

Pacific Gas and Electric Company's
Embarcadero-Potrero
230 kV Transmission Project

**FINAL
MONITORING
REPORT**

Prepared by:



December 2016

Contents

1.	Introduction and Project Overview	1
1.1	Overview of the PG&E Embarcadero-Potrero 230 kV Transmission Project.....	2
1.2	Role of Aspen Monitoring Team.....	2
1.3	Pre- and During-construction Compliance.....	4
1.4	Notices to Proceed.....	8
1.5	Minor Project Changes.....	9
1.6	Compliance Monitoring.....	10
1.7	Coordination and Communications.....	10
2.	Potrero Switchyard Site Preparation and GIS Building (NTPs #1 and #5)	11
2.1	Description of Potrero Switchyard and GIS Building.....	11
2.2	Construction Activities.....	11
2.3	Environmental Compliance and Non-compliance Events During Construction.....	15
2.4	Minor Project Changes Requested for Potrero Switchyard.....	15
2.5	Final Inspection of Potrero Switchyard.....	16
3.	Horizontal Directional Drilling (NTP #2)	17
3.1	Description of Horizontal Directional Drilling (HDD).....	17
3.2	Construction Activities.....	17
3.3	Environmental Compliance and Non-compliance Events During Construction.....	19
3.4	Minor Project Changes Requested for HDD.....	19
3.5	Final Inspection of HDD.....	19
4.	Duct Bank and Vaults (NTP #3)	20
4.1	Description of Duct Bank and Vaults.....	20
4.2	Construction Activities.....	20
4.3	Environmental Compliance and Non-compliance Events During Construction.....	23
4.4	Minor Project Changes Requested for Duct Bank and Vaults.....	23
4.5	Final Inspection of Duct Bank and Vaults.....	23
5.	Rock Removal and Submarine Cable Install (NTPs #4 and #6)	24
5.1	Description of Rock Debris and Submarine Cable Installation.....	24
5.2	Construction Activities.....	24
5.3	Environmental Compliance and Non-compliance Events During Construction.....	25
5.4	Minor Project Changes Requested.....	25
5.5	Final Inspection.....	25
6.	Remaining Work	26
7.	Post-construction Requirements	26

Tables

Table 1	Notice to Proceed (NTPs).....	9
Table 2	Minor Project Changes.....	10
Table 3	Incidents and Non-compliance Issues for Potrero Switchyard Site Preparation and GIS Building.....	15
Table 4	Incidents and Non-compliance Issues for the HDD Work.....	19
Table 5	Incidents and Non-compliance Issues for the Underground Duct Bank and Vaults.....	23

Figures

Figure 2	Potrero Switchyard demolition and debris removal, October 9, 2014.....	11
Figure 3	Potrero Switchyard soil displacement work, February 26, 2015	12
Figure 4	Potrero Switchyard drill displacement columns installed, April 28, 2015	12
Figure 5	Potrero Switchyard site prep completed, June 16, 2015.....	12
Figure 6	GIS building foundation in Potrero Switchyard, July 16, 2015.....	13
Figure 7	Installing wall panels of GIS building at Potrero Switchyard, October 29, 2015	13
Figure 8	GIS building installation at Potrero Switchyard and reactor foundation in foreground, December 1, 2015	13
Figure 9	Inside GIS building prepping for concrete floor pour, February 24, 2016	13
Figure 10	Installation of equipment in GIS building, July 12, 2016.....	14
Figure 11	Cable pulled through basement of GIS building, July 26, 2016	14
Figure 12	Transformer being delivered to switchyard, December 17, 2015	14
Figure 13	Crews working on assembling the transformer, March 31, 2016.....	14
Figure 14	Reactor pad installed, dress and test, February 24, 2016	15
Figure 15	HDD North on Spear Street, September 29, 2014	17
Figure 16	Vortex set up at Pier 30-32 to aid HDD operations, February 26, 2015	18
Figure 17	HDD South on 23rd Street, November 20, 2014.....	18
Figure 18	Setting rebar in duct bank on Folsom Street, April 1, 2015.....	20
Figure 19	Vault pit shored on Spear Street, March 25, 2015	21
Figure 20	Setting wall in vault with crane, April 1, 2015	21
Figure 21	HDD to duct bank transition on Spear Street, April 28, 2015	21
Figure 22	Duct Bank South installation of conduit on 23rd Street, May 15, 2015	22
Figure 23	Excavating for Duct Bank South on 23rd Street, September 22, 2015	22
Figure 24	Manson dredging for rock and debris off Pier 30-32, December 17, 2014	24
Figure 25	Cable-laying barge, June 10, 2015	25

1. Introduction and Project Overview

This Final Construction Completion Report has been prepared to summarize the construction and monitoring activities conducted for the Pacific Gas and Electric (PG&E) Company's Embarcadero-Potrero 230 kV Transmission Project. The Embarcadero-Potrero 230 kV Transmission Project included approximately 3.5 miles of new single-circuit 230 kV transmission line in the City of San Francisco, San Francisco County, California. The California Public Utilities Commission (CPUC), as the Lead Agency for the project, conducted the environmental review process and granted final approval of the project. The CPUC issued a Certificate of Public Convenience and Necessity (CPCN) and certified the Final Mitigated Negative Declaration (MND) on January 16, 2014 (Decision D.14-01-007), and a Notice of Determination was submitted to the State Clearinghouse (SCH #2013082047). The MND was prepared by Aspen Environmental Group under contract to the CPUC in accordance with the California Environmental Quality Act (CEQA) to inform the public and to meet the needs of local, State, and federal permitting agencies in considering the project proposed by PG&E. Aspen Environmental Group implemented the Mitigation Monitoring, Compliance, and Reporting Program to ensure compliance with the Project mitigation measures, compliance plans, and permit conditions during all phases of construction.

Chapter 1, Introduction and Project Overview, provides a brief overview of the Embarcadero-Potrero 230 kV Transmission Project and project approvals granted by the CPUC. In addition, Chapter 1 outlines the role and responsibility undertaken by Aspen Environmental Group as the mitigation monitoring team, including preconstruction compliance review. The methods established for addressing non-compliance issues, changes in the project description or mitigation implementation, and extra workspace requirements are also discussed.

The Embarcadero-Potrero 230 kV Transmission Project was construction in six phases, as described in Chapters 2 through 5:

1. Site preparation and excavation of the 230 kV Potrero Switchyard site (see Chapter 2);
2. The Horizontal Directional Drilling (HDD) component on Spear Street and 23rd Street connecting to the San Francisco Bay (see Chapter 3);
3. The duct bank and vault installation component between the HDD transition on Spear Street to the Embarcadero Substation on Folsom Street in the northern section, and between the HDD transition on 23rd Street to the Potrero Switchyard in the southern section (see Chapter 4);
4. The rock removal obstructing the path of the submarine cable component (see Chapter 5);
5. Construction of the 230 kV Potrero gas-insulated switchgear (GIS) building and cable tie-in component (see Chapter 2); and
6. The submarine cable installation component in the San Francisco Bay (see Chapter 5).

Chapter 6 discusses the work that remains for the project, and Chapter 7 provides a comprehensive summary of post-construction requirements for the project.

Mainline construction of the Embarcadero-Potrero 230 kV Transmission Project took place between September 2014 and December 2016, with full energization on September 11, 2016. Some work within the electrical buildings and GIS building inside the Potrero Switchyard will continue into 2017, as well as the plaza work in front of the GIS building. However, all remaining work will occur within the fenced confines of the substation.

1.1 Overview of the PG&E Embarcadero-Potrero 230 kV Transmission Project

PG&E constructed and will operate and maintain the 230 kV transmission line, substation, and related facilities listed below, known as the Embarcadero-Potrero 230 kV Transmission Project (see Figure 1). PG&E's project objectives included improving the reliability of the existing transmission system in San Francisco to provide a high likelihood of continued electric service to downtown San Francisco in the event of overlapping outages on both of two existing 230 kV transmission lines that presently feed Embarcadero Substation. The project provides a third cable into Embarcadero Substation from Potrero Switchyard rather than Martin Substation.

The Embarcadero-Potrero 230 kV Transmission Project consists of:

- Approximately 3.5 miles of new single-circuit 230 kV transmission line
 - 2.5 miles was installed offshore in the San Francisco Bay
 - 0.4 miles was installed by HDD between onshore transition points and the bay
 - 0.6 miles was installed underground in paved areas and streets
- Termination of the new transmission line into the upgraded 230 kV bus at Embarcadero Substation
- Construction of a new 230 kV switchyard adjacent to the existing 115 kV Potrero Switchyard and termination of the new cable

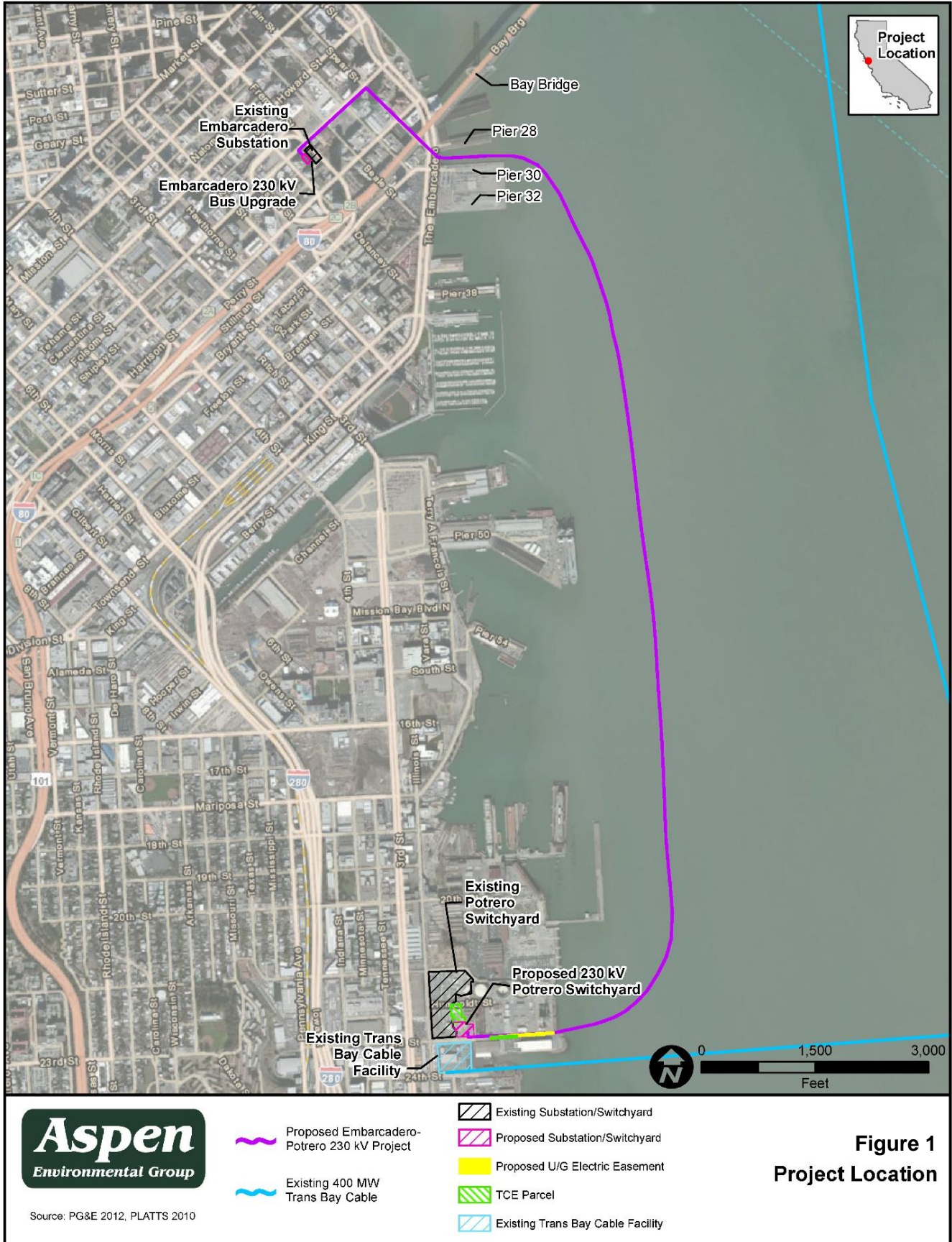
1.2 Role of Aspen Monitoring Team

The Aspen Monitoring Team was composed of the Monitoring Manager (Vida Strong), Project Liaison (Fritts Golden), and Environmental Monitor (Jody Fessler).

Aspen's Monitoring Manager, Vida Strong, supervised Aspen's Environmental Monitor, determined the appropriate inspection frequency, and was responsible for weekly report preparation. The Monitoring Manager also served as the main point of contact with the CPUC Project Manager (CPUC PM) for major compliance matters.

Aspen's Project Liaison, Fritts Golden, provided a direct line of contact with CPUC management and legal, as well as PG&E, regarding public complaints and other issues.

Aspen's CPUC Environmental Monitor (CPUC EM), Jody Fessler, conducted the day-to-day monitoring and was the primary point of contact with in-field agency and project personnel. The CPUC EM stayed apprised of construction activities and schedule changes, and monitored construction activities for compliance with approved project mitigation measures, APMs, compliance plans, and permit conditions. The CPUC EM documented compliance through daily logs and provided input for the weekly reports. The CPUC EM noted any issues or problems with implementation of mitigation/APM/permit conditions, notified the appropriate designated project members, and reported problems to the Aspen Monitoring Manager. All other issues were brought to the attention of the PG&E field representatives to address appropriately.



1.3 Pre- and During-construction Compliance

The Mitigation Monitoring, Compliance, and Reporting Program was developed between the CPUC, Aspen, and PG&E, which provides guidelines and procedures for environmental compliance on the Project. Several specific compliance plans and reports were submitted to satisfy federal and State agency requirements, including:

- Worker Environmental Awareness Program Materials
- Plan to Minimize Fugitive Dust
- Plan to Minimize Construction Exhaust Emissions
- Asbestos Dust Mitigation Plan
- Health and Safety Plans
- Hazardous Materials and Emergency Response Plan
- Soil, Groundwater, and Underground Tank Characterization
- Horizontal Directional Drilling (HDD) Frac-out Plan
- Sediment Sampling and Analysis Plan
- Sediment Monitoring and Response Plan
- Switchyard Lighting Design
- Design Plans
- Construction Runoff Control (SWPPP)
- Construction Noise Minimization Plan
- Traffic Management Plans
- Preconstruction Biological Survey Report
- Preconstruction Nesting Bird Survey Reports

These compliance plans were reviewed by Aspen prior to the start of construction to ensure that appropriate environmental protection would take place. In addition, Aspen tracked the necessary permitting requirements to ensure that all the applicable agency permits and approvals had been issued prior to construction. Permits and approvals issued for the project included:

Federal

- U.S. Army Corps of Engineers (USACE) – Nationwide Permit, Approval of Dredge Operation Plan, Approval of Sampling and Analyses Plan for Dredge Material Characterization
- National Marine Fisheries Service (NMFS): Letter of Approval stating project not likely to adversely affect listed species or designated critical habitats
- U.S. Fish and Wildlife Service: Letter of Approval stating project not likely to adversely affect listed species or designated critical habitats
- U.S. Coast Guard (USCG): Anchor Waiver

State

- CPUC: MND Certification; Certificate of Public Convenience and Necessity; Notices to Proceed
- California Department of Fish and Wildlife (CDFW): Pacific Herring Work Window Waiver
- California Department of Transportation (Caltrans): Encroachment Permit

Regional and Local

- San Francisco Public Utilities Commission (SFPUC): Construction Runoff Control Permit
- San Francisco Bay Regional Water Quality Control Board (RWQCB): Water Quality Certification

- San Francisco Bay Conservation and Development Commission (BCDC): Approval of Rock and Debris Dredging Episode, BCDC Permit
- Bay Area Air Quality Management District (BAAQMD): Approval of Asbestos Dust Mitigation Plan
- Port of San Francisco: Encroachment Permit and License
- City and County of San Francisco Department of Public Works (SFDPW): Night Noise Authorization Permit, Utility Excavation Permit, General Excavation Permit, Street Improvement Permit, Temporary Occupancy Permit
- City and County of San Francisco Department of Building Inspection: Electrical Permit, Building Permit, Plumbing Permit
- San Francisco Water, Power, and Sewer: Batch Wastewater Permit (Wastewater Discharge Permit)
- San Francisco Municipal Transportation Agency (SFMTA): Special Traffic Permit

Mitigation measures and Applicant Proposed Measures (APMs) were included in the Mitigated Negative Declaration to reduce impacts to less than significant levels in the areas of air quality, biological resources, cultural resources, water resources, hazardous materials, sensitive land uses/noise, and utilities/service systems.

Air Quality. Due to the naturally occurring asbestos in the soil at the Potrero Switchyard and along 23rd Street, the BAAQMD required an Asbestos Dust Mitigation Plan, which they reviewed and approved. The Asbestos Dust Mitigation Plan contained provisions to mitigate impacts of airborne asbestos by requiring air quality monitoring stations and an air quality specialist monitor within the Project area when earth disturbing activities were occurring, as well as consistent watering of soil and excavation activity to minimize dust.

Biological Resources. The proposed 230 kV Potrero Switchyard site was a highly disturbed lot within the site of the former Potrero Power Plant site now owned by GenOn Energy, Inc., and adjacent to and east of the existing Potrero Switchyard. Vegetation in this area was largely limited to sparse ornamental shrubs and trees around the property and some minimal ruderal non-native vegetation within the site. No tree trimming or removal was conducted in this portion of the Project area. No wetlands occurred along the Project route. The nearest known wetland was near Pier 96, about 0.5 miles south of Potrero Switchyard. Nesting bird surveys were conducted between February 15 and August 31.

The northern HDD, duct bank and vault locations were entirely in City streets (Spear Street and Folsom Street) and the surrounding area was entirely paved. There were large, mature trees that provided nesting habitat for many species of urban birds and possibly also roosting habitat for bats. One hummingbird nest was observed and monitored for disturbance during Project activities.

The southern HDD, duct bank and vault locations were entirely in the City street (23rd Street) and the surrounding area was entirely paved. Vegetation in this area was largely limited to ornamental shrubs and trees around Potrero Switchyard. No tree trimming or removal was conducted in this portion of the Project area.

The submarine portions of the Project route passed through natural and artificial intertidal, subtidal, and open-water habitats. Marine habitats and associated marine communities in the Project area included natural (rock) and artificial (concrete, rock riprap, wood, and concrete pilings) hard intertidal areas near shore; soft substrate subtidal habitat; and open water. The Bay depth in the Project area was about 10 feet along the east-west portion near the former Potrero Power Plant. The depth ranged from approximately 30 feet along the southern portion to 70 feet deep along the northern portion of the submarine

route. Ambient underwater noise levels in the Project area were heavily influenced by the anthropogenic activity in the Bay, such as marine vessels or construction that occurs in the water.

Intertidal habitat is habitat between the low and high tide lines. The Project included drilling through sediment beneath the Bay shoreline and adjacent intertidal habitat, 40 to 50 feet below the water surface. Intertidal habitat located along the Project route consisted of riprap and soft-bottom mud at the southern cable landing and pavement, ports, wharfs, and soft-bottom mud at the northern cable landing. There were no natural rocky areas, sandy beaches, or wetlands on the shore along the proposed route.

Subtidal habitat consists of the submerged area below the low tide mark. Within the San Francisco Bay, these habitats include mud, shell, sand, rocks, artificial structures, shellfish beds, eelgrass beds, algal beds, and the water column above the Bay bottom. Subtidal habitat along the proposed route consisted of soft-bottom mud and sandy habitats and the water column above them. There were no eelgrass (*Zostera marina*) beds, shell, or rock areas along the route, nor were there any planned eelgrass or shell bed restoration projects in the area. The Project route passed through subtidal open-water and bottom-sediment habitat.

There were 11 special-status marine species (fish and mammals) with high or moderate potential to be present in the Project area, including: green sturgeon (*Acipenser medirostris*), central California coast Coho salmon (*Oncorhynchus kisutch*), Chinook salmon (*Oncorhynchus tshawytscha*), California central coast steelhead (*Oncorhynchus mykiss irideus*), longfin smelt (*Spirinchus thaleichthys*), Pacific herring (*Clupea pallasii*), great white shark (*Carcharodon carcharias*), Pacific harbor seal (*Phoca vitulina richardsi*), California sea lion (*Zalophus californianus*), harbor porpoise (*Phocoena phocoena*), and gray whale (*Eschrichtius robustus*). The San Francisco Bay is federally designated as critical habitat for the southern Distinct Population Segment (DPS) of North American green sturgeon and for the DPS of Central California Coast steelhead.

The NMFS issued a not likely to adversely affect letter for the Project and no USFWS permit was required because no potential for species under their jurisdiction would be impacted. CDFW conditionally authorized the Project to proceed, requiring a qualified biological observer approved by CDFW to be present during all Project activities to monitor for the presence of Pacific herring during the extension of the environmental work window from December 1st until February 28th, 2014. A BCDC permit was also obtained. All construction personnel received biological resource and environmental awareness training prior to starting work.

Cultural Resources. The records search for prehistoric resources did not return any finds near the 230 KV Potrero Switchyard site. However, historic resources had been documented near the Potrero Switchyard site and include surrounding brick buildings (a former power plant referred to as Station A). Vibration monitoring took place at the site in compliance with APM CUL-6.

For the HDD and underground duct bank and vault areas, a records search for information was performed at the Northwest Information Center (NWIC) and the California Historical Resources Information System (CHRIS) on April 20, 2012. The records search conducted for the proposed route centered on the alignment and included a one-quarter mile buffer on either side. The records search included a review of base maps and resource records on file at the NWIC, as well as the California Office of Historic Preservation (OHP) listings of significant resources. A search of the Sacred Lands Files maintained by the Native American Heritage Commission (NAHC) was requested on June 27, 2012 and again on July 6, 2012. In its response, the NAHC noted that a search of the Sacred Lands Files failed to indicate the presence of Native American cultural resources in the immediate Project area, and provided a list of recommended contacts

that may have additional information concerning archaeological sites or traditional cultural properties near the Project area.

Intensive pedestrian archaeological and historical architectural surveys of the Area of Potential Effects (APE) were completed on June 28, 2012. A maritime archaeologist reviewed the Project studies, reports, and a marine geophysical survey, as well as digital geophysical datasets to determine the presence of submerged cultural resources, primarily shipwrecks.

Archaeological Monitors were on site during all ground disturbance in areas previously not disturbed by the Project. All construction personnel were trained regarding the potential for presently unknown cultural resources and the procedures to treat unexpected discoveries. Many historic cultural resources were uncovered, evaluated, recorded, and inventoried in compliance with the *Archaeological Monitoring and Inadvertent Discovery Plan for the Potrero Portion of the Embarcadero-Potrero 230 kV Transmission Project, City of San Francisco, California* (July 2014 FINAL), prepared by Far Western Anthropological Research Group, Inc.

Marine Geophysical Survey: A maritime archaeologist reviewed the *Final Embarcadero to Potrero ZA-1 230kV Underground Transmission Project Feasibility Study* prepared by Black and Veatch for PG&E (B&V Project No. 173915.42.3008). A review of the Black and Veatch report included a detailed examination of *Exhibit K, Final Report, Submarine Utility Corridor Investigation, Marine Geophysical Survey, Proposed AZ-1 Transmission Line, San Francisco Bay, California* (OSI Report No. 11ES057), the geophysical report prepared by Ocean Surveys, Inc. (OSI) for Black and Veatch. The review also included a detailed examination of the digital geophysical datasets collected by OSI, specifically the side scan sonar and magnetometer data. Although OSI collected a suite of geophysical data, the datasets most relevant to an evaluation of the potential that historical resources in the form of cultural/archaeological deposits are present within the APE are the side scan sonar imagery and the magnetometer data. As detailed in the OSI report, side scan sonar uses acoustical data to create an image of the sea floor, while the magnetometer records variations in the earth's magnetic field that may represent ferrous metal objects. The side scan sonar imagery records objects visible above the sea floor, while the magnetometer can determine the presence of either visible or buried material. Used together, the instruments are the primary tools used by maritime archaeologists to determine the presence of submerged cultural resources, primarily shipwrecks (Aspen 2013, MND 5-82).

No cultural resources were encountered during the submarine portion of the Project.

Water Resources. PG&E prepared an Erosion and Sediment Control Plan as part of a Stormwater Pollution Prevention Plan (SWPPP), which was approved by the San Francisco Public Utilities Commission on August 13, 2014. The Regional Water Quality Control Board issued a Waste Discharge Identification (WDID) number for the Project (WDID# 2 38C370601). Erosion control and pollution prevention measures in the SWPPP addressed elements such as track-out controls, stock-pile handling, dewatering discharge, drain inlet protection, and replacement of any disturbed pavement or landscaping.

PG&E received a USACE Nationwide Permit and Regional Water Quality Control Board 401 certification for work in the marine environment.

Hazardous Materials. PG&E provided the CPUC with hazardous waste characterization trucking and land-fill manifests for all soil, materials, and debris taken off site.

Sensitive Land Uses/Noise. At the northern HDD, duct bank and vaults location, there were commercial and residential uses, apartment and condominium towers along Folsom Street, and the Marin Day School Hills Plaza Campus was located at the corner of Spear and Harrison. At the southern duct bank and vaults

location, adjacent land uses included commercial facilities, a storage facility, and the Trans Bay Cable facility. Construction notifications were provided to the public with tips on reducing noise intrusion, for example, by closing windows facing the planned construction. PG&E also specified construction noise reduction measures that required the contractor to ensure all equipment was in good working order, adequately muffled, and maintained in accordance with the manufacturers' recommendations. Also, at HDD North, a noise blanket was required to be installed on the fencing around the HDD equipment and regular noise measurements were taken.

Utilities and Service Systems. APM UTIL-1 required coordination with the SFPUC regarding stormwater system facilities in the northern segment of the Project near the Embarcadero. PG&E conducted this coordination regarding avoidance of these facilities and continued to coordinate with the SFPUC regarding this, and water and sewer system facilities in the southern segment of the Project, as construction proceeded. Mitigation Measure (MM) UT-1 required that underground utilities be protected and that PG&E coordinate with utility owners. PG&E coordinated with all potentially impacted utility owners and continued to do so as construction proceeded.

As part of PG&E's Environmental Compliance Management Plan, and a requirement of the MND, all employees working on the Project were required to attend an environmental training session (Worker Environmental Awareness Training) before they could begin work. PG&E's environmental and safety representatives presented the training sessions, which covered environmental and cultural resources issues, water quality protection, hazardous materials handling, emergency response, State and federal laws, and reporting procedures.

1.4 Notices to Proceed

The CPUC issued Notices to Proceed (NTP) authorizing the start of construction on a given portion of the Project. PG&E divided the Project into six construction work packages and requested six NTP authorizations from the CPUC (see Table 1). Each separate NTP request was applicable to a defined segment or aspect of the Project.

In general, the NTP requests included the following:

- A description of the work.
- Detailed description of the location, including maps, photos, and/or other supporting documents.
- Verification that all mitigation measures, permit conditions or requirements, APMs, project parameters, or other project stipulations have been met, apply, or do not apply to the work covered by the NTP request.
- In a case where some outstanding requirements cannot be met prior to issuance of the NTP, an outline of outstanding submittals and how they will be met prior to construction.
- Up-to-day resources surveys or a commitment to conduct surveys and submit results prior to construction.
- Cultural resource surveys or verification that no cultural resources will be significantly impacted.
- Copies of permits issued by other agencies, including requirements.
- Date of when construction is anticipated to begin and duration of work.

Aspen reviewed the NTP requests and the applicable pre-construction requirements to ensure that all the information required to process and approve the NTP was included. If additional information or clarification was needed, it was requested from PG&E. Aspen prepared recommended NTPs for CPUC review and issuance.

Table 1. Notice to Proceed (NTPs)

NTP #	Date Requested	Date Issued	Phase	Description
NTP #1	6/23/14	8/21/14	Potrero site preparation	Site preparation and excavation of the 230 kV Potrero Switchyard site on 23 rd Street, SF.
NTP #2	7/31/14	8/28/14	HDD	Horizontal directional drilling on Spear Street and 23 rd Street connecting to the San Francisco Bay.
NTP #3	9/18/14	10/09/14	Underground duct bank and vaults	Underground duct bank and vault installation between the HDD transition on Spear Street to the Embarcadero Substation on Folsom Street in the northern section, and between the HDD transition on 23 rd Street to the Potrero Switchyard in the southern section, SF.
NTP #3 MOD	11/13/14	11/14/14	Underground duct bank and vaults	Trench from the new Potrero Switchyard to the existing switchyard for the 230kV/115kV connections across the Trans Bay Cable.
NTP #4	11/19/14	11/21/14	Rock removal	Rock and debris removal along subsea cable route in the San Francisco Bay.
NTP #5	2/19/15	3/27/15	Potrero GIS switchgear building	Construction of 230 kV Potrero gas-insulated switchgear (GIS) building and cable tie-in component at Potrero Switchyard.
NTP #6	2/19/15	4/07/15	Submarine cable installation	Submarine cable installation in the San Francisco Bay

1.5 Minor Project Changes

The CPUC and Aspen reviewed Minor Project Change requests for consistency with CEQA requirements. Minor Project Changes are located within the geographic boundary of the project study area. Minor Project Changes do not create new or substantially more severe significant impacts, or conflict with any mitigation measure or applicable law or policy. Also, they do not trigger other permit requirements unless the appropriate agency has approved the change, and clearly and strictly comply with the intent of the mitigation measure or applicable law or policy. The CPUC allowed Minor Project Change requests to be submitted by PG&E along with the NTP request for incorporation into the NTP.

Each Minor Project Change Request submitted by PG&E was first reviewed by Aspen for completeness. If incomplete, a request for information was prepared by Aspen and sent to PG&E. When complete, each request was analyzed, including field verification and resource/local agency consultation, to determine if new impacts or an increase in significant impacts would result. After analysis of the request, Aspen prepared a written recommendation of approval or denial for the CPUC. As appropriate, mitigation measures or other agency conditions were required by the CPUC to avoid, or reduce to a less than significant level, any identified impacts. The Minor Project Change Requests submitted for the PG&E Embarcadero-Potrero Project are presented in Chapters 2 through 5. The Minor Project Change requests that were not incorporated into a NTP are summarized in Table 2.

Table 2. Minor Project Changes

MPC #	Date Requested	Date Issued	Phase	Description
MPC #1	7/16/14	7/23/14	Amador Staging and Laydown Yard	Use of an existing staging and laydown yard adjacent to Alternate Staging Area #3 (as identified in the IS/MND) on Amador Street, SF.
MPC #2	12/31/14	1/5/15	Staging and Laydown Yard	Use of an existing paved staging and laydown yard at 1215 Michigan Street, SF, two blocks from the Potrero Switchyard.

1.6 Compliance Monitoring

Compliance monitoring by the CPUC EMs is intended to chronicle and document PG&E’s compliance with project mitigation measures, compliance plans, and agency permit conditions. Compliance monitoring is implemented to minimize or eliminate potential significant impacts and to protect environmental resources. A Non-Compliance is defined as “any deviation from applicable mitigation measures, applicant-proposed measures and project parameters, permit conditions or requirements, and approved plans.” A Project Memorandum is a written warning of a non-compliance activity. A Non-Compliance Report is issued when chronic non-compliance activity occurs or a blatant disregard for project mitigation measures, compliance plans, or permit conditions is demonstrated. Verbal warnings are typically given prior to any written Project Memoranda or Non-Compliance Reports. The compliance record for the Embarcadero-Potrero Project is discussed in Chapters 2 through 5.

1.7 Coordination and Communications

In field communications were conducted by the CPUC EM with PG&E’s Environmental Inspectors (EIs) and other Project personnel. Verbal warnings and written communications (emails and photographs) were utilized to notify PG&E and its contractors of non-compliance activities. Field observations were logged by the CPUC EM for every site visit. Weekly reports were submitted to the CPUC documenting compliance, requested Project changes, and construction progress.

2. Potrero Switchyard Site Preparation and GIS Building (NTPs #1 and #5)

2.1 Description of Potrero Switchyard and GIS Building

Switchyard Site Preparation

On June 23, 2014, PG&E requested authorization from the CPUC to commence with the site preparation and excavation of the Potrero Switchyard site for the PG&E Embarcadero-Potrero 230 kV Transmission Project. On August 21, 2014, NTP #1 was issued by the CPUC for the requested Switchyard work.

Work authorized under NTP #1 included site preparation, fence installation, demolition of existing pavement and structures within the identified work areas, excavation, and drilling of displacement columns for ground improvement preparation prior to the actual building construction.

GIS Building and Cable Tie-in

On February 19, 2015, PG&E requested authorization from the CPUC to commence with construction of the 230 kV Potrero gas-insulated switchgear (GIS) building and cable tie-in component of the Project at the Potrero Switchyard site. On March 27, 2015, NTP #5 was issued by the CPUC for the requested work.

Work authorized under NTP #5 included the new 230 kV switchyard that featured switchgear, associated automation and control systems, and station service systems (i.e., AC power equipment to supply the building) housed in the 8,500 square-foot GIS building with basement. The submarine cable enters and exits the new 230/115 kV GIS building via the basement. The 230 kV switchyard connects to the existing 115 kV switchyard through twelve underground 115 kV cables (i.e., two cables per phase per 115 kV bus). The cables are connected to the existing 115 kV switchyard using six single-phase tubular steel termination poles, approximately 10 feet high, with insulated terminals to a total height of approximately 17 feet. The switchyard also includes a transformer and reactor. The entire site is contained by cement block perimeter fencing.

2.2 Construction Activities

Switchyard Site Preparation

Construction activities under NTP #1 for the Potrero Switchyard site preparation began in September 2014, with the staging of office trailers, mobilization of equipment and materials, and fence and BMP installation. Around mid-September, crews began asbestos abatement on a small shed and cement wall that were to be removed, while other crews demolished and removed concrete foundations, rebar, bollards, contaminated soil, and other debris (see Figure 2). Concrete and rebar was separated from other debris and taken off site for recycling. The area was watered down to prevent dust while demolition was taking place in accordance with the Asbestos Dust Mitigation Plan. Work also included the abandonment of an on-site well in October 2014, and the abatement and



Figure 2. Potrero Switchyard demolition and debris removal, October 9, 2014



Figure 3. Potrero Switchyard soil displacement work, February 26, 2015

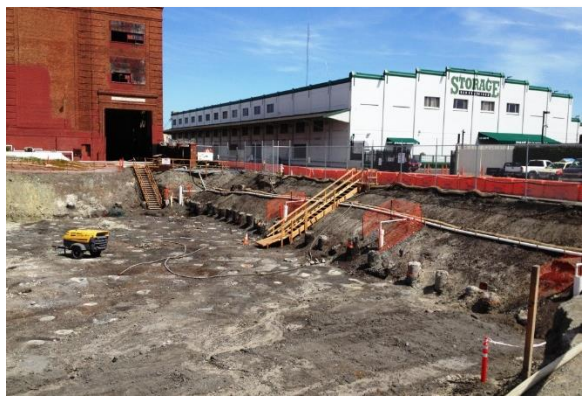


Figure 4. Potrero Switchyard drill displacement columns installed, April 28, 2015

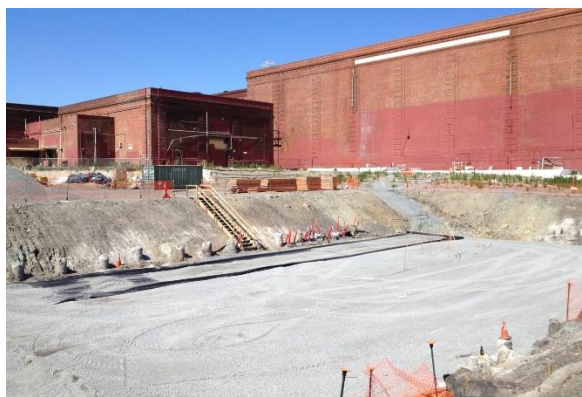


Figure 5. Potrero Switchyard site prep completed, June 16, 2015

removal of a large unearthed pipe and condensate tank in November 2014. Demolition and removal of concrete and debris continued until January 2015.

Grading of the Potrero Switchyard site began in early January 2015 and the soil displacement contractor mobilized to the site (see Figure 3). By mid-January 2015, the soil displacement columns began to be drilled and drilling continued until early March 2015. The drilled displacement columns were installed to improve the density, strength and stiffness of weak and loose soil. The drilled displacement columns were drilled areas about 18 inches in diameter that were drilled into the soil, and then backfilled under pressure with controlled low strength material into the cavity left by the drill displacement tool. The drill was up to 35 feet in depth. The drilled displacement columns were installed in close proximity to each other, the objective being to push (displace) the soil against the nearby columns causing compaction of the soil. The more columns, the more compaction inside the desired area (see Figure 4).

Excavation, grading, and spreading and compacting of base rock continued into June 2015, as well as other activities including sidewalk removal along 23rd Street, old pipe removal, vapor well installation, and exposing and raising columns. Site preparation work was completed the end of June 2015 (see Figure 5).

Equipment used for work under NTP #1 included: backhoe (w/hoe-ram), skip loader, bobcat, excavator (various sizes, w/hoe-ram), large loader, dump truck, bulldozer, Sheep's foot roller, Vibraplate compactor, drill rig, concrete pump truck (boom), concrete pump truck (line hose), Gradeall (fork lift), crane (truck), flatbed delivery trucks, welding truck, JLG, welding generator, scissors lift, grout/concrete mixer, ditch witch, asphalt laying machine, drum roller, and fence installer. PG&E also had dump trucks and utility pole trucks on site.

GIS Building and Cable Tie-in

Construction activities under NTP #5 for the GIS building and related infrastructure began in mid-June 2015. Crews built and set forms, and installed rebar and grounding wire for the GIS building foundation (see Figure 6). The concrete foundation was poured mid-August 2015, and forms were removed and the foundation slab cleaned at the end of the month. For the next month and a half, little work was conducted at the site. At the end of October, drainage work began and more materials and equipment were delivered to the site. A crane was mobilized to the site and the GIS building wall panels were installed and welded the end of October (see Figures 7 and 8). Grouting and welding of the wall panels to the foundation continued. Steel infrastructure was delivered and welded inside the GIS building starting in mid-November 2015. Electrical work began inside the GIS building in mid-November 2015 and continued until mid-October 2016. Waterproofing work was conducted on and in the GIS building beginning in November 2015 and continuing into May 2016. The first floor decking was installed in December 2015 and January 2016. Crews continued to install infrastructure and electrical equipment in the GIS building. Rebar was installed on the first floor and roof of the GIS building the end of January 2016. At the end of February, the first floor was poured with concrete (see Figure 9). Crews continued to install infrastructure and electrical equipment in the GIS building until mid-October 2016 (see Figures 10 and 11).

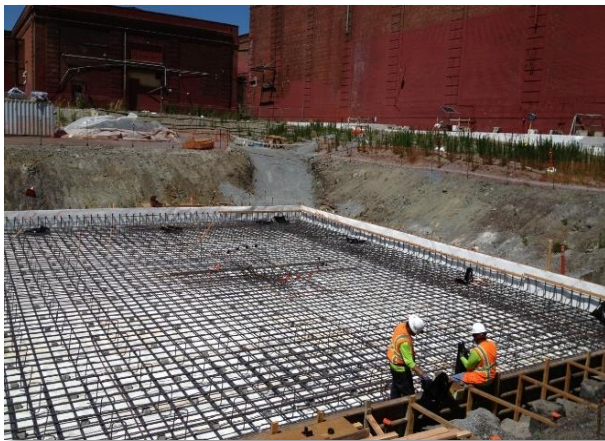


Figure 6. GIS building foundation in Potrero Switchyard, July 16, 2015



Figure 7. Installing wall panels of GIS building at Potrero Switchyard, October 29, 2015



Figure 8. GIS building installation at Potrero Switchyard and reactor foundation in foreground, December 1, 2015



Figure 9. Inside GIS building prepping for concrete floor pour, February 24, 2016



Figure 10. Installation of equipment in GIS building, July 12, 2016

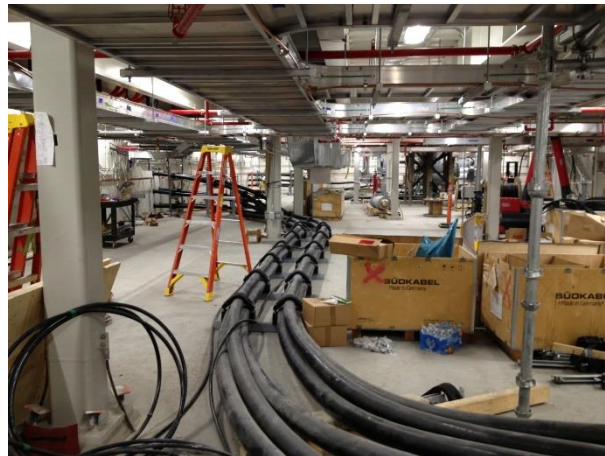


Figure 11. Cable pulled through basement of GIS building, July 26, 2016

Excavations and conduit installation occurred throughout the Switchyard between the existing electrical operations building, the adjacent existing substation, the reactor, the transformer, and the GIS building. Base rock was distributed and compacted throughout the site. Infrastructure for landscaping began to be installed the end of April 2016, and vegetation was finally planted in mid-November 2016. Construction of the perimeter concrete block wall began the end of May 2016 and was completed the beginning of October 2016. Installation of the architectural panels occurred from the end of July 2016 until the end of September 2016. Excavation and tie-in to water and sewer pipes began in August 2016 at the southeast and southwest corners of the Switchyard and continued through December 2016.

Crews began working on the transformer foundation in mid-November 2015. Foundation forms were built and installed, then rebar and grounding wire installation occurred. Concrete was poured in late November 2015, early December 2015, and late February 2016, to build the foundation up and create a containment area. The transformer was delivered and set on the foundation December 17 and 18, 2015 (see Figure 12). Foundation work, including rebar and concrete pours, continued into February 2016. Crews began to assemble, or “dress and test,” the transformer in early March 2016 (see Figure 13). Electrical termination work was conducted on the transformer in June 2016. The transformer was painted in mid-July 2016. Flowable thermal backfill (FTB) was poured around the transformer on August 9, 2016.



Figure 12. Transformer being delivered to switchyard, December 17, 2015



Figure 13. Crews working on assembling the transformer, March 31, 2016

Crews began working on the reactor foundation at the end of November 2015. Foundation forms were built and installed, then rebar and grounding wire installation occurred. Concrete was poured in mid-December 2015 and again at the end of December 2015. The reactor was delivered and set on the foundation February 10, 2016. Crews began to “dress and test” the reactor the end of February 2016 (see Figure 14). Electrical termination work was conducted on the reactor in June 2016. The reactor was painted in mid-July 2016.



Figure 14. Reactor pad installed, dress and test, February 24, 2016

Work in the adjacent existing substation demolishing old bus foundations began mid-October 2015 and continued into late November 2015. New foundation holes were excavated and augured in mid-November, and then foundation forms set, rebar and grounding installed, and concrete poured. A trench was excavated from the new Switchyard to the adjacent existing substation in December, and conduit and grounding were installed. New infrastructure was installed on new foundations starting in January 2016. Excavations and installation of infrastructure continued into April 2016. Electrical termination work was conducted on the 115 kV bus June through mid-September 2016.

2.3 Environmental Compliance and Non-compliance Events During Construction

Worker Environmental Awareness Program trainings were held for new workers to the Project site and sign in sheets were submitted to the CPUC on a weekly basis. Throughout construction, the CPUC EM and the PG&E EI brought attention to incidents and non-compliance issues. All issues were resolved. There were very few incidents at the Potrero Switchyard for the site preparation work; however, the work for the GIS building required many different contractors and they had to be constantly reminded about secondary containment and trash clean-up. Designated concrete wash-out areas and appropriate maintenance of these areas was also an ongoing issue. The incidents and non-compliance issues are noted in Table 3.

Table 3. Incidents and Non-compliance Issues for Potrero Switchyard Site Preparation and GIS Building

Incidents/Non-compliance Issues	Incidents
Inadequate/missing BMPs, spills, containment	49
Track-out	4
Fugitive dust	1
Off-site sedimentation from project	0
Trash	30
Concrete trucks not washing out in approved areas	7
Working without attending Worker Environmental Awareness Training	0

2.4 Minor Project Changes Requested for Potrero Switchyard

PG&E requested that Notice to Proceed #1 (NTP #1) include two Minor Project Changes, which included the use of two existing access roads within the existing switchyard property that were not included in the Project area or description in the MND. The MMCRP acknowledges that temporary changes to the project,

such as the need for additional workspace or access, are anticipated and common practice for construction efforts of this scale and that a Minor Project Change request would be required for these activities and can be incorporated into an NTP. The NTP documented the CPUC's thorough evaluation of all activities covered in this Minor Project Change, and that no new impacts or increase in impact severity would result from the requested Minor Project Change activities.

On December 31, 2014, PG&E submitted a request for Minor Project Change #2 for an additional equipment storage area for the Potrero Switchyard GIS building and switchyard work. The additional storage space was on an existing paved area, two blocks from the Potrero Switchyard, and was a commercially available staging area. Although this equipment storage area was not specifically mapped in the Final IS/MND, the IS/MND noted that additional off-site existing yard space may be used for the project and this space falls under that category (see IS/MND p. 4-47 "Existing commercially available office and yard space may be used by contractors or agencies"; and p. 4-11 "Commercially available off-site office and yard space may also be used." The site was entirely paved and was in use at the time for Sheedy's Drayage storage (e.g. rigging, hauling, trucks). The CPUC approved Minor Project Change #2 on January 5, 2015.

2.5 Final Inspection of Potrero Switchyard

The CPUC EM conducted a final inspection of the Potrero Switchyard on October 26, 2016. The CPUC EM observed that the site was neat and clean, and that SWPPP measures were in place. All observed work activities were in compliance with mitigation measures (MMs), Applicant Proposed Measures (APMs), and other permit requirements.

3. Horizontal Directional Drilling (NTP #2)

3.1 Description of Horizontal Directional Drilling (HDD)

On July 31, 2014, PG&E requested authorization from the CPUC to commence with the Horizontal Directional Drilling (HDD) component of the PG&E Embarcadero-Potrero 230 kV Transmission Project on Spear Street (HDD North) and 23rd Street (HDD South) connecting to the San Francisco Bay. PG&E requested that Notice to Proceed #2 (NTP #2) also include use of the approved staging area/laydown yard on Amador Avenue under Minor Project Change #1, referred to as the Amador Staging and Laydown Yard. On August 28, 2014, NTP #2 was issued by the CPUC for the PG&E Embarcadero-Potrero Project.

Work authorized under NTP #2 included site preparation, excavation within the streets for drilling mud collection pits, traffic control, set-up of equipment and noise barriers where needed. In addition, HDD-related activities included preparing three HDD entry points with casings at HDD North and HDD South, excavating the HDD entry pits for fluid containment and aligning the HDD rigs, performing the HDDs, excavating adjacent in-water receiving pits at the exit of the bore holes for capture of drilling mud, which was collected and placed on a barge for appropriate disposal, pulling back of fused sections of high-density polyethylene (HDPE) 12-inch pipe into the bore holes, and restoration of excavated entry pits.

3.2 Construction Activities

HDD North – Spear Street

Construction activities began mid-September 2014, under NTP #2 for the HDD North operations and included installation of signs, traffic controls, and BMPs. Materials and equipment were delivered to the site on Spear Street, and a fence and sound blanket were installed around the HDD equipment. The pavement was saw cut, the drill pits were excavated, and casings for Bore #2 and Bore #3 were installed (see Figure 15). This continued through the end of the month as more equipment and materials were delivered and staged.



Figure 15. HDD North on Spear Street, September 29, 2014

Initial drilling of Bore #3 began at the end of September 2014 and continued until the second week of October 2014. HDD equipment was then moved to Bore #2 and drilling began. During the week of October 20, 2014, larger more powerful HDD equipment mobilized to the site and drilling at Bore #3 continued the following week. In early November 2014, drilling continued at Bore #3 and Rhodamine dye was added to the drilling fluid for detection since it was close to punching out into the San Francisco Bay. Submarine work included installing coil and buoys in-water, and excavating Bores #1 through #3 in-water receiving pits. Drilling of Bore #3 continued through the month of November 2014 and into mid-December 2014. Drilling at Bore #3 punched out in the receiving pit on November 25, 2014. For the next couple of weeks, back-reaming and drilling continued at Bore #3, aided by the submarine contractor divers removing drill heads and replacing with reamers. The submarine contractor also conducted air lift operations and jetting at the receiving pit to blow out sediment, which was a problem at this location due to the steep underwater bank and fast-moving tides under the Bay Bridge. During the week of December 15, 2014, the HDPE conduit was floated from HDD South to HDD North where pull-back of the HDPE conduit occurred at Bore #3.

The HDD equipment was moved to Bore #2 and drilling commenced the end of December 2014 and continued into mid-January 2015. Drilling at Bore #2 punched out in the receiving pit on January 22, 2015. Back-reaming and drilling then occurred, aided by the submarine contractor divers, followed by HDPE conduit pull-back the next day.



Figure 16. Vortex set up at Pier 30-32 to aid HDD operations, February 26, 2015

HDD equipment was moved to Bore #1 end of January 2015, where the pavement was saw cut and an entry pit excavated. An impact hammer was used to drive casing, and drilling began the first week of February 2015 and continued until the drill punched out at the Bore #1 receiving pit on February 25, 2015. Back reaming was conducted, aided by the submarine contractor divers (see Figure 16), and the HDPE conduit pulled back through the following week. The contractor removed casings from all three bores and completely demobilized from the site in mid-March 2015. Cleanup and restoration activities included removal of BMPs, fencing, traffic controls, and repaving and striping/painting.

HDD South – 23rd Street

Construction activities began mid-September 2014, under NTP #2 for the HDD South operations and included installation of signs, traffic controls, and BMPs. Materials and equipment were delivered to the site. The pavement was then saw cut and the drill pit was excavated at Bore #1. Air quality monitoring was conducted during all excavation activities due to naturally occurring asbestos in the area. In early October 2014, it was discovered that a water line needed to be relocated around the HDD work area and was the focus of construction efforts for majority of the month.

In early November 2014, drilling began at Bore #1 (see Figure 17). Submarine work included installing coils and buoys in-water, and excavating Bores #1 – #3 in-water receiving pits. HDPE conduit was laid out along 23rd Street and fused together. Drilling at Bore #1 punched out in the receiving pit on November 20, 2014. Back-reaming and drilling then occurred, aided by the submarine contractor divers removing drill heads and replacing with reamers, followed by HDPE conduit pull-back.



Figure 17. HDD South on 23rd Street, November 20, 2014

HDD equipment was moved to Bore #2 end of November 2014, and the casing driven into the ground and augured, followed by drilling. Drilling at Bore #2 punched out into the receiving pit on December 12, 2014. The submarine contractor located the drill head the same day and attached a back-reamer. The HDPE conduit was pulled back through Bore #2 on December 14, 2014.

HDD equipment was moved to Bore #3 mid-December 2014, and the casing driven into the ground and augured, followed by drilling. Drilling at Bore #3 punched out into the receiving pit on January 7, 2015. Back-reaming and drilling then occurred, aided by the submarine contractor divers, followed by HDPE conduit pull-back. The contractor removed casing from all three bores and was completely demobilized from the site by the end of January 2015. Cleanup and restoration activities included removal of BMPs, fencing, traffic controls, and recontouring existing unpaved areas and repaving previously paved areas.

Equipment used for work under NTP #2 included: HDD drilling rigs and support equipment, two backhoes, an excavator, 3000 gallon Vac truck, air compressor, 10 wheel dump truck, and marine support. Marine support included two Derrick barges, 1200 HP tug boat, one deck barge, one closed Hopper barge (for spoils containment), one deep water dive station, and one shallow water dive station.

3.3 Environmental Compliance and Non-compliance Events During Construction

Worker Environmental Awareness Program trainings were held for new workers to the project site and sign in sheets were submitted to the CPUC on a weekly basis. Throughout construction, the CPUC EM and the PG&E EI brought attention to incidents and non-compliance issues. All issues were resolved. Most of the issues for the HDD work involved inadequate containment of equipment, small spills from equipment or the drilling fluids, and maintenance of drainage inlet protections. Incidents and non-compliance issues are noted in Table 4.

Table 4. Incidents and Non-compliance Issues for the HDD Work

Incidents/Non-compliance Issues	Incidents
Inadequate/missing BMPs, spills, containment	17
Track-out	0
Fugitive dust	0
Off-site sedimentation from project	2
Trash	0
Concrete trucks not washing out in approved areas	0
Working without attending Worker Environmental Awareness Training	0

3.4 Minor Project Changes Requested for HDD

On July 16, 2014, PG&E submitted a request for Minor Project Change #1 for use of an existing staging and laydown yard adjacent to Alternate Staging Area #3 on Amador Street identified in the Project IS/MND, in the City of San Francisco, San Francisco County, California. Additional information was submitted by PG&E on July 21, 2014. PG&E’s contractor originally planned to utilize Alternate Staging Area #3 as specifically identified in the IS/MND; however, this staging area was already leased out by the Port of San Francisco for the duration of the Project to multiple other firms, and PG&E was informed that it would not be available. The Port recommended using a 3-acre parcel that was a commercially available staging area immediately adjacent to the north of the Alternate Staging Area #3 from the IS/MND, owned by the same property owner (the Port of San Francisco), fronts on the same road, and was similarly already disturbed and paved or graveled. Although this staging and laydown area was not specifically mapped in the final IS/MND, the IS/MND noted that additional off-site existing yard space may be used for the project and this space fell under that category. The MND states, “Existing commercially available office and yard space may be used by contractors or agencies” (p. 4-47, Aspen 2013); and “Commercially available off-site office and yard space may also be used” (p. 4-11, Aspen 2013). The yard was used as a typical construction laydown area for storage of equipment and materials (equipment such as excavators, backhoes, support equipment, pickup trucks, traffic control devices, etc.). Materials included PVC pipe, HDPE pipe, shoring materials, etc. The yard was needed as equipment and materials were not able to be left within public rights-of-way at the end of work shifts. Contractors office trailers were also staged at the yard, which were used for support services. The CPUC approved Minor Project Change #1 on July 23, 2014.

3.5 Final Inspection of HDD

The CPUC EM conducted a final inspection of the HDD work areas on January 29, 2015 at HDD South, and on March 25, 2015 at HDD North. All BMPs were removed, all necessary paving and striping had been conducted, and the work areas were left neat and clean.

4. Duct Bank and Vaults (NTP #3)

4.1 Description of Duct Bank and Vaults

On September 18, 2014, PG&E requested NTP authorization from the CPUC to commence with the duct bank and vault installation component of the PG&E Embarcadero-Potrero 230 kV Transmission Project between the HDD transition on Spear Street to the Embarcadero Substation on Folsom Street in the northern section, and between the HDD transition on 23rd Street to the Potrero Switchyard in the southern section. On October 9, NTP #3 was issued by the CPUC for the requested work.

Work authorized under NTP #3 included traffic controls, site preparation, utility relocations, trenching and duct bank installation, vault installations, pulling and splicing of cables, and terminations and testing of cables.

4.2 Construction Activities

Duct Bank North

Folsom Street

Construction activities began mid-October 2014 and included BMP installation, traffic control setup, saw cutting of pavement, excavation, and potholing for utilities. Duct bank excavation, shoring, and installation of conduit began the end of October 2014 and continued until the Holiday Moratorium where no work was allowed from December 1st to January 1st. Progress was very slow due to the large amount of existing underground utilities, as well as unstable soils.



Figure 18. Setting rebar in duct bank on Folsom Street, April 1, 2015

On January 1, 2015, the underground duct bank work recommenced with BMP installation, traffic control set up, saw cutting of pavement, and potholing for utilities. Duct bank excavation, installation of rebar cages and conduit, laying base rock, and backfilling with cement slurry followed (see Figure 18). Monitoring point systems were also installed to monitor old water and sewer infrastructure for impacts from construction vibration. Dewatering systems were also installed where necessary. HDD equipment was set up at Folsom and Fremont Streets to bore under some utilities in mid-May 2015, which only took a few days. Progress continued to be very slow and construction activities continued until the end of November 2015. Clean up and restoration activities included removing BMPs and traffic controls, and repaving and restriping Folsom Street and restoring impacted sidewalks. This work was completed the first week of December 2015.

Spear Street

Construction activities began mid-October 2014 and included BMP installation, traffic control setup, saw cutting of pavement, excavation, potholing for utilities, and relocation of an AT&T fiber optic cable under Spear Street. The week of November 10, 2014, work to relocate a 12 kV underground electrical line began and continued until the Holiday Moratorium. On January 1, 2015, work recommenced for the 12 kV relocation and continued until the end of the month.

The beginning of February 2015, crews saw cut pavement and excavated for the vault to be installed on Spear Street between Folsom Street and Harrison Street. Shoring was installed as the vault pit was excavated, and a dewatering filtration system was installed when the final depth was reached (see Figure 19). On March 27, 2015, a crane installed the base slab in the vault, and on April 1, 2015, the sides and top of the vault were installed by a crane in the middle of the night (see Figure 20). The shoring was then removed and the vault backfilled and manhole rings installed on the top of the vault. Internal shoring was then welded in the vault. It was cleaned and waterproofed, and conduit fused into early-May 2015. Curb and drainage restoration was conducted on May 29, 2015. The electrical and cable contractors mobilized to the site early June 2015, and cable pulling from the bores began the end of June 2015 and continued to the end of July 2015. Crews worked on and off until early January 2016, cleaning and waterproofing of the inside of the vault, pulling mandrels through conduit, painting, and grounding. The cable and electrical contractors returned the beginning of July 2016 and conducted cable pulling mid-July 2016. Wire splicing, testing, grounding, and fiber optic work was conducted through the end of August 2016.

In mid-March 2015, the transition work between the HDD and the underground duct bank on Spear Street began with saw cutting of pavement, excavation of duct bank trench, and installation of conduit (see Figure 21). The conduit transition was connected and fused beginning in April 2015, and backfilled with cement slurry once completed. Underground duct bank work along the remaining portions of Spear Street commenced around April 2015 and continued until the end of August 2015.

Duct Bank South – 23rd Street

Construction activities began the last week of November 2014 and included BMP installation, traffic control setup, and saw cutting of pavement. Next, crews pot-holed for utilities and removed old abandoned pipes. Temporary fencing was installed around the work area mid-December. Duct bank trench excavation began January 2015 and more abandoned pipe was encountered and removed, as well as several underground vaults associated with the Station A water circulation feature that had to be stabilized with wall supports and sand slurry. Duct bank excavation, shoring and conduit installation, and backfilling with sand and cement slurry continued until mid-November 2015 (see Figures 22 and 23). Clean up and restoration activities included removing BMPs, traffic controls and temporary fencing; and repaving and restoring a fire hydrant. This work was completed in early January 2016.



Figure 19. Vault pit shored on Spear Street, March 25, 2015



Figure 20. Setting wall in vault with crane, April 1, 2015



Figure 21. HDD to duct bank transition on Spear Street, April 28, 2015



Figure 22. Duct Bank South installation of conduit on 23rd Street, May 15, 2015



Figure 23. Excavating for Duct Bank South on 23rd Street, September 22, 2015

In February 2015, it was determined in coordination with the City of SF that a waterline needed to be replaced along 23rd Street because of its age and vulnerability to adjacent construction activities. PG&E agreed to replace it in order to facilitate moving forward with the underground duct bank portion of the Project. This work began mid-February 2015 and was completed end of July 2015.

Water and sewer tie-in work was necessary from the Potrero Switchyard to pipes on 23rd Street. This work began in August 2016 and was completed in December 2016.

In mid-March 2015, vault excavation and shoring installation began. On April 16 and 17, 2015, the vault base was set with a crane; and on April 22 and 23, 2015, the sides and the top of the vault were set. Next, the manhole rings were set on top of the vault, shoring was removed, and the vault was backfilled with concrete. Internal shoring was welded inside the vault. The vault was then cleaned and waterproofed, and conduit installed, which continued until June 2015. The cable and electrical contractors mobilized to the site the end of June 2015 and cable pulling from the bores began and continued until the end of July 2015. Crews worked on and off until early January 2016, cleaning and waterproofing the inside of the vault, pulling mandrels through conduit, painting, and grounding. The cable and electrical contractors returned the beginning of August 2016 and conducted cable pulling mid-August 2016. Wire splicing, testing, grounding, and fiber optic work was conducted through the end of August 2016.

Construction equipment utilized for the underground duct bank and vault work included backhoes, excavators, 3000 gal Vac truck, air compressor, 10 wheel dump trucks, 5 CY dump truck, tractor with low-bed trailer, pipe trailer, loader, generators, light plants, contractor pick-up trucks,

4.3 Environmental Compliance and Non-compliance Events During Construction

Worker Environmental Awareness Program trainings were held for new workers to the project site and sign in sheets were submitted to the CPUC on a weekly basis. Throughout construction the CPUC EM and the PG&E EI brought attention to incidents and non-compliance issues. All issues were resolved. Most of the incidents and non-compliance issues related to small spills from equipment, containment of excavated material, and drainage inlet protections. Incidents and non-compliance issues are noted in Table 5.

Table 5. Incidents and Non-compliance Issues for the Underground Duct Bank and Vaults

Incidents/Non-compliance Issues	Incidents
Inadequate/missing BMPs, spills, containment	22
Track-out	1
Fugitive dust	0
Off-site sedimentation from project	0
Trash	0
Concrete trucks not washing out in approved areas	0
Working without attending Worker Environmental Awareness Training	1

4.4 Minor Project Changes Requested for Duct Bank and Vaults

The contractor for the duct bank and vaults work, Underground Construction Co., utilized the Amador Staging and Laydown Yard approved under Minor Project Change #1 (see Table 2 and Section 3.4 above).

4.5 Final Inspection of Duct Bank and Vaults

The CPUC EM conducted a final inspection of the duct bank and vaults work areas on September 1, 2016. BMPs had been removed from all work areas, all necessary paving and striping had been conducted, and the work areas were observed to be neat and clean.

5. Rock Removal and Submarine Cable Install (NTPs #4 and #6)

5.1 Description of Rock Debris and Submarine Cable Installation

Rock Removal

On November 19, 2014, PG&E requested NTP authorization from the CPUC to commence with the rock removal obstructing the path of the submarine cable component of the PG&E Embarcadero-Potrero 230 kV Transmission Project along the submarine cable line off shore of Pier 50 in the San Francisco Bay. On November 21, 2014, NTP #4 was issued by the CPUC for the PG&E Embarcadero-Potrero Project.

Work authorized under NTP #4 included removing rock and other debris along the submarine cable line and rock mounds found off shore of Pier 50 during the final Project design phase. This rock and debris would otherwise block the hydro-plow operation and rock had to be removed prior to construction. Rock debris removal was incorporated into resource agency permit applications and was approved for removal and upland disposal per the approved USACE, RWQCB, and BCDC permits. A Dredge Operations Plan and Pre-Dredge Survey was submitted to USACE and BCDC prior to the work. On November 21, 2014, NTP #4 was issued by the CPUC for the requested work.

Submarine Cable Installation

On February 19, 2015, PG&E requested NTP authorization from the CPUC to commence with the submarine cable installation component of the PG&E Embarcadero-Potrero 230 kV Transmission Project in the San Francisco Bay. On April 7, 2015, NTP #6 was issued by the CPUC for the requested work.

Work authorized under NTP #6 included laying of the submarine cable, which consisted of site preparation for the submarine cable installation, laying the cable, and pulling the cable to land at either end. A grapnel run was completed to further clear the pathway of the hydroplow, and the hydroplow was used to install each of three submarine cable circuits. Each of the submarine cables was directly buried using the hydroplow into the Bay floor to a depth of approximately 6 to 10 feet below the Bay floor. A barge towed the hydroplow, a water jet that consisted of a long blade mounted to a sled-mounted submerged vehicle. The hydroplow blade contained water nozzles on the leading edge that fluidized the sediment using high-pressure water. Water pumps utilized water from the Bay to the plow for jetting. The water pump intake was equipped with a fish screen meeting CDFW standards. In addition, submarine-cable related activities included pulling the submarine cables back through the HDPE pipes and then into the splice vaults, and splicing the submarine cable to the underground land cable in the splice vaults.



Figure 24. Manson dredging for rock and debris off Pier 30-32, December 17, 2014

5.2 Construction Activities

Rock Removal

Construction activities for the rock and debris removal began December 1, 2014 and continued through the third week of December 2014 (see Figure 24). All rock and debris was removed except for several debris items that were too near the north end exit pits and the HDD work at Pier 30/32. These few items were removed the first week of June 2015 when the submarine cable vessels and equipment arrived for the cable installation. Herring monitoring was conducted during all work activities.

Equipment used for the rock and debris removal included a clamshell dredge with a 5 CY capacity bucket; a clamshell dredge with a 36 CY capacity bucket; 4,000 CY dump scow; a flat barge with 749 ton capacity; a flat barge with 1599 ton capacity; 2,000 HP tending/towing tug boat; a 'Westar' tending/towing tug boat; a loader; an excavator; and dump trucks.

Submarine Cable Installation

Construction activities for the cable laying began the beginning of June 2015. A barge tour was given to Aspen and others on June 10, 2015 from Pier 50 (see Figure 25). Plow and anchor trials were conducted the beginning of June 2015 and pre-lay grapnel runs were conducted mid-June 2015. Diving operations were also conducted at the north and south bores beginning in mid-June 2015 and continuing until the end of July 2015. Submarine cable-laying and burying via hydro-plow began the end of June 2015 and was completed mid-July 2015. Concrete mats were installed on top of the cable starting the last week of July 2015 and finishing mid-August 2015.



Figure 25. Cable-laying barge, June 10, 2015

Equipment used for the submarine cable installation included a cable laying barge; a main support tug boat; an aux support tug boat; a survey boat; work skiffs; anchor winches; anchors, fairleads and sheaves; a 250 kW barge generator; 100 kW aux barge generator; running line tensionmeter; ROV system; Applanix POS MV differential global positioning system, Hypack navigation software, LinkQuest TrackLink 1500USBL acoustic tracking system, GS2500 cable toner and detection system, BlueView high resolution 2D forward looking sonar—barge mounted for viewing of cable catenary and water jet plow pull wire; BlueView high resolution 2D forward looking sonar—water jet plow mounted for viewing of cable catenary, water jet plow pull wire, and obstacle avoidance; foreman's tool shipping container; rigging shipping container; office trailers on barge; cable container; cable pan turntable; turntable snorkel; linear cable engine; cable over-boarding chute; miscellaneous cable equipment; cable floats; water jet plow; cable plow electronics; cable plow control; pump for cable plow; dive support equipment; land-based winch truck; fiber optic cable linear belt engine; and fiber optic pulling head.

5.3 Environmental Compliance and Non-compliance Events During Construction

Worker Environmental Awareness Program trainings were held for new workers to the project site and sign in sheets were submitted to the CPUC on a weekly basis. No incidents or non-compliance issues were noted by the CPUC EM or PG&E EI for the submarine rock and debris removal work, or the submarine cable-laying work.

5.4 Minor Project Changes Requested

No Minor Project Change requests were submitted for the work conducted under NTPs #4 and #6.

5.5 Final Inspection

No final inspection of the submarine work was necessary or accessible since all of the work was conducted from marine vessels in the San Francisco Bay and was submarine.

6. Remaining Work

Remaining work at the Potrero Switchyard includes the water and sewer tie-in work at the southeast and southwest corners of the GIS building near 23rd Street; possibly one new drainage inlet; final grading; security installation; and the plaza work on 23rd Street, which includes sidewalk and curb restoration, installation of seating areas along the sidewalk in front of the GIS building, and the planting of trees. This work is expected to be completed in March 2017 at the latest.

7. Post-construction Requirements

In accordance with **APM HM-1, Implementation of Hazardous Material and Emergency Response Procedures**, for the operations and maintenance (O&M) phase of the Project, existing operational hazardous substance control and emergency response plans will be updated as appropriate to incorporate necessary modifications resulting from this Project

In accordance with **APM HM-2, Development and Implementation of a Health and Safety Plan**, for the O&M phase of the Project, existing Health and Safety plans for Potrero Switchyard and Embarcadero Substation will be modified and adhered to as appropriate.