrate amendment facility at the MW-20 Bench (see Figure 3-3g) described for the NTH IRZ.

3.6.1.5 Remedy-Produced Water Conditioning System

The Final Groundwater Remedy Project is reliant on several dozen extraction and injection wells (see Figure 3-3 series). For all wells, especially for the injection wells, regular maintenance such as backwashing and rehabilitation is vital to maintain efficient and effective operations during the approximately 30 years of active remediation. Well maintenance would also prevent or reduce the need for drilling new replacement wells. These maintenance activities would produce an ongoing wastewater stream that must be managed as part of the remedial action. Other types of produced water with smaller volumes would also need to be managed as part of the proposed Project, such as purge water from monitoring well sampling, equipment decontamination wastewater, and rainfall that collects in remedy facility secondary containment.

The Remedy-Produced Water Conditioning System would be located on the southern portion of the Station within the fence line, as shown in Figure 3-3g. All components of the system would be located within the Station boundary, all of which has been previously disturbed. The total footprint of the system would be approximately 8,700 square feet. In some cases during well rehabilitation, mobile equipment may be used to condition the produced water at the well location. In the event that the produced water is hazardous, permitted transportable treatment units could be used at the well location. During the operation phases of the Project, the system is anticipated to treat about 7.6 million gallons (MG) of water per year at an average of 20 gpm and a maximum of 35 gpm. Water use during construction phases is discussed in this chapter in Section 3.6.2.6 and is estimated at about 25 MG. The concept and details of the Remedy-Produced Water Conditioning System were developed subsequent to the Groundwater FEIR during the Final Remedy Design. The system would consist of the following components, with the following approximate parameters:

- Influent Water Storage Tank Farm – four 21,000-gallon, 15-foot-high (including the catwalk), aboveground storage tanks within a containment structure that is approximately 53 feet by 52 feet for about 2,800 square feet.
- Remedy-Produced Water Conditioning Building (Building 12) – one 38-foot-high, two-story building with a footprint of approximately 51 feet by 33 feet for about 1,700 square feet. Building 12 would include liquid phase separators, processing equipment, chemical storage, a sump, and an office/sample room.
- Decontamination Pad adjacent to Building 12 – one pad that is approximately 50 feet by 33 feet for about 1,700 square feet within the footprint of the contingent arsenic treatment

system.

- Conditioned Water Storage Tank – one 17-foot-high, 600-square-foot 42,000-gallon storage tank on a 48-foot-diameter concrete pad with a retaining wall surrounding about half of the pad.
- Conditioned Water Tank Farm – two 12-foot-high, 21,000-gallon aboveground storage tanks within a containment structure that is approximately (55 feet by 34 feet) 1,900 square feet.
- Contingent granular carbon vessels – in the event that removal of hydrocarbons from produced water is needed, space has been reserved for two 1,000-pound capacity granular carbon vessels. The vessels could be located at the TW Bench, the long-term operation and maintenance support area west of Moabi Regional Park, or the MW-20 Bench.
- Associated conveyance piping, pumps, and controls.
- The proposed Project includes dedicated automatic backwashing systems connected to pipelines that would convey the wastewater produced from the injection and extraction wells to the Remedy-Produced Water Conditioning System at the Station (see Figure 3-3g). The pipelines would be installed within the same utility corridors as the freshwater-flushing conveyance piping described in Section 3.6.1.7.3, resulting in no additional utility corridors.
- A contingent Dissolved Metals Removal System to remove scale-forming ions from the remedy-produced water prior to injection, if needed. The implementation of the Dissolved Metals Removal System would be triggered by significant performance losses in pipelines and/or wells due to heavy scaling of calcium, magnesium, and/or manganese that cannot be managed by the CIP system, described in Section 3.6.1.6. The Dissolved Metals Removal System would be incorporated into and located entirely within the Remedy-Produced Water Conditioning System building. The method would use partial caustic softening, which uses a 25 percent caustic additive and possibly a coagulant to precipitate the ions out of solution. The system equipment would include:
 - One caustic feed system including one approximately 55-gallon, high-density polyethylene tank, a 10-gallon-per-hour pump, conveyance piping, controller, and control valves.
 - One acid feed system, including a 0.01-gallon-per-hour pump and controller.
 - One fiberglass 1,000-gallon backwash tank.
 - One fiberglass 1,000-gallon treated water tank.
 - Two-inch-diameter static mixers.
 - Associated pumps, conveyance piping, controller, and control valves.
- Permitted transportable treatment units – if needed, permitted transportable treatment processes for hazardous remedy-produced water would consist of one or more of the following treatment processes, depending on the produced water chemistry: neutralization (via addition of acid/base), physical filtration (with or without filtering aids), membrane

filtration (such as reverse osmosis), ion exchange, media filtration, precipitation, evaporation or crystallization, electrochemical processes (such as electrodialysis), adsorption, and/or physical separation of solids and liquids (with or without settling aids). The processes typically involve tanks, pumps, and associated instrumentation/controls. The specific equipment needed and the footprint of the permitted transportable treatment unit(s) would depend on which treatment processes are needed.

3.6.1.6 Clean-In-Place System

Routine maintenance of NTH IRZ pipelines would likely be needed to address biological fouling and/or mineral scaling, requiring a CIP system. The CIP system would include valves and fittings in selected pipeline locations to allow for recirculation of a maintenance solution in a closed loop through the pipelines. CIP events would be scheduled to coincide with the regular system shutdown periods at an expected frequency of once every 1 to 5 years, depending on need.

The CIP system would consist of one 20,000-gallon frac tank and pumping system for the recirculation of acid- or caustic-based maintenance solutions within the pipelines. The reagents used would be those categories of water treatment chemicals approved for use in drinking water systems. Chemical reagents under consideration for use in the CIP system include hydrochloric, glycolic (hydroxyacetic), and phosphoric acids; sodium hydroxide; and hydrogen peroxide. Ultimate selection of an effective reagent(s) would require bench scale testing. The CIP system would be centrally located at the MW-20 Bench area, and may use some components of the carbon substrate amendment system (e.g., pumps, tanks, and metering equipment).

During each CIP event, the carbon-amended water injection system would be temporarily shut off, groundwater extraction would cease, and freshwater or conditioned water would be used to flush the lines. Each conveyance force main valve would be positioned to isolate the wells and create a loop with the associated section of pipeline. This loop would originate and terminate with the CIP tank (frac tank). Freshwater would be added to the CIP tank along with the appropriate quantities of amendments per the recommended recipe as determined based on the bench-scale testing of scale deposit samples. The CIP system would operate by recirculating the amended water in a loop. Upon completion, freshwater would be added to flush the lines. Following completion of the CIP event, the valves would be positioned to facilitate normal operation. CIP system conveyance piping would be operated at velocities between 3 and 10 feet per second.

Water produced during the CIP maintenance cycles (i.e., maintenance solution and freshwater flush) would be conveyed to the Remedy-Produced Water Conditioning Plant for conditioning, or would be shipped off-site for disposal. The volume of spent solution is expected to be roughly 10,000 to 40,000 gallons per event.

3.6.1.7 Freshwater Flushing

To assist with flushing the plume through the NTH IRZ, and with constraining the westward spread of the plume, carbon substrate amended water, and in situ byproducts from the IRL, groundwater imported from Arizona would be injected into the freshwater injection wells

previously described. The following sections discuss the proposed sources of freshwater, the chemistry of the Arizona groundwater, the FWPTS, the freshwater supply storage tank, and freshwater conveyance piping network. The Groundwater FEIR included three separate options for a freshwater supply source: (1) well(s) in California; (2) well(s) in Arizona; or (3) surface water from the Colorado River through an intake structure. Subsequently, the use of water from wells in Arizona was investigated in the adopted Addendum to the Groundwater FEIR in 2013, and the results of that investigation concluded that there is water of sufficient quantity to be used in the remedial system.

Although the Arizona groundwater contains concentrations of arsenic above the California and federal Maximum Contaminant Levels (MCLs), PG&E's fate and transport model concluded that the increase in arsenic concentration surrounding the injection wells would be limited to a lateral distance of no greater than 150 feet. Furthermore, the concentration of arsenic is anticipated to return to pre-injection background over time.

PG&E, DTSC, and the SWRCB consulted in 2013 regarding the possibility that pre-treatment of freshwater for injection might be required due to the level of arsenic in the water. The Water Board stated that the use of injection water containing arsenic at levels above the applicable water quality objective was appropriate, subject to several conditions as stated in the Water Board, November 20, 2013, Memorandum to DTSC (included as Appendix WAT to the SEIR). The Water Board required that:

- “Monitoring wells must be established to confirm this modeling prediction” (i.e., that the arsenic exceedance will be limited to 150 feet from the injection wells).
- “If the leading edge of the arsenic plume extends more than 150 feet away from the injection well locations, PG&E must immediately reassess its modeling calculations and quickly identify interim actions it can take to limit the migration of the arsenic plume. These interim actions may include triggering activation of the contingency plan for arsenic pretreatment PG&E was directed by DTSC to include in its 60 percent groundwater remedy design.”
- “In the event the arsenic plume exceeding the water quality objective extends 225 feet from any of the points of injection, then PG&E shall immediately cease further injection of untreated water from the HNWR-1 well and DTSC should either (i) require pretreatment to remove arsenic prior to injection or (ii) require another source of freshwater in order to meet the water quality objective.” This requirement would apply to whichever freshwater supply wells are being used. Pursuant to this direction, DTSC may direct PG&E to pre-treat the water to remove arsenic prior to injection if the arsenic plume extends 225 feet radially from any point of injection. Alternatively, DTSC may require another source of freshwater.

The Final Remedy Design presents the selected freshwater source, as described in more detail below and in the following pages.

Freshwater Supply Sources

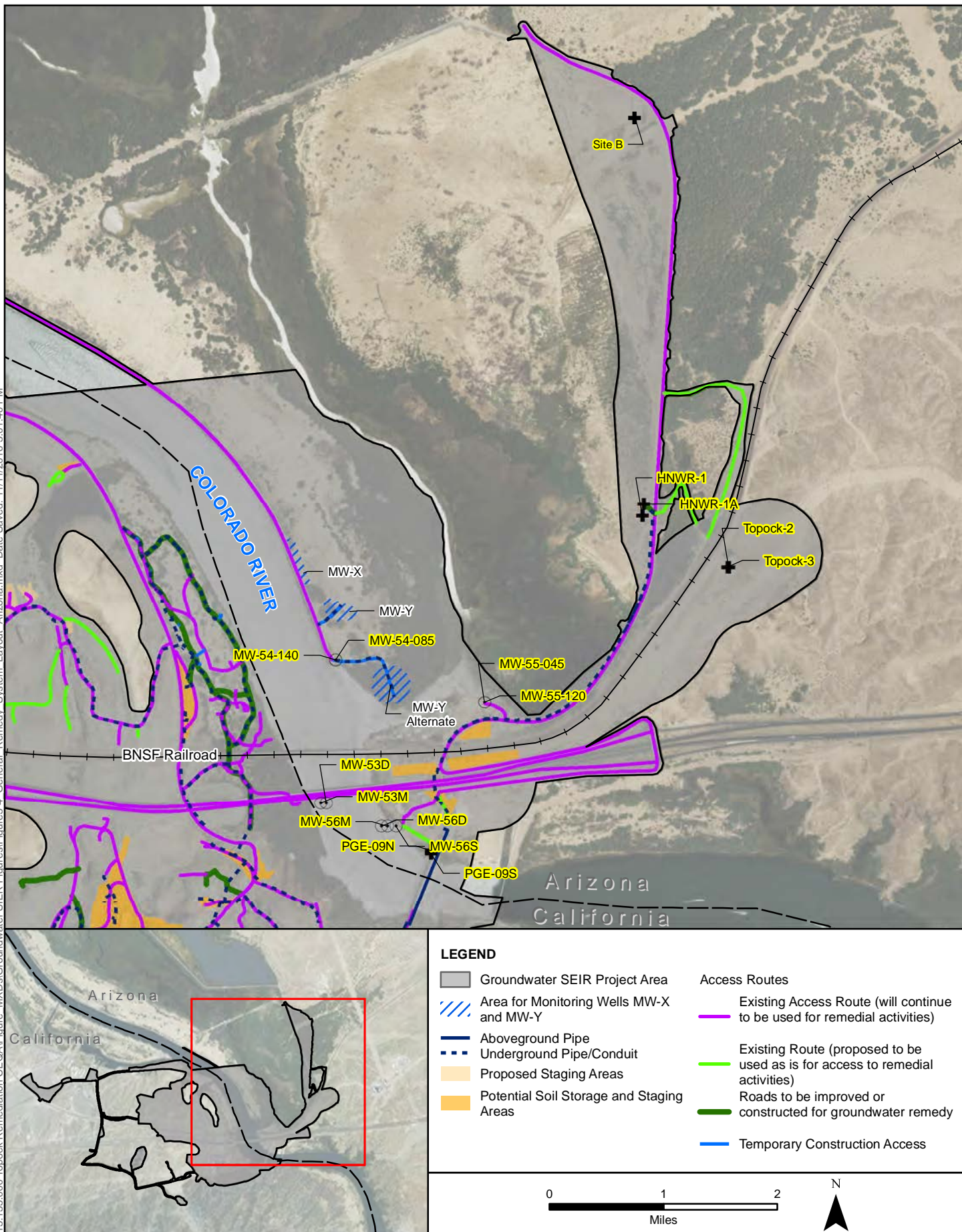
The primary source of freshwater supply would be from the installed 14-inch-diameter Well HNWR-1A, located on the Havasu National Wildlife Refuge in Arizona (see **Figure 3-4**). Freshwater could also be supplied from the existing nearby secondary supply Well HNWR-1, the existing contingent Topock-2/-3 wells, or the contingent installed Site B well (see Figure 3-4). The Final Remedy Design includes a provision to connect the secondary and contingent wells to the remediation system, whereas the Addendum to the Groundwater FEIR assumed the full-time use of two wells (HNWR-1A and the contingent Site B well).

Water from the HNWR-1A, HNWR-1, Topock-2 and -3, and the Site B well in Arizona has concentrations of naturally occurring arsenic that exceed the MCL of 10 µg/L.⁶ The arsenic concentration is also higher than the naturally occurring levels of arsenic in the receiving California groundwater basin. Although the SWRCB has provided a conditional approval for the injection of the Arizona groundwater in California, PG&E, as directed by DTSC, has included the design of an FWPTS to reduce arsenic to below the federal/state MCL in the Final Remedy Design as a contingency. This contingent pre-treatment system is also evaluated in this Draft SEIR.

A sand collection system for removing sand from the well water would be constructed within the fenced freshwater well area near Well HNWR-1A (and Site B, should it be used). The sand collection system would be 11 feet by 15 feet (165 square feet) and 6 feet deep.

⁶ MCLs are also known as drinking water standards and are the maximum concentrations permitted in drinking water at the tap.

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Contingent Freshwater Pre-Injection Treatment System

The contingent FWPTS would be located at the southern end of the Station within the fence line, next to the planned Remedy-Produced Water Conditioning Building (refer to Figure 3-3g). All components of the contingent FWPTS would be located on previously disturbed areas within the Station boundary. The FWPTS was developed subsequent to the Groundwater FEIR during the Final Remedy Design. The FWPTS is designed to treat arsenic, as discussed above. In addition, the FWPTS may have to be modified to treat other chemical constituents, if those constituents exceed the local basin water quality objectives.

The total footprint of this treatment system would be about 2,542 square feet, not counting the second floor of the building. The proposed FWPTS would consist of the following components, as described in Appendix M of the Final Remedy Design:

- One 45.5-foot by 28.5-foot, two-story building for a footprint of approximately 1,166 square feet that would contain cartridge filters, and the three treatment vessels. The building height would be approximately 31 feet at the ridgeline.
- One 12-foot-diameter by 17-foot-tall, 10,000-gallon remedy freshwater storage tank with a footprint of approximately 200 square feet.
- Two 10,000-gallon storage tanks (backwash and treated water) within a secondary containment structure of approximately 600 square feet.
- One 34-foot by 20-foot chemical storage area with one 1,000-gallon sulfuric acid tank, one acid feed skid, one hypochlorite tablet feeder system, and one dechlorination feed system all located within a pre-engineered structure with an internal secondary containment of 576 square feet.
- Associated conveyance piping, pumps, and controls.

If pre-treatment is needed, groundwater would be pumped and conveyed from Well HNWR-1A (or secondary or contingent wells) to the remedy freshwater storage tank. Water would be pumped from this tank and injected with hypochlorite for arsenic oxidation and acid to reduce pH to 6.5 to improve arsenic removal, then through a solids filtration process, then through a treatment media vessel, and ultimately the treated water would be pumped to a treated-water storage tank. The water would then be dechlorinated to remove residual chlorine from the treated freshwater because if the treated freshwater contained residual chlorine compounds, it could adversely affect microorganisms in the in situ reactive zones. Dechlorination would be accomplished by addition of commonly used chemicals such as ascorbic acid, calcium thiosulfate, and hydrogen peroxide. The equipment needed for dechlorination includes chemical storage tanks or totes, metering pumps, and an inline static mixer. Upon dechlorination, the treated water would be pumped to the freshwater injection wells. The backwash water used to periodically clean treatment media, filters, and tanks would be reused in the cooling towers, discharged to the evaporation ponds, and/or trucked to off-site permitted disposal facilities.

Freshwater Conveyance Piping Network

The freshwater well would supply water to the FWPTS via a new 12-inch conveyance pipeline network. The conveyance pipeline network would be approximately 26,000 feet (4.9 miles) long, with most of the pipeline being installed underground, as shown in **Figure 3-5**. This is a decrease from the 50,000 linear feet (9.5 miles) of water conveyance pipelines analyzed in the Groundwater FEIR. While the Groundwater FEIR did not specify underground or aboveground conveyance piping for this location, subsequent design iterations proposed aerial crossings at the Colorado River and Bat Cave Wash; there are no longer any aerial or aboveground pipeline crossings of Bat Cave Wash in the Final Remedy Design. The pipeline alignment would generally follow existing roadways and existing PG&E pipeline rights-of-way (ROWs). Where the ROW is not available, the pipeline alignment would be placed in previously disturbed areas. Typical trench dimensions would be 6 to 8 feet wide by 3 to 4 feet deep.

Starting from the freshwater supply well HNWR-1A in Arizona, the 12-inch underground pipeline would follow the Topock-Oatman Highway (Mohave County Road 10) toward the south and southwest, crossing under the BNSF railroad track and under I-40 (see Figure 3-4). The pipeline would cross privately owned parcels south of I-40 and continue onto the existing Arched Bridge (aboveground), currently co-owned by Kinder Morgan and PG&E, to cross the Colorado River.

After crossing the Colorado River into California via the Arched Bridge, the pipeline would run underground along the existing PG&E Line 300A natural gas pipeline maintenance road toward the Station (see Figure 3-3h). The pipeline would terminate at the remedy freshwater storage tank on the south side of the Station. The remedy freshwater storage tank would be a 10,000-gallon coated carbon steel tank (see Figure 3-5, inset of the Station). Midway along the PG&E Line 300A gas pipeline maintenance road, the freshwater pipeline would branch to the north to connect underground to the conveyance piping corridor located near National Trails Highway and the Station entrance road. However, in the event that treatment of freshwater for naturally occurring arsenic is required, all freshwater would be conveyed directly to the FWPTS treatment facility at the Station. The treated freshwater would then be conveyed along the PG&E Line 300A pipeline maintenance road (underground) prior to rejoining the freshwater pipeline.

The freshwater conveyance piping would continue underground along the National Trails Highway and split down to the floodplain with a short leg crossing under I-40 and the BNSF railroad tracks (see Figure 3-3h). The northern branch would connect to and serve the MW-20 Bench facilities. A western branch of the freshwater conveyance piping would cross the National Trail Highway to the access road west of the highway. This pipeline would continue westward and serve freshwater injection well FW-1 and the four IRL injection wells (IRL-1 through IRL-4), as needed.

At the location where the pipeline crosses the Bat Cave Wash in the uplands north of the Station, the pipeline would be buried in the wash. Once the pipeline crosses the wash, the pipeline would continue underground until it reaches FW-1 (Figure 3-3c). FW-2, located in Bat Cave Wash just west of the Station, would be served by a pipeline from the proposed freshwater storage tank at the Station that would also be buried in Bat Cave Wash (Figure 3-3g).

In the event that freshwater from the contingent Site B well is required, approximately 3,510 feet of additional conveyance piping would be required to connect the Site B well to the freshwater conveyance piping (the connection point would be located near the HNWR-1A well). In the event that freshwater from Topock-2/-3 wells are required, piping, valves, and a meter would be installed at the Station to connect to the existing water supply from these wells to the freshwater supply line for the remedy.

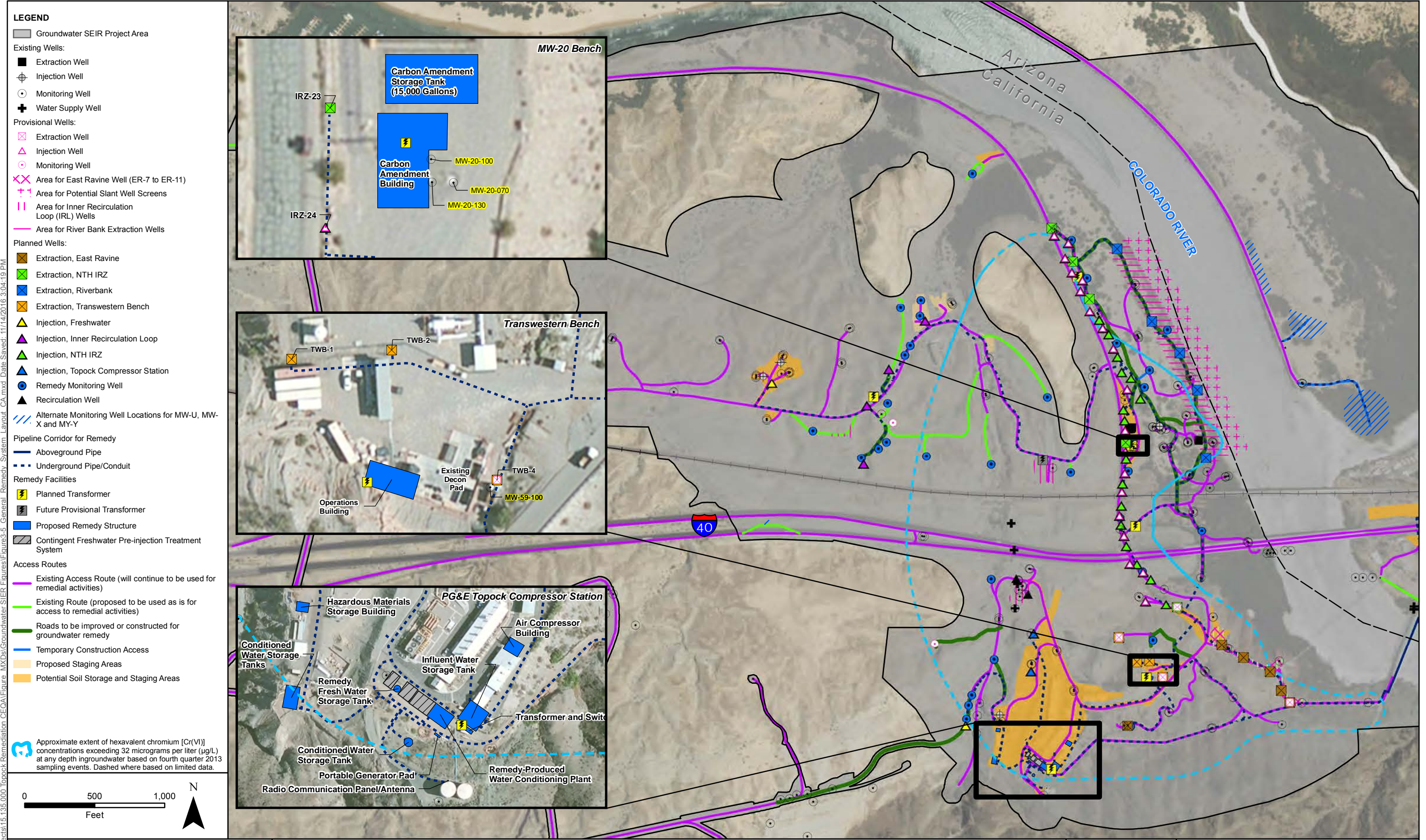
3.6.1.8 Monitoring Wells

As of the second quarter 2015 monitoring event, 146 installed wells were used for monitoring near the Station (CH2M Hill 2015c). These wells were used to collect groundwater samples during completion of the RCRA facility investigation/remedial investigation, and are also used for performance monitoring of the IM-3 Facility. The existing groundwater monitoring program that samples these wells, as well as surface waters of the Colorado River, would continue. Additional groundwater monitoring wells would be installed as part of the Final Groundwater Remedy Project to further evaluate site conditions, monitor contaminant levels, and assess the performance of the remediation system. Monitoring would include the collection, management, and reporting of groundwater quality, surface water quality, and operational data from the remedial system. Monitoring would be required during the construction and operation and maintenance phases and for an estimated 20 years following active remediation.

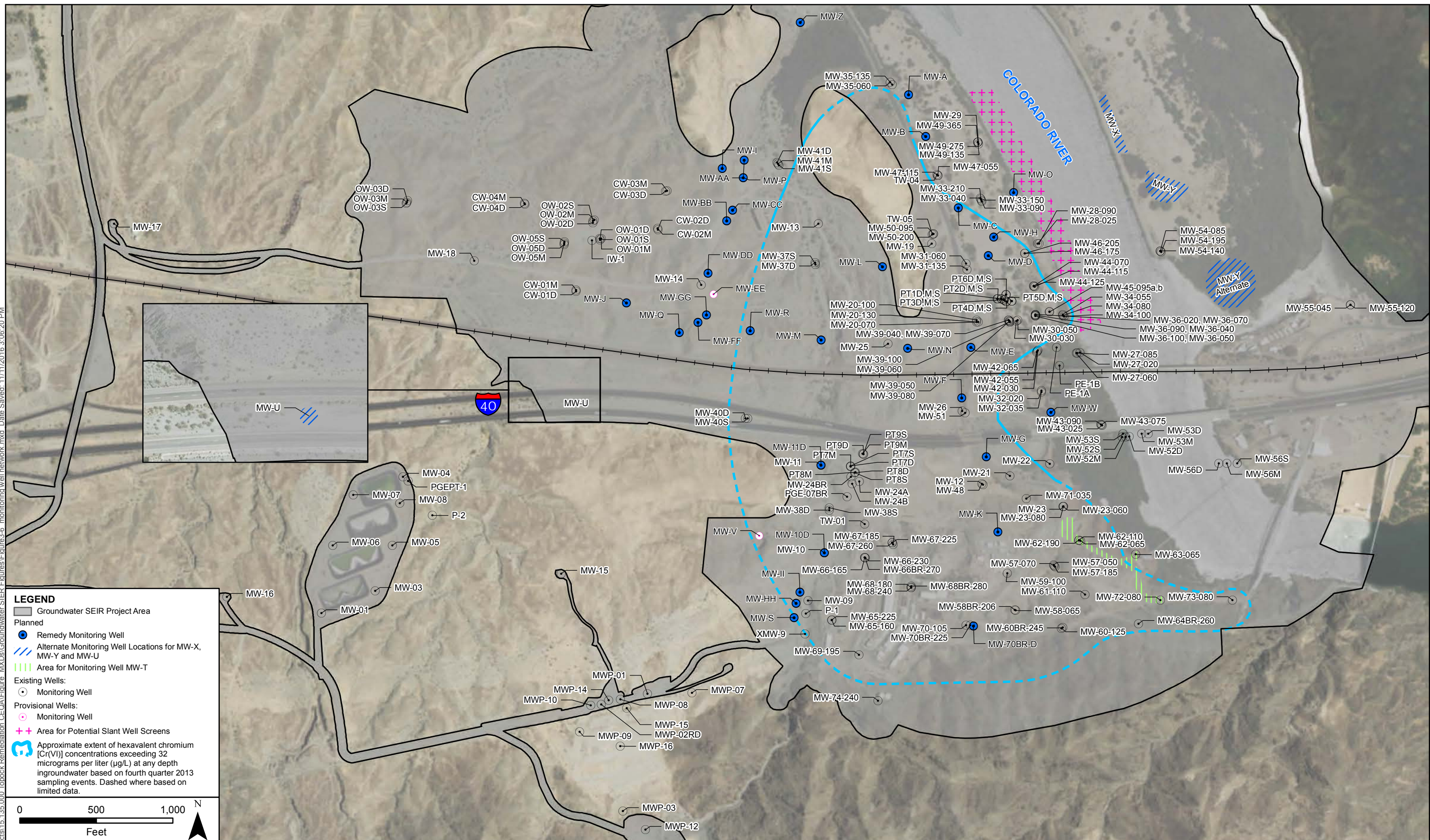
The Final Groundwater Remedy Project would include a monitoring well network that comprises selected previously installed and new monitoring wells, as shown in **Figure 3-6**. The general areas for MW-U (in California) and MW-X, MW-Y, and MW-Y Alternate (in Arizona) have been identified and are included in Figure 3-6 (see Figure 3-4 for monitoring well areas in Arizona). Although specific well locations within each area have not been identified, placement of a well within any of those locations is considered in the environmental analysis in this SEIR. The Groundwater FEIR considered a maximum of 60 new monitoring well boreholes. The Final Remedy Design provides more detail on the monitoring network that would be associated with the groundwater remedy and consists of 16 installed monitoring well boreholes, 56 planned monitoring well boreholes, plus up to 24 provisional monitoring well boreholes, for a total of up to 96 monitoring well boreholes.

An additional allowance of 25 percent (approximately 24 additional monitoring well boreholes) is included in the SEIR evaluation, as part of the Future Activity Allowance. Also included as part of the Future Activity Allowance are up to 10 additional monitoring well boreholes to be installed in Arizona as part of the monitoring program to assess/monitor groundwater levels and chemical constituents as a result of freshwater pumping. As indicated in Table 3-1, there would be a maximum of 54 additional monitoring well boreholes from what was previously considered and approved in the Groundwater FEIR. Many other existing monitoring wells will be used as part of remedy monitoring, but are not counted towards new well construction. Most boreholes would be up to 12 inches in diameter with 2-inch-diameter well casing(s). Some boreholes may be up to 24 inches in diameter. It should be noted, however, that PG&E may construct multiple individual wells in each borehole.

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Path: G:\Projects\15.135.000 Topock Remediation CEQA\Figure 3-6 monitoring well network.mxd Date Saved: 11/11/2016 3:06:20 PM



3.6.1.9 Fluid Conveyance, Utilities, Buildings, and Roadways

The Final Groundwater Remedy Project would require pipelines to transfer freshwater, remedy-produced water (untreated and treated), and carbon substrate-amended water throughout the Project Area. Other utilities and supporting facilities would be needed to ensure proper operations and include electrical power, monitoring and control systems (Supervisory Control and Data Acquisition (SCADA)), and security, as well as access roadways, operator's facilities, equipment and materials storage, equipment maintenance and testing areas, office space, bathrooms, and one on-site laboratory at the Remedy-Produced Water Conditioning Plant. A summary comparison between the Groundwater FEIR estimates and the Final Remedy Design lengths and areas is presented below in **Table 3-2**. The following sections describe these components of the Project.

**TABLE 3-2
SUMMARY OF NON-WELL INFRASTRUCTURE**

Infrastructure Component	Groundwater FEIR Estimate	Final Remedy Design	Future Activity Allowance
Fluid Conveyance Piping and Trenches	50,000 linear feet	127,500 linear feet of piping in 43,200 linear feet of trenches	31,875 linear feet of piping in 10,800 linear feet of trenches
Electrical/Communications Conduits and Trenches	50,000 linear feet	124,000 linear feet of conduits in 43,200 linear feet of trenches	31,000 linear feet in the same 10,800 linear feet of trenches listed above
Natural Gas Pipeline at TCS Evaporation Pond	Not envisioned at that time	670 feet	None needed
Buildings and Structures	100,000 square feet	42,000 square feet	10,500 square feet
Roadway Improvements	6,000 linear feet	8,150 linear feet (new) and 4,060 linear feet (improvements to existing)	2,038 linear feet (new) and 1,015 linear feet (improvements to existing)

SOURCE: CH2M Hill 2015a.

Fluid Conveyance Piping and Trenches

As previously described, the Final Groundwater Remedy Project would include multiple fluid conveyance pipelines and use an existing wastewater pipeline to the TCS Evaporation Ponds. In total, the Final Remedy Design includes approximately 43,200 linear feet of trenches for fluid conveyance piping (about 8.2 miles) with most of the conveyance piping placed belowground in trenches. Trenches may range from 3 to 22 feet wide, typical trench dimensions would be 6 to 8 feet wide by 3 to 4 feet deep.

To minimize the length of trenches, multiple pipelines would be placed within the same trench. The trenches would contain approximately 92,000 feet for fluid conveyance piping (including 4.9 miles of freshwater conveyance piping previously described), 29,000 feet of spare pipes, 1,400 feet of piping at Moabi Regional Park facilities, 4,900 feet for future Moabi Regional Park utility connections, and 200 feet of sampling tubing for certain monitoring wells, for a total of 127,500 feet of fluid piping. An additional allowance of 25 percent additional liquid conveyance piping (approximately 32,000 linear feet or 6 miles) and belowground trenches (approximately 10,800

linear feet or 2 miles) is included in the SEIR evaluation as part of the Future Activity Allowance. This is an increase over the 50,000 linear feet (9.5 miles) of fluid conveyance pipelines analyzed in the Groundwater FEIR.

Electrical/Communications Conduits and Trenches

Electric conduit and fiber optic conduit would be installed to supply communication and power to pumps and instrumentation associated with the Final Groundwater Remedy Project and would typically be installed underground along the same alignments as fluid conveyance piping. Wherever feasible, trenches would be dug to place conduits underground, which would reduce wear from weather and vandalism. Power conduits would be buried in underground trenches at a minimum depth of 18 inches to 36 inches, depending on voltage. If required in order to avoid conflicts with other utilities, power conduits may have to go deeper; typical vertical separations from pipes and other utilities would be 6 to 12 inches.

In most cases, the conduit would be placed within the same trenches discussed for the fluid conveyance piping and would consist of approximately 80,900 feet for electrical/fiber optic conduit, 15,450 feet of spare conduit, 4,700 feet of conduits at Moabi Regional Park facilities, 23,000 feet of conduits for future monitoring well telemetry system, for a total of 124,000 feet of conduits. An additional allowance of 25 percent additional electric and fiber optic conduit (approximately 31,000 linear feet or 6 miles) is included in the SEIR evaluation as part of the Future Activity Allowance. This is an increase over the 50,000 linear feet (9.5 miles) analyzed in the Groundwater FEIR (see Table 3-2).

Electrical Power Supply

The Groundwater FEIR estimated a demand of 1.6 million kilowatt hours (KWh) of electricity annually. The Final Remedy Design estimates a higher demand of electricity of up to 7.82 million KWh annually (an increase of 6.22 million KWh annually) during the operations phase; energy use during the construction phase would be lower. The increase in power demand is primarily due to the development of system details that were not included in the Groundwater FEIR, such as the TCS Recirculation Loop, the FWPTS, the TCS Evaporation Ponds, and the Moabi Regional Park facilities.

For the Final Groundwater Remedy Project, the primary power supply source for the remedy facilities in California would be power provided by the Station. The power supply at the Station would provide up to 5.12 million kWh/yr to power the remedy systems, including improvements at the TCS ponds (0.020 million kWh/yr), and would be supplemented by two new 480 volt natural gas generators with new switchgear that would be housed in the existing Auxiliary Building. The new generators would be fully integrated into the Station power supply. The estimated amount of natural gas is 1,160,000 million SCF over the remedy operations period of 30 years.

Power for the Construction Headquarters would be provided by the City of Needles Electric Department via an existing overhead service line that runs to an existing water supply source for Moabi Regional Park, near the northwest corner of the Construction Headquarters. The IM-3 Facility also gets its electrical power from the City of Needles. From there, power will be routed

underground to the Construction Headquarters utility pad where power distribution panels will allow use throughout the Construction Headquarters. There are no proposed power poles at the Construction Headquarters, however 93 305-watt photovoltaic solar panels are proposed at the workshop building and parking shade structure to provide additional power supply. A backup generator is included in the design to operate some functions at the Construction Headquarters when utility power is not available. Power for the Soil Processing Area would be routed from the existing overhead service line to the area via a new overhead distribution line. It is anticipated that the new overhead distribution will consist of 2 to 3 electrical poles in the area between the existing distribution line and the Soil Processing Area. Once inside the Soil Processing Area, wire will be run down the pole to a conduit and power distribution panel for use throughout the yard. The electrical load for the Moabi Regional Park facilities is estimated to be 1.3 million kWh annually during remedy construction and 0.85 million kWh during remedy operation. Annual kWh would be offset by use of the solar panels the Construction Headquarters, and at remote Arizona wells (described below), for an approximate total of 15,200 kWh.

The Mohave Electric Cooperative would supply power for the freshwater supply well in Arizona where there are 5 existing power poles at the Well HNWR-1A site and one pole at the Site B well site. An additional two power poles proposed at the HNWR-1A well site and one power pole proposed at the Site B well site (three total poles), however, would be necessary to bring the electrical line to the well locations. Power poles were not considered in the Groundwater FEIR. The Mohave Electric Cooperative will provide up to 1.4 million kWh/yr.

For improvements at the TCS Evaporation Ponds, the power supply for the new agitator and pumps would be provided by a new natural-gas-fueled reciprocating internal-combustion engine electrical power generator housed in a new enclosed utility building located within the TCS evaporation ponds fence line. Fuel for the generator would be provided via a new approximately 670-foot-long underground gas line brought in from the main line located south of the ponds. Power for auxiliary equipment (lighting, controls, sensors, security cameras, and valve actuators) would be provided by new 24-volt direct current thermoelectric generators within the fence line adjacent to the new utility building. The electrical load for the TCS Evaporation Ponds facilities is estimated to be 0.020 million kWh annually during remedy operation.

As described in the Groundwater FEIR, small solar panels would be installed to provide supplemental power to serve the electrical demands of remote smaller ancillary facilities. Photovoltaic solar panels are planned to be located at the workshop/sample-processing building and parking shade structure at the Construction Headquarters, as described above, and at select remote well locations to power well data recording instruments. Up to five 140-watt solar panels would be installed for monitoring at remote well locations in Arizona. The anticipated offset of energy from the grid by the planned solar panels at the Arizona wells and at the Construction Headquarters is approximately 15,200 kWh. In addition, a portable, rental backup generator would be mobilized as needed during Project implementation to provide power to temporary remote locations that do not need a permanent or long-term power supply. The Final Groundwater Remedy Project also includes a connection panel and reserved space for a portable rental generator to be located behind the Remedy-Produced Water Conditioning.

Buildings and Structures

At the time the Groundwater FEIR was prepared, the level of detail and location of planned buildings and structures for major equipment and key supporting functions for the groundwater remedy were not yet developed. The Groundwater FEIR assumed a maximum footprint of about 110,000 square feet for buildings and structures. Through the collaborative design and comment process and with the elimination of river intake structure, the consolidation of some remedy components into existing structures (e.g., power supply), the shared use of existing buildings (e.g., TCS hazardous material storage building), the optimization of the limited space available for new remedy infrastructures inside TCS, and the consolidation of carbon substrate structures (i.e., the elimination of TW Bench carbon substrate structures), the Final Groundwater Remedy Project includes up to 20,000 square feet of planned buildings and structures, approximately 15,000 square feet of new structures at the proposed Construction Headquarters/Long-Term Remedy Support Area to be located near Moabi Regional Park, and up to 7,000 square feet for vaults (wells, electrical)/aprons around stickup wells, for a total of up to 42,000 square feet. This is a decrease of 57,500 square feet associated with buildings and structures analyzed in the Groundwater FEIR.

The buildings and structures would be located in four main areas, namely the Station, the TW Bench, the MW-20 Bench, and the northwest area of Moabi Regional Park. **Table 3-3** provides a summary of proposed remedy buildings/structures for major equipment and key supporting functions.

All of the planned buildings and structures would be constructed in previously disturbed areas that can be accessed by existing roads. The Station, MW-20 Bench, and TW Bench areas are located on previously disturbed areas next to existing graded roads, and have been used to support various field and Interim Measure activities since 2004. The northwest area of Moabi Regional Park is located on federal lands and on previously disturbed areas near the National Trails Highway, an existing paved road.

**TABLE 3-3
REMEDY BUILDINGS AND STRUCTURES**

Compressor Station	TW Bench	MW-20 Bench
<ul style="list-style-type: none"> Existing Auxiliary Building Share use of Hazardous Material Storage Building Remedy-Produced Water Conditioning Plant and associated tanks and chemical storage (see Section 3.6.1.5.) Equipment decontamination pad Remedy freshwater storage tank 	<ul style="list-style-type: none"> Operations Building Fence around the TW Bench Existing equipment decontamination pad (reuse) Security equipment (fencing, cameras, intrusion alarms, card readers, etc.) Stormwater catch basins Septic waste tank Electrical equipment concrete pad 	<ul style="list-style-type: none"> Carbon Amendment Building and Carbon Storage Tank for NTH IRZ and IRL Truck loading/unloading station Existing storage tanks (reuse three large, heavy gauge steel "frac" tanks) Security equipment (fencing, cameras, intrusion alarms, card readers, etc.)
Facilities within Moabi Regional Park	TCS Evaporation Ponds	
<ul style="list-style-type: none"> Workshop/sample processing building Parking shade structure Covered rest area Equipment decontamination pad Utility pad Office and training facilities, conference room, restrooms Temporary office and contractor trailers within laydown areas. Two buried septic tanks One buried remedy-produced wastewater tank Security fencing and equipment Provisional noise barrier Equipment storage area; portable contractor office trailers, tool storage containers Truck waiting area Soil Processing Area/Clean-Soil Storage Area Informational Outreach Center 	<ul style="list-style-type: none"> New drip systems for ponds 3 and 4 Pond observation cameras New valves on discharge points Utility building/Fenced area adjacent to the Utility building Concrete containment pad for water truck loading station 	

SOURCE: CH2M Hill 2015a.

Most of the items listed above in Table 3-3 have been previously described, as indicated in the table. The following sections provide additional details for proposed buildings and structures from Table 3-3, including the Existing Auxiliary Building, the TW Bench, MW-20 Bench, and the Construction Headquarters/Temporary Construction Laydown Area/Long-Term Remedy Support Area.

Compressor Station

Existing Auxiliary Building

The new power generators required for the Final Groundwater Remedy Project would be housed in the existing Auxiliary Building at the Station, which currently houses air compressors, generators, and switch gear equipment (see Figure 3-5). Separate from this Project, the Station has decided to construct a new building for its air compressors, which resulted in the existing air compressor space in the auxiliary building being available to house the generators needed for the Project. This modification is a separate PG&E project as part of the operation of the Compressor Station, but it is considered in the cumulative analysis and presented here for completeness.

Hazardous Materials Storage Building

The Station has an existing Hazardous Materials Storage Building located along the western side of the Station (see Figure 3-5). This building is used for storage of hazardous waste. The Project would share the existing use of this building for storage of hazardous waste generated by the Project. PG&E does not plan to use the Hazardous Materials Storage Building for management of non-hazardous wastes generated by remediation activities.

TW Bench

The TW Bench area is currently used to support various field and IM-3 Facility activities, ongoing groundwater and surface water sampling activities, well drilling activities, equipment decontamination activities, soil sampling activities, temporary waste management activities, and various field surveys to collect baseline data. The TW Bench currently houses a field trailer, a decontamination pad, and several large, metal, cargo containers (conex boxes) for temporary storage. These facilities are regularly used by the groundwater and surface water sampling crew, PG&E staff, and field personnel/staff on-site for ad hoc field tasks. In addition to PG&E's use of the TW Bench area, Transwestern has been operating its metering station on the northernmost portion of the bench since 1991.

As shown in Figure 3-5, a new approximately 2,200-square-foot Operations Building would be located at the TW Bench to house certain supporting functions for long-term operation and maintenance of the Final Groundwater Remedy Project (programmable logic controllers, uninterruptible power supply, communications, Remedy SCADA system, Operator Interface Terminal systems, etc.). Space would be reserved in the Operations Building for a small drinking water system (approximately 2,000 gallons per day capacity) to provide drinking water for operators/crews and visitors. The existing decontamination pad would be reused. One 10,000-gallon underground septic waste tank would be installed. One electrical equipment concrete pad (approximately 240 square feet) would be installed to provide support for electrical equipment housings. The TW Bench would also include stormwater catch basins. The TW Bench would be secured with a fence and appropriate security measures.

MW-20 Bench

The MW-20 Bench area has been used to support various field and IM activities since 2004. Currently, a portion of the MW-20 Bench is used to house IM equipment and to support IM operations (e.g., extraction wells, an electrical room, three frac tanks, and a truck loading/unloading facility). There is fencing around the equipment area and nighttime lighting for

health and safety and security purposes. The remaining portion of the MW-20 Bench is used for vehicle parking and equipment staging, and provides an alternative access route around the fenced facility.

As described in Section 3.6.1.1 and shown in Figure 3-5, the buildings and structures within the MW-20 Bench area include the planned Carbon Amendment Building and the Carbon Amendment Storage Tank, the reuse of the existing three 20,000-gallon frac tanks and 960-square-foot truck loading/unloading containment pad, and the installation of appropriate security measures (e.g., fence, cameras, intrusion alarms, and card readers).

Facilities near Moabi Regional Park

Construction Headquarters and Long-Term Remedy Support Area

The Construction Headquarters and Long-Term Remedy Support Area are new components that were not included or analyzed in the Groundwater FEIR; they are shown in **Figure 3-7a** and **Figure 3-7b**. They would be located within an area that was identified in the Groundwater FEIR as a potential location for one or more freshwater wells to be used in the remedy. The fenced facilities would be approximately 1.85 acres in size. The temporary construction laydown area would be approximately 1.05 acre in size. The construction laydown area would serve as the primary location for the mobilization and management of equipment, supplies, and site workers/contractors to and from the Project Area. The Construction Headquarters would function as PG&E's main area for construction oversight and support during construction. Following construction completion, a portion of this area (approximately 0.8 of the 1.85 acre) would function as an operation and maintenance support area for the lifetime of the groundwater remedy (referred to as the Long-Term Remedy Support Area). Key features of the Construction Headquarters and Long-Term Remedy Support Area include:

- Workshop/sample processing building with sample processing rooms, and restrooms – approximately 3,000 square feet of floor area, 23 feet tall.
- Parking shade structure – approximately 2,100 square feet, 10 to 12 feet tall.
- Covered rest area – 20 feet by 20 feet.
- Equipment decontamination pad – approximately 1,400 square feet.
- Utility pad (electrical generator/transformer, 15,000-gallon fire water tank, two 5,000-gallon potable water tanks) – approximately 1,000 square feet.
- PG&E office, consultants, and restroom trailers – approximately 6,000 square feet.
- Primary power would be supplied by City of Needles Electric Department via an underground feed from a utility pole to a transformer located on the utility pad (this remains an assumption until final installation from the City of Needles). Backup power would be provided via an on-site diesel generator. These facilities may be connected in the future to sewage and domestic water systems within Moabi Regional Park.
- Temporary office and contractor trailers within laydown areas.
- Two buried septic tanks – 10,000 gallons each and 8 feet diameter by 31 feet 6.5 inches long

each. The tanks are connected to the PG&E office trailer, men's and women's restrooms, and workshop building (restrooms and shop sink). An odor-neutralization system would be installed on the tank vent line to mitigate odors.

- One buried remedy-produced wastewater tank – 1,000 gallons.
- Security provisions – perimeter fencing with gates equipped with chains and locks, security cameras, and alarm system/yard lighting.
- Provisional noise barrier – 6 to 20 feet tall.

Temporary Construction Laydown Area

The temporary construction laydown area would be used by construction contractors over the duration of Final Groundwater Remedy Project construction. At least six lots would be provided in the temporary construction laydown area for the staging of contractor-provided trailers; each lot would include connections to the Construction Headquarters electric power supply and fire protection. In addition, fencing that meets PG&E's security standards (approximately 6 to 7 feet tall) would be installed to completely enclose the area.

Other anticipated features would include temporary facilities (e.g., portable contractor office trailers, tool storage containers such as conex boxes), construction materials, and construction equipment that would be removed following construction completion.

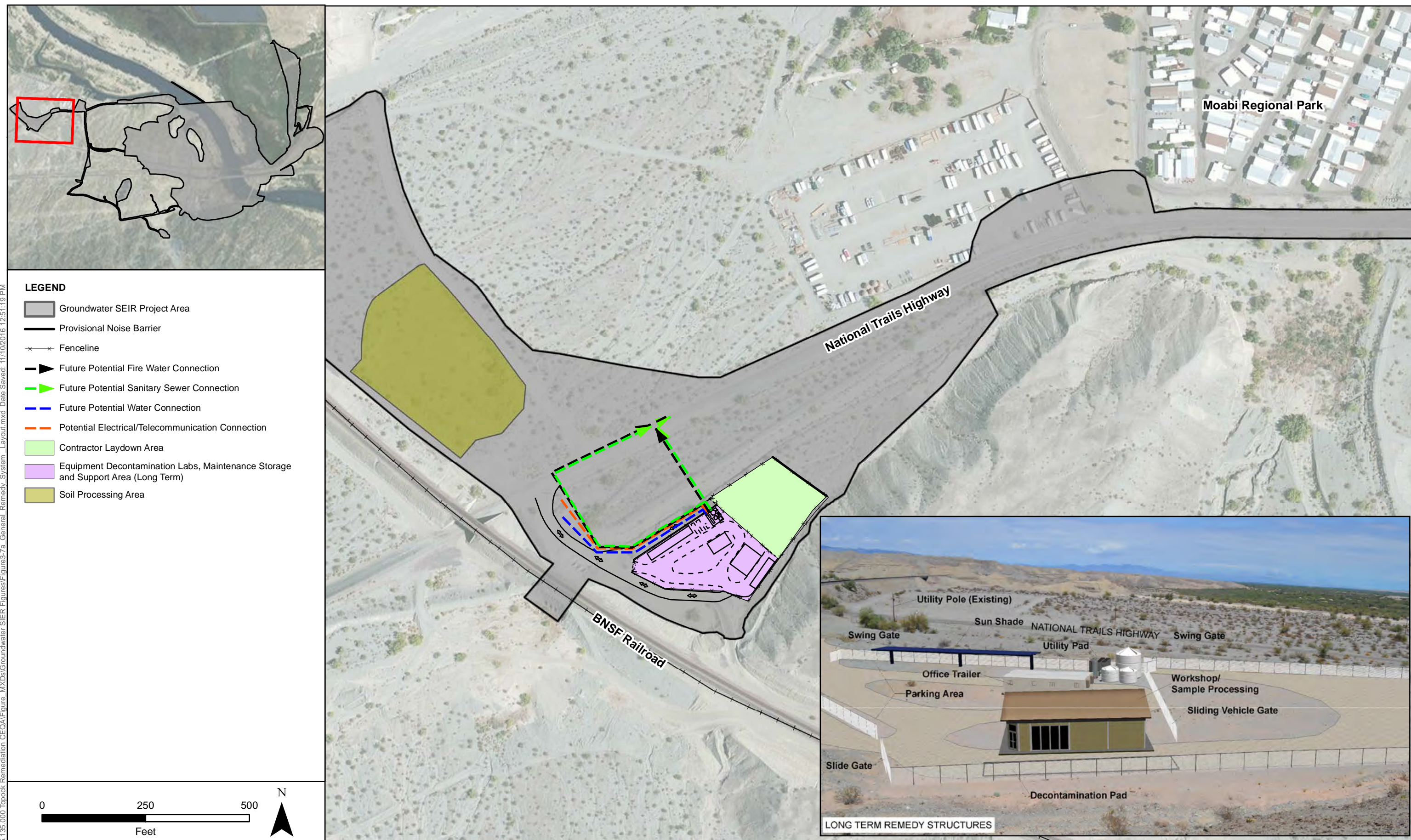
The construction laydown area would serve as the primary location for contractor site offices and for the mobilization and management of equipment (drill rigs, excavators, backhoes, cranes, etc.), materials/supplies (pipes, valves, transformers, well materials, etc.), and site workers/contractors (inspectors, supervisors, superintendents, construction workers, etc.). Unaccompanied access to the temporary construction laydown area would be restricted to construction personnel who have completed required site health and safety training and are equipped with the required personal protective equipment.

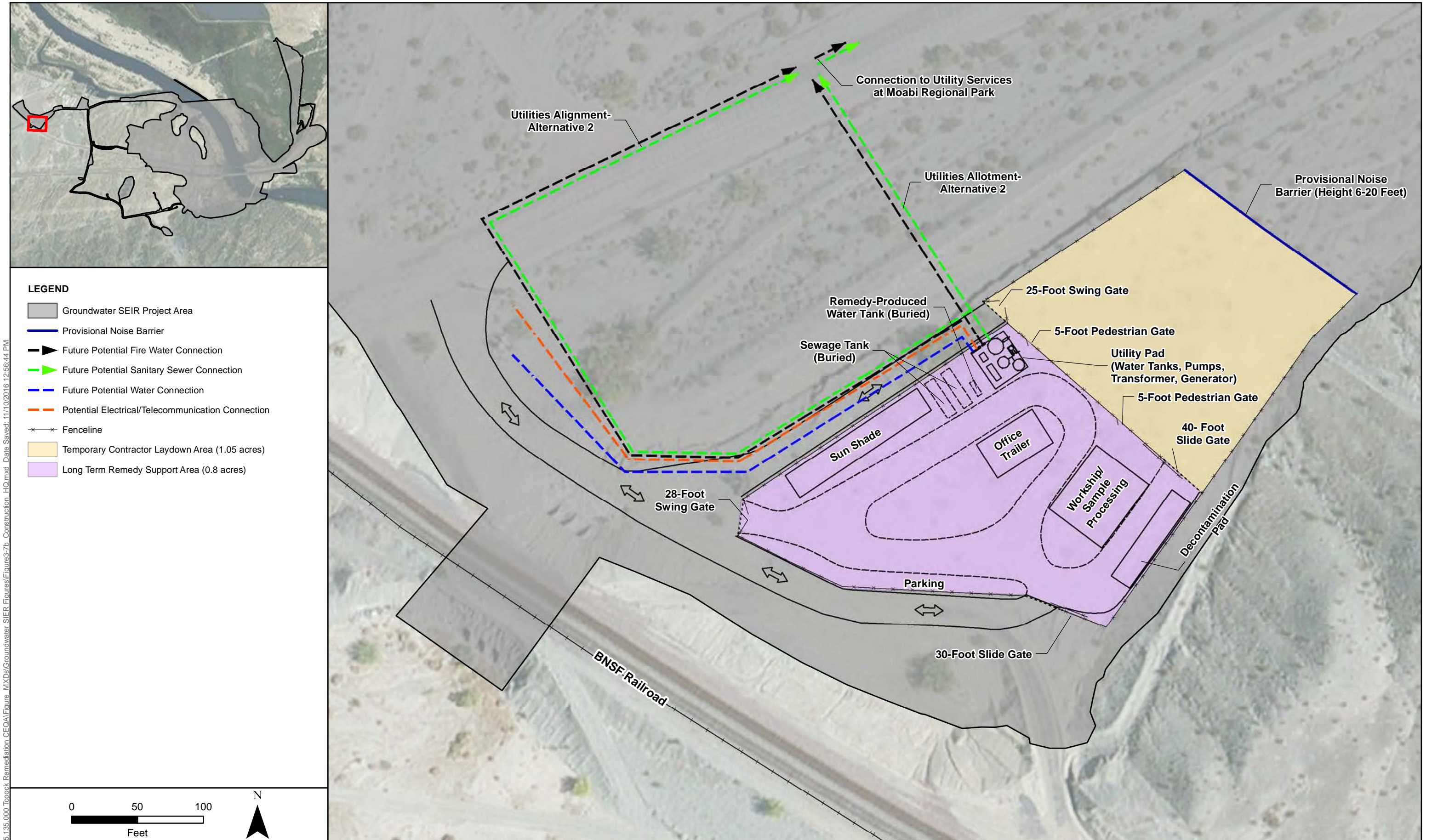
Soil Processing Area/Clean-Soil Storage Area

Soils/materials displaced during construction activities would be brought for staging, processing, and potential reuse at the proposed 2.68-acre Soil Processing Area. Import material for use in construction may also be temporarily staged in this area. The estimated storage capacity is 11,700 cubic yards, the estimated volume to be generated during construction is 11,000 cubic yards for clean soil, and 4,000 cubic yards for soil above screening levels (but below hazardous waste levels). The up to 11,300 cubic yards of soil resulting from implementation of the Future Activity Allowance could be accommodated at the Soil Staging Area assuming soil is stockpiled in an efficient and deliberate manner. Soil could also be stored in the temporary construction laydown area, as needed. The Soil Processing Area layout includes:

- Separate staging/storage areas for construction-generated soil (pre-processing) and screened material (post-processing).
- An area where material can be processed (screened/crushed) for on-site use.
- A staging area for any material rejected during the screening process.

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- A staging area for imported material.
- A truck waiting area would be established just outside the entrance of the Soil Processing Area near the truck access road.

While these are anticipated to be the primary features of the Soil Processing Area, the final layout would be determined by the construction contractor, consistent with any applicable mitigation measures or conditions of approval. The Soil Processing Area may include a 20-foot by 20-foot shade structure to provide a covered rest area for on-site personnel. An elevated water tank would be employed to provide water for dust control. Water would be transported to the Soil Processing Area (e.g., filled from the main potable water tanks at the Construction Headquarters or other construction water source) to fill the elevated water tank. In addition, connection to the City of Needles electrical utility would be provided via an overhead feed from a nearby existing power pole to a new pole installed just outside the fenced yard.

Active equipment in the Soil Processing Area (e.g., soil screening unit, crushers, loaders, dump trucks/trailers) is expected to only be needed during Final Groundwater Remedy Project construction. At the onset of construction activities, the Soil Processing Area may be used as a temporary location for staging of construction equipment and office/construction trailers before they are moved to/located in the Construction Headquarters. This area may continue to be used as a location for storage of clean soils. Clean soils may also be used in this location as fill material, at the landowner's or land manager's request.

Informational Outreach Center

An Informational Outreach Center would be located at the entrance of Moabi Regional Park to provide residents and members of the public information about construction activities associated with the Project. The Informational Outreach Center would consist of a trailer of similar size to existing trailers in Moabi Regional Park. The Informational Outreach Center would be staffed with one person to provide information and would be available through the construction phase, and may remain open for inquiries during the initial operation phase depending on the community need.

TCS Evaporation Ponds

As previously noted, the existing TCS Evaporation Ponds may be used to dispose of some of the remedy-produced water. The water would be evaporated over time. The ponds are lined and designed to prevent leaks. Under some circumstances, the existing capacity of the ponds may be inadequate. The ponds would be upgraded with the following improvements:

- Existing ponds 3 and 4 would be equipped with new drip systems and agitators to increase the evaporation rate.
- Cameras would be installed to enable remote monitoring of the pond levels.
- New valves would be placed on top of the discharge points to remotely control filling.
- One one-story 17-foot by 25.3-foot (430 square feet) by 12-foot-tall masonry utility building would be constructed adjacent to the two southernmost ponds at the TCS Evaporation Ponds

to house the new natural-gas-fueled reciprocating internal-combustion-engine electrical power generator.

- One fenced area (approximately 500 square feet) next to the utility building would be constructed to house the thermoelectric generators.
- Containment area for truck loading at TCS Evaporation Ponds of about 800 square feet.
- Natural gas would be piped to the facility from the existing PG&E Line 300B to the utility building with a regulator and isolation valves.

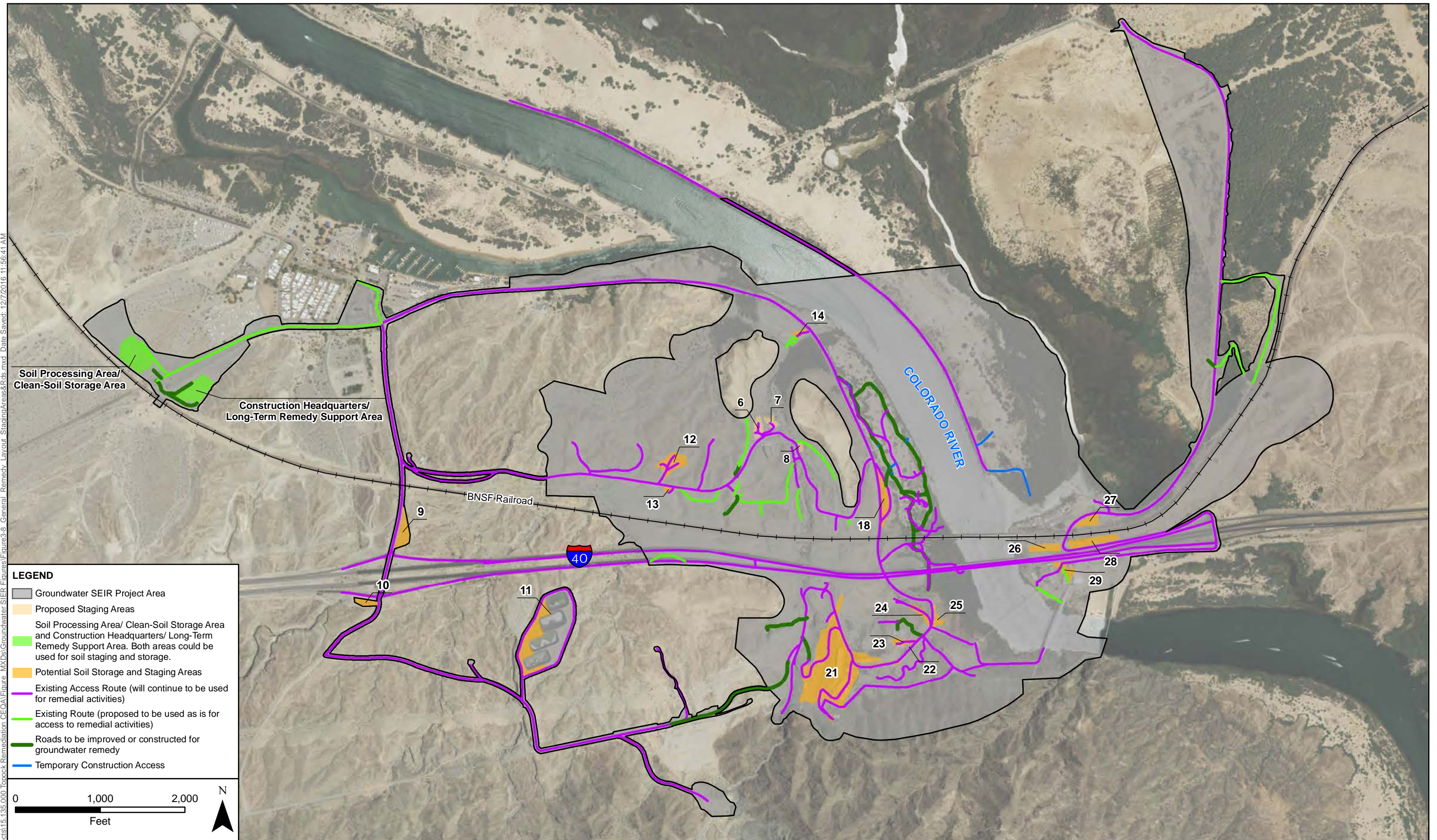
With these improvements, the evaporation rate would be increased to accommodate the additional water.

Roadways

There would be two types of access roads that would be used as part of the Final Groundwater Remedy Project: temporary access roads used for construction and long-term access roads used to regularly operate and maintain the proposed Project. An existing road network consisting of maintained dirt roads and some paved roads for accessing the existing network of monitoring wells currently runs throughout the Project Area. This road network would be used where feasible for construction and operation of the Final Groundwater Remedy Project; however, additional roads would be required, as shown in **Figure 3-8**. A maximum of 8,150 linear feet (1.54 miles) of new roads would be needed throughout the Project Area, for both construction and long-term operation and maintenance of the Final Groundwater Remedy Project. An additional allowance of 25 percent additional roads (approximately 2,038 linear feet) is included in the SEIR evaluation as part of the Future Activity Allowance. In addition, 4,060 linear feet (0.76 miles) of improvements consisting of limited grading and drainage improvements would occur on existing roads east and west of Bat Cave Wash to Well FW-2 (approximately 2,000 feet) and access to the Construction Headquarters area (approximately 2,060 feet). The Project would result in a total of 12,210 linear feet of roadway additions or improvements. This is in comparison to the 6,000 linear feet of roadway improvements analyzed in the Groundwater FEIR.

Access roads would be graded to create a smooth surface and proper drainage. The construction of new roads and improvements of existing roads would result in the disturbance of approximately 11,000 cubic yards of soil. With an additional allowable increase of 25 percent, soil disturbance would be up to 13,750 cubic yards). This is an increase over the 4,600 cubic yards of soil disturbance associated with road construction analyzed in the Groundwater FEIR. The roads would be maintained throughout the operation and maintenance period of the Final Groundwater Remedy Project. Following determination that the remedial or monitoring structure is no longer needed, the road would be closed and restored to pre-Project conditions.

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Staging Areas and Roadways

Figure
3-8

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As shown in Figure 3-8, the following improvements would be needed to construct and service the remedy infrastructure:

- Well IRL-4 – This well would be located at the bottom of a ravine, in the upland area just north of the BNSF tracks. A new, engineered road would be built to access and service this well, the nearby monitoring well, and associated conveyance piping. In addition, a portion of the ravine bottom would be partially filled in to create a sturdy, flat area with adequate work space for wells installation; well maintenance and sampling activities during remedy operations; and future decommissioning of these wells and associated conveyance piping. The new road would connect to the Southern California Gas Pipeline access road.
- Well IRL-2 – An existing road would be modified to service this well and associated conveyance piping and MW-I, located in the upland area west of the IM-3 Facility. Specifically, the connection from this road would be improved to connect to old Route 66.
- Floodplain Road, also referred to as the Ring Road (NTH IRZ and RB extraction wells) – A new gravel road would be built in the floodplain to construct and service the NTH IRZ and RB extraction wells, including future provisional wells and associated conveyance piping. This gravel road would form a loop around the floodplain and connect to MW-20 Bench and NTH. The length would be about 6,610 feet.
- TW Bench Area – The parking lot would be paved and a new gravel access road would be constructed north of the TW Bench to accommodate for shared use of the bench and to allow for access to and from Transwestern’s equipment during the construction, operation, and maintenance of remedy facilities at the bench. The road would travel east of the TW Bench to allow for access to Transwestern’s gas transmission equipment. The length would be about 490 feet.
- FW-2 Road – Improvements would be made to about 1,300 linear feet of existing roads located west of Bat Cave Wash to Well FW-2.
- Pipeline I Road – Improvements would be made to approximately 700 linear feet of existing road located east of Bat Cave Wash.
- MW-V Provisional Well – Approximately 500 feet of road access to this provisional well would be established from Bat Cave Wash to the well location. An existing abandoned 34-inch gas pipeline and berm would be removed to allow for the construction.
- Construction Headquarters Area and Soil Processing Area – About 2,060 linear feet of road improvements would be made for access to the Construction Headquarters area.

Access roads would be provided to allow regular operation and maintenance of remedy system components. In some locations, access roads and pipelines may share the same alignment, with the pipeline being installed adjacent to or underneath the access road.

For new access roads, routes would be graded and drainage systems would be established if necessary. In addition, grading near well vaults or aboveground structures may be necessary to

enable maintenance vehicles to reach the well and perform necessary work. Roads would be built with materials sourced from the site based on balancing cut and fill and imported fill.

Fill Materials

A total of about 16,000 cubic yards of fill materials would be required for roads, trenches, and foundations (PG&E 2016). The fill material types and sources are listed below. The off-site sources of fill materials are assumed to be within 60 miles of the Station.

- Sand backfill: 6,000 cubic yards imported, 4,000 cubic yards on-site sources
- Gravel backfill: 11 cubic yards imported
- Aggregate base: 2,900 cubic yards imported
- Crushed rock: 7,000 tons (about 3,500 cubic yards) imported
- Embankment soil: 3,200 tons (about 2,462 cubic yards) on-site sources

With an additional 25 Percent Future Project Activity Allowance of 4,000 cubic yards, the total estimate for fill materials is 20,000 cubic yards.

3.6.1.10 Monitored Natural Attenuation

Because of the heterogeneity of the aquifer, it is anticipated that different portions of the aquifer will achieve the RAOs at different times, and that the shape and extent of the plume will change and diminish over the decades-long treatment period. The Final Groundwater Remedy Project includes monitored natural attenuation to address residual Cr(VI) that may remain in recalcitrant (difficult to treat) portions of the aquifer following the active treatment and flushing activities. Monitored natural attenuation uses naturally-occurring processes in the aquifer to continue to reduce the concentrations of Cr(VI) dissolved in groundwater to the less soluble Cr(III), which precipitates out of solution.

The decision to use monitored natural attenuation on specific areas of the plume would be made by DTSC and DOI during future evaluations, such as the 5-year reviews, and would be based on the types and options of active treatment system adjustments that could be made, the effectiveness of the treatment systems as of that date, and the location of proposed monitored natural attenuation areas relative to natural reductive zones in the aquifer. The effectiveness of monitored natural attenuation would be monitored using the monitoring network. The process would continue until the RAOs have been achieved.

3.6.1.11 Institutional Controls

Institutional controls are non-engineering mechanisms, such as legal or contractual restrictions on property use, which are used to help minimize the potential for human exposure to contamination and/or protect the integrity of a remedy. Institutional controls can be imposed by authorized agencies (such as DTSC). Institutional controls were a part of the description of the Project in the Groundwater FEIR and would be implemented in the Final Groundwater Remedy Project. They generally do not involve ground disturbing activities. The target timeframe for having the institutional controls in place is prior to remedy construction. It is anticipated that most of these controls would remain in place for the duration of the remedy and until the RAOs are achieved.

An RAO for the final groundwater remedy is to prevent ingestion of groundwater with Cr(VI) levels in excess of the regional background concentration of 32 µg/L as a potable water source. This RAO would be achieved by prohibiting the installation of potable water wells within the plume area until concentrations within the plume are below the cleanup goal, unless DTSC and DOI determine such prohibition is not necessary. Additionally, there are currently no known municipal or private wells in the chromium plume area. The Final Groundwater Remedy Project includes pumping and injecting groundwater to maintain hydraulic conditions so that the chromium plume moves through the treatment zone in the designed direction and at the designed rate. Pumping groundwater is a critical element of the remedy and thus needs to be protected whether it involves pumping from extraction wells in California or the freshwater supply well(s) in Arizona. Satisfactory performance of the remedy depends upon the control of groundwater flow directions and the gradients necessary to contain and remediate the chromium plume. The remedy also includes several physical elements (wells, pipelines, facilities, etc.) that would need to be protected to ensure that the RAOs can be met.

3.6.2 Description of Construction Activities

3.6.2.1 Overview of Construction Activities

The following provides a general description of the construction activities needed to implement the Final Groundwater Remedy Project. Where available, comparisons to the original assumptions used in the Groundwater FEIR are provided and additional new information based on the Final Remedy Design is also included.

Construction and treatment system start-up activities for the Final Groundwater Remedy Project would occur in two phases requiring a total of about 4.5 years, including construction closeout. The first phase would include the construction and start-up of the NTH IRZ and components needed to operate the NTH IRZ (about 2.5 years); the second phase would include the construction and start-up of the remaining groundwater remedy system (about 2 years). The construction closeout activities would occur during the second year of Phase 2 and would include generating as-built documents and other reports, surveying final elevations (e.g., well heads), soil stabilization of disturbed areas, demobilization of materials and equipment, and site inspections (e.g., biological monitors). Some limited construction closeout activities are expected to occur following Phase 1 construction and prior to the start of Phase 2, and task-specific demobilization of equipment, personnel, and materials as well as stabilization of disturbed areas will occur on an ongoing basis as field work is complete. The length of time required for construction is dependent on a number of factors, including the geologic conditions encountered during well installation, the time required for regulatory and landowner approvals, and the availability of construction labor and materials at the time of construction. In addition to this initial construction period, provisional wells and associated infrastructure, if needed, could be constructed during Phase 1, Phase 2, or the operation and maintenance period, depending on the response of the plume.

The proposed Project analyzed in this SEIR includes a Future Activity Allowance which could occur during the construction and/or operation and maintenance phase. During construction, activities associated with the Future Activity Allowance could include the 25 Percent Potential Allowance for Project components identified in the Final Remedy Design. Activities included in

the Future Activity Allowance could include short-term immediate Project modifications made with concurrence from the parties in the field, and long-term modifications that are anticipated by PG&E far enough in advance such that a design or workplan for the feature (well, new segment of pipeline, etc.) would be possible, with appropriate review by stakeholders. All activities conducted under the Future Activity Allowance, as needed, will be tracked by PG&E and DTSC to maintain accurate levels of components installed under this allowance.

3.6.2.2 Construction Power and Lighting

Construction power would be supplied by portable generators whenever existing utility power is not readily available near the point of use. Approximately 6 portable generators would be operating simultaneously over an average work day, and 11 portable generators on a maximum-intensity work day. Types of portable generators that could be used include a 5,000 watt portable generator with hour meter or a 6,800 watt electric-start gas-powered portable generator. Types and models would be chosen directly by the construction contractor. With the exception of security lighting in the Construction Headquarters area, temporary lighting would be supplied by portable generators and lights, as needed and consistent with any applicable mitigation measures and conditions of approval. While night work is not planned as part of routine construction activities, it may be determined that limited circumstances require the continuation of work into the nighttime periods because it cannot be disrupted or suspended (for example, special conditions during drilling or concrete pouring) or work may require an early morning start to ensure completion within 1 day or because of heat constraints. For these special circumstances, nighttime construction lighting would be limited to active construction areas during nighttime or early-morning operations. To minimize lighting impacts, lighting would include shrouding or shielding for portable lights, the use of the lowest allowable height and fewest feasible numbers of lights consisting of downward-facing fixtures fitted with cutoff shields to reduce light diffusion. No permanent poles would be installed. However, lighting would also be required to comply with the minimum county, state, and federal security and safety standards.

3.6.2.3 Construction Traffic

Construction workers would be present on-site each day throughout the duration of construction. Heavy equipment would likely include drill rigs to install wells, trucks and excavators or backhoes to lay the pipeline network, and cranes to place control sheds and carbon substrate storage tanks. Trucks would be necessary for making deliveries and hauling waste from the site. For construction activities during a maximum work week, there would be 115 delivery truck trips to and from the work site and 560 worker vehicle trips to and from the work site per week. For functional testing, there would be 12 additional vehicles (4 technicians, 4 instrumentation specialists, and 4 engineers). Durations, staffing, and truck trips are summarized in Section 3.7.6, Task Durations and Staffing.

3.6.2.4 Soil Disturbance

Soil disturbance in the Project Area would occur with installation of extraction, injection, and monitoring wells; excavation of the new pipeline network; improvements to existing roads and construction of new roads; and construction of new buildings and supporting infrastructure.

Table 3-4 shows the total amounts of cubic yards of soil expected to be disturbed during construction. As shown in Table 3-4, the total amount of 45,200 cubic yards of soil would be

disturbed. This would be more than three times the 13,400 cubic yards of soil disturbance analyzed in the Groundwater FEIR. With the additional 25 Percent Potential Allowance assumed for specific Project components identified in Section 3.6.1 as part of the Future Activity Allowance, the amount of soil disturbance would increase by approximately 11,300 cubic yards. The difference is primarily because the Groundwater FEIR underestimated the volumes for roadways, excluded drill cuttings, and did not include the Station, Moabi Regional Park, and Arizona soil disturbance areas associated with the freshwater supply sources because they were not reasonably foreseeable at that time.

The Final Remedy Design includes a contingency in the event that unanticipated soil contamination is discovered in utility trenches or at locations where wells are to be installed. Additional soil sampling and analysis would be conducted to identify the appropriate disposal of the soil. The soil would be separated and stockpiled at the Soil Processing Area pending receipt of the analytical results.

3.6.2.5 Water Usage

Drinking water to be used by personnel during construction would consist of bottled water purchased from off-site sources. Water for other uses during construction activities would be trucked/conveyed from the existing water system at the Station, or other water sources, to locations in the Project Area. Example uses for construction water include dust control, equipment decontamination, process water for well construction, development, and testing; hydrostatic testing of constructed pipelines; and other activities. As shown in **Table 3-5**, the maximum amount of water used during construction is estimated to be a total of about 72 acre-feet for all construction and IM-3 Facility decommissioning activities (not per year). With the Additional Activity Allowance, water use (primarily for construction-related uses of additional Project components) could, although unlikely, be up to 25 percent more, or approximately 18 acre-feet (for a total of 90 acre-feet). This is an increase over the 9.2 acre-feet of water use assumed in the Groundwater FEIR, and is due to the increase in overall disturbed areas, and an expanded assumption that active dust control would occur on all roads that handle construction traffic, including public roads. However, this volume of water is within PG&E's allocation of 422 acre-feet per year and PG&E's 300 acre-feet per year of excess capacity.

TABLE 3-4
SOIL DISTURBANCE IN THE PROJECT AREA

Location within the Project Area	Volume of Soil Disturbance (cubic yards) (assumed in the Groundwater FEIR)	Volume of Soil Disturbance^a (cubic yards) (revised Final Remedy Design estimates)
Floodplain (includes MW-20 Bench and Ring Road)	3,400	11,000
Bat Cave Wash	1,400	500
Roadways (Excluding Ring Road)	4,600	11,000
Undisturbed areas	2,100	200
IRZ reagent storage tank	1,000	50
Well installation	900	5,600 ^b
Topock Compressor Station	Not Included	4,530
Moabi Regional Park	Not Included	2,120
Arizona	Not Included	2,000
All future provisional well locations	Not Included	4,900 ^b
Arizona - Pipeline B extension from HNWR-1A to Site B well	Not Included	2,600
Arizona - Wellhead improvements/civil work at Site B well	Not Included	200
TCS - Contingent Freshwater Pre-Injection Treatment System	Not Included	500
Total	13,400	45,200
Future Activity Allowance	Not Included	11,300
TOTAL SOIL DISTURBANCE		56,500

^a Amount of soil excavation or drill cuttings

^b Drill cuttings

SOURCE: Data provided by PG&E, February 17, 2015, February 26, 2016.

**TABLE 3-5
MAXIMUM AMOUNT OF WATER USED DURING CONSTRUCTION**

Types of Construction Water Uses ^a	Estimated maximum amount of water to be used during construction (acre-feet)			
	Remedy Construction		IM-3 Facility Decommissioning	Future Activity Allowance
	Phase 1	Phase 2		
Construction water for well installation, development, and testing ^b	3	2	0	1.2
Construction water for piping, utilities, vertical infrastructure, and access pathways ^c	35	29	2.1	16.5
Freshwater for functional testing	0.5	0.3	0	0.2
Freshwater for mitigation planting ^d	0.04	0.04	Minimal	0.02
Totals	38.54	31.34	2.1	17.92

NOTES:

^a Water sources discussed in Sections 3.6.1.5 and 3.6.1.7.1 of this chapter^b 80 percent of this water would not be consumptive use because it will be re-injected into the aquifer during drilling. All injection testing water will be reused purge water during extraction testing.^c Most of this water would be used for dust control; a small amount would be used for soil compaction, equipment decontamination, and for hydrostatic testing of pipelines.^d Mitigation planting is to address potential plant impacts that cannot be avoided during remedy construction.

SOURCE: Data provided by PG&E, February 2015.

The sources of water for construction water supply in addition to the water trucked from the water tanks at the Station include:

- **Existing Station water supply system.** This supply would be accessed by a temporary storage and distribution system so interference with Station operations is minimized. The existing water supply pipe would be tapped and temporary aboveground pipes would convey water from the taps to temporary freshwater storage tanks staged in the vicinity of the turnout area outside east of the Station entry gate.
- **Existing freshwater supply well in Arizona (HNWR-1, HNWR-1A, Topock-2/-3, or Site B).** This supply would be accessed either at the wellhead (typically, to support construction in Arizona) or through Pipeline B once it is constructed. Water would be pumped from the well using either a temporary pump/power supply (generator) or using the remedy equipment and power supply once it is constructed. If present, existing pumps in the wells would be used. The power supply would be from the Mohave Electric Cooperative.
- **Treated water from the IM-3 Facility.** Treated water from IM-3 Facility would be accessed by the existing IM-3 Facility storage and distribution system, or using a temporary storage and supply system until the IM-3 Facility is turned off from service at the start of the remedy. This option would only be pursued following agency concurrence and DTSC approval of PG&E's evaluation of the potential total dissolved solids (TDS) impacts associated with the use of IM-3 Facility treated water for dust suppression during remedy construction control.
- **Existing water supply for Moabi Regional Park.** This water supply is included as a contingency and would only be accessed as determined necessary and as authorized by the

water supply operator. If implemented, a water supply station would be established in the Construction Headquarters area using a storage and distribution system.

- **Other commercially available supplies.** Construction water would be obtained, as necessary, from commercially available supplies including, but not limited to, Golden Shores Water Company and the City of Needles. Water would be transported to the site via truck.

Primary construction water supply tanks (typically 12,000-gallon overhead fill tanks) would be staged near the given water source. Typically, water trucks would be used to convey water from the water sources to the work areas to support field work and wet down vehicle traffic routes, as determined necessary to suppress dust; however, a temporary network of aboveground distribution pipes may be employed to convey water to the appropriate work areas, where feasible, to minimize the disturbance associated with water truck traffic. Secondary construction water tanks would be placed in the primary work zones or adjacent staging areas in California and Arizona to support construction in a given work area.

Consumptive water use during operations would consist of about 2.8 acre-feet per year (0.91 mg per year) of water to the TCS evaporation ponds, off-site disposal, and miscellaneous water use. Consumptive water use during decommissioning activities is anticipated to be similar to during construction activities.

3.6.2.6 Water Management

Construction and Start-Up

Wastewater would be generated during construction activities from well installation, development, testing, and sampling. In addition, other miscellaneous wastewater streams would be generated from equipment and vehicle decontamination, water from hydrotesting of conveyance piping, and rainfall that collects in secondary containment areas. The total volume of wastewater generated over the entire construction period is estimated to be approximately 25 MG. On-site reuse and disposal of wastewater generated during construction would be maximized. Water not managed on-site would be transported off-site to a permitted facility. On-site options are discussed in Section 3.6.3.3.

Management at IM-3 Facility and TCS Evaporation Ponds

The DOI's ARARs for the operation of IM-3 treatment and injection facilities authorize the disposal of groundwater generated during well installation, well development, and aquifer testing, and purged groundwater and water generated in rinsing field equipment during sampling events for the area-wide groundwater monitoring program at the IM-3 Facility. The lined TCS Evaporation Ponds receive cooling tower blowdown water and evaporate the water as part of normal Station operations. Solids are removed from the Ponds periodically and as needed. The Ponds are also operating under Waste Discharge Requirements issued by the California Regional Water Quality Control (RWQCB) Board. Discharge of remedy-produced water to the ponds would require coordinating capacity with the Station operations and authorization by the RWQCB.

On-Site Reuse

Water from hydrostatic testing of conveyance piping may be reused on-site for dust control, backfill moisture control, and other similar uses in accordance with the substantive requirements of the SWRCB Water Quality Order No. 2003-003-DWQ, Statewide General Waste Discharge Requirements for Discharges To Land With A Low Threat To Water Quality. The water generated from hydrostatic testing would be low volume discharges with minimal pollutant concentrations, and would not be reused in a manner that results in a discharge to waters of the United States or waters of the state. The volume and date of each reuse event would be documented.

Injection at Individual Wells During Well Testing

Following well installation and development, a well may be tested to evaluate its maximum injection flow rate. This hydraulic testing involves extracting water from the well, storing the water in portable tanks, then injecting the water back into the aquifer at the same or nearby well through a filter to remove particulate matter. Because chemical additives would not be used during these well testing activities, the water would be injected without additional characterization.

In addition, remedy-produced water would be generated during remedy start-up activities, such as backwashing of wells. This wastewater stream would be transported on-site via piping or trucking to the Remedy-Produced Water conditioning plant, conditioned by removing solids and adjusting the pH, and transported via piping to the IRZ wells for re-injection and/or discharge to TCS Evaporation Ponds. The conditioning plant is not designed for treatment of RCRA and non-RCRA hazardous waste. Only non-hazardous waste would be sent to the TCS Evaporation Ponds. The estimated total volume of remedy-produced water is approximately 7.6 MG per year. Water not managed on-site would be transported off-site to a permitted facility.

Operation & Maintenance

Different types of remedy-produced water (including spent solutions from CIP) require different management approaches. Multiple options are maintained to provide operational flexibility and reliability (see Section 6.1/Exhibit 6.1-2 [Waste Management Plan] of the O&M Plan [Volume 1 of the O&M Manual] for details). A major portion of the produced water would be conditioned in the remedy-produced water conditioning plant located inside of the Station. Certain waste streams generated by the remedy (e.g., first flush wastewater from well rehabilitation or purge water from certain monitoring wells) may exhibit hazardous levels of dissolved chromium and/or arsenic. Such streams would be appropriately managed and not sent to the TCS Evaporation Ponds.

3.6.2.7 Construction Staging

Site preparation and demarcation activities would be conducted for areas where construction-related activities occur and include the following types:

- **Primary Work Zones (also called Construction Areas)** – These zones are defined as the immediate area where actual construction would occur for a given component of remedy infrastructure. For example, the primary work zone for the construction of a well would consist of a defined area around the well location, while the zone for the construction of a

pipeline would consist of an area on one or both sides along the length of the pipeline. To the extent feasible, primary work zones would be limited to previously disturbed areas (that is, minimizing use of undisturbed areas and those potentially exposed to differential compaction).

- **Staging Areas (also called Support Zones)** – Most of the staging areas would be located adjacent to or near primary work zones to support construction. Staging areas would be located in existing disturbed areas (that is, minimizing use of undisturbed areas and those potentially exposed to differential compaction). These areas would be used to minimize the size of the primary work zones by centrally placing temporary facilities (such as portable toilets and break areas) and for laydown of construction equipment, materials, supplies, and tools. Displaced soil, material (e.g., asphalt), and water generated in the primary work zones might also be temporarily staged in route to the designated storage or disposition area so that the size of the primary work zones can be minimized. Staging areas would also be used to coordinate transportation activities—for example, a staging area for the management of wastewater generated during well construction and development on the floodplain would be set up at the centrally located MW- 20 Bench. This central wastewater management area would include a series of portable frac tanks for temporary storage of wastewater, a truck haul station for hauling of wastewater, and pumping facilities to pump the wastewater to the IM-3 treatment plant, as appropriate, thereby limiting the need for these activities in the primary work zones on the flood plain.

Tanks, bins, or tanker trucks would be used to contain excess water and drill cuttings (e.g., the fragments of rock and soil that are removed to create the borehole) in the primary work zone and at designated staging areas. Displaced soil, material (e.g., asphalt), and water generated in the primary work zones might also be temporarily staged in staging areas in route to the designated storage or disposition area so that the size of the primary work zones can be minimized.

- **Soil Processing/Clean-Soil Storage Area** – This area would be located near Moabi Regional Park, and is the primary area where soil and material displaced during construction activities would be brought for staging, processing, and potential reuse in the Project Area. In addition, this area would be used for storage of excess clean soil generated from construction of the remedy.

As shown in Figures 3-8, and **Table 3-6**, there are a total of 23 proposed staging areas. Some of the previously proposed staging areas are no longer being considered for use, hence the exclusion of certain staging area numbers in Table 3-6.

DTSC recognizes and acknowledges the importance of the Topock area to the Tribes as a significant cultural and historic area. Since 2013, DTSC has encouraged Tribal input on staging areas to be avoided during implementation of the Final Groundwater Remedy Project. The FMIT, Hualapai Indian Tribe, and Cocopah Indian Tribe submitted a table to DTSC indicating which staging areas should be avoided in the Final Groundwater Remedy Project. In the Final Remedy Design Directive letter dated October 19, 2015, DTSC details which staging areas were eliminated from use in the Final Groundwater Remedy Project. DTSC also detailed conditions PG&E must follow when using Staging Areas 6, 7, 12, 13, and 25, in order to minimize impacts on the areas and surrounding areas.

**TABLE 3-6
PLANNED STAGING AREAS**

Staging Areas ID	Location and Purpose	Approximate Size (in acres)
Moabi Regional Park Area		
#4	Construction Headquarters Area southeast of NTH and BNSF Railroad intersection	1.88
#5	Soil Processing and Staging Area northwest of NTH and BNSF Railroad intersection	2.56
Upland Area		
IM-3 System	Ongoing operation of IM-3 Facility until decommissioning, and for communication and coordination during remedy construction	0.98
#6 and #8	North and northeast of IM-3 Facility, respectively – Primary construction work zone and staging area for wells, vaults, piping, instrumentation; no long-term storage and lavatories are allowed in area 6.	0.73
#7	North of IM-3 Facility – Support zone for construction work zone and staging area for wells, vaults, piping, instrumentation; no long-term storage and lavatories in this area.	0.33
#12	West of IM-3 Facility – Primary construction work zone and staging area for laydown of construction equipment, materials, supplies, and tools, as well as temporary placement of displaced soils	1.45
#13	West of IM-3 Facility – Staging area for laydown of construction equipment, materials, supplies, and tools, as well as temporary placement of displaced soils; also to be used as critical vehicle turnaround area	0.12
MW-20 Bench and Vicinity		
#14	West of National Trails Highway and Colorado River – Primary work construction zone for Well MW-Z; staging area for construction of NTH IRZ	0.1
#18	MW-20 Bench Facility – Primary construction work zone for carbon amendment facilities; staging area for NTH IRZ and other remedy infrastructure; IM-3 Facility operation and maintenance activities until IM-3 Facility decommissioning	1.29
Near I-40 On-/Off-Ramp (California)		
#9	Park Moabi Road north of I-40 – Construction staging area	1.03
#10	Park Moabi Road south of I-40 – Subject to concurrence from Caltrans, construction staging area	0.45
TCS and Vicinity		
#11	TCS Evaporation Ponds – Primary construction work area for remedy infrastructure; staging will be limited to the western side of the fenced area	2.68
#20	North of Topock Compressor Station – Not currently proposed for use; if Provisional Well IRL-6 is needed, then this would be a primary construction work zone for the well, vault, piping, and controls	0.52
#21	Topock Compressor Station – Primary construction work zone and staging area	11.72
#22	East of Topock Compressor Station – Primary construction work zone for Pipeline F	0.74
#23	TW Bench east of Topock Compressor Station – Primary construction work zone for remedy infrastructure at the TW Bench; staging area for Pipeline F and other remedy infrastructure	0.41
#24	East of Topock Compressor Station and west of Colorado River – Primary construction work zone for remedy infrastructure in the topographic low area	0.54
#25	East of Topock Compressor Station and west of Colorado River – Flat area to be used for vehicles and water trucks to obtain water; limited materials and equipment staging; limited temporary parking; Route 66 sign will be cordoned off with protective barriers	0.34
Arizona		
#26 – #28	Remedy System area on Arizona Side, north of I-40 – Staging of equipment and materials	2.49
#29	Remedy System area on Arizona Side, south of I-40 – Staging of equipment and materials	0.65

SOURCE: CH2M Hill 2015a.

3.6.2.8 Construction of Wells

The following information describes the proposed approach to construction of new wells associated with the Final Groundwater Remedy Project, including extraction, injection, and monitoring wells. While the specific design and function of each well or well type would vary, the approach to construction for each would use similar methods, tools, and procedures. For many wells, the approach to finalizing the design and/or siting would depend on the information collected during location-specific well construction and/or information collected during the construction and testing of other nearby wells.

Well construction and testing would be conducted intermittently throughout the Project duration. Most wells would be installed during the construction period, but some wells, especially the provisional, may be installed during the operation and maintenance period. This duration is based on preliminary work sequencing assumptions and the assumption that a range of up to five drill rigs would be operating concurrently at any time over the given duration. In general, well-testing activities would be conducted following the completion of well construction and development in a given testing area.

The following describes the methods, tools, and general procedures that would be used to drill the boreholes that are needed for data collection (pilot boreholes) and well construction. The methods, tools, and general procedures are consistent with the analysis contained within the Groundwater FEIR. **Figure 3-9** shows a typical drill rig to be used for the Final Groundwater Remedy Project, which is the same as what was presented in Exhibit 3-10 of the Groundwater FEIR depicting a typical drill rig for the installation of a monitoring well.

- **Drill Rigs and Drilling Methods.** Drill rigs would be mounted on either a tracked vehicle or highway-rated truck/trailer. In general, the footprint of the drill rig would be a maximum of 10 feet wide by 50 feet long. The type of drill rig used would vary depending on the borehole depth and diameter, data collection requirements, and the subsurface conditions to be drilled through.
 - Rotosonic is the preferred method for drilling through unconsolidated materials above bedrock for 6- to 12-inch-diameter boreholes; this method has also been used at Topock for limited applications for drilling in the conglomerate and crystalline metadiorite bedrock. During the construction of the proposed Project well network, it is anticipated that the rotosonic method would be most useful when installing pilot boreholes for data collection or installing smaller-diameter wells (for example, monitoring wells with two or less nested, 2-inch-diameter well casings). The method typically does not require the addition of drilling additives but may require the addition of water for larger-diameter or deeper boreholes.
 - Rotary drilling with a casing advance (i.e., dual-rotary, dual-tube methods) is the preferred method for drilling through unconsolidated materials above bedrock for larger diameter boreholes when continuous core is not required. The method may require the addition of water or drilling additives may be required. Typical additives are discussed further in this section.



- Conventional rotary drilling (e.g., air rotary, mud rotary, tri-cone roller bit, percussion hammer) is used for drilling through both unconsolidated materials and bedrock. Drilling fluid is commonly used because the method does not use an outer drill casing to stabilize the borehole. It is anticipated that air rotary would be used to install the extraction wells at the east end of the East Ravine area. Mud rotary is not planned for use but may be used in the upland area if other drilling methods are unsuccessful or inefficient.
- Wireline core drilling methods are preferred for drilling through bedrock when relatively undisturbed core samples are beneficial for well design. This method uses a dual-barreled or triple-barreled core barrel and diamond core drill bits. Typically, water with no additives is used for the drilling fluid, but sometimes a polymer additive is needed to remove cuttings from the borehole. It is anticipated that the wireline method would be used for drilling the deeper portion of MW-70BR-D in the East Ravine.
- Bucket auger methods are used for large-diameter boreholes in unconsolidated materials when other methods are not capable or inefficient of drilling the borehole. This method is typically used to install large-diameter conductor casings to depths generally less than 100 feet. The method uses a bucket with a cutting edge to cut through materials and remove them by bringing the bucket to the surface. The method typically requires the use of a conductor casing and drilling fluids to keep the borehole open. It is anticipated that a bucket auger would only be used if large-diameter conductor casings become necessary to maintain borehole integrity.
- Hollow-stem auger drilling methods are typically used to install smaller-diameter boreholes in finer-grained (minimal cobbles and boulders) unconsolidated materials to shallower depths (less than 100 to 150 feet). Drilling fluids are typically not needed unless required to manage borehole pressure (e.g., heaving sand conditions). Usually, this method is not used at Topock because of the rocky lithology and occasional heaving conditions. However, this method may be used for shallower wells near the southern end of the NTH IRZ where the unconsolidated materials are thin and the depth to groundwater is shallow.
- **Drilling fluids.** To assist in keeping boreholes open during drilling and well construction, air, water, and drilling additives may be added to boreholes. The primary fluids used would be air and/or water. However, drilling additives may be needed based on field conditions. The drilling additives would be commercially available products typically used in the water supply and drilling industry and would be compliant with National Science Foundation/American National Standards Institute Standard 60: *Drinking Water Treatment Chemicals – Health Effects*. Potential additives include foaming agents, bentonite-based products, and fluid control additives. In all cases, wells are developed following construction. The purpose of well development, in part, is to remove the drilling fluids, muds, and/or additives (to the extent practicable), which can interfere with the geochemical environment of the aquifer to be sampled and/or treated. The fluids would be placed in the bins or tanks described below for off-site disposal.
- **Primary Service Truck or Trailer.** A drill rig would be supported by a truck or trailer used to deliver and manage larger drilling tools like the drilling pipe or well casing. In some cases, this would be the same truck that delivers water to the drill rig. This vehicle is usually

positioned adjacent to the drill rig and often end-to-end. The dimension of this piece of equipment is typically similar to or smaller than the drill rig.

- **Secondary Support Equipment.** This smaller equipment would vary from rig to rig and is primarily dependent on the drilling method or given task. Examples of secondary support equipment that might be required include, but are not limited to, the following:
 - Auxiliary compressors, pumps, and generators
 - Material management equipment (backhoe or forklift)
 - Solids control unit for management of drill cuttings when drilling fluids are recirculated
 - General equipment trailer(s) to store smaller tools and materials
- **Bins and Tanks.** Drill cuttings and fluids generated during drilling would be temporarily stored in the primary work zone and/or staging area using tanks and bins. It is estimated that tanks would range in size from fixed-axle tanks that are approximately 9 feet wide by 50 feet long by 12 feet high to those that are smaller and mounted on a skid or trailer. The dimension of a typical bin (20-cubic-yard capacity) is approximately 25 feet long by 8 feet wide by 5 feet high; however, smaller bins might also be used. The amount of storage capacity required at each drilling site would vary significantly depending on variables such as the production rate of groundwater from the formation and the drilling method, but it is estimated that up to three tanks and three bins could be required to support the drilling of a borehole at a given time.
- **Crew Vehicles and Facilities.** Vehicles used by the crew to access the primary work zone and staging areas would range from standard highway vehicles to smaller off-highway vehicles. The exact number of vehicles would change depending on location and crew size at a given time but would typically be less than five. Temporary bathroom facilities would typically be in the primary work zone or staging areas unless the given area is within a jurisdictional area.

Throughout work, the crew would continuously assess what specific equipment is needed for a given task. Effort would be made to minimize the amount of equipment in the work zone. For example, if storage tanks were initially needed but are no longer required for a given task, then they could be removed. Similarly, if several drilling sites are located in the same general area, then a central tank staging area could be used to minimize the number of physical locations where the tanks are staged, thereby minimizing total footprint.

3.6.2.9 Construction of Fluid Conveyance, Utilities, Buildings, and Roadways

Fluid Conveyance/Electrical Power Supply and Distribution

Fluid conveyance piping and electrical conduit systems would connect together different components of the remedy system such as wells and buildings. The fluid conveyance pipelines and electrical/fiber optic lines would be predominantly located belowground in trenches. With the change of placing the Bat Cave Wash pipe crossings belowground, there is, overall, less aboveground conveyance piping than envisioned in the Groundwater FEIR. The design contains five typical configurations for these systems:

- Direct burial - Pipes, conduits, and/or wires are placed in an excavated trench so they are in direct contact with the ground, earthen backfill, and/or concrete encasement.
- Concrete trenches - Typically made of precast concrete, box-like concrete trenches are placed in an excavated trench and joined to make a continuous trench, and then the pipes, conduits, and/or wires are placed in the concrete trenches. Alternatively, concrete trenches may also be cast-in-place.
- Trenchless technologies - An underground hole is created to install a carrier pipe under the ground and then pipes, conduits, and/or wires pulled through the carrier pipe.
- Installed aboveground - In this instance pipes, conduits, and/or wires are installed close to or above the ground surface and are often attached to other structures for support.
- Installed on pipe bridges - Also an aboveground option, the pipes, conduits, and/or wires are installed high above the ground on bridges.

Conveyance piping and utility systems are often installed sequentially from one end of the pipe to the other. However, the number and location of work sites and crews for a given pipeline would vary over time based on site specific factors including equipment availability, market rates, employee skill sets, construction schedule, the size/structure/scope of the construction contract(s), and site conditions encountered in the field.

Buildings

The surface surrounding buildings would typically consist of a gravel layer during the remedy construction phase. Portions of the Construction Headquarters yard supporting long-term operation and maintenance use may be paved in the future.

The construction procedures for buildings are described in the C/RAWP (CH2M Hill 2015b). Buildings would be constructed as slab-on-grade structures. Concrete foundations would be built by excavating holes and trenches in the ground and using cast-in-place reinforced concrete footings. Construction equipment would be used to excavate soil, and the excavated soil would be loaded directly into haul vehicles and/or temporarily stockpiled near the excavations. Excavation in hard soil or rock may require special excavation techniques such as road mining, ripping, grinding, and/or hoe-ramming. Concrete would be delivered to the site and placed in the forms and around the reinforcing steel in one or more pours. Concrete pumping equipment may be used to place concrete in forms. Generally, the structural framing and outer skin of metal buildings would be prefabricated then assembled on-site. Masonry structures would be constructed on-site. Structural members would be welded and/or mechanically fastened together (bolted, screwed or riveted). Wall and roof skins would be attached next using mechanical fasteners or, in some case, welding the components. Electrical, plumbing, and HVAC systems would be installed concurrently as erection of the structure progresses. Equipment and conveyance piping for the remedy process systems would also be installed concurrently as the various areas are ready for the different components. Finishes, such as paint, hardware, electrical and plumbing fixtures, would be generally accomplished later in the process to avoid damages to the exposed components. Exterior visible finishes would be in conformance with the Groundwater EIR Mitigation Measures AES-1d and AES 2e, which require the color of the wells, pipelines, reagent storage tanks, control structures, and utilities consist of muted, earth-tone colors consistent with

the surrounding natural color palette. Matte finishes shall be used to prevent reflectivity along with the view corridor. Integral color concrete should be used in place of standard gray concrete. Decommissioning of structures is discussed in Sections 3.8.2.1 and 3.8.2.2.

Temporary and Long-Term Access Routes and Roadways

Although existing access routes and roads would be used (and periodically maintained) to the maximum extent possible, two types of access roads would be installed as part of the remedy: temporary access roads used for construction, start-up activities, and eventual decommissioning activities; and long-term access roads used to regularly operate and maintain the groundwater remedy. Preferred existing and new access roads proposed to be used or installed as part of the Final Groundwater Remedy Project are shown in Figure 3-8. In addition to the access routes and roads shown in Figure 3-8, all existing access routes located on maintained roads into and out of the Project Area could occasionally be used during Project construction, operation and maintenance, and decommissioning (e.g., travel east and west of the site along the I-40 freeway, travel to/from local suppliers, travel through Needles to access well MW-54 on the peninsula, routes to private water supply wells, or customarily used routes for river water sampling activities). No Project-related improvements would be made to these roads.

Temporary Access Routes/Roads

Construction of temporary access roads would include the use/improvement of existing access routes and roads and/or the clearing, or regrading of the ground to provide an adequate driving surface. Large rocks would be removed from the road alignment and, if necessary, vegetation would be trimmed, cut, and/or cleared. If the existing subgrade base material is soft or loose, it may be reinforced, removed and replaced, or both. Geotextiles, geogrids, steel mats, plastic mats, sand grid, and/or soil stabilizers may be used to reinforce soil. If soil is removed and replaced, the excavated subgrade soil may be loaded directly into haul vehicles or stockpiled near the excavation for reuse. The replacement soil would generally be a coarse-grained material such as gravel, crushed rock, and/or aggregate base, built and maintained to carry the construction equipment expected on that route. In some cases, road surfacing is not needed, or it may incorporate coarse-grained soil and/or compacted native soil.

The use of temporary construction access routes would be discontinued after the necessary construction activity. After the temporary use, the access would be abandoned or restored. An example of this type of temporary access exists at the well MW-Y area where track mounted drill rig would access work areas across dredge sands during well installation, followed by installation of light duty plumbing and electrical conduit in trenches from the well head to the existing road. After construction is completed, the area and the access route would be restored as needed, and as directed through compliance with mitigation measures in this SEIR. Sampling would take place remotely from the existing road; therefore, eliminating the need for a long-term road to access the well head.

Long-Term Access Routes/Roads

Long-term access routes/roads would allow for regular operations and maintenance activities; in some locations, access roads and pipelines would share the same alignment. The proposed access routes/roads are described in Section 3.6.1.9.4. Select segments are described below.

For the unpaved access to Wells IRL-2 and IRL-4, the road ground surface would be cut to grade, compacted, and covered with a layer of gravelly soil called aggregate base (essentially a processed mixture of sand and gravel). Aggregate base would be acquired within 60 miles of the Project Area, with reuse of on-site sand backfill material and crushed rock as much as possible.

For the Floodplain Road, a new ring-shaped access and connecting spurs would be constructed in the floodplain to support construction and provide long-term access to the wells. The road may be constructed on granular stabilization rock depending on the stiffness of the existing subgrade soil. The structural layers in the road would consist of gravel, aggregate base, and geosynthetic layers such as geotextiles. The road materials would be placed and compacted in lifts or layers after preparing the subgrade.

For the TW Bench Area, the parking lot would be covered with asphalt concrete pavement. The ground surface would be cut to grade, compacted, and covered with a layer of gravelly soil called aggregate base. In addition, a new road would be installed to provide access to the existing TW Gas Metering Station yard from the north. The footprint of the new access would be cleared and graded, and the remaining subgrade would be compacted. The road would be surfaced with gravel or aggregate base.

For FW-2 access, improvements would be made to the road that leads into Bat Cave Wash to the west of the Station. The improvements would consist of installing new drainage structures, raising the road elevation, and providing a new road surface. This work would be accomplished with heavy construction equipment. New drainage structures, such as ditches, inlets, and pipes, would be installed by excavating below the ground surface and placing the structures in the excavation. The road would be raised by placing fill on the existing surface, cutting soil from higher portions of the road, and placing it on lower portions to create a more uniform surface. The fill would likely be borrowed from other excavations at the Project Area. The road surface would be created by spreading and compacting imported gravel on the surface.

For the Construction Headquarters, the existing access road south of the NTH would be used to cross the channelized ephemeral wash that originates from three culverts under the BNSF railroad tracks and runs southwest to northeast adjacent to the Headquarters area. The existing unpaved access route would be improved as described above and drainage will be engineered to divert flow through a concrete spillway. The existing unpaved access route north of the NTH will also be improved as described above.

Based on ongoing discussions with Caltrans, it may be necessary to relocate proposed wells at MW-U location and possibly even existing wells MW-40S and MW-40D out of the I-40 freeway median. If required, the wells would likely be moved due north of the freeway on Caltrans-leased land or BLM land. Access to the wells would require new road construction as described above and include construction from the bottom of an unnamed wash segment to the top of an isolated mesa located between the freeway and railroad.

3.6.2.10 Construction of Freshwater Pipeline on Arched Bridge

The installation of freshwater conveyance Pipeline B on the Arched Bridge over the Colorado River would require the use of customized roller-type pipe supports bolted to the bridge deck. A

temporary elevated working platform would be installed to the existing deck beams to allow installation. The 12-inch-diameter pipe would be delivered to the Arizona side of the river, welded together to create segments of workable length, lifted onto the pipe supports and welded to the other pipe segments already on the bridge. The pipe could be hydrostatically tested in segments before mounting on the bridge, or the entire installed pipeline could be hydrostatically tested after mounting. None of the work activities would occur in the water (Colorado River).

3.6.3 Description of Operation and Maintenance of the Final Groundwater Remedy Project

Operation and maintenance of the entire Final Groundwater Remedy Project is forecast to begin in around January 2022 and would occur during the entire period in which cleanup activities would be ongoing and until the cleanup goals defined in the Objectives have been met (see Section 3.4). It is recognized that the NTH IRZ and those components required for operating the NTH IRZ would be started up and begin operation earlier (after Phase 1 Construction is complete), and as early as January 2019. The cleanup goal has been defined as the regional background level of 32 µg/L of Cr(VI). Depending on the performance of the Final Groundwater Remedy Project, the anticipated remedial timeframe is estimated to be about 30 years, followed by up to 10 years of long-term monitoring and concurrently up to 20 years of arsenic monitoring. If monitored natural attenuation is selected to continue remediation for portions of the plume, the long-term monitoring may be longer.

The groundwater remedy would comply with the O&M Manual in the Final Remedy Design (CH2M Hill 2015a). The O&M Manual includes of plans for operation and maintenance, sampling and monitoring, standard operating procedures, and management of contingencies associated with the Final Remedy Design. The manual consists of the following components:

- **O&M Plan** – Describes the main remedy system and its supporting systems, procedures for operation and maintenance (including start-up/shutdown), replacement schedule for equipment and system alarms, well and pipeline maintenance, waste management practices, road maintenance, stormwater pollution prevention, and hazardous material management.
- **Sampling & Monitoring Plan** – Presents goals and data quality objectives for sampling and monitoring of groundwater, surface water, and process water, details for various monitoring programs including remedy compliance monitoring, in-situ remediation performance monitoring, monitoring for other constituents of potential concern, monitoring of freshwater sources, process control monitoring for the remedy-produced water management system, and domestic/private well monitoring.
- **Contingency Plan** – Contingency planning and procedures to address potential operational problems and equipment failures.
- **Soil Management Plan** – Sampling protocols and analysis for soil and the plan for managing soils during operation and maintenance; sampling and analysis plan to document baseline soil conditions prior to remedy implementation, and plan to implement Best Management Practices to prevent or reduce stormwater pollution related to soil storage activities during remedy construction and operation and maintenance.

- **Project Health and Safety Plan** – Provides a framework for safe operation and maintenance of the groundwater remedy and includes procedures that would apply to PG&E employees and/or contractors who may operate and maintain the groundwater remedy.

As described in Section 3.6, the proposed Project analyzed in this SEIR includes a Future Activity Allowance, which could occur during the construction and/or operation and maintenance phase. During the operation and maintenance phase, activities associated with the Future Activity Allowance could include: (1) the 25 Percent Potential Allowance for all Project infrastructure; and (2) 10 additional monitoring well boreholes to be installed in Arizona as part of the monitoring program to assess monitor groundwater levels and chemical constituents as a result of freshwater pumping. Activities included in the Future Activity Allowance during operation and maintenance could include short-term immediate Project modifications made with concurrence from the parties in the field, and long-term modifications that are anticipated by PG&E far enough in advance such that a design for the feature (well, new segment of pipeline, etc.) would be possible, with appropriate review by stakeholders. Given the nature of activities involved with operation and maintenance, it is assume the majority of features to be installed under the Future Activity Allowance would be able to be conducted as long-term modifications. All activities conducted under the Future Activity Allowance, as needed, will be tracked by PG&E and DTSC to maintain accurate levels of components installed under this allowance.

3.6.3.1 Final Groundwater Remedy Operation and Maintenance

Normal Operations

Normal operations of the groundwater remedy would include groundwater extraction and recirculation, carbon substrate storage and deliveries; carbon substrate injections, and monitoring and control of the system. There would also be activities associated with freshwater supply, conveyance, and storage; remedy-produced water management; pre-injection water treatment (if required); power supply and distribution; and the Remedy SCADA system. All of these systems would require regularly scheduled maintenance to keep the systems functioning in an efficient and optimal manner.

In general, normal operation of the groundwater remedy associated with optimization of the groundwater extraction and recirculation systems would be accomplished through use of the Remedy SCADA system housed at the TW Bench. Carbon substrate would be delivered by tanker truck to the carbon storage tank at the MW-20 Bench. Operation personnel would be present during all chemical transfer activities and would verify the liquid level in each tank prior to beginning the filling operation to prevent overfilling. The tank would have secondary containment and be outfitted with level detectors and alarms to prevent overfilling.

Carbon substrate dosing and injection into the NTH IRZ, IRL, and TCS Recirculation Loop wells would also be primarily controlled by the Remedy SCADA system. Carbon substrate would be delivered to individual injection wells by a system of distribution lines and manifolds. The design incorporates the flexibility that would also allow for the injection of carbon substrate directly to selected wells through connections in the well vaults. Those individual well injections would be accomplished by pulling a portable tank to the well on a trailer or in a smaller vehicle carried by an operator during work hours. The anticipated footprint of these operations would be similar to

that for sampling or maintenance of a well. All carbon substrate delivery valves and controls would be tested before start-up. There are system controls that are linked to the Remedy SCADA system including well packer pressure sensors and process control features that would allow operators to detect leaks or flow problems in the carbon substrate delivery system.

Regularly scheduled equipment operation and maintenance activities would include regular record keeping on important information from the Remedy SCADA system, such as tank levels and flow data. It would also include regular visual inspections of aboveground storage tanks for signs of damage, leaks, or excessive deformation of tank walls. Vent pipes and screens would be inspected and cleaned as needed. Carbon substrate pumps, well maintenance reagent pumps, and submersible well pumps would be regularly maintained according to manufacturer's recommendations and as established in the operation and maintenance manual and standard operating procedures (SOPs).

Monitoring flow rates through the Remedy SCADA system would help identify potentially faulty well pumps that may require removal from the individual wells for servicing. Planned actions, therefore, include maintenance of all equipment or replacement of faulty devices to keep the final groundwater remedy systems operating.

Regular planned activities for the freshwater supply, conveyance, and storage system would follow SOPs to guide the testing of the system start-up and shutdown procedures; well maintenance and cleaning and maintenance of the instrumentation and control equipment.

Maintenance activities for the Remedy-Produced Water Management system would follow SOPs for cartridge filter change-out; produced water storage tank cleaning and inspection; produced water conditioning system secondary containment inspection and operation; phase separator loading and removal; cleaning and maintenance of instrumentation and control equipment; and conveyance system and secondary containment inspection and maintenance.

Contingency Operations

The Final Remedy Design includes contingencies in the event that the groundwater remedy does not remove Cr(VI) as expected or the extraction system is not effective at preventing Cr(VI) or byproducts from migrating toward the Colorado River. The Operation and Maintenance Manual, Volume 3, Contingency Plan (Final Remedy Design, Appendix L; CH2M Hill, 2015a) itemizes potential causes and provides contingencies to address the possible causes. Potential causes and the contingencies to address the causes are summarized below.

- Insufficient volume of carbon substrate: Operational adjustments could include increasing the flow rate of the carbon substrate or changing to a different carbon substrate.
- Inadequate well spacing or Cr(VI) plume is larger than expected: Operational adjustments could include installing provisional wells in areas where treatment is underperforming.
- Recalcitrant (resistant to treatment) contaminant mass in immobile pore spaces: Operational adjustments could include installing provisional wells in areas where treatment is underperforming or changing to a different carbon substrate.

- Unexpected hydrogeologic conditions (e.g., preferential flow paths allowing groundwater to flow through treatment zone without treatment): Operational adjustments could include installing provisional wells in areas where groundwater flow is missing the treatment zone
- Limitations to injection and/or extraction: Operational adjustments could include installing provisional wells in areas where limitations are observed or redirecting water from the TCS Recirculation Loop to the NTH IRZ.
- Inadequate extraction: Operational adjustments could include adjusting pumping rates of wells or installing provisional wells in areas where extraction is underperforming.
- Excessive extraction: Excessive extraction could cause oxic water from the river to be pulled into the floodplain reducing the naturally-occurring reducing area near the river. This natural reducing zone would be used to treat residual levels of Cr(VI) after active remediation ends. Operational adjustments could include adjusting pumping rates of extraction wells along the riverbank to reduce excessive extraction.
- Insufficient treatment at the TCS Recirculation Loop: The remedy design at the TCS Recirculation Loop may be ineffective at driving the plume through the treatment zone. Operational adjustments could include injecting freshwater at the upgradient edge of the plume of the TCS Recirculation Loop. This would also require the installation of arsenic monitoring wells.

The Final Remedy Design includes contingencies in the event that the treatment methodology results in generating manganese, an in-situ byproduct, at concentrations above basin water quality objectives. Available methods for the treatment of manganese and iron are described Appendix J of the Final Remedy Design and include PG&E's preferred method of adsorptive or greensand filtration (CH2M Hill 2015a). The method would include two banks of eight filters consisting of filter with filter media in pressure-rated housings, submersible and process pumps, piping, valves, chemical storage tanks and metering pumps for sodium hypochlorite, polymer, and sodium bisulfite, a surge tank and a decant tank. The equipment would be mounted on a 2,500 square foot concrete foundation with a building or partially-sided roof (sunshade). The flow rate to the system is estimated at 150 to 500 gpm. The system could be located at TW bench or MW-20 Bench (after IM No.3 is decommissioned/removed), but not at the Station, the Remedy-Produced Water Conditioning Plant, or the FWPTS.

The Final Remedy Design includes contingencies in the event that the conveyance pipelines do not convey fluids as designed. The Operation and Maintenance Manual, Volume 3, Contingency Plan (Final Remedy Design, Appendix L; CH2M Hill, 2015a) itemizes potential causes and provides contingencies to address the possible causes. Potential causes and the contingencies to address the causes are summarized below.

- Leaks or breaks: The pipeline system has leak and pressure drop detection alarms that would automatically shut the system down. The secondary containment and well head boxes would limit the volume of fluids released before automatic system shutdown. Repairs would then be made, the system tested, and system operations restored.
- Fouling or clogging: The clean-in-place system (see Section 3.6.1.6) would minimize solids build-up and pipeline cleanouts would provide access to sections of pipelines that clog or

foul. The pressure detection alarms would identify pipeline sections with clogging or fouling and that portion of the system would be temporarily shut down and cleaned. If necessary, buried pipeline sections would be excavated and replaced.

- Release of pipeline maintenance chemicals to wells: The clean-in-place system is programmed to require wellhead valves to be closed prior to clean-in-place operations. In the event that the wellhead valve is not closed, clean-in-place maintenance chemicals would be discharged to the well. This would require rehabilitation of the well, similar to well development, where groundwater and the well maintenance chemicals would be pumped out of the well.

3.6.3.2 Long-Term Remedy Support Area

Operation and maintenance activities at the Long-Term Support Area would include on-site sample processing, and vehicle and equipment storage, decontamination, and maintenance. Routine and non-routine operation and maintenance activities would include inspection and preventative maintenance of the generator and solar panels; water delivery to the potable water tank; inspection and maintenance of the booster pump; removal and off-site disposal of sewage; decontamination of vehicles and equipment; management of rainwater collected in the secondary containment; inspection and maintenance of the sump pump; and off-site hauling of wastewater from the decontamination water storage tank. Water from this tank will be trucked to the appropriate location (e.g., the Remedy-Produced Water Conditioning Plant, TCS Evaporation Ponds, or off-site) for management. Soil could also be stored in the temporary construction laydown area, if needed, during implementation of the Future Activity Allowance, and if the soil stockpile area is at capacity.

3.6.3.3 Remedy-Produced Water Management

Normal Operations

As discussed in Section 3.6.1.5, well backwashing and rehabilitation, purge water from monitoring well sampling, equipment decontamination wastewater, and rainfall that collects in remedy facility secondary containment would result in remedy-produced water. The volume is estimated at about 7.6 MG per year. The wastewater chemistry of the injection and extraction wells would not be known initially until the water is pumped out of the wells and analyzed. Once the water chemistry is known, management of the wastewater would have the four options based on water quality summarized in **Table 3-7**.

The highest quality would be sent to the Remedy-Produced Water Conditioning System for processing and reuse by injection into IRZ wells or by blending with freshwater for use in TCS cooling towers. The volume of conditioned water available for reuse is estimated to range from 5.8 MG per year to the entire volume of 7.6 MG per year, depending on changes in the water quality over time. The volume is anticipated to increase over time as the Final Groundwater Remedy Project reduces contaminant concentrations.

TABLE 3-7
CRITERIA FOR REMEDY-PRODUCED WATER MANAGEMENT OPTIONS

Reuse/Disposal Option in Decreasing Order of Preference	Criteria	Comments
Reuse by injection into IRZ wells	Neutral pH (6.5 to 8.5) and non-hazardous	Adjust pH, if necessary
Reuse by blending with freshwater for use in TCS cooling towers	Neutral pH (6.5 to 8.5), non-hazardous, low TDS, low solids, and low concentrations of iron, silica, and manganese to prevent fouling	Limit to freshwater well backwash water
Discharge to TCS evaporation ponds	pH > 2.0 and non-hazardous	
Off-site disposal	No limitations	

SOURCE: CH2M Hill 2015a.

Reusing the water in the IRZ injection wells would assist in containment of the contaminant plume and in driving the contaminated water through the IRZ and promote treatment while reducing freshwater needs. This would also be consistent with the goal of near-zero consumptive use of water since the water would be returned to the basin. Reusing the water in the TCS cooling towers would serve as in-lieu groundwater recharge since the Station wouldn't have to import as much water for operational use in the cooling towers.

Contingency Operations

The remedy-produced treatment system has the flexibility to be altered to address unanticipated water quality conditions. Additional settling tanks and filters can be installed to handle excessive solids loads. Redundant tank educators can be installed to adjust high or low pH. Conditioning units can be added to remove scaling ions that can foul pipelines and wells (e.g., calcium, magnesium, iron). In addition, the system has automatic pressure and leak detectors that would automatically shut the system down to enable repairs of leaks or other system failures.

If the volume of treated remedy-produced water exceeds the capacity of the IRZ injection wells and the TCS cooling towers water demand rate or if the water is not accepted by PG&E TCS Operations for reuse in cooling towers, then the water would be routed to the TCS evaporation ponds. The volume is estimated to be up to 12 percent of the total 7.6 MG per year or about 0.9 MG per year.

If the TCS evaporation ponds do not have the capacity to accept the water or the water quality does not meet the pond acceptance criteria, then the backwash frequency could be temporarily decreased or the water could be disposed of at a permitted off-site facility (for purpose of the SEIR analysis, the off-site disposal facility is assumed to be Liquid Environmental Solutions in Phoenix). The TCS evaporation pond depths data measured over a 9-year period from 2005 to 2013 show only one year (2009) where the ponds approached their capacity (2-foot freeboard). Extrapolating this frequency of occurrence over the 30-year life of the Final Groundwater Remedy Project, the ponds could reach freeboard limits four times. Assuming a worst-case scenario each time the ponds reach freeboard, the entire approximately 0.9 MG of remedy-

produced water generated for that entire year and intended for the TCS evaporation ponds would be transported to a permitted off-site facility (for purpose of the SEIR analysis, the off-site disposal facility is assumed to be Liquid Environmental Solutions in Phoenix). This equates to approximately 4 times 0.9 MG, or 3.6 MG. For a maximum case for the purpose of CEQA analysis, PG&E suggests using a volume that is 4 times 3.6 MG, or up to 15 MG to account for contingencies.

3.6.3.4 TCS Evaporation Ponds

Normal Operations

Operation and maintenance activities at the TCS Evaporation Ponds would include ongoing maintenance of the power system and remote sensing equipment. The electrical power generator at the TCS Evaporation Ponds would require routine maintenance of the radiator (monthly or post-100 hours of operation); checking of oil levels, drive belt condition, electrical connections, and emergency stop button (weekly or post-50 hours of operation); and a check of engine fluids, lines, hoses, cooling fan blades, exhaust components, and air intake (daily or after every 8 hours of operation).

The natural gas powered thermoelectric generators would receive an annual service check including performing a power check with maintenance as needed; replacing the fuel filter; draining the pressure regulator sediment bowl; checking the fuel orifice for clogging; cleaning the heat pipe fins, air intake screens, and cabinet interior; and checking all bolts and fasteners for tightness.

The natural gas regulators would require annual checks for regulators and monitoring of set points; inspection of regulators, monitors, valves, and fittings for leaks and other damage; checks of differential pressure across filter; manual operation of emergency valves; exercising of valves to ensure functionality; and inspection of one-quarter-inch Welker Sulfur Removal Filter. Inspection for atmospheric corrosion damage would occur every 3 years and internal inspection of the regulator and monitor would occur every 5 years.

The water recirculating pumps would be inspected monthly for hose connections, overall hose condition, power supply cable connections, overall cable condition, and pump influent and effluent to ensure there are no obstructions present hindering flow and to determine if the pump is making unusual sounds (e.g., unusual vibrations, squealing).

The actuator valves, liquid-level sensors, and control units used to transfer water to the ponds and control water levels would be visually checked monthly for the overall conditions, the condition of cable connections, power supply cable connections, cover seals, wire glands, and transmitter face. The cathodic protection for the buried steel natural gas pipeline would be inspected bi-monthly for the rectifier condition and annually for the pipe-to-soil potential.

Contingency Operations

The Final Remedy Design includes contingencies in the event that the TCS Evaporation Ponds is unable to accept water for disposal. The Operation and Maintenance Manual, Volume 3, Contingency Plan (Final Remedy Design, Appendix L; CH2M Hill, 2015a) itemizes potential

causes and provides contingencies to address the possible causes. Potential causes and the contingencies to address the causes are summarized below.

- Insufficient pond capacity: The Station and/or remedial waste water production needs could be higher than anticipated, which could result in overflow at the ponds. Operational adjustments could include transferring water between the four ponds to utilize available capacity, storing water in portable tanks until capacity becomes available, reducing wastewater production at the Station, or trucking the water to an off-site disposal facility. In addition, drip systems could be added to Ponds 1 and/or 2.
- Insufficient evaporation rates: Pump failure, clogging of circulation pipelines, or pipeline perforations could reduce evaporation efficiency. Operational adjustments could include rehabilitation or replacement of pumps and/or pipelines. In addition, drip systems could be added to Ponds 1 and/or 2.

3.6.3.5 Well Maintenance

Routine Maintenance

Well performance would be monitored to assess the frequency and methods required for well maintenance. Well performance monitoring consists of establishment of a baseline during well installation, development, and system start-up. Once the system is online, well performance will be tracked by comparing the baseline data to long-term performance data.

Routine or preventative maintenance would be used to mitigate performance losses at injection and extraction wells and is generally conducted without intrusive modifications to the wellhead or well and do not require removing existing equipment from the well for access. Extraction wells would be maintained by surging and pumping to remove silt or mineral encrustation, while tightening the filter pack. Injection wells would be maintained by backwashing, which is conducted by stopping injection and pumping the well for a short period. Backwashing removes the solids which have accumulated in the well screen and gravel pack during injection. In the event that more aggressive routine maintenance is needed, the addition of Aqua Gard[®] would be used on both extraction and injection wells. The Aqua Gard method injects cryogenic liquid carbon dioxide into existing well access tubes. During the injection, plugging and fouling deposits are dislodged and detached from the filter pack and formation through rapid gas expansion during the liquid/gas phase change. Once the injection is complete, pumping, surging, and/or backwashing is employed to agitate and remove the material that was loosened during the injection. Some of the necessary equipment may include all or some of the following: a carbon dioxide injection trailer, carbon dioxide storage vessel, support truck, pump rig and/or crane (if a pump or pipe needs to be installed/removed), bag filters, and a support truck. Water produced from the routine well maintenance activities would be sent to the Remedy-Produced Water Conditioning System.

Monitoring wells would be inspected during the routine sampling or water-level gauging events to confirm that the condition of the well is acceptable. Well heads would be visually inspected to assess the well head integrity. Wells would be measured for total depth, turbidity, and pH to assess the well casing and screen integrity, and for the accumulation of sediment in the bottom of

the well casing. If the monitoring well assessment indicates the need for maintenance, then the well would be redeveloped using methods for the extraction wells described above.

Non-Routine Maintenance

In the event that routine well maintenance does not restore well performance, non-routine invasive methods may be used, requiring removal of existing equipment from the well prior to conducting maintenance. Submersible pumps typically last 5 to 7 years. Given the decades-long life of the Project, submersible pumps are anticipated to require periodic repair or replacement. This would require the use of a truck- or trailer-mounted well maintenance rig with well pulling equipment. Drop-pipes may corrode over time and may require occasional replacement. This would require the use of a truck- or trailer-mounted well maintenance rig with pipe pulling equipment.

Well repair and well rehabilitation would require more extensive measures to restore well performance. Depending on the plugging or clogging mechanism, the recommended rehabilitation method may vary. Well rehabilitation programs must be tailored to the given well conditions and problems. Potential rehabilitation methods could include well conditioning using wire brushes; surging; air impact gun; bailing; the application of commercially available well rehabilitation chemicals that are typically inorganic or organic acids; or mechanical agitation and removal swabbing, jetting, surging, and pumping using a swab or surge block.

In severe cases, the well may require repair or replacement. Holes or gaps in the casing can be repaired using commercially available well patch materials. Wells can be relined with a new well casing inside the older casing, although this also means that the casing diameter would be smaller, reducing well performance. If the damage is too severe, the well may need to be reconstructed in place by removing the well casing and reconstructing the well with new materials in place. Alternately, the damaged well could be destroyed and a new well constructed at a new location, with approval of the regulatory agencies.

Well Maintenance Frequency

Operation and maintenance of the groundwater remedy would require between 10 and 12 full-time employees for routine operation and maintenance of the groundwater remedy throughout the life of the Project. **Table 3-8** provides a sample breakdown of employees by operation and maintenance activities; however, there may be fluctuations in employee assignments throughout the course of the remedy. Monitoring wells would be redeveloped on an as-needed basis.

TABLE 3-8
SAMPLE BREAKDOWN OF EMPLOYEES FOR OPERATION AND MAINTENANCE FACILITIES

Operation and Maintenance Activities	Sample Breakdown of Full-Time Equivalents (FTEs)	# of Weekly Vehicles On-Site (5 days/week)	Annual Deliveries/Pickups		Total Max Vehicle & Delivery Trips per Year ^b
			Chemical Deliveries, Supply Deliveries, Sample Pickups	Sludge/ Waste Haul	
Routine					
Routine O&M ^{a,b}	2.75 (average), 4.25 (worst case) <i>IRZ O&M^b – 3–5/week (IRZ On), 0/week (IRZ Off)</i> <i>Other System O&M – 2 or 3/week</i>	10–40	IRZ O&M ² – 9-228 (IRZ On), 4-92 (IRZ off) Other System O&M – 25–53 Water delivery to Park Moabi - 52	Other System O&M – 2–19 Sewage hauling from all septic tanks – 12	2,440
Well Maintenance ^c	3 (average), 10 (worst case)	9–32	7–24		1,660
Site Management	2	10	NA		520
Groundwater Monitoring ^b	3	12.5	52		702
Non-Routine					
Well Rehabilitation ^c	2 (average), 5 (worst case)	9–23	15–27		1,220
Other Non-Routine Well Repair/Replacement ^c	1.5 (average), 3 (worst case)	1–1.75	1–2		93

NOTES:

FTEs = Full-Time Equivalents, account for PG&E employees and its contractors/subcontractors only. One vehicle trip is one round trip to/from site.

^a Includes IRZ operation and maintenance, water conditioning plant operation and maintenance, freshwater supply well site operation and maintenance, Operation and maintenance of Moabi Regional Park facilities, etc. Excludes operation and maintenance of the enhancements at TCS Evaporation Ponds as those activities are Compressor Station work (PG&E estimated that an extra man-day per month [or 100 man-hours per year] would be required for operation and maintenance of the enhancements, a 7% increase over current work load). Worst case includes operation and maintenance of future provisional wells and contingent systems, and worst case carbon usage.

^b In each 52-week year, there are 13 weeks of active IRZ operations (i.e., IRZ ON), and 39 weeks inactive IRZ operations (i.e., IRZ OFF). Groundwater monitoring occurs 52 weeks/yr for Years 1–3, 40 weeks/yr for Year 4-5, 32 weeks/yr for Year 6-10, 26 weeks/yr for Year 11-30, and 20 weeks/yr for Year 31+.

^c Well maintenance type and frequency as defined in Exhibit 4.2-6 of the O&M Plan (Volume 1 of the O&M Manual). Assumes all planned and future provisional wells require routine well maintenance, non-routine well rehabilitation and repair/replacement.

SOURCE: Data provided by PG&E February 2016.

3.7 Schedule and Staffing

3.7.1 Overview

The anticipated schedule for implementation of the Project is described below. The major elements of the Project are (1) pre-construction, construction, and start-up, (2) operation and maintenance, and (3) decommissioning and restoration. Each of these phases would overlap, as indicated below. The schedule for each of these major elements is presented in the following pages and is based on what is currently reasonably foreseeable given what is known about the Project Area and work involved in the Project, but is subject to change. The schedule may be longer or shorter than described, however, depending on occurrences outside the control of DTSC or PG&E, including discoveries of biological or archeological resources that require work to be halted and rescheduled.

At this time and assuming the appropriate approvals are acquired, the pre-construction and construction activities are scheduled to begin in July 2017. The overall tasks are summarized in the sections that follow, along with **Table 3-9**, which summarizes the tasks durations, and **Figure 3-10** that shows Project phasing. The preliminary construction schedule presented below is based on estimated durations and sequencing typical for similar projects. The exact durations and sequencing may vary to provide the safest and most efficient operation that meets project requirements. The schedule is known as an early-start schedule because it shows the earliest possible start date for each activity; the actual schedule may vary. PG&E will develop a more detailed construction schedule with more solid start dates after the approval of the final design and selection of contractors.

TABLE 3-9
ESTIMATED PRECONSTRUCTION AND CONSTRUCTION SCHEDULE

Task	Estimated Duration
Preconstruction	4 months
• Mobilization ^a	4 months
• On-Site Stakeholder Kickoff Meeting	1 day
Construction and Start-Up Activities	60 months
• Phase 1 Construction ^b	19 months
• Shutdown of IM-3 Facility; Start-up of NTH IRZ	12 months
• Phase 2 Construction ^c	12 months
• Start-up of Freshwater Injection ^d	6 months
• Start-up of IRL and TCS Recirculation Loop	6 months
• Start-up Complete; Start Full Remedy Operations	0
Construction Closeout	12 months

NOTES:

^a Mobilization includes construction of the Construction Headquarters, the Soil Processing Area, construction water connection, and demarcation/setup of staging areas.

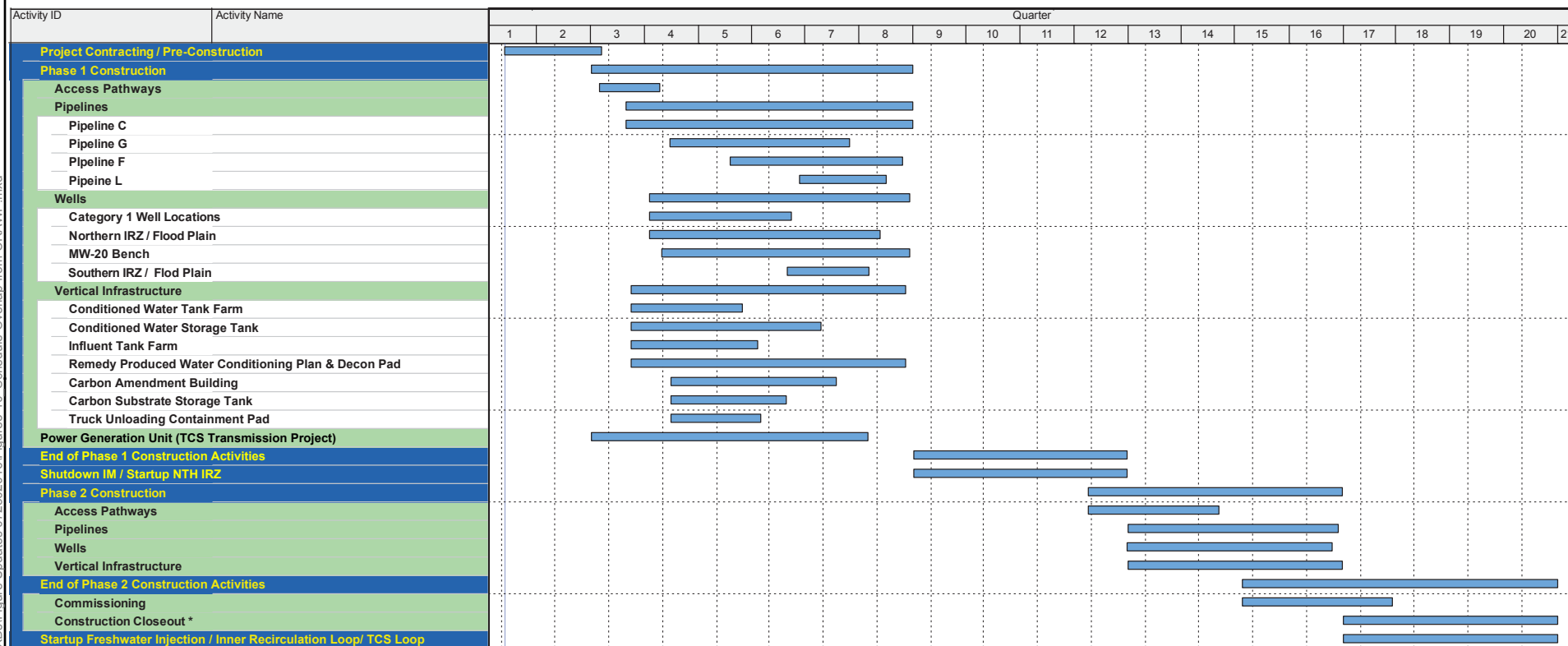
^b Phase 1 includes NTH IRZ, MW-20 Carbon Amendment Facility, carbon substrate storage, Remedy-Produced Water Conditioning Facility, power supply, Category 1 wells, and IRZ monitoring wells. Category 1 well installation will begin concurrently with Mobilization period.

^c Phase 2 includes remaining systems (River Bank Extraction System, Freshwater Injection System, Inner Recirculation Loop, and TCS Recirculation Loop, and Category 2 and 3 wells)

^d Contingent Freshwater Treatment System would require 11 weeks to construct if needed.

SOURCE: Adapted from Project schedule dated October 16, 2016 (an October 2016 Consultative Work Group handout), CH2M Hill 2016.

G:\Projects\15,135,000 Topock Remediation CEQA\Figure 3-10 Schedule Overlap from CRAWP.mxd



NOTE:

* Includes preparation and submittal of the Construction Completion Report

3.7.2 Pre-Construction, Construction, and Start-Up

The pre-construction, construction, and start-up of the Project are estimated to occur over an approximately 5-year period, following DTSC and DOI approval of the Final Remedy Design and C/RAWP. This includes time for contracting, mobilization, construction, start-up, IM-3 Facility shutdown, and construction closeout activities, among other activities, some of which are not entirely field construction activities in the strict sense. Currently, construction and start-up are proposed in two phases:

- The first phase is projected to include pre-construction activities and construction of the NTH IRZ and associated supporting infrastructure, installation of high priority wells (e.g., Category 1), and key mobilization and site preparation activities such as construction of the Construction Headquarters. Supporting infrastructure projected to be constructed during this phase includes access-roadways, pipelines, vertical infrastructure (e.g., carbon storage and amendment facility, remedy-produced water conditioning plant, power supply), and monitoring wells associated with the NTH IRZ system. Following construction and associated functional testing of the NTH IRZ and supporting systems, the Interim Measure is proposed to be turned off, and the NTH IRZ cutoff line would then be established. During start-up of the NTH IRZ, some limited construction closeout activities are expected. The estimated duration for the first phase of construction and start-up is approximately 2.5 years.
- The second phase is projected to include construction of the remaining systems (River Bank Extraction Wells, IRL, TCS Recirculation Loop, and freshwater injection), and associated supporting infrastructure, remaining monitoring wells (e.g., Categories 2 and 3), and associated pipelines, access roadways, controls, and electrical and mechanical systems. Depending on the progress of construction and the plume capture effectiveness of wells installed up to that time. The installation of the Riverbank Wells could be moved up into Phase 1 as a contingency. Following construction and associated functional testing, start-up of the remaining systems and construction closeout would occur. The proposed construction sequence is subject to change based on baseline data collected and analyzed and data collected and analyzed during first phase operation of the NTH IRZ. The estimated duration for the second phase of construction and start-up is approximately 12 months. Phase 2 may overlap the end of Phase 1 by a month or two, depending on the progress of construction.

The durations and sequencing that would be used for construction and system start-up depend on a number of uncertainties associated with construction scheduling, including specialized equipment availability; the size/structure/scope of the construction contract(s); constraints imposed by operations at the TCS; constraints imposed by landowners, leaseholders, and other adjacent property users; constraints in place to protect sensitive resources including but not limited to cultural and biological resources; and site conditions encountered in the field.

Start-up of the remedy involves those activities required to start the remedy system and fine-tune system operations based on performance monitoring. Start-up activities can generally begin once functional testing is complete and the permanent remedy power supply has been established. Start-up activities would generally occur concurrent with construction closeout activities for each phase.

3.7.3 Operation and Maintenance

Operation and maintenance would begin following start-up of the various remedy systems. Within approximately 1 to 3 years of the beginning of remedy start-up, which is when remedy components have been constructed, tested, and found to be operational. DTSC will evaluate and determine if the remedy is considered to be “Operating Properly and Successfully,” meaning: (a) the remedy is operating as designed; (b) the information obtained from remedy operation indicates that the remedy is protective of human health and the environment; and (c) the remedy is likely to be able to achieve the cleanup levels or performance goals defined in the DTSC’s Statement of Basis (DTSC 2010) and the DOI’s Record of Decision for the groundwater remedy at the PG&E Topock Site (DOI 2010). Data collected during the operation and maintenance period would be used to update model projections of the anticipated active remediation duration. Currently, the anticipated duration is approximately 30 years of active remediation followed by up to approximately 10 years of long-term monitoring and up to approximately 20 years of arsenic monitoring, which would occur concurrently with the long-term monitoring for the first 10 years. This estimated timeframe does not account for additional time for monitoring that may be required if monitored natural attenuation is selected for portions of the plume and extends past the 10 years of long-term monitoring.

3.7.4 IM-3 Facility Decommissioning and Restoration

After receipt of approval for IM-3 Facility decommissioning by DTSC, with concurrence from the DOI, PG&E would decommission IM-3 Facility in accordance with an approved work plan. The estimated duration for the decommissioning and removal of IM-3 is approximately 1.5 years. After completion of IM-3 Facility decommissioning and removal, PG&E would submit a site-specific IM-3 Facility Restoration Plan, which would be reviewed by appropriate agencies and Tribes. The estimated duration for restoration is approximately 5 to 6 years.

3.7.5 Remedy Decommissioning and Restoration

Decommissioning of the groundwater remedy infrastructure would begin following the attainment of the cleanup objectives and/or the determination that the remedy facilities are no longer needed (estimated at 40 years). Once the completion criteria/performance standards for the groundwater remedy are met to the satisfaction of the agencies, PG&E would submit a plan to decommission the final groundwater remedy. Because of heterogeneity in the aquifer at the Topock site, it is expected that during the decades-long operation and maintenance period, there would be portions of the site that attain the completion criteria/performance standards at different times. During future evaluations, such as 5-year reviews, distinct geographical areas of the site may be identified where criteria/standards have been attained and/or where optimization of treatment would be necessary. If the agencies determine, based on data provided by PG&E, that monitored natural attenuation is appropriate to address residual chromium, the remedy facilities in those geographical areas may be altered or decommissioned in accordance with a decommissioning plan.

Currently, the steps and schedules for decommissioning and restoration are general and therefore analyzed in this SEIR to the extent such feature activities are foreseeable at this time.

Decommissioning and restoration of remedy components is projected to occur decades in the future and would be affected by information and conditions that become available prior to and at the time of decommissioning and restoration. The steps and schedule for decommissioning and restoration may occur during multiple mobilizations and would be affected by the specific infrastructure to be decommissioned. Decommissioning and restoration activities are discussed in Section 3.8 below.

In general, restoration activities would not begin until after the completion of Phase 2 construction activities. However, some restoration activities would begin during Phase 1 (e.g., restoration of disturbed areas after well installation activities have been completed, revegetation to offset habitat loss that could not be avoided during construction) and the remaining restoration activities would not be completed until after the groundwater remedy has been completed and the groundwater remedy components have been removed.

3.7.6 Task Durations and Staffing

The phasing of the construction schedule is focused on transitioning from the IM-3 Facility system to the Final Groundwater Remedy Project as expeditiously as practical and consistent with the terms of the Settlement Agreement with FMIT. Table 3-9 summarizes the preconstruction and construction tasks and the forecasted durations associated with implementation of the Final Groundwater Remedy Project. The durations are best estimates and may vary depending on field conditions.

Mobilization would include moving personnel and equipment to the site, building the Construction Headquarters, setting up the soil-processing/clean-soil storage area, and establishing associated utilities and services for the Construction Headquarters. Site preparation would begin as mobilization progresses. It would include preparing temporary staging and work areas, including the construction water-filling station; installing temporary site controls (fencing, erosion control, etc.); conducting geophysical surveys to locate utilities; and demarcating sensitive areas. Site-specific sensitivity training and orientation would also occur during site preparation activities to inform construction workers about the biological, cultural, and historic resources in the area, consistent with mitigation measures and conditions of approval.

Site access roadway improvement would occur throughout the Project timeline as needed to provide access to primary work zones and staging areas. The construction durations for individual roadways are included in the duration for the associated construction element. For example, the time needed to construct a road leading to the primary work zone for a well or pipeline is included in the duration for that well or pipeline.

It is expected that Station construction projects not associated with the Final Groundwater Remedy Project may be active at the same general time as the remedy construction (for example, power generation). PG&E would coordinate with Station operations and sequence remedy construction to avoid conflict with the Station construction projects, as well as any delays to implementation of the groundwater remedy.

Construction of the structures on the MW-20 Bench would likely begin after completion of the portion of Pipeline C in the MW-20 Bench area. This would be done largely to avoid congestion on the MW-20 Bench. Construction of the structures on the TW Bench is part of Phase 2, and would likely begin over 2 years after the start of field construction activities to avoid congestion created by monitoring well installation. In addition, construction on the TW Bench would not start until a new road has been built to access the north side of the existing Transwestern gas pipeline metering yard.

Construction closeout activities would occur after completion of field construction activities. This group of activities includes producing record drawings and other as-built information, submitting and obtaining approval for construction completion report, soil stabilization, and demobilization.

Remedy start-up activities would be generally concurrent with construction closeout activities and the time durations may vary depending on the response of the aquifer to injection and extraction, and the shakeout response of equipment. Start-up activities include those activities required to start the remedy system and fine-tune remedy operations based on performance monitoring. These activities can generally start once commissioning activities are complete and the permanent remedy power supply has been established.

The construction, operation, maintenance, and decommissioning activities would require various trucks and vehicles to transport employees, equipment, and materials to and from the Project Area. The truck and vehicle counts, and durations are summarized in **Table 3-10**. As previously noted, the durations may vary depending on the rate of construction progress.

TABLE 3-10
SUMMARY OF NUMBERS OF ANTICIPATED WORKERS, TRUCKS, AND VEHICLES

Project Activities	Estimated Duration	Number of Trucks and Vehicles
Mobilization	4 months	During a maximum work week, there would be approximately 80 workers and 30 delivery truck trips to and from the work site.
Phase 1 Construction including Functional Testing ^a	19 months of construction, including functional testing	For construction activities, during a maximum work week, there would be approximately 168 workers, 115 delivery truck trips to and from the work site, and 560 worker vehicle trips to and from the work site per week. ^b For functional testing, there would be 12 additional vehicles (4 technicians, 4 instrumentation specialists, 4 engineers).
Start-up and operation and maintenance of NTH IRZ ^b	12 months for start-up 30 years for operation and maintenance	For operation and maintenance activities under worst case scenario (i.e., including future provisional wells and contingent systems), on a peak day there would be approximately 24 vehicles and 20 trucks. For start-up, on a peak day there would be approximately 2 or 3 additional vehicles (1 operator, 1 or 2 engineers).
Phase 2 Construction	12 months of construction, including functional testing	For construction activities, during a maximum work week, there would be approximately 181 workers, 105 delivery truck trips to and from the work site, and 603 worker vehicle trips to and from the work site per week. ^b For functional testing, there would be 12 additional vehicles (4 technicians, 4 instrumentation specialists, 4 engineers).
Start-up and operation and maintenance of remaining system	12 months for start-up 30 years for operation and maintenance	For operation and maintenance activities under worst case scenario (i.e., including future provisional wells and contingent systems), on a peak day there would be approximately 24 vehicles and 20 trucks. For start-up, on a peak day there would be approximately 2 or 3 additional vehicles (1 operator, 1 or 2 engineers).
Potential off-site wastewater disposal ^c	4 events	Assuming a 6,000-gallon truck hauling 15 million gallons would require 2,500 trucks resulting in 5,000 truck trips to and from the site.
Contingent Freshwater Treatment System	Up to 11 weeks	Construction crew vehicle trips would be 310; CM/monitors vehicle trips would be 130.
Decommissioning and Removal of IM-3 Facility	15 months	For IM-3 Facility decommissioning activities, during a maximum work week, there would be approximately 33 workers, 25 delivery truck trips to and from the work site and 117 worker vehicle trips to and from the work site per week.
Decommissioning and Removal of Remedy	12 months	For remedy decommissioning activities, during a maximum work week, there would be approximately 69 workers, 75 delivery truck trips to and from the work site and 240 worker vehicle trips to and from the work site.

NOTES:^a These Project phases are illustrated in the Final Remedy Design (CH2M Hill 2015a), Figure ES-2.^b Basis for vehicle trip counts:

Daily trips per vehicle: 1 morning, 1 lunch, 1 back from lunch, 1 p.m.	2	daily round trips per car
Assumed number of equipment/materials deliveries per day	1	daily round trips per site
IDW Management soil transfer trips per day	2	daily round trips per crew

^c See Section 3.6.2.6 for discussion of potential need for this activity.

SOURCE: PG&E 2015.

3.7.7 Project Working Hours

Implementation of the Project would involve construction activities throughout the construction, operation and maintenance, and decommissioning phases. The primary working hours for field construction activities would be between 7:00 a.m. and 5:00 p.m., Monday through Friday. The term “field construction work” includes construction activities at the primary work zones and staging areas throughout the Project Area, but does not include preparatory or support activities at the Construction Headquarters, the Soil Processing Area, or within the Station, which could occur in the hours leading up to 7:00 a.m. and following 5:00 p.m. All work hours are subject to and are superseded by all immediate-effect health and safety related stand-downs (e.g., wind, lightning, fire, or excessive heat shutdowns or incident-related shutdowns). The following construction-associated work could occur outside of the default working hours:

- Activity at the Construction Headquarters, Soil Processing Area, and within the Station to allow for morning safety meetings, contractor equipment/materials preparation, equipment/materials deliveries, post-work day meetings, and office-based work construction office facilities at the Construction Headquarters or elsewhere.
- Biological, environmental, cultural, and archeological monitors could perform survey activities at field construction sites outside of the standard construction hours as needed to perform required survey tasks to allow construction to take place within allowable construction hours.
- Contractors may begin transferring workers, equipment, and materials to primary work zones and/or staging areas shortly before 7:00 a.m. to be able to begin work promptly at 7:00 a.m. In addition, in order to meet the 5:00 p.m. end-of-day requirement, contractors would likely begin daily work site cleanup and demobilization activities earlier, to ensure that they can be completely vacate the work sites by 5:00 p.m.
- Delivery of materials/equipment to site may be allowed to occur past the default end-of-day time of 5:00 p.m., on a case-by-case basis.

Workers have the ability to work using a “4-10” schedule. The “4-10” schedule would allow field construction work hours between 6:00 a.m. to 6:00 p.m., Monday through Thursday or Tuesday through Friday. This schedule is preferred by contractors when planned work requires significant daily equipment/materials setup and takedown time, and where there is sufficient daylight to allow extended daily work hours. Extending the work hours for a single day allows for additional productive work to take place. For example, pipeline installation work generally requires 2-3 hours of daily setup and takedown time, resulting in 5 to 6 hours of productive time under a standard 8-hour day. A “4-10” schedule allows for 7 to 8 productive hours per work day, and gives workers an extra day off to account for longer work days.

Given the climate in the Project Area, workers may elect to work during cooler parts of the day and minimize safety risks associated with working during peak daily temperatures. Requiring work to take place during peak temperature summer hours subjects workers to unnecessary health risks, imposes extensive worker monitoring, and reduces productivity. In addition, certain construction tasks themselves are difficult or impossible to complete in very high temperatures

(e.g., concrete pours, controls equipment installation, working on exposed steel). Under seasonal modifications, work hours would be adjusted to begin earlier in the day. Work hours could be modified to 4:00 a.m. to 2:00 p.m. or 5:00 a.m. to 3:00 p.m. Monday through Friday under a 5-day working schedule, and 4:00 a.m. through 4:00 p.m. or 5:00 a.m. through 5:00 p.m. Monday through Thursday or Tuesday through Friday under a “4-10” working schedule. As described above, surveys and pre- and post-work activity could still occur outside of construction work hours. Temporary construction lighting may be required at the start of the day depending on the time of year this work is occurring.

Certain tasks may require work to extend outside of established working hours, and/or extend into weekend days (Saturday/Sunday). For example well drilling and testing are long-duration tasks that may need to continue to completion once begun, which would require extending work hours for these tasks and required supporting tasks (water management, soil management, biological/cultural/archeological monitoring) beyond the default construction hours. Concrete pours are also not done in very high temperatures, and have to be completed in a single continuous effort. These tasks would be identified during development of detailed contractor work schedules, and may also require temporary construction lighting.

3.8 Decommissioning and Restoration

3.8.1 IM-3 Facility

As stipulated in the Settlement Agreement (Superior Court of California 2013), not later than 30 days after the DTSC determines that the groundwater remedy is achieving plume control, the groundwater remedy is operating properly and successfully, and the DOI concurs with the decommissioning, DTSC shall issue a written approval to PG&E to decommission and remove the IM-3 Facility system. However, during the response to comment process for the 90% design (CH2M Hill 2014), DTSC stated that it may require some existing wells to be retained to avoid drilling additional wells. As stated in the 90% comment #1152, some of those wells (e.g., TW-series wells) may be used as part of the groundwater remedy and would be evaluated on a case-by-case basis before decommissioning at the direction of the DTSC. The IM-3 Facility system shall be turned off when the groundwater remedy equipment and facilities are in place, and ready to begin start-up. The remedy equipment and facilities may include some or all of the following: NTH IRZ wells, the monitoring wells, the pipelines, and/or other systems (e.g., controls, electrical) needed to operate these wells. Following notice from PG&E that the system is ready to be turned off, DTSC will advise PG&E whether it concurs that the IM-3 Facility system is ready to be turned off. Once DTSC has provided PG&E with such concurrence, PG&E will turn off the IM-3 Facility system. (Further details regarding this procedure are set forth in Exhibit A to the 2012 Settlement Agreement between DTSC and the FMIT).

The IM-3 Facility system components that would be removed, pending DTSC approval and with concurrence from DOI, consist of the following:

- There are three extraction wells in the MW-20 Bench area of the site (TW-2S, TW-2D, and TW-3D) and one extraction well in the floodplain (PE-1), as well as ancillary well equipment and vaults. There are two injection wells in the East Mesa area of the site (IW-2 and IW-3)

and power supply infrastructure located at this site. Prior to decommissioning the wells, submersible pumps in the extraction wells, air-lift tubing in the injection wells, and pipes, valves, and instruments in both the extraction and injection well vaults would be removed. Conduit, electrical panels, and other features within a well vault would also be removed.

- Underground conveyance piping and vaults are located between the extraction wells and the treatment plant. After successful decontamination or cleaning, unneeded underground pipelines, conduits and well vaults for Wells PE-1, IW-2, and IW-3 would be removed and the locations restored to pre-project conditions.
- The entire IM-3 Facility, including equipment, pipelines, valves, instrumentation, utilities, and infrastructure underneath the sunshade, the sunshade, mobile warehouse units, trailer, treatment plant foundation and secondary containment areas, underground pipelines and utilities within the footprint of the treatment plant fence line, and security fence and gate would be removed.
- Underground and aboveground pipelines, and instrumentation conduit between treatment plant and injection well field would be removed in accordance with Agencies' direction unless otherwise agreed to and/or directed by the landowner.
- Support facilities are located on the MW-20 Bench and include Valve Vault #1, pumps, valves, pipelines, electrical, and instrumentation associated with the extraction wells, parking areas, security fence and gates, security system, lighting, and other ancillary equipment. Most of these components would be reused for the Final Groundwater Remedy Project.

Existing monitoring wells and their instrumentation that are currently used to monitor the IM-3 Facility performance would be reused as part of the monitoring network associated with the final groundwater remedy, and therefore would not be decommissioned. Decommissioning of existing wells and their instrumentation would be addressed as part of the decommissioning of the groundwater remedy.

The brine storage and loading facility (three tanks, the truck lane, and associated pumps and conveyance piping) also would be reused by the groundwater remedy in its existing location at the MW-20 Bench. No aboveground component of the existing IM-3 system located within the footprint of the existing IM-3 Facility building, or within the IM-3 Facility fence line, would be reused in its current location as part of the groundwater remedy. Approximately 500,000 kWh is anticipated to be used during decommissioning of the IM-3 Facility and associated site restoration, discussed in the following pages.

3.8.1.1 Site-Specific IM-3 Facility Restoration Plan

As discussed in the IM-3 Decommissioning Work Plan (Appendix F of the C/RAWP), PG&E would submit a Site-Specific IM-3 Restoration Plan for review and approval prior to implementation. The restoration plan would include a restoration design to meet the project objectives, an adaptive management approach that allows for evaluation of the effectiveness of the restoration through monitoring, long-term management of the site, and reporting.

PG&E would develop the Restoration Plan in consultation with the affected land owners and managers, including the FMIT, regulatory agencies (DTSC, BOR, and BLM), and Signatories

and Invited Signatories to the Programmatic Agreement, and the Tribes. Some details of the more detailed Restoration Plan would be deferred until after the completion of the IM-3 Facility decommissioning, so that the Tribes and PG&E can further evaluate restoration approaches that would minimize further disturbance and earth movement. The completion of the removal of system facilities would better facilitate developing the restoration approaches.

3.8.2 Final Groundwater Remedy Facilities

As discussed in the Final Remedy Design, the decommissioning process would occur decades in the future and would be subject to change based on information and conditions that would become available prior to and at the time of remedy decommissioning. To account for this, once the RAOs for the groundwater remedy are met to the satisfaction of the agencies, PG&E would submit a Remedy Decommissioning Plan to DTSC and DOI for consideration and approval within 120 days of agency certification that the RAOs have been met. Consequently, the decommissioning steps described in the Final Remedy Design are general and conceptual. Most of the groundwater remedy facilities and components would be decommissioned and removed with certain exceptions discussed further in this section. After decommissioning and removal of the facilities, the areas would be restored using decompaction and grading techniques designed to decrease erosion and accelerate revegetation of native species (if requested by landowner). Decommissioning of groundwater treatment facilities at the Project Area could occur in separate phases, as described in the following subsections.

3.8.2.1 Decommissioning Plan

In compliance with the 2013 Consent Decree executed with the DOI, PG&E would submit a decommissioning plan within 120 days of the agencies' certification of completion of the remedial action and a determination that removal of such facilities is protective of human health and the environment. The decommissioning plan would describe procedures for the removal of the remedy facilities and associated infrastructure. The plan would also describe the post-remedy restoration of the site to the conditions existing prior to the implementation of the remedy construction, to the extent practicable. In addition, biological surveys would be conducted prior to decommissioning and during the breeding season, to inform the decommissioning planning process.

3.8.2.2 Wells

The decommissioning of wells would be in accordance with the CCR and the Standard Operating Procedure Well-SOP-01 in the O&M Manual, Volume 1, Appendix B, which complies with the standard well decommissioning procedures required by San Bernardino County and the California Water Resources Department (Bulletins 74-81 and 74-90), as well as Arizona regulations. The process would include either decommissioning the well in place (e.g., placing sealing material within the well casing) or removing the well (e.g., overdrilling). Typically, the top 5 feet of casing (including the concrete vault and any above-grade monument or concrete pad and protective bollards) would be removed. Surficial soil excavated from the hole would typically be placed back in the excavation as backfill; imported fill or other appropriate material would be added to the excavation to reach existing grade. As remedy decommissioning would occur

decades from now, technological innovation and regulatory advancement could result in different processes for well decommissioning. It is anticipated that decommissioning activities will adapt and follow the lawful decommissioning standards in effect at the time of decommissioning.

Typical equipment that may be used for decommissioning wells includes drill rigs, support vehicles, backhoes, dump trucks, front loaders, cement trucks or trailers, and/or pump service trucks. The length of time required to decommission a well is anticipated to be between 1 day and 2 weeks per well depending on the procedure, location, condition, and design of the well. Some vegetation trimming and/or clearance may be necessary to accommodate equipment for the decommissioning activities. Investigation-derived waste materials that would be generated during well decommissioning may include incidental trash, the 5-foot-long sections of well casing that would be cut off the top of the well removed from the borehole, other well materials as described previously, soil and some amount of groundwater mixed with cement residue. Incidental trash typically includes excess cement, empty cement and sand bags, pallets, empty drink and food containers, plastic sheeting, and other disposables associated with construction work. Incidental trash would be placed in dumpsters or roll-off bins that would be hauled off-site periodically by truck to an appropriate disposal or recycling facility.

Conveyance piping and instruments in the well vaults would be decontaminated as appropriate and reused or disposed of as nonhazardous waste along with the additional incidental waste, or sold to a salvage company. Decontamination water or groundwater generated during the decommissioning operation would be managed as described in Section 3.8.2.7. The concrete vault would be either removed intact or broken into pieces for subsequent disposal. The amount of investigation-derived waste materials that may be generated per well range from 5 to 20 cubic yards of solid waste, and up to 2,000 gallons of water. The volume of soil/grout cuttings when overdrilling is needed for well decommissioning would depend on the length of the well.

3.8.2.3 Carbon Substrate Storage Facilities

Decommissioning the carbon substrate storage facilities would include removing the above-grade treatment facilities from the site. Removed materials would be reused, transported to an off-site disposal facility, or sold as scrap material. Equipment would be decontaminated as appropriate, such as by power washing. Decontamination wash water would be managed as described in Section 3.8.2.7. Regrading by placement of imported fill or other appropriate materials would typically be completed if foundation materials for the treatment facilities are removed during decommissioning.

3.8.2.4 Freshwater Flushing

While most facilities would be expected to be decommissioned following the completion of the remedial action, it is possible that water supply wells may not be decommissioned and that they could be transferred to another use after agencies and landowner concurrence.

3.8.2.5 Fluid Conveyance, Utilities, Buildings, and Roadways

Pipelines would be decontaminated as appropriate. Aboveground conveyance piping would be removed and either reused or disposed off-site as scrap material. It is DTSC's general direction to PG&E that all underground utilities and infrastructure should be removed to the extent

practicable at the time of remedy decommissioning and the locations restored to pre-project conditions to the extent practical; however, it is possible that some infrastructure could be transferred to another use after agencies and landowner concurrence.

Decontamination wash water would be managed as described in Section 3.8.2.7. Electrical utilities would be disconnected from their service points and unused underground conduit would be removed and the locations restored to pre-project conditions to the extent practical.

Underground electrical and conveyance piping conduit and vaults would be excavated, removed, and the locations restored to pre-project conditions or could be transferred to another use after agencies and landowner concurrence. Aboveground conduit would be removed with the conveyance piping. Electrical cable would be disposed of or sold for salvage value. Waste materials described above would be disposed of at a permitted off-site disposal facility (for the purpose of the SEIR analysis, a disposal facility located within approximately 200 miles of the site is used). As wells and other infrastructure are removed and it is determined that access roads are no longer necessary, roads would be decommissioned from further use. The efforts involved in decommissioning would be dependent on the type of road (could be paved with asphalt, covered in gravel, or left unpaved) and the location of road (such as in previously disturbed areas or areas that were in a more natural state prior to the Final Remedy Design). As discussed in Section 3.8.2.6, some components may be retained for other non-project uses. In such cases, some trenches may only be partially decommissioned.

Areas that are decommissioned from further use as roads would be restored back to pre-project conditions to the extent practical. After deconstruction and decommissioning of the facilities, the areas would be restored using decompaction and grading techniques designed to decrease erosion and accelerate revegetation of native species (if requested by landowner) or as directed.

Similarly, buildings would be decommissioned and decontaminated as appropriate. Buildings would be removed and the locations restored to pre-project conditions to the extent practical or could be transferred to another use after agencies and landowner concurrence. As previously noted, it is DTSC's general direction to PG&E that all infrastructure should be removed to the extent practicable at the time of remedy decommissioning and the locations restored to pre-project conditions to the extent practical.

3.8.2.6 Remedy Components to Remain

PG&E has proposed that the following components be left in place:

- Freshwater pipeline under I-40.
- Conveyance piping and conduits located in or under paved public roads.
- Subsurface infrastructure that property owners or land managers request not be removed providing the request is approved by the DTSC and DOI.
- Aboveground infrastructure that property owners or land managers request not be removed providing the request is approved by the DTSC and DOI.

PG&E will work with the agencies and landowners to incorporate their preference at the time of decommissioning for removal or abandonment in place. It is DTSC's general direction to PG&E

that all underground utilities and infrastructure should be removed to the extent practicable at the time of remedy decommissioning and the locations restored to pre-project conditions to the extent practical; however, it is possible that some infrastructures could be transferred to another use after agencies and landowner concurrence.

3.8.2.7 Water Management and Soil Disturbance

Decontamination water generated from decommissioning activities would be managed based on water quality of the decontamination water and in conformance with applicable regulations. Disposal options would include: (1) on-site by disposal at the TCS evaporation ponds, (2) on-site use of permitted transportable treatment units (see Section 3.6.1.5 for description), or (3) disposal at an off-site disposal facility.

In general, activities associated with removal of infrastructure are anticipated to occupy about the same footprint and lesser amount of soil disturbance. Because future soil disturbance would occur at the same location with similar or smaller footprint as that for construction, the amount of future soil disturbance would not be counted against the estimated volume of soil disturbance in Table 3-4.

3.9 Site Access

3.9.1 Access to Federal Lands

Remedial infrastructure is planned on federal lands, including lands administered by BOR (managed by BLM) and Havasu National Wildlife Refuge (managed by USFWS). The Record of Decision, Consent Decree, and DOI's approval of the Construction/Remedial Action Work Plan constitute permission to implement the groundwater remedy. No other permit applications or approvals for access to federal lands would be required before field implementation.

3.9.2 Access to Non-Federal Lands

Remedial infrastructure is planned on non-federal lands, including lands owned by BNSF Railway, Kinder Morgan, the FMIT, and private property owners in the Topock Marina area. In addition, infrastructure is planned on county roadways or their ROWs (San Bernardino County, California, and Mohave County, Arizona) as well as roadways/ROWs of state transportation agencies (Caltrans, ADOT). Where remedial infrastructure crosses or travels along utility easements, a consent to common use agreement or other notification process would be implemented, as appropriate.

Pursuant to CERCLA Section 121(e), activities conducted on-site are exempt from obtaining federal, state, or local permits or complying with other procedural requirements. However, PG&E is still required to comply with the substantive requirements of the identified location and action specific ARARs. The following is a list of approvals/permits/agreements that PG&E anticipates obtaining for the Project:

- Encroachment permits from ADOT and Caltrans for pipeline segment under I-40.

- Easement(s) from BNSF for pipeline segments and access roads under land owned by BNSF.
- License from San Bernardino and Mohave Counties for infrastructure in the county roadways and ROWs.
- Any necessary approvals from California and Arizona State Lands for the crossing of the Colorado River via the Arched Bridge.
- Consent to common-use agreements or other appropriate notification requirements with utility companies for remedial infrastructure on their lands or within their easements and ROWs.
- Access agreements with private property owners for remedial structures on their lands, where such agreements do not otherwise exist.
- Land Use Covenant for PG&E's Topock Compressor Station parcel to be executed with DTSC.

It should be noted that under the Settlement Agreement between PG&E and the FMIT, PG&E has access to the land owned by the FMIT to implement the groundwater remedy. More specifically, the 2009 Easement Agreement between the FMIT and PG&E covers access as well as activities such as operation and maintenance of facilities. The FMIT's preference to limit such activity to the extent practicable and to have as little remedial infrastructure placed on its property as possible is recognized; this preference has been, and would continue to be, considered during the development of the design, consistent with the provisions of the Easement Agreement and the 2006 Settlement Agreement. For example, in siting arsenic monitoring wells during the 90% design, PG&E relocated the freshwater injection Well FW-1 in order to use two installed monitoring well clusters and thereby avoided drilling additional new monitoring wells on the FMIT property.

3.10 Intended Uses of This SEIR

DTSC intends to use this SEIR for all further decisions and activities associated with implementing the Final Remedy Design, C/RAWP, decommissioning Work Plan, site-specific IM-3 Restoration Plan, and completion reports associated Final Groundwater Remedy, as evaluated in this SEIR. The Future Activity Allowance has been included in the Project Description and evaluation to further that objective, and to be sure that potentially foreseeable activities are included in the SEIR analysis. DTSC may also approve other related activities, such as existing well reconditioning or replacement work, groundwater investigation, characterization related activities, and activities determined by DTSC to be necessary to meet the completion criteria/performance standards for the Final Groundwater Remedy to the satisfaction of DTSC and DOI. If there is a future proposed activity in connection with the Final Groundwater Remedy, such as the installation of additional infrastructure beyond that specifically set forth in the Final Remedy Design, C/RAWP, and other associated Project documents, DTSC will evaluate whether that activity is within the applicable parameter set forth in this SEIR, including the Final Remedy Design, C/RAWP, and the Future Activity Allowance, and DTSC will also consider whether the location of the activity is within the Project Area. If the activity is found to be within the applicable parameter and within the Project Area (i.e., within the scope of this SEIR), that activity

would likely be considered to have been covered by the evaluation in this SEIR and no further CEQA analysis would be conducted.

If, however, the activity is outside the applicable parameter of activity analyzed in the SEIR DTSC would consider whether the approval was a “discretionary approval of a project” under CEQA and, if so, would apply the provisions of Public Resources Code 21166 and the implementing CEQA Guidelines 15162 through 15163 in determining whether further CEQA would be required, and the scope and form of that further CEQA review.

The CEQA Guidelines identify the lead agency as the public agency with the principal responsibility for carrying out or approving a project (Section 15367). DTSC is the CEQA lead agency for the Final Groundwater Remedy Project because DTSC has the primary approval authority for the Project.

A number of other agencies in addition to DTSC will serve as responsible and trustee agencies, pursuant to CEQA Guidelines Section 15381 and Section 15386, respectively. This SEIR provides environmental information to these and other public agencies, which may be required to grant approvals or otherwise coordinate with DTSC, PG&E, or other agencies as part of Project implementation. For the purposes of CEQA, the term “responsible agency” includes all state and local public agencies other than the lead agency that have discretionary approval power over the project (14 CCR Section 15381). “Trustee agencies” are state agencies that have jurisdiction by law over natural resources affected by the project and held in trust for the people of the state of California. Future discretionary approvals may include issuance of a permit, if not otherwise exempt as explained below, or other required action. Responsible agencies may consider and use the analysis provided in this SEIR to satisfy their responsibilities under CEQA, as they deem appropriate. Federal agencies may review the SEIR and submit comments and/or use the information in this SEIR as part of their own approval processes.

As noted, CERCLA as implemented by DOI includes an exemption for removal or remedial actions conducted entirely on-site, and where such remedial action is selected and carried out in compliance with Section 121. Specifically, CERCLA Section 121(e)(1) provides that: “No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely on-site, where such remedial action is selected and carried out in compliance with this section.” (See 42 U.S.C. Section 9621 [e][1], also referred to as Section 121[e][1]). The Code of Federal Regulations provide that: “[t]he term on-site means the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action.” (40 CFR Sections 300 and 400[e][1]). Substantive requirements that would be required by a particular law, however, must still be attained after conferring with the applicable agency, consistent with the requirements of CERCLA. The general intent behind the provisions described in this section 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.

The on-site portions of remedial actions taken under CERCLA authority administered by DOI must meet the substantive provisions of promulgated requirements that are ARARs, which were

determined by DOI, BLM, USFWS, and Bureau of Reclamation (DOI 2009). ARARs must be attained by the remedial action pursuant to Section 121(d) of CERCLA, which assures protection of human health and the environment, and requires attainment of “legally applicable or relevant and appropriate standard(s), requirement(s), criteria, or limitation(s).” There are four basic criteria that define ARARs: (1) substantive rather than administrative, (2) applicable or relevant and appropriate, (3) promulgated state requirements which are more stringent than comparable federal standards, and (4) categorized as Chemical-specific, Location-specific, or Action-specific. ARARs were considered in the preparation of the Final CMS/FS, and are included as Appendix B to that document. Criteria, guidance, advisories, and proposed standards that are not legally binding are not ARARs, but may be considered and used as appropriate to ensure the protectiveness of the remedy. These are referred to as “To Be Considered” criteria (TBCs). DOI, as the lead agency for remedial actions taken under CERCLA authority, has established a list of ARARs and TBCs for the site, which is presented in the Final Corrective Measures Study/Feasibility for Solid Waste Management Unit 1 (SWMU 1)/Area of Concern 1 (AOC 1) and AOC 10 (Final CMS/FS) (CH2M Hill 2009), and included as Appendix CMS to the Groundwater FEIR.

In accordance with the Topock Remedial Design/Remedial Action Consent Decree (CD) between PG&E and the United States, on behalf of DOI, which was approved by the District court for the Central District of California in November 2013, the various response and corrective actions required to clean up groundwater contamination within the Project Area are exempt from obtaining permits pursuant to CERCLA Section 121(e)(1). If the exemption is found not to apply for any reason, a permit may be required. Because it is unclear what specific future actions may be requested by PG&E in the future, DTSC is unable to conclude with absolute certainty that the CERCLA exemption will be found to apply to all future actions that may arise. As discussed throughout this EIR, therefore, some of the following agencies may need to issue permits or approvals relating to the following activities if not otherwise deemed exempt under CERCLA.

This SEIR is intended to be used as the primary CEQA document for any permits or approvals from DTSC or other California public agencies which may be required for implementation of the remedial action as described in this SEIR, including investigatory, maintenance, repair, and infrastructure replacement activities.

3.10.1 Responsible and Trustee Agencies

Responsible and trustee agencies may include, but are not limited to, the following state, regional, and local agencies in California:

- The State of California Colorado River Basin RWQCB for Clean Water Act (CWA) may issue or modify waste discharge requirements pursuant to the Porter-Cologne Water Quality Control Act for the existing evaporation ponds at the Topock Compressor Station, relating to the disposal of water from the remedy construction and operation. Additionally, the Project may obtain coverage under the General Construction Activity Stormwater National Pollutant Discharge Elimination System (NPDES) permit (33 U.S. Code Section 1341). The NPDES General Construction Permit is issued by the SWRCB. In order to obtain coverage under this permit, a Notice of Intent and Storm Water Pollution Prevention Plan must be submitted to

the RWQCB. The RWQCB may also use this EIR as the CEQA document for any other approvals that may be required for response and remediation activities as a responsible agency and pursuant to the CEQA Guidelines Section 15096.

- The California State Lands Commission (CSLC) may act as a responsible agency for issuance of ROWs or leases for Project activities that would occur on land owned or managed by the CSLC.
- In addition to its role in approving investigations on lands held by the state, the CSLC is a responsible agency regarding state-owned “sovereign” lands such as the beds of navigable waters.
- The California Department of Fish and Wildlife (CDFW) may be asked to issue permits pursuant to the California Endangered Species Act (California Fish and Game Code Section 2081 for listed species and may be asked to approve one or more streambed alteration agreements (California Fish and Game Code Section 1600 et seq.) for alteration of the bed or banks of surface waters. CDFW is also a trustee agency responsible for protecting fish and wildlife resources in the state.
- The California Department of Transportation (Caltrans) may be asked to issue ROW or leases for Project activities that would occur on land owned or managed by Caltrans.
- The Mojave Desert Air Quality Management District may be consulted regarding air quality and emissions and may be asked for certain permit approvals.
- The State Historic Preservation Officer may be asked for review of projects within the State of California for purposes of protecting historic and archeological resources pursuant to the Public Resources Code, Sections 5020 et seq. and Section 21083.2 et seq.
- The Metropolitan Water District of Southern California (MWD) may be asked for ROWs or leases related to construction and operation of any portion of the Project that would occur on MWD land.
- The San Bernardino County Division of Environmental Health may be asked to approve permits for well installation and potentially for on-site treatment of hexavalent chromium in groundwater and Health and Safety Plans and Soil Management Plans related to investigation and cleanup activities at the site.
- The San Bernardino County Fire Department may be asked to approve permits for tank installations associated with the investigation and cleanup of the Project Area.

3.10.2 Federal Agencies

The following federal agencies may review the draft SEIR and submit comments and/or use the information in this draft SEIR at their own discretion and in their own approval of any federal action not otherwise exempt as part of the remediation:

- The U.S. Environmental Protection Agency is the federal agency that enforces the federal RCRA (42 U.S. Code Section 6901 et seq.) and that is responsible for oversight related to the investigation and corrective action activities being conducted at the site by DTSC under their delegated authority to implement RCRA within California.

- On July 20, 2013, the U.S. Army Corps of Engineers (USACE) issued a letter that confirmed that a Section 404 permit pursuant to the CWA (33 U.S. Code Section 1344) for project-related discharges of dredged fill into waters of the United States is not required for the Topock remediation project because the site is exempt under CERCLA 121(e)(1). Additionally, USACE confirmed that it will not verify a jurisdictional delineation for this action because a permit is not required. A Wetland Delineation Report was completed on April 18, 2014. A protocol to identify procedures to be taken to ensure the Project's compliance with Section 404 is included in the Final Remedy Design (see Appendix A3 of the Final Remedy Design).
- The BOR has oversight authority for constructions, operations and maintenance of the Lower Colorado Water Supply Project, from which PG&E derives water rights.
- On July 7, 2014, the USFWS issued a letter to the BLM and provided concurrence with the findings presented in the Programmatic Biological Assessment (PBA) for the Final Groundwater Remedy (USFWS 2014), pursuant to Section 7 of the federal Endangered Species Act (ESA) (16 U.S. Code Section 1535[a][2]). The findings in the PBA state that the proposed activities associated with the Final Groundwater Remedy were not likely to adversely affect five species listed under the ESA and were not likely to jeopardize one species proposed for listing as threatened under the ESA and one candidate species for listing under the ESA. With this concurrence, the new PBA for the Final Remedy Design became effective as of July 7, 2014.
- The BLM, USFWS, and the BOR, as land managing agencies with authority over lands on which Project activities would occur, would also be responsible for compliance with Executive Order 13007. This order requires federal agencies, to the extent practicable and permitted by law, and not clearly inconsistent with essential agency functions, to accommodate access to and ceremonial use of Native American sacred sites by Native American religious practitioners and avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies shall maintain the confidentiality of sacred sites.

3.10.3 Arizona Agencies

The Final Groundwater Remedy Project may require ROWs, leases, or approvals from the Arizona State Land Department, Arizona Department of Transportation, Arizona Department of Water Resources, or Arizona Department of Environmental Quality for Project activities that would occur on lands under the department's jurisdiction. Coordination or approval from Mohave County or the Arizona Department of Water Resources may be required for construction of freshwater wells and any support facilities in Arizona.

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