PUBLIC DRAFT

UPPER BLUE LAKE DAM SEISMIC RETROFIT PROJECT

INITIAL STUDY/PROPOSED MITIGATED NEGATIVE DECLARATION

PREPARED FOR:

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ICF

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Proposed Mitigated Negative Declaration
Upper Blue Lake Dam Seismic Retrofit Project

The Central Valley Regional Water Quality Control Board (Central Valley Water Board), acting as the California Environmental Quality Act (CEQA) lead agency, has reviewed the proposed project described below to determine whether substantial evidence supports a finding that project implementation could have a significant effect on the environment. “Significant effect on the environment” means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land use, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.

Name of Project: Upper Blue Lake Dam Seismic Retrofit Project.

Project Location: The proposed project is located at Upper Blue Lake, which is approximately 10 miles southwest of Markleeville and 4.1 miles south of Carson Pass in Alpine County.

Project Description: Pacific Gas & Electric Company (PG&E) is proposing to construct the Upper Blue Lake Dam Seismic Retrofit Project at Upper Blue Lake reservoir in Alpine County. A preliminary seismic slope stability evaluation of the dam that was conducted in 2014 indicated that the dam would likely liquefy during an earthquake. The proposed project would improve the seismic stability of the dam by placing a 50-foot-wide by 175-foot-long rock fill buttress on the upstream side of the Upper Blue Lake dam. The addition of the buttress would require an upstream extension of two low level outlet pipes by approximately 50 feet and reconfiguration of the intake structure and trash rack. The project area consists of the dam retrofit area, bypass piping discharge area, a laydown and staging area, parking areas, access roads, and spoils placement and storage areas.

Findings: The attached initial study identifies one or more potentially significant effects on the environment in the resource areas listed in the table below. After consideration of the analysis contained in the initial study, the Central Valley Water Board finds that the proposed project as described above would not have a significant effect on the environment following implementation of mitigation measures described therein and listed below.

Upper Blue Lake Dam Seismic Retrofit Project Mitigation Measures

Biological Resources

M**itigation Measure BIO-MM-1**: Retain Qualified Botanists to Conduct Floristic Surveys for Special-status Plants during Appropriate Identification Periods

Mitigation Measure BIO-MM-2: Implement Measures to Avoid or Compensate for Long-Term Effects on Special-Status Plants Documented in the Project Area

Mitigation Measure BIO-MM-3: Conduct Worker Environmental Awareness Training and Implement General Requirements

Mitigation Measure BIO-MM-4: Implement Cofferdam, Turbidity Curtain, and Construction Site Dewatering Restrictions

Mitigation Measure BIO-MM-5: Guide and Rescue Fish from Affected Habitats

Mitigation Measure BIO-MM-6: Implement Flow Pumping System Requirements

Mitigation Measure BIO-MM-7: Continue the Operations Practice of Not Drawing Down Upper Blue Lake Reservoir until after July 31 to Allow for Yosemite Toad Breeding Success

Mitigation Measure BIO-MM-8: Conduct a Genetics Study of the Upper Blue Lake Reservoir Yosemite Toad Population

Mitigation Measure BIO-MM-9: Conduct Surveys and Implement Protective Measures for Yosemite Toad and Sierra Nevada Yellow-legged Frog

Mitigation Measure BIO-MM-10: Conduct a Preconstruction Survey for Nesting Birds and Implement Protective Buffers around Active Nests

Mitigation Measure BIO-MM-11: Retain a Qualified Biologist to Conduct Periodic Monitoring during Construction

Mitigation Measure BIO-MM-12: Avoid the Introduction and Spread of Invasive Plants

Mitigation Measure BIO-MM-13: Avoid and Minimize Disturbance of Waters of the United States/Waters of the State

Mitigation Measure BIO-MM-14: Compensate for the Temporary and Permanent Loss of Waters of the United States/Waters of the State

Mitigation Measure BIO-MM-15: Monitor Fish Passage Conditions in Tributary Streams within the Reservoir Inundation Zone during Reservoir Drawdown, and Relocate Blocked Lahontan Cutthroat Trout to Upper Blue Lake Reservoir

Hydrology and Water Quality

Mitigation Measure HYDRO-MM-1: Ensure Stability of Energy Dissipation Structure during Initial Placement

Mitigation Measure HYDRO-MM-2: Conduct Channel Stability Monitoring in Middle Creek and Downstream of the Bypass Discharge Point

Mitigation Measure BIO-MM-4: Implement Cofferdam, Turbidity Curtain, and Construction Site Dewatering Restrictions

Mitigation Measure BIO-MM-6: Implement Flow Pumping System Requirements

Geology and Soils

Mitigation Measure GEO-MM-1: Install Temporary Barricades at Base of Unstable Slopes

Mitigation Measure GEO-MM-2: Ensure Stability of Slopes Above Spoils Sites 1, 2a, and 2b

Mitigation Measure GEO-MM-3: Educate Construction Personnel in Recognizing Fossil Material

Mitigation Measure GEO-MM-4: Stop Work if Substantial Fossil Remains are Encountered during Construction

Cultural Resources

Mitigation Measure CUL-MM-1: Conduct Mandatory Cultural Resources Awareness Training for All Project Personnel

Mitigation Measure CUL-MM-2: Stop Work if Previously Unidentified Archaeological Resources are Encountered until a Qualified Archaeologist Assesses the Find and Native American Consultation Has Been Conducted

Mitigation Measure CUL-MM-3: Stop Work in Case of Accidental Discovery of Buried Human Remains until Procedures in Public Resources Code Section 5097 Have Been Completed

Public Review Period: The proposed project's Initial Study and proposed Mitigated Negative Declaration (IS/MND) is available for review from March 7 to April 5, 2019. No later than **April 5, 2019**, any person may:

1) Review the IS/MND; and
2) Submit written comments regarding the information, analysis, and mitigation measures in the IS/MND by mail or email.

The IS/MND may be viewed at the following location:

- 11020 Sun Center Drive #200, Rancho Cordova, CA 95670.

Lead Agency Contact: Questions, comments, or requests for digital or physical copies may be directed to **Mr. Nicholas White** by email at Nicholas.White@waterboards.ca.gov; or in writing care of Central Valley Water Board, 11020 Sun Center Drive #200, Rancho Cordova, CA 95670; or by telephone at **(916) 464-4856**.

Name: NICHOLAS WHITE

Title: WATER RESOURCE CONTROL ENGINEER

Signed: Nic White

Circulated on: March 7, 2019 Nic White

Adopted on: ______________ ______________

Contents

Tables

Figures

Follows Page

Acronyms and Abbreviations

AB	Assembly Bill
ACHP	Advisory Council on Historic Preservation
ACMC	Amador Canal and Mining Company
AF	acre-feet
Alquist-Priolo Act	Alquist-Priolo Earthquake Fault Zoning Act
APE	Area of Potential Effect
BA	biological assessment
Basin Plan	Water Quality Control Plan for the Sacramento River and San Joaquin River Basins
Basin Plans	Water Quality Control Basin Plans
BLM	Bureau of Land Management
BMPs	best management practices
BO	biological opinion
CAAQS	California ambient air quality standards
Cal-Fire	California Department of Forestry and Fire Protection
CCR	California Code of Regulations
CCRD	Confidential Cultural Resource Database
CDFW	California Department of Fish and Wildlife
Central Valley Water Board	Central Valley Regional Water Quality Control Board
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
cfs	cubic feet per second
CH4	methane
CLSM	controlled low strength material
CNDDB	California Natural Diversity Database
CNEL	community noise equivalent level
CNPS's	California Native Plant Society's
CO	carbon monoxide
CO2	carbon dioxide
CO2e	carbon dioxide equivalents
CRHR.	California Register of Historical Resources
CWA	Clean Water Act
dB	decibel
DO	dissolved oxygen
DSOD	Division of Safety of Dams
DWR	Department of Water Resources
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FR	Federal Register

GBUAPCD	Great Basin Unified Air Pollution Control District
GBVAB	Great Basin Valleys Air Basin
GHG	greenhouse gas
GWP	global warming potential
HPMP	Historic Properties Management Plan
IPCC	Intergovernmental Panel on Climate Change
IS	initial study
Ldn	day-night sound level
Leq	equivalent sound level
Lmin and Lmax	minimum and maximum sound levels
LOS	Level of Service
MLD	most likely descendant
Mokelumne ERC	Mokelumne River Project Ecological Resources Committee
msl	mean sea level
MTCO2e	metric tons of CO2 equivalent emissions
N2O	nitrous oxides
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NISC	National Invasive Species Council
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
OHWM	ordinary high water mark
PA	Programmatic Agreement
PG&E	Pacific Gas & Electric Company
PM	particulate matter
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
PPV	peak particle velocity
RWQCBs	Regional Water Quality Control Boards
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SHPO	State Historic Preservation Officer
SNYLF	Sierra Nevada yellow-legged frog
SR	State Route
State Water Board	State Water Resources Control Board
SWPPP	Stormwater Pollution Prevention Plan
TCRs	transportation concept reports
TMDL	total maximum daily load
UBL reservoir or reservoir	Upper Blue Lake reservoir
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

USGS	U.S. Geological Survey
WBWG	Western Bat Working Group
WEAT	worker environmental awareness training

Chapter 1
Introduction

1.1 Project Purpose

Pacific Gas & Electric Company (PG&E) is proposing to construct the Upper Blue Lake Dam Seismic Retrofit Project (proposed project or project) at Upper Blue Lake reservoir (UBL reservoir or reservoir) in Alpine County (Figure 1). A preliminary seismic slope stability evaluation of the dam was conducted in 2014. The results of the stability analysis indicated that the earthfill likely would liquefy under the postulated earthquake ground shaking, and the fully liquefied residual strengths would be insufficient to maintain stability of the upstream portion of the maximum height section of the dam. The purpose of the proposed project is to improve the seismic stability of the upstream slope of the dam by placing a rock fill buttress approximately 50 feet wide on the upstream face of the dam in the maximum height section around the low level outlet (LLO). The UBL dam is operated by PG&E as part of the Mokelumne River FERC No. 137 Project, which is licensed by the Federal Energy Regulatory Commission (FERC).

1.2 Document Purpose and Use

This initial study (IS) was prepared in accordance with Article 5, Section 15060 et seq. of the California Environmental Quality Act (CEQA) Guidelines (California Code of Regulations [CCR], Title 14, Division 6, Chapter 3). This IS describes the existing environmental resources in the project area, evaluates the environmental impacts of the proposed project on these resources, and identifies mitigation measures to avoid or reduce any potentially significant impacts to a less-than-significant level.

The Central Valley Regional Water Quality Control Board (Central Valley Water Board) is the CEQA Lead Agency, considering discretionary actions under Sections 401 and 402 of the Clean Water Act (CWA). The Central Valley Water Board will consider the findings of this IS in determining whether preparation of an environmental impact report would be necessary prior to implementation of the proposed project.

1.3 Project Area and Setting

The UBL dam is located at the head of Middle Creek, a tributary to the North Fork of the Mokelumne River, approximately 10 miles southwest of Markleeville and 4.1 miles south of Carson Pass in Alpine County, California (Figure 1). The dam is accessible from State Route 88 by traveling south and then southwest on Blue Lakes Road for approximately 13 miles, and then continuing north on Blue Lakes Road for another 0.5 mile. The dam is located in the Carson Pass U.S. Geological Survey (USGS) 7.5-minute quadrangle in Township 9 North, Range 19 East, Section 18.

The dam is located at an elevation of approximately 8,100 feet, near the crest of the Sierra Nevada mountain range, on land owned by PG&E and under a conservation easement held by the Mother Lode Land Trust. The conservation easement restricts development of the lands so as to protect and preserve beneficial public values but includes an express reservation of PG&E's right for continued operation, maintenance, and improvements of structures located on the property, including UBL dam.

In general, the Blue Lakes area (including Upper Blue Lake and Lower Blue Lake) is characteristic of high-elevation granite basins in the Sierra Nevada. Granite outcrops are a prominent feature of the area, and there are numerous outcrops, ridges, and peaks of younger volcanic rock. The dominant vegetation type is Sierra Nevada mixed conifer forest. Recreation uses of the area primarily consist of camping, hunting, fishing, hiking, swimming, off-highway vehicle use, and boating. Developed campgrounds, day use areas, and boat ramps owned and operated by PG&E are located at both lakes, as are trailheads to the adjacent Mokelumne Wilderness. The land surrounding PG&E's Upper Blue Lake and Lower Blue Lake parcels consists of both private property and national forest system lands managed by the Eldorado National Forest.

1.4 Project Background

Historically, UBL reservoir was a natural lake, before the water level was raised by a dam across the outlet. The UBL dam is a homogeneous earth fill embankment that was constructed between 1872 and 1881. In 1899 and 1900, the dam subsequently was raised approximately 10 feet to its current height. There are no hydroelectric facilities associated with the UBL dam. UBL reservoir is operated primarily for seasonal storage and regulation of water for power generation downstream of the lake. The reservoir is approximately 343 acres and has an available capacity of approximately 7,300 acre-feet at the normal maximum water level elevation of 8,137.5 feet.[1] The total volume of the reservoir is much greater, approximately 19,364 acre-feet, and includes the portion of the former lake below the elevation of the LLO pipes. The dam is composed of loose to medium dense silty sands and is buttressed on the downstream side at the maximum height section with a stacked dry-masonry wall. The dam is approximately 31 feet high at the maximum section, but the majority of the 786-foot-long embankment is approximately 9 to 13 feet high.

The spillway is a partially lined open channel at the east abutment. The control structure is a 51-foot-long concrete sill at an elevation of 8,135.9 feet and which supports a steel frame to hold flashboards. The flashboards are normally installed each spring (after April 1) to a height of 1.6 feet (8,137.5 feet elevation). The flashboards are removed prior to October 1 each year. A new spillway control section was constructed and the spillway channel was repaired in 2007 as a result of damage caused by erosion in spring 2006. The spillway walkway and flashboard channels were replaced in 2001 and again in 2006. A reinforced concrete cutoff wall, approximately 3 feet thick, was constructed upstream of the spillway. The west training wall (a wall along a spillway that directs [trains] water to flow in a desired direction) was repaired with a 12-inch-thick reinforced concrete wall, riprap, and geotextile. A level concrete apron was constructed in 2006 immediately downstream of the control section.

The outlet works were modified in 2004 to comply with a new FERC license. A 14-inch outside diameter steel pipe was placed inside each of two existing 18-inch steel LLO pipes. New 16- by 20-inch knife gate valves with motor operators were installed downstream of the dam. An 8-inch diameter branch line releases the minimum instream flow requirement of 5 cubic feet per second

[1] USGS datum is used throughout this document. USGS datum can be converted to PG&E datum, which may be used in other project permitting documents, by subtracting 9.27 feet from the USGS datum.

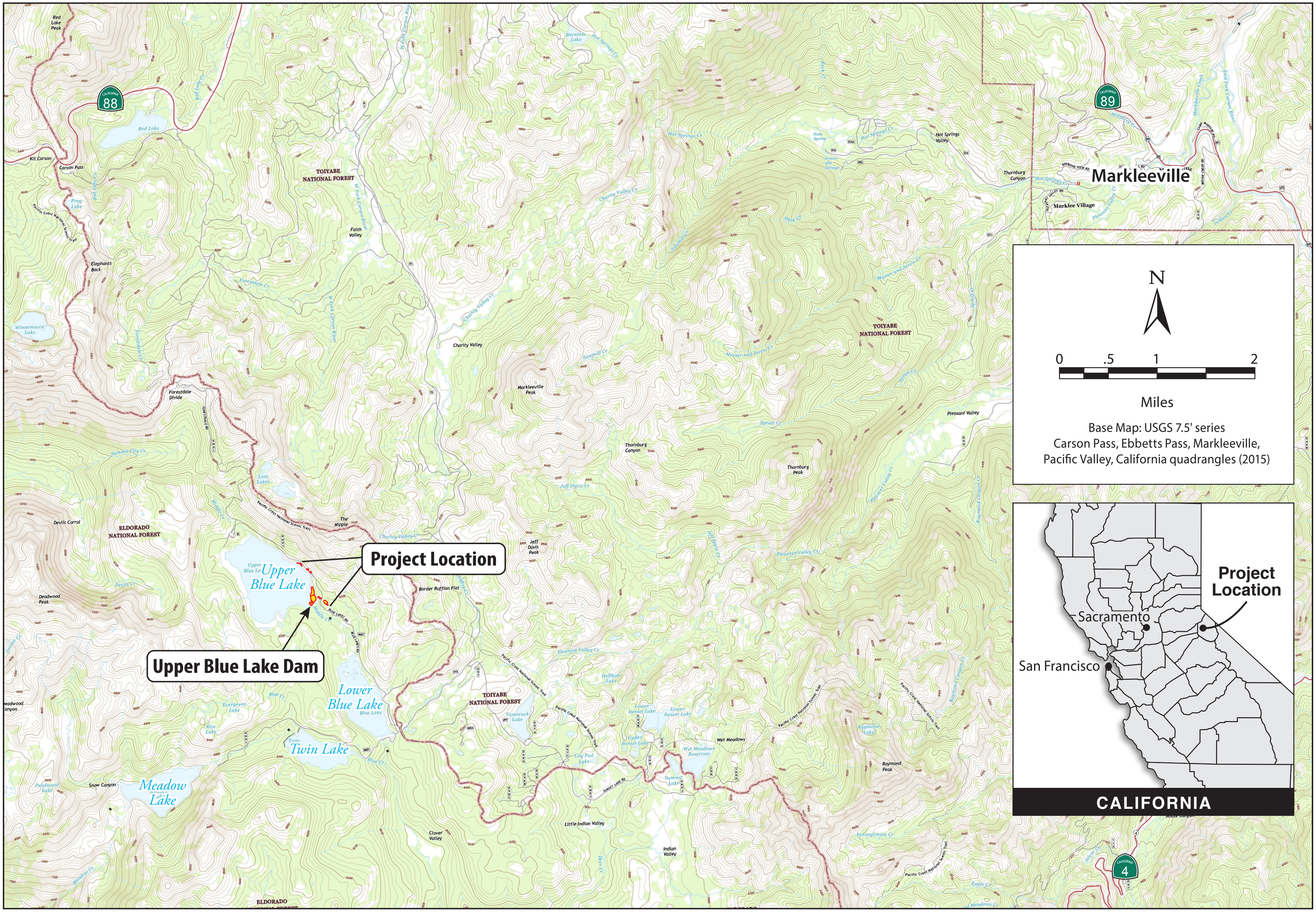

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Figure 1
Location of the Upper Blue Lake Dam Seismic Retrofit Project
Upper Blue Lake Dam Seismic Retrofit Project

(cfs) into Middle Creek, and the larger LLO pipes are used for pulse flows and higher releases. The two LLO pipes have a combined discharge capacity of about 60 cfs at maximum reservoir elevation (8,137.5 feet).

In 2014, AMEC Environment & Infrastructure performed a preliminary seismic slope stability evaluation of the maximum height section, including a liquefaction triggering analysis of the earth fill based on subsurface investigation data they collected in 2013. The results of the stability analysis indicated that the earth fill likely would liquefy under postulated earthquake ground shaking, and that fully liquefied residual strengths would be insufficient to maintain stability of the upstream portion of the maximum height section of the dam. The dam was previously classified as a “Significant Hazard Potential” under FERC guidelines. Based on the probable loss of life from a hypothetical dam breach, FERC reclassified the downstream hazard potential rating for UBL dam from “Significant Hazard Potential” to “High Hazard Potential” in 2014.

A seismic stability evaluation was conducted in 2016 to study the sensitivity of the upstream stability of the maximum height section of the dam to reservoir water elevation. The results of the study recommended an interim operational reservoir elevation restriction of 8,122.5 feet, which would prevent the sudden release of water during a seismic event. Both FERC and the California Department of Water Resources Division of Safety of Dams (DSOD) agreed with the reservoir restriction criteria and it was implemented in early April 2016. FERC and DSOD require it to be maintained until seismic stability repairs are complete. As an additional risk reduction measure, PG&E’s Facility Safety Program recommended closing the Middle Creek Campground, which consists of five campsites located along the banks of the creek about 0.2 miles downstream of the dam. PG&E closed the Middle Creek Campground in July 2016.

In accordance with the Upper Blue Lake operations plan approved by the Mokelumne River Project Ecological Resources Committee (Mokelumne ERC), which includes representatives from the U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Wildlife (CDFW), the U.S. Forest Service (USFS), the U.S. Bureau of Land Management (BLM), the California Department of Boating and Waterways, and several non-governmental organizations, PG&E has begun releasing additional water from the reservoir to reduce the amount of water stored prior to the winter of 2018-2019. The target water surface elevation for the winter of 2018-2019 is 8,111.3 feet, and PG&E will operate the reservoir in the same manner as it typically does through the winter to ensure that the minimum instream flows, or natural flows, in Middle Creek are maintained. These flows are maintained through the winter by making weekly adjustments to the LLO valve to match outflow to inflow.

1.5 Regulatory Compliance

In addition to compliance with Sections 401 and 402 of the CWA, PG&E would seek all necessary permissions, authorizations, concurrences, and permits to comply with the following regulations for implementation of the proposed project.

1.5.1 Federal Endangered Species Act

Because the proposed project is part of the Mokelumne River Project, which is licensed by FERC, FERC is required to consult with USFWS on the effects of the proposed project on federally listed species and critical habitat pursuant to Section 7(a)(2) of the federal Endangered Species Act of

1973 (ESA). A biological assessment (BA) has been prepared in compliance with legal requirements set forth under Section 7 of the ESA (16 United States Code [USC] 1536) to support PG&E and FERC's consultation with USFWS; it documents the potential effects of the proposed project on three species federally listed as threatened that may occur in the project area and designated critical habitat for two species.

1.5.2 Clean Water Act, Section 404

Section 404 of the CWA (33 U.S.C. Section 1344) requires that a permit be obtained from the U.S. Army Corps of Engineers (USACE) for the discharge of fill material into waters of the United States. PG&E is consulting with USACE through its Nationwide Permit Program to ensure compliance with Section 404 of the CWA.

1.5.3 National Historic Preservation Act, Section 106

PG&E's application to USACE for a CWA Section 404 permit for the proposed project triggers compliance with Section 106 of the National Historic Preservation Act (NHPA), which requires federal agencies to evaluate the effects of their undertakings on historic properties. FERC is coordinating with USACE, the Advisory Council on Historic Preservation (ACHP), and the California State Historic Preservation Officer (SHPO) to ensure compliance with Section 106 of the NHPA.

1.6 Document Organization

This IS is organized as follows.

- Chapter 1, *Introduction*, describes the project purpose, project area and setting, project background, and regulatory compliance requirements.
- Chapter 2, *Project Description*, describes construction of the proposed project as well as avoidance and minimization measures that PG&E would implement as part of the proposed project.
- Chapter 3, *Environmental Setting and Impacts*, describes the environmental resources present in the project area, and analyzes the proposed project's potential to affect such resources.
- Chapter 4, *Cumulative Impacts*, discusses the potential for the proposed project's incremental effect to be cumulatively considerable when combined with other projects causing related impacts.
- Chapter 5, *References*, provides a list of all printed references and personal communications used to prepare this document.
- Chapter 6, *List of Preparers*, presents a list of all personnel who assisted in the preparation of this document.
- Appendix A, *Environmental Checklist*, contains the Environmental Checklist Form from State CEQA Guidelines Appendix G.
- Appendix B, *PG&E Activity-Specific Erosion and Sediment Control Plans*, contains PG&E's guides for implementing erosion control and sediment control best management practices at construction sites.

- Appendix C, *Upper Blue Lake Dam Seismic Retrofit Project Water Quality Monitoring Plan*, details the measures PG&E would implement to ensure turbidity levels during in-water work are controlled.
- Appendix D, *Species Lists*, contains the result of database searches for plant and wildlife species that could occur in the project vicinity.
- Appendix E, *Lists of Plants and Animals Observed in the Upper Blue Lake Dam Seismic Retrofit Project Area*, lists the species of plants and animals observed during surveys.
- Appendix F, *Air Quality and Greenhouse Gas Supporting Documentation*, specifies the construction schedule and anticipated equipment use, as well as the air emissions that the equipment is expected to generate.

Chapter 2
Project Description

This chapter describes the proposed project, which consists of placing a 50-foot-wide by 175-foot-long rock fill buttress on the upstream side of UBL dam to restrict lateral movement of the embankment slope if it were to lose substantial shear strength during strong ground shaking. The buttress would fill in the natural valley at the approach channel of the LLO intake and would improve the seismic stability of the tallest section of the dam by resisting expected deformations resulting from the liquefaction hazard identified in the embankment fill soils (SAGE Engineers 2016). The addition of the buttress would require an upstream extension of the two LLO pipes by approximately 50 feet and reconfiguration of the intake structure and trash rack. FERC and DSOD review and approval will be required for the final design of the proposed project. The project area consists of the dam retrofit area, bypass piping discharge area, a laydown and staging area, parking areas, access roads, and spoils placement and storage areas (Figure 2).

2.1 Construction Methods and Activities

2.1.1 Reservoir Drawdown

In the spring of 2019, the reservoir would be drawn down to an elevation that can be moderated with a small cofferdam. This target elevation is anticipated to be approximately 8,114.3 feet. When spring inflows to the reservoir start to increase, the LLO valves would be fully opened to discharge as much water as possible to ensure that the target elevation of 8,114.3 feet can be achieved by the end of July 2019. The target elevation of 8,114.3 feet is necessary to minimize the height of the cofferdam that would be needed to facilitate construction site dewatering. Because the lower reservoir elevation reduces the pressure (head) and amount of flow from the LLO, it is anticipated that pumps would be needed to increase the amount of outflow from the reservoir prior to construction to meet the target elevation. The size of the pumps and duration of pumping would be determined after springtime access to the site is established and anticipated inflow to the reservoir from snowpack is estimated, but it is estimated that the pumps would be operated from mid-June to mid-July and would release up to an additional 15 cfs of water downstream in Middle Creek to augment flow releases through the LLO. Regardless of the volume of water that would be pumped from the reservoir, the total amount of outflow to Middle Creek would not exceed the LLO maximum discharge capacity of about 60 cfs. The discharge point in Middle Creek would be protected from scour by energy dissipaters.

The target elevation of 8,114.3 feet is anticipated to provide enough storage to allow minimum instream flow (2 to 5 cfs, or natural flow) in Middle Creek through the summer and fall of 2019. The target elevation would be further evaluated and refined during the development of the 2019 summer and fall UBL reservoir drawdown plan and would be presented to Mokelumne ERC for approval. After construction is completed, the LLO would be returned to service.

2.1.2 Site Access and Staging

A construction laydown area where equipment and material would be stored would be established on the east side of the reservoir between the boat ramp near the spillway and the work site on the upstream side of the dam (Figure 2). The work area around the dam would be fenced with orange construction fencing. Water quality protection measures (see *Avoidance and Minimization Measure-1: Implement Water Quality Protection Measures and Erosion and Sediment Control Plans*) would be employed during set up and use of the site. Clean rock fill and filter rock materials (approximately 3,800 cubic yards total) would be imported to the site and stockpiled.

2.1.3 Minimum Instream Flows

Because releases through the LLO would need to be terminated to facilitate project construction, the construction contractor would install a pumping system in the reservoir that would be used to maintain minimum instream flows (2 to 5 cfs) in Middle Creek during construction. The minimum instream flow would be determined in the 2019 summer and fall drawdown plan. The pumping system would consist of screened floating intakes for drawing clean lake water, trailer mounted pumps with generators and spill containment, and bypass piping. The pumps would be operated 24 hours a day, 7 days a week during construction. A backup pumping system with automatic transfer capability would be utilized and would ensure that releases to Middle Creek are not interrupted in the event of any equipment malfunction. The discharge piping would divert water around the work site and up over the dam to a discharge point in Middle Creek downstream of the valve house. The discharge point in Middle Creek would be protected from scour by energy dissipaters. The dam embankment would be protected with plastic sheeting in the location of the discharge pipe crossing to prevent erosion of the embankment in the case of an accidental break or leak in the pipe.

2.1.4 Dewatering

To facilitate construction, the work area within the reservoir would need to be dewatered. Figure 3 shows the work area dewatering plan. Once the pump system is operational and flow through the LLO is terminated, a turbidity curtain would be installed to isolate the work area within the reservoir. A second turbidity curtain would be installed in the reservoir if additional discharge capacity is needed. If feasible, the turbidity curtains would be installed by moving them from the shoreline towards the location where they would be anchored such that fish are not trapped between the curtain and the shoreline. If this method to install the turbidity curtains is not feasible, then fish would be gently guided out of the proposed work areas with seines and then the turbidity curtains would be installed as needed.

Following installation of the turbidity curtain nearest the work area, a temporary, non-earthen cofferdam dam would be installed at the neck of the LLO approach channel upstream of the work area but inside the turbidity curtain (Figure 3). The non-earthen cofferdam would be buttressed on the downstream side with rock fill material as needed (see cross section on Figure 3). Additional plastic sheeting and sand bags may be placed on the upstream side of the cofferdam to reduce leakage.

The water between the cofferdam and the intake would be drained through the LLO down to the invert elevation of the pipes. If needed, a filter sock or turbidity curtain would be installed on the end of the discharge pipe and in Middle Creek to prevent introducing turbid water to Middle Creek

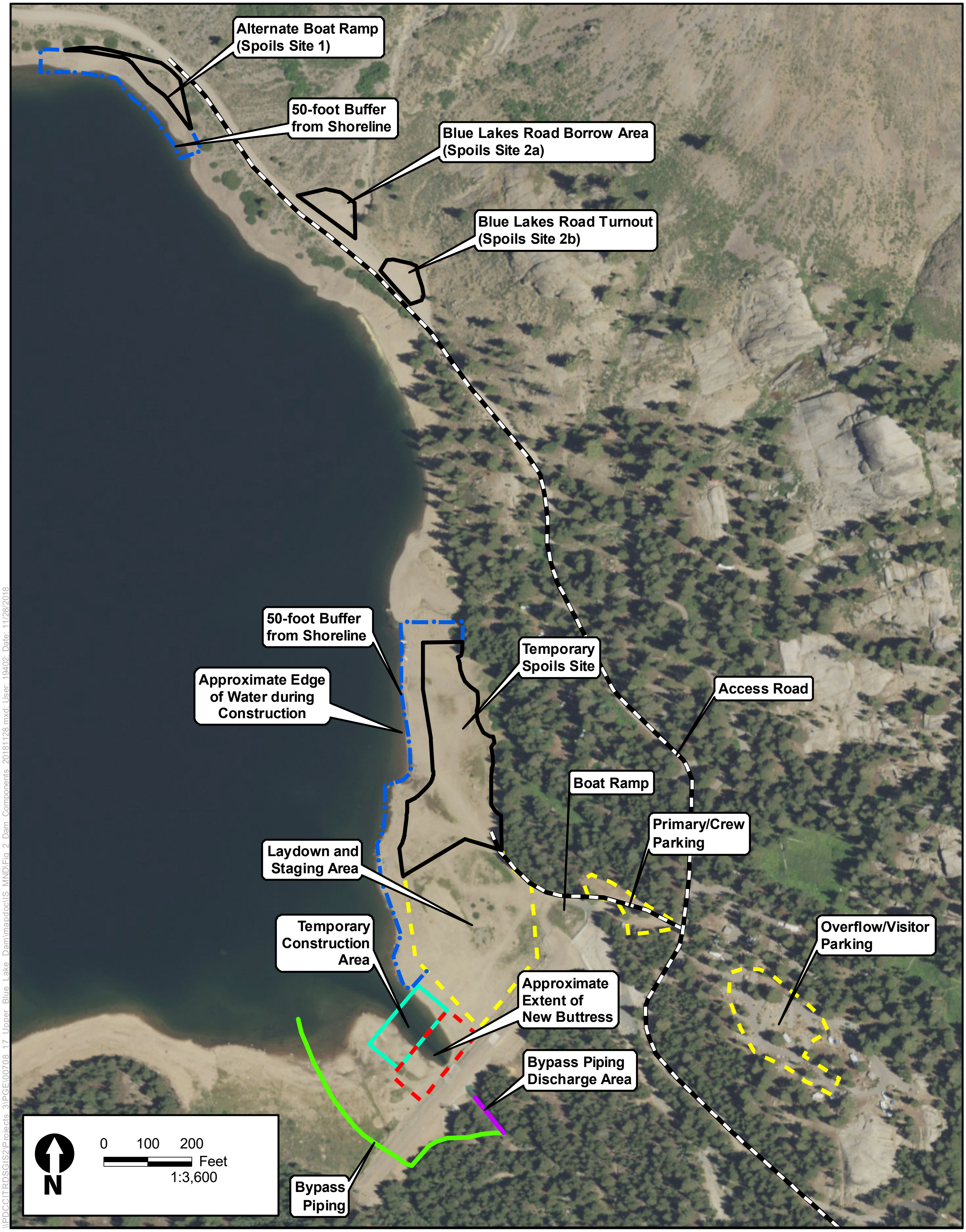

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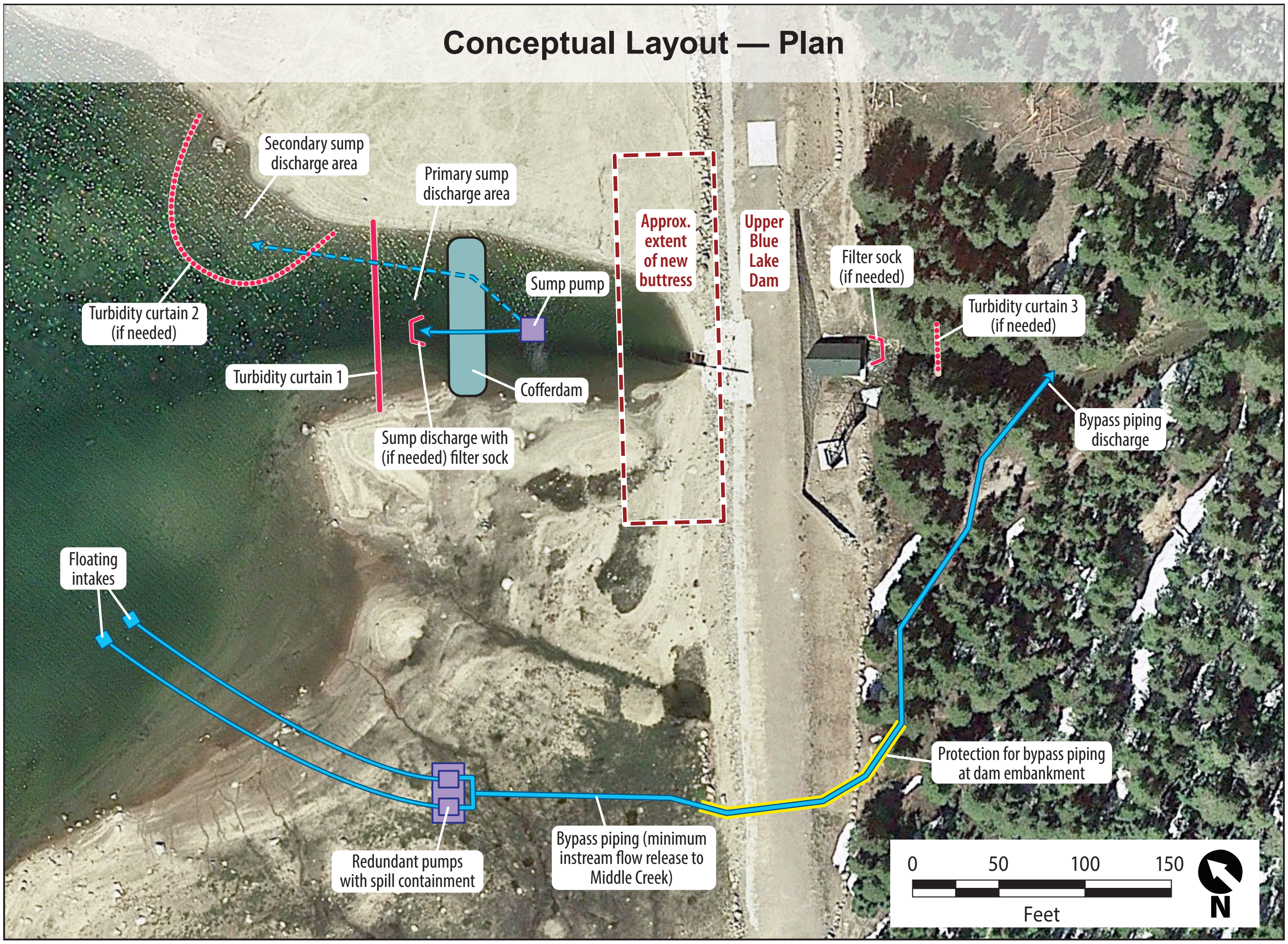
Figure 2
Components of the Upper Blue Lake Dam Seismic Retrofit Project



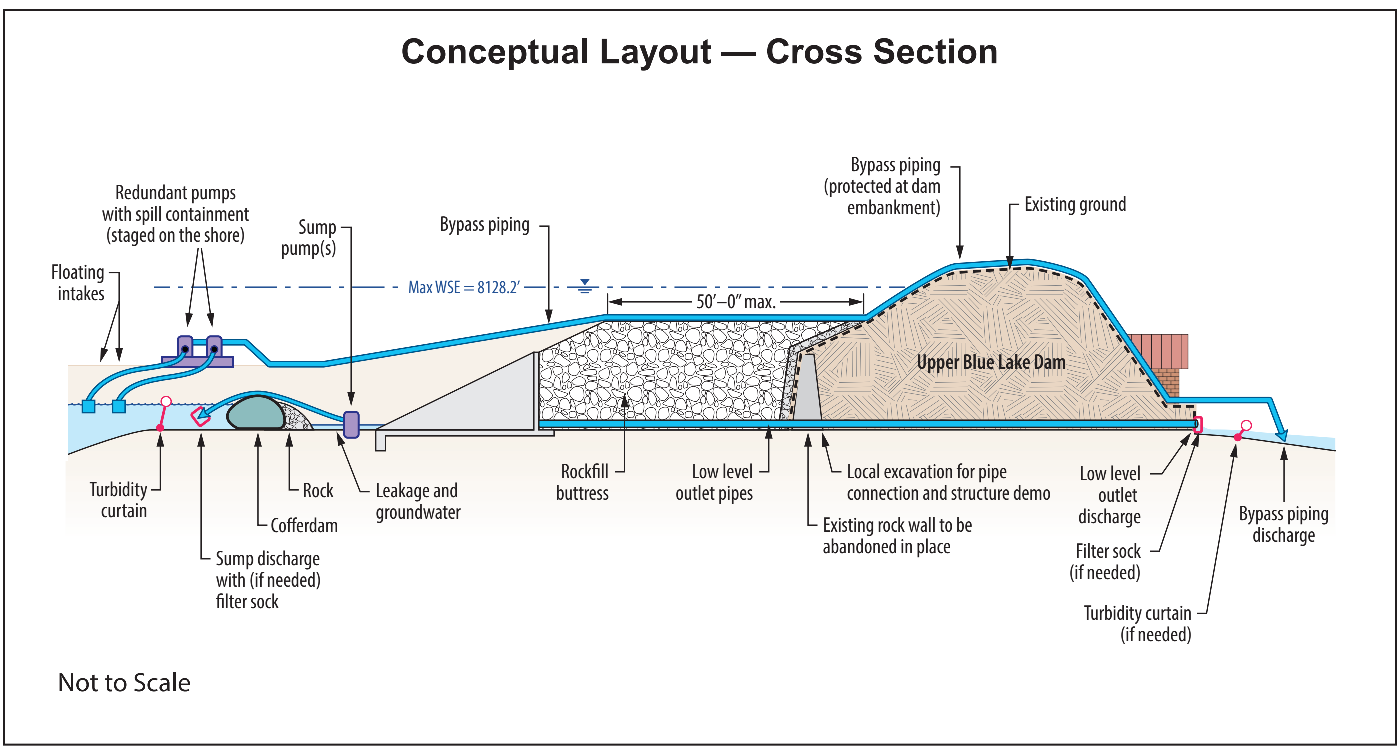


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Figure 3
Work Area Dewatering Plan
Upper Blue Lake Dam Seismic Retrofit Project

as the remaining water is being drained through the LLO. Standing water remaining in the dewatered work area would be pumped back over the cofferdam into the sump discharge area within the reservoir, behind the turbidity curtain.

Sumps would be installed on the upstream end of the work area to collect and discharge any leakage or groundwater that enters the work area during construction. Additional sumps may be required to keep the work area dry during construction. Water in sumps would be allowed to settle and then would be pumped over the cofferdam and discharged into the reservoir inside the turbidity curtain. If ground disturbance or precipitation cause water in the sumps to become substantially turbid, the turbidity would be further managed by placing filter socks on the discharge pipes of the sump pumps, or by implementing other effective means of managing turbidity. PG&E or the contractor would continuously monitor turbidity during construction in the lake outside of the turbidity curtain and in Middle Creek downstream of the bypass discharge. Periodic visual observations would be made to check for any turbidity plumes in the lake or in Middle Creek. If turbidity exceeding regulatory standards is observed, then construction would stop until the turbidity subsides and the cause for the turbidity is rectified. Additional turbidity-reduction measures (e.g., filter socks, turbidity curtains) would be installed as necessary between the LLO and bypass discharge (Figure 3).

A major summer storm (several inches of rain within 24 hours) that generates runoff into the work area would be managed through the use of wattles and additional submersible pumps. Prior to a forecasted storm, straw wattles would be placed to direct runoff away from the work area and additional submersible pumps would be brought onsite. Any water that collects in the work area would be removed using four or more 60-gallon-per-minute submersible pumps. Water would be pumped back into the reservoir in the same manner as the sump pumps that would continuously be handling leakage. Based on a conservative analysis of the amount of precipitation that would flow into the work site from a major summer storm (i.e., assuming no soil saturation in or runoff from the work area), it was determined that any standing water in the work area could be pumped out within 24 hours using up to four submersible pumps.

2.1.5 Construction Activities

Once the construction area is dry, the area to receive new fill would be cleared of all debris, surface boulders, and topsoil, and excavated to a competent bearing foundation. This process would include removal of portions of the intake channel's stacked rock wall in the area to receive new fill. Excavated materials (approximately 2,000–2,300 cubic yards) would be hauled to one or more of three spoils sites that are shown on Figure 2. Excavation equipment would access the northeast side of the intake channel through the existing boat ramp near the spillway. Equipment would access the southwest side of the intake channel by ramping into and out of the intake channel area or by crossing a temporary bridge that is placed across the intake channel.

Excavated materials would be processed onsite as necessary and disposed of at up to three spoils placement and storage locations (shown on Figure 2). Approximately 200 cubic yards of the excavated material would be processed and transported to the alternate boat ramp area (Spoils Site 1) on the east shore of the lake to be used for improvements to the traveled surface of the boat ramp. Spoils processing and other spoils sites are discussed below under *Site Access, Parking Areas, Laydown Areas, and Spoils Sites.*

The upstream face of the dam would be prepared to receive new fill by removing the staff gauge, shotcrete, and riprap armoring on the embankment slope. The intake structure (i.e., gated grizzly and portal) would be demolished and removed.

The foundation for the new extended portion of the LLO pipes would be prepared to receive controlled low strength material (CLSM) that would be used as a working surface base. The new twin, 50-foot-long, 18-inch-diameter steel LLO pipes would be constructed in place and welded to the existing LLO pipes at the upstream end of the exiting pipes. Formwork and steel rebar would be constructed for the new intake portal and pipe encasement. Concrete for the portal and pipe encasement would be poured and allowed to cure and then formwork would be removed. Horizontal layers of filter rock materials and rock fill would be placed and compacted in place to build the buttress to its design configuration.

A new staff gauge and a new bubbler would be installed upstream of the new LLO intake portal. The temporary, non-earthen cofferdam would be removed and full operational service would be restored to the reservoir.

For the duration of the project, the access road would be monitored and watered for dust control. Water for dust suppression would be pumped from UBL and into a water truck. It is estimated that approximately 64,000 gallons of water would be necessary for dust control use over the entire project duration. Repairs would be made to the road as necessary and the road would be restored to its original condition or better at the conclusion of the project.

2.1.6 Site Cleanup and Demobilization

Following completion of construction activities, the project site would be returned, as much as is reasonably practical, to its original condition, including recontouring of the temporary spoils site and laydown/staging area. All environmental mitigation measures stipulated by agency approvals and permits would be implemented in a timely manner. All equipment and surplus materials would be removed from the project site. All construction debris and environmentally deleterious material would be removed from the project site and from the laydown/staging areas and disposed of at an appropriate waste collection site.

2.1.7 Operations and Maintenance

Operations and maintenance activities after completion of the proposed project would be the same as pre-project operations and maintenance activities. The lake level would be managed in accordance with the FERC license and the interim operational reservoir elevation restriction would be lifted.

2.2 Site Access, Parking Areas, Laydown Areas, and Spoils Sites

The project would be accessed from Blue Lakes Road off State Route (SR) 88 (Figure 4). The campgrounds around UBL reservoir would be closed for the entire 2019 season to accommodate construction activities. Construction crew vehicles would be parked in the campground parking areas and in the laydown area.

Figure 4
Access Roads
Upper Blue Lake Dam Seismic Retrofit Project

The laydown area would be located between the boat ramp near the spillway and the dam retrofit site (Figure 2). Materials and equipment would be staged in the laydown area. A 50-foot-wide buffer zone would be maintained from the edge of the water during construction. No equipment or materials would be staged in this buffer zone. Equipment not being used would be staged near the tree line away from the water.

Excavated material would be temporarily stored at a temporary spoils site located along the east shore of the reservoir (Figure 2). Dry material would be placed in a pile in this area for temporary storage before being relocated to one of three permanent spoils placement and storage sites (Figure 2). Wet material would be placed and spread out at a thickness of 2 to 4 feet and allowed to dry at the temporary spoils area. Once dried, the material would be removed with a front loader or other piece of heavy equipment, placed in a dump truck, and hauled to one of the permanent spoils placement and storage sites. Spoils would not be placed within 50 feet of the edge of water at the temporary spoils site or the alternate boat ramp site (Spoils Site 1). At the temporary spoils site, water quality protection best management practices (BMPs) would be implemented to prevent water from wet spoils from entering UBL reservoir.

The total quantity of excavated material is estimated to be approximately 2,000–2,300 cubic yards and would vary depending on the quality of foundation material uncovered during excavation. The approximate amounts of material that would be placed at each permanent spoils placement and storage site are shown in Table 2-1. Disposed material would be compacted in horizontal lifts and water quality protection measures would be used for erosion control as necessary(see *Avoidance and Minimization Measure AMM-1: Implement Water Quality Protection Measures and Erosion and Sediment Control Plans*). Prior to spoils placement at Blue Lakes Road borrow area (Spoils Site 2a), the area would be re-graded so that borrow material for future filling of potholes and campsite spurs would be accessible. Permanent erosion protection measures, such as placing riprap or seeding the spoils piles, may be implemented at Spoils Sites 2a and 2b because the majority of spoils would be placed in these areas and they are located upslope of the reservoir.

Table 2-1. Disposal Locations and Expected Quantities of Spoils

Disposal Location	Quantity (cubic yards)
Site 1 Alternate boat ramp	200
Site 2a Blue Lakes Road borrow area	1,500–1,800
Site 2b Blue Lakes Road turnout	300

2.3 Construction Schedule

It is anticipated that construction work would begin around June 10, 2019, or as soon as Blue Lakes Road has been cleared of snow and is open for use. If Blue Lakes Road is not cleared of snow by early June, a helicopter flying out of Alpine County Airport in Markleeville may be used to deliver the reservoir drawdown equipment and installation personnel so that drawdown can begin ahead of other project components. Staging and laydown areas would be established and equipment would be delivered to the site before dam work would begin. Materials would be delivered before and throughout construction. When feasible, haul truck traffic on Blue Lakes Road would be limited to Monday through Thursday in order to minimize effects on weekend recreation users of the Blue

Lakes area. Work is expected to be finished by approximately September 25, 2019. Table 2-2 shows the anticipated work schedule.

Table 2-2. Upper Blue Lake Seismic Retrofit Project Construction Schedule

Project Element/Phase	Construction Start/End Date	Construction Duration (Number of Work Days)
1. Initial Helicopter Materials Delivery (if necessary)	June 7 – June 9, 2019	3
2. Materials Delivery	June 10 – September 10, 2019	92
3. Reservoir Drawdown	June 15 – July 14, 2019	30
4. Mobilization Start	July 15 – July 20, 2019	6
Dewatering	July 21 – July 23, 2019	3
Access Installation	July 24, 2019	1
Excavation	July 25 – August 13, 2019	20
Low Level Outlet Extension	August 7 – August 22, 2019	16
Construct Intake Structure	August 23 – September 17, 2019	26
Place Buttress Rock	August 14 – September 18, 2019	36
5. Demobilization/Finish	September 18 – September 25, 2019	7
Site Restoration	September 18 – September 25, 2019	7

Construction is expected to take place from 7a.m. to 7 p.m. Monday through Sunday. An alternating work schedule is anticipated for the duration of the proposed project excluding holidays. Two crews (one crew working primarily on grading and earthwork and another crew working primarily on carpentry, concrete, and steel) are expected to work 12-hour work days, 4 days per week, with one crew working alternating weekends at 12 hours per day. Crews would work additional hours and days as needed to finish the project during the limited construction window. In the case of predicted early winter conditions in fall 2019, the "construct intake structure" phase may begin as soon as August 14 and may be condensed by up to one day, and the "place buttress rock" phase may be condensed by up to 10 days, so that both phases are completed by September 8, 2019. No night work is planned. During non-work hours and holidays, security personnel would be contracted to provide oversight and security at the project site.

2.4 Construction Equipment and Personnel

2.4.1 Construction Equipment

Table 2-3 shows the type and quantities of equipment expected to be used onsite during construction of the proposed project. Diesel-powered generators would also be used onsite for powering a mobile office, drawdown pumps, bypass pumps, and miscellaneous equipment. Table 2-4 shows anticipated diesel-powered generator use. Most equipment would stay onsite for the duration of the proposed project. Although not shown on the table, a helicopter may be used, if necessary, once every 2 weeks for 2 hours during the materials delivery, mobilization start, and demobilization/finish phases.

Table 2-3. Construction Phases and Equipment Use

Project Phase	Equipment Type	Fuel Type	Quantity	Horse-power	Hours/ Day
1. Initial Helicopter Materials Delivery (if necessary)					
	Helicopter	N/A	1	N/A	5
2. Materials Delivery					
	Dump Truck	Diesel	1	320	8
	Water Truck	Diesel	1	300	6
3. Reservoir Drawdown *(see Table 2-4)*					
4. Mobilization Start					
Dewatering	Excavators	Diesel	1	150	10
	Tractors/Loaders/Backhoes	Diesel	1	150	10
	Boom Truck	Diesel	1	425	8
	Water Truck	Diesel	1	300	6
Access Installation	Bulldozers	Diesel	1	250	10
	Tractors/Loaders/Backhoes	Diesel	1	150	10
	Graders	Diesel	1	150	5
	Excavators	Diesel	2	150	10
	Water Truck	Diesel	1	300	6
Excavation	Excavators	Diesel	2	150	10
	Tractors/Loaders/Backhoes	Diesel	1	150	10
	Water Truck	Diesel	1	300	6
Low Level Outlet Extension	Excavators	Diesel	1	150	5
	Boom Truck	Diesel	1	425	5
	Water Truck	Diesel	1	300	6
	Welding Truck	Diesel	1	425	10
Construct Intake Structure	Excavators	Diesel	1	150	10
	Tractors/Loaders/Backhoes	Diesel	1	150	10
	Bulldozers	Diesel	1	100	10
	Boom Truck	Diesel	1	425	10
	Vacuum Truck	Diesel	1	400	10
	Concrete Truck	Diesel	1	300	6
Place Buttress Rock	Excavators	Diesel	2	150	10

Project Phase	Equipment Type	Fuel Type	Quantity	Horse-power	Hours/Day
	Tractors/Loaders/Backhoes	Diesel	1	150	10
	Bulldozers	Diesel	1	100	10
	Water Truck	Diesel	1	300	6
5. Demobilization/Finish					
Site Restoration	Excavators	Diesel	1	150	10
	Tractors/Loaders/Backhoes	Diesel	1	150	10
	Boom Truck	Diesel	1	425	10

Table 2-4. Anticipated Diesel-Powered Generator Use

Generator Purpose	Size (kilowatts)	Phase and Duration of Use	Hours/Day
Power for Drawdown Pumping	119	Reservoir drawdown (approximately 30 days)	24
Power for Mobile Office	25	Entire project after reservoir drawdown (approximately 3 months)	12
Power for Bypass Pump	55	Entire project after reservoir drawdown (approximately 3 months)	24
Power for Dewatering/ Sump Pumps	15	Excavation, low level outlet extension, and intake structure construction (approximately 2 months)	24
Power for Hand Tools	5	Intermittent use during low level outlet extension and intake structure construction (approximately 2 days per week)	4

2.4.2 Haul Trucks and Material Import

There would be a low level of haul truck trips to and from the project area during construction, but an elevated level of construction traffic during mobilization, demobilization, and material import. Imported materials would come from Bing Materials in Gardnerville, Nevada, or another commercially available source with materials that meet design specifications. Table 2-5 shows the anticipated number of haul truck material delivery trips for the proposed project. More or fewer haul trucks may be needed depending on the foundation conditions discovered during excavation.

Table 2-5. Haul Truck Delivery Trips

Project Phase	Number of Round Trips	Miles (Round Trip)	Notes
2. Materials Delivery			
Rock Material Delivery	21 per day	70	Approximately 7 trucks per day would make 3 round trips from the quarry to the project site until 200 total truckloads have been delivered.
Miscellaneous Material Delivery	2 per day	132	Approximately 2 trucks per day would deliver material and equipment to the project site from the Tiger Creek Yard until 14 total truckloads have been delivered.
4. Mobilization Start			
Rock Material Delivery	15 per day	70	Approximately 5 trucks per day would make 3 round trips from the quarry to the project site (Monday–Thursday only) until approximately 100 total truckloads have been delivered.
Concrete Delivery	2 per day	70	2 trucks per day would deliver concrete from the batch plant to the project site until a total of 10 truckloads have been delivered.
5. Demobilization/Finish			
Site Restoration	2 per day	132	Approximately 2 trucks per day would demobilize material and equipment from the project site to the Tiger Creek yard until a total of 8 truckloads have been delivered.

2.4.3 Personnel and Employee Vehicle Travel

Approximately 13 workers are expected to be onsite each day during construction (except for holidays), and it is assumed each worker would make one round trip to the project area each day.

2.5 Avoidance and Minimization Measures

PG&E will implement the following avoidance and minimization measures to ensure that direct and indirect impacts on certain environmental resources are avoided and minimized. The resource analyses in Chapter 3 include descriptions of how these measures minimize and avoid specific impacts.

2.5.1 Avoidance and Minimization Measure AMM-1: Implement Water Quality Protection Measures and Erosion and Sediment Control Plans

PG&E will comply with all applicable construction site best management practices (BMPs) specified in PG&E's Activity Specific Erosion and Sediment Control Plans[1] (Appendix B), the Stormwater Pollution Prevention Plan (SWPPP), and any other permit conditions to minimize the introduction of construction-related contaminants and mobilization of sediment into wetlands and other waters in and adjacent to the project area. These BMPs will address soil stabilization, sediment control, wind erosion control, vehicle tracking control, non-stormwater management, and waste management practices. The BMPs will be based on the best conventional and best available technology. PG&E will also conduct turbidity monitoring as described in its draft *Upper Blue Lake Dam Seismic Retrofit Project Water Quality Monitoring Plan* (Appendix C).

The proposed project is subject to stormwater quality regulations established under the National Pollutant Discharge Elimination System (NPDES), described in Section 402 of the federal Clean Water Act (CWA). In California, the NPDES program requires that any construction activity disturbing 1 or more acres comply with the statewide General Permit, as authorized by the State Water Resources Control Board. The General Permit requires elimination or minimization of non-stormwater discharges from construction sites and development and implementation of a SWPPP for the site. The SWPPP will include the following primary elements.

- Description of site characteristics—including runoff and streamflow characteristics and soil erosion hazard—and construction procedures.
- Guidelines for proper application of erosion and sediment control BMPs.
- Description of measures to prevent and control toxic materials spills.
- Description of construction site housekeeping practices.

In addition to these primary elements, the SWPPP will specify that the extent of soil and vegetative disturbance will be minimized by control fencing or other means, and that the extent of soil disturbed at any given time will be minimized. The SWPPP must be retained at the construction site. PG&E will perform routine inspections of the construction area to verify that the BMPs are properly implemented and maintained.

The BMPs will include, but are not limited to the following, as well as those listed in Avoidance and Minimization Measure AMM-2: Implement Hazardous Materials Control Measures.

- All earthwork activities involving wetlands and other waters will be conducted during the dry season.
- Water in the construction area will be isolated from UBL reservoir with a turbidity curtain. Turbid water, removed from the construction area and released into the reservoir, will also be contained by a turbidity curtain located in the reservoir. In the event of a major unforeseen thunderstorm or emergency event, water released via the LLO to Middle Creek will be filtered

[1] The relevant Activity Specific Erosion and Sediment Control Plans are *Good Housekeeping, Laydown/Staging Area Construction, Dirt and Gravel Access Road Maintenance – Mountain Regions, and Stockpile Management*. All four of these plans are included in Appendix B.

through a turbidity curtain. In addition, any discharge with elevated turbidity will be filtered using appropriate filter bags before being released to Middle Creek or the reservoir.

- The discharge point in Middle Creek for the bypass piping will be protected from scour by energy dissipaters.
- As required by the NPDES permit, concrete will not be discharged to aquatic habitat while concrete is being poured.
- Concrete, solvents, adhesives, fuels, dirt, and gasoline will not be rinsed or washed into the reservoir, reservoir bottom, drainages, or wetlands.

2.5.2 Avoidance and Minimization Measure AMM-2: Implement Hazardous Materials Control Measures

To ensure the potential effects of hazardous materials or potential spills are minimized, PG&E will implement the following measures.

- All hazardous materials will be contained in appropriate spill-proof containers and/or secondary containment, and stored in a designated area away from waterways.
- Temporary storage of hazardous materials, and servicing and refueling of equipment, will be conducted only at designated locations away from water bodies. Drip pans or absorbent pads will be used during equipment fueling. Fuels will be stored in containment basins.
- Hazardous wastes generated onsite will be placed in proper containers, labeled appropriately, and transported from the project site to an authorized Hazardous Waste Consolidation Site.
- No bulk fuel storage tanks will be placed onsite. Trucks and equipment will be refueled from non-bulk, truck-mounted fuel tanks. All refueling operations will be attended by trained personnel and conducted in accordance with applicable PG&E policies.
- Only equipment in good working order and free of dripping or leaking engine fluids will be used when working in and around the reservoir, drainages, and wetlands. All vehicle maintenance will be conducted within the Primary/Crew Parking area Any necessary equipment washing will be conducted where the water cannot flow into adjacent waterbodies.
- Prior to operation, all equipment will be inspected for fluid leaks and for signs of worn or damaged parts that may result in a release of fuel or other hazardous materials.
- All power equipment and vehicles will be free of petroleum residue, kept in good working order, and inspected each day for leaks prior to use. Leaks will be repaired immediately or problem vehicles or equipment will be removed from the project site.
- Small-engine-powered equipment will be provided with secondary containment. Whenever possible, vehicles and equipment with engines supplying motive power will be parked in designated areas located 200 feet or more from water. Drip pans or other containment measures will be placed under vehicles and equipment when not in use while located within 200 feet of water.
- Equipment will be staged overnight in secondary containment or with other suitable barriers to prevent accidental leakage of fuel, oils, and other liquid from soaking into the soil, or being carried to waterways.

- In accordance with PG&E policy, all hazardous substance releases to the environment will be reported internally. A spill kit will be maintained onsite to ensure prompt containment in the unlikely event of a release to the environment. All media impacted by a spill will be cleaned up and disposed of offsite in accordance with applicable regulation.

2.5.3 Avoidance and Minimization Measure AMM-3: Implement Fire Hazard Prevention Measures

During construction, crews will take appropriate measures to eliminate the potential for fire, including the following.

- When cutting or welding is required onsite, fire prevention and suppression tools (including backpack-type water pumps, shovels) will be made available onsite.
- Project vehicles will be equipped with appropriate fire response and fire prevention and suppression tools.
- Contractor crews will have the following equipment:
  - One shovel, one axe, and one or more UL-rated 4BC extinguishers on each crew vehicle.
  - One shovel with each tractor, backhoe, or other heavy equipment.
  - One shovel and one 5-gallon water-filled backpack pump with each welder.
  - One shovel and one fully charged chemical fire extinguisher at a point not greater than 25 feet from the work site for each gasoline-powered tool, including chainsaws and rock drills. Fire extinguishers shall be of the type and size set forth in California Public Resources Code Section 4431, and California Administrative Code Title 14, Section 1234.
  - Shovels will be a type "O" with an overall length of not less than 46 inches. Axes or pulaskis (pulaskis being the tool of preference) will have a 2.5-pound or larger head and have an overall length of not less than 28 inches.
- Fire extinguishers will be placed in easily accessible locations near potential ignition sources (internal combustion engines). Each vehicle and trailer will be equipped with a multi-purpose dry chemical extinguisher located in a readily accessible location. All internal combustion engines brought to the project site will be equipped with a spark arrestor.
- All personnel will perform daily inspections of work areas and laydown areas to ensure they are clear of debris and trash and that flammable or combustible materials are not allowed to accumulate. All flammable liquids will be stored appropriately and at a safe distance from ignition sources. All flammable gas containers will be secured in an upright position with their valve caps in place at a safe distance from ignition sources.
- Utility Standard TD-1464S, *Fire Danger Precautions in Hazardous Fire Areas*, must be reviewed before any welding or cutting operations are performed whenever flammable or combustible material cannot be completely removed from the area where hot work will be performed or wherever hot work is being performed on surfaces other than bare steel. A fire watch will be stationed at the work location and will have either a portable fire extinguisher or water hose with a nozzle immediately available at all times. The fire watch and person that will be performing hot work will ensure that the area is safe for hot work before work will be allowed to begin.

2.5.4 Avoidance and Minimization Measure AMM-4: Implement Traffic Control Plan

To avoid potential conflicts between members of the public and construction vehicles, a Traffic Control Plan will be implemented that contains the following measures.

- Warning signs of construction activities will be posted near the intersection of State Route 88 and Blue Lakes Road, as well as at points along Blue Lakes Road.
- Signs will be posted near the intersection of State Route 88 and Blue Lakes Road as well as at the intersection of State Route 88 and Forestdale Road near Red Lake to notify the public of the Upper Blue Lake campground closure for the 2019 season. The Lower Blue Lake campground and day-use areas will remain open, but gates will limit public traffic beyond the northernmost Lower Blue Lake day use area.
- All on-street construction traffic will be required to comply with the local jurisdiction's standard construction specifications.
- As many haul truck deliveries as possible will be made before the Lower Blue Lake campground is open for the season, in order to minimize effects on recreation users.
- When feasible, haul truck traffic on Blue Lakes Road will be limited to Monday through Thursday to minimize effects on weekend recreation users of the Blue Lakes area.

2.5.5 Avoidance and Minimization Measure AMM-5: Implement Measures to Avoid the Spread of Noxious Weeds

To avoid the spread of noxious weeds, PG&E will implement the following measures.

- Prior to mobilization to the project site, all equipment will be pressure washed clean to ensure noxious weeds are not imported into or out of the project area. Equipment will be considered clean when no visible soil or plant parts are attached to equipment.
- Any erosion control materials required for the project will be rice straw or come from certified weed-free sources, as practicable (e.g., certified weed-free straw wattles, mulch).
- All heavy equipment, vehicles, and construction activities will be confined to existing access roads, road shoulders, and disturbed or designated areas.

2.5.6 Avoidance and Minimization Measure AMM-6: Implement Fugitive Dust Abatement Measures

To limit fugitive dust from project activities, PG&E will implement the following measures:

- Vehicle speeds will be limited to 15 miles per hour when traveling on unpaved roads.
- A water truck will be used to control dust on roads and in the laydown areas.
- The water truck will be equipped to provide a focused knockdown spray during excavation activities if excessive dust is created.

Chapter 3
Environmental Setting and Impacts

3.1 Introduction

This chapter provides an overview of the existing physical environment and regulatory requirements for each of the resources that may be affected by the proposed project. For each resource, there is a discussion of the environmental setting, followed by an evaluation of the environmental impacts on the resource. This chapter is organized by resource topic and corresponds to the Environmental Checklist Form of the State CEQA Guidelines. A complete environmental checklist from Appendix G of the State CEQA Guidelines is provided in Appendix A.

Implementation of the mitigation measures specified in the impact analysis would either avoid adverse impacts completely or reduce the impacts to a less-than-significant level. The Central Valley Water Board would adopt a mitigation and monitoring plan at the time it adopts a mitigated negative declaration. The purpose of the plan is to ensure that the mitigation measures adopted as part of the project approval would be implemented when the project is constructed. Some impacts have been avoided or minimized by including certain avoidance and minimization measures in the project description (see Chapter 2).

The following terminology is used to describe the level of significance of impacts.

- A finding of *no impact* is appropriate if the analysis concludes that the project would not affect the particular topic area in any adverse way.
- An impact is considered *less than significant* if the analysis concludes that the project would cause no substantial adverse change to the environment and requires no mitigation.
- An impact is considered *less than significant with mitigation incorporated* if the analysis concludes that the project would cause no substantial adverse change to the environment with the inclusion of mitigation measures.
- An impact is considered *significant and unavoidable* if the analysis concludes that the project could have a substantial adverse effect on the environment and mitigation to a less-than-significant level of impact is not feasible.

If an impact is determined to be significant and unavoidable, an environmental impact report would be prepared pursuant to Section 15063 of the State CEQA Guidelines.

3.2 Resources Not Likely to Be Affected

Initial evaluation identified several resources that would not likely be affected by implementation of the proposed project. The resources for which there would be little to no impact are discussed below.

3.2.1 Aesthetics

Because the project area would be closed to public access during construction, any temporary aesthetic impacts due to construction activities would not be visible to the public. Furthermore, project construction would not occur at night and, therefore, would not introduce any temporary sources of light or glare that would adversely affect views.

The project would not substantially degrade the existing visual character of the area or its surroundings, because the post-construction view of the dam would be similar to existing conditions. The project would seismically reinforce UBL dam by increasing a portion of its width by 50 feet with rock fill. Although the dam would be wider, most of it would be submerged in the lake. The upstream face of the dam is already protected by rock fill, and the exposed portions of the reinforced dam would be visually similar to existing conditions.

Project implementation would not damage any scenic resources or change views from a scenic highway, because the project area is not visible from any state- or county-designated scenic roadways (California Department of Transportation 2017 and 2018). Additionally, the project would not introduce any sources of light or glare that would adversely affect daytime or nighttime views in the area because lights are not included in the final project design. Overall, the project would have very little to no impact on aesthetic resources, and these resources are not discussed further in this IS.

3.2.2 Agriculture and Forestry Resources

No soil units in Alpine County have the qualities of Prime Farmland or Farmland or Statewide Importance (California Department of Conservation 2018), nor is any land in Alpine County under Williamson Act contract (California Department of Conservation 2017). No agricultural activities are conducted in or around the project area. PG&E's timbered lands around the project area are managed for uses other than sustained timber production under a salvage management prescription (Stewardship Council 2017:9). The project would not conflict with any existing zoning or result in the loss or conversion of any forest land because trees would not be removed as part of the project. Accordingly, agriculture and forestry resources are not discussed further in this IS.

3.2.3 Land Use and Planning

The lands within and around the project area are classified as Open Space (Alpine County 2017:96). There are no established communities in or near the project area. The project would not change the land use in the project area. Seismic retrofit of the UBL dam would not physically divide an established community or conflict with any applicable land use plan, policy, or regulation, including the *Alpine County General Plan*. Implementation of the project, therefore, would not result in any changes to existing land uses, and land use and planning are not discussed further in this IS.

3.2.4 Mineral Resources

No known mineral resources or mineral resource extraction sites are located within the project area; nor has a locally important mineral resource recovery site been delineated by Alpine County in its General Plan or by the California Geological Survey Minerals Program (California Department of Conservation 2013:20). Further, implementation of the project would not preclude future discovery or utilization of mineral resources because the project involves the seismic retrofit of an existing dam within the footprint of an existing reservoir. The project would have no impact on mineral resources, and these resources are not discussed further in this IS.

3.2.5 Population and Housing

The proposed project would not involve the construction of any new housing, businesses, roads, or infrastructure. Project implementation would not displace existing housing units or residents because there are no homes within the project area; therefore, the construction of replacement housing units offsite would not be required. Accordingly, population and housing are not discussed further in this IS.

3.2.6 Public Services

Public services in and around the project area consist of law enforcement, fire protection, and emergency medical assistance. There are no schools, formal parks, or other public facilities near the project area. Haul trucks accessing the project area would have the potential to briefly slow traffic during construction hours. However, because a maximum of only 23 round trips per day would occur during the busiest phase of construction, and because Blue Lakes Road currently operates at Level of Service A (Alpine County 2017:121), emergency access would be maintained during construction of the project. Therefore, the project would not result in any degradation of service ratios, response, times, or other performance objectives related to public services. Accordingly, impacts on public services are not expected, and public services are not discussed further in this IS.

3.2.7 Utilities and Service Systems

Wastewater treatment would not be part of the project because the project does not involve the development of infrastructure needing wastewater treatment. The project would not require, or result in, the construction or expansion of stormwater drainage facilities because the project does not involve the development of infrastructure requiring stormwater drainage (for information regarding maintenance of surface water quality during construction, please see Section 3.3, *Hydrology and Water Quality*). No additional water supply would be needed. The project would comply with statutes and regulations related to solid waste during construction. Once construction is complete, no solid waste would be generated by the operation of the reservoir or the retrofitted dam. There are no utilities in or around the project area and no utilities or electricity usage would be affected or relocated as part of the project. Accordingly, utilities and service systems are not discussed further in this IS.

3.2.8 Growth Inducement

The proposed project would seismically reinforce an existing high alpine dam. System capacity and water release volumes and schedules would not change relative to existing conditions as a result of the project. Land use designations, growth rates, employment, and housing values would continue to be determined by local government regulations and economic conditions and would not be affected by the proposed project. Accordingly, the proposed project is not growth-inducing, and no further discussion is required for this IS.

3.3 Hydrology and Water Quality

3.3.1 Existing Conditions

This section discusses the existing conditions related to hydrology and water quality in the project area. The UBL dam is located at the head of Middle Creek, a tributary to the North Fork of the Mokelumne River, approximately 10 miles southwest of Markleeville and 4.1 miles south of Carson Pass in Alpine County, California (Figure 1). The project area is located at an elevation of approximately 8,100 feet above mean sea level (msl).

3.3.1.1 Regional Setting

The project area is within the San Joaquin River Hydrologic Region, which encompasses an area of approximately 9.7 million acres (15,200 square miles) and includes all of Calaveras, Tuolumne, Mariposa, Madera, San Joaquin, and Stanislaus Counties, most of Merced and Amador Counties, and parts of Alpine, Fresno, Alameda, Contra Costa, Sacramento, El Dorado, and San Benito Counties (California Department of Water Resources 2003:169). The project area is within the Upper Mokelumne Watershed (USGS Hydrologic Unit Code #18040012) (U.S. Geological Survey 1978).

3.3.1.2 Surface Water Hydrology

Reservoir Description

UBL dam is a homogeneous earthfill embankment located at the head of a tributary (Middle Creek) to the North Fork of the Mokelumne River. There are no hydroelectric facilities directly related to UBL dam; rather, UBL reservoir is operated primarily for seasonal storage and regulation of water for power generation farther downstream. The reservoir has an area of approximately 343 acres and a capacity of approximately 7,300 acre-feet at the normal maximum water level elevation, which is 8,137.5 feet (USGS datum) with flashboards installed (8,135.9 feet without flashboards). Elevations in the area range from approximately 8,100 feet at the lake to 9,374 feet in the surrounding mountains.

The outlet of the reservoir has a maximum capacity of 62 cfs at full pool and supplies water to Middle Creek, which flows approximately 0.7 mile (3,500 feet) to Lower Blue Lake. During high runoff periods (e.g., water year 2011), inflows cause water to spill over the reservoir spillway channel and into Middle Creek.

PG&E operates the reservoir by capturing snowmelt runoff in spring (April to June) and releasing the water to Middle Creek through the LLO from summer into fall, consistent with available runoff and storage, and with ecological needs. Surface releases have occurred infrequently when the reservoir is full and spilling over the reservoir spillway channel. When water is not spilling over the spillway, most or all of the flow in Middle Creek downstream of the dam is derived from releases through the LLO, the invert of which is located at elevation 8,109.3 feet. Consequently, the depth at which releases are made from the reservoir is a function of the reservoir's water surface elevation.

SAGE Engineers, Inc. (2016) performed a seismic stability analysis to study the sensitivity of the upstream stability of the maximum height section of the dam to reservoir water elevation and recommended an interim operational elevation restriction of 8,122.5, which provides a freeboard of about 17.8 feet to the dam crest (elevation 8,140.3 feet). To limit the potential for an uncontrolled release in the event of a seismic event, PG&E implemented the 15-foot operational restriction on the reservoir elevation in early April 2016.

Federal Energy Regulatory Commission and U.S. Forest Service Operating Conditions

On October 11, 2001, FERC issued a new license for the Mokelumne Project No. 137. The FERC license included the following USFS conditions requiring minimum in-stream flows.

- Winter streamflow releases of at least 2 cfs or natural flow conditions, whichever is less, from October 1 to May 1.
- Spring streamflow releases of at least 5 cfs from May 1 until up to 5 days after Salt Springs Reservoir has stopped spilling (or stopped filling, in non-spill years), but no later than July 30.
- Early summer target streamflows, by water year type, for at least 5 consecutive days and not longer than 14 consecutive days based on operator availability:
    - 20 cfs in Critically Dry[1] and Dry[2] years
    - 40 cfs in Below Normal[3] and Above Normal[4] years
    - 60 cfs in Wet[5] years

If spill occurs at UBL dam and the resulting streamflow exceeds these target streamflows, this spill flow may be used to meet all or a portion of the target streamflow requirement. Any portion of the target streamflows not met through spill is released by PG&E so that the above requirements are met.

After the early summer target streamflows are complete, PG&E determines the subsequent release rates by calculating the difference between the fall target pool level of 2,000 acre-feet (AF) and the sum of the actual storage on July 1 and any expected inflows. This amount is apportioned equally and released among the remaining months until October 1 or until the fall target pool level is reached, whichever occurs first. Once this point is reached, PG&E resumes the required winter streamflow release of at least 2 cfs or natural flow conditions, whichever is less.

Inflow Channels

ICF staff surveyed the various drainage channels that provide inflow into UBL reservoir. On October 10, 2018 an ICF geomorphologist with additional expertise in hydrology surveyed 18 distinct drainage channels feeding into UBL reservoir from upslope. Seventeen of the channels had a direct surface connection the surrounding uplands. The channels ranged from smaller channels with sinuous planforms to larger, gullied channels with braided planforms. Several seeps and springs at the hillside/lacustrine transition were also observed. Seven of the surveyed channels were characterized as being significant contributors of water and, under the appropriate flow regimes, sediment to UBL reservoir. These seven channels were all flowing with at least some water reaching

[1] Less than 376,100 acre-feet (AF) inflow to Pardee Reservoir.
[2] Less than 518,100 AF but greater than or equal to 376,100 AF inflow to Pardee Reservoir.
[3] Less than 724,400 AF but greater than or equal to 518,100 AF inflow to Pardee Reservoir.
[4] Less than 958,700 AF but greater than or equal to 724,400 AF inflow to Pardee Reservoir.
[5] Greater than or equal to 958,700 AF inflow to Pardee Reservoir.

UBL reservoir under the dry fall conditions during the October survey. Of these seven channels, five are mapped with corresponding names as shown in Figure 5: South, Granite, West, Middle, and North Creeks.

Outflow Channel

Middle Creek extends for approximately 0.7 mile (3,500 feet) from UBL dam to Lower Blue Lake. Middle Creek flows are supplied by springs and snowmelt runoff, by releases from UBL dam, and by infrequent, uncontrolled spills via the dam spillway. The hydrology is primarily snowmelt driven, with natural summer and fall flows augmented by releases of stored water from the reservoir. Streamflows are measured and recorded at the stream gaging station located approximately 1,200 feet downstream of UBL dam near the Middle Creek campground. Streamflow varies seasonally, with low flows occurring during late fall and winter and high flows occurring during summer when releases from the reservoir are made. In summer, flows are highly variable within the season and among years in response to the annual variability of snowpack and runoff in the watershed. In general, mean daily summer flows in Middle Creek have ranged from 1 to 89 cfs (Pacific Gas & Electric Company 2018).

3.3.1.3 Surface Water Quality

The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins* (Basin Plan) describes beneficial uses for various water bodies in the San Joaquin River Hydrologic Region (Central Valley Regional Water Quality Control Board 2018). The project area is considered to be located within the "Sources to Pardee Reservoir" water body. Table 3.3-1 shows the beneficial uses for this water body as listed in the Basin Plan. Section 303(d) of the CWA established the total maximum daily load (TMDL) process to assist in guiding the application of state water quality standards. Section 303(d) requires states to identify streams in which water quality is impaired (i.e., affected by the presence of pollutants or contaminants) and to establish the TMDL, which is the maximum quantity of a particular contaminant that a water body can assimilate without experiencing adverse effects. There are no CWA 303(d) listed impairments for UBL reservoir or the upper Mokelumne River based on the 2010 California Integrated Report (California State Water Resources Control Board 2011).

Table 3.3-1. Designated Beneficial Uses for Surface Water Bodies in the Project Vicinity

Water Body	Designated Beneficial Uses
Sources to Pardee Reservoir	Municipal and domestic supply; power; contact recreation; canoeing and rafting; other non-contact water recreation; warm and cold freshwater habitat (resident fish); warmwater fish[a] migration; coldwater fish[b] migration and spawning habitat; wildlife habitat.

Source: Central Valley Regional Water Quality Control Board 2018 (Table 2-1)
[a] Striped bass, sturgeon and shad.
[b] Salmon and steelhead.

No spatial and temporal water quality information specific to surface flows in the project area is available (U.S. Environmental Protection Agency 2018). The water draining to and from UBL reservoir is likely to be of fairly high quality because of the remote and undisturbed condition of the landscape. Based on field reconnaissance, water quality parameters such as water temperature, water clarity values, and dissolved oxygen all indicate healthy water quality conditions for aquatic organisms throughout the various inlet channels as well as for UBL reservoir.

3.3.1.4 Groundwater Hydrology and Quality

The California Department of Water Resources (DWR) delineates groundwater basins throughout California under the State's Groundwater Bulletin 118 (California Department of Water Resources 2003). The proposed project is not located in a groundwater subbasin or basin, due to the fact it is situated in the headwaters of the Sierra Nevada mountains. The nearest groundwater basins are the Carson Valley Basin (6-6) to the northeast, the Tahoe Valley South Subbasin (6-5.01) to the northwest, and the Slinkard Valley Basin (6-105) to the east.

In addition, no spatial or temporal water quality information specific to groundwater in the project area is available.

3.3.2 Regulatory Setting

3.3.2.1 Federal

The following federal regulations related to hydrology and water quality would apply to implementation of the proposed project.

Clean Water Act

The CWA is the primary federal law that protects the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. It operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit. Permit review is the CWA's primary regulatory tool under the following sections.

- Section 404, which regulates the discharge of dredged and fill materials into "waters of the United States," which include oceans, bays, rivers, streams, lakes, ponds, and wetlands. Project proponents must obtain a permit from USACE for all discharges of dredged or fill material into waters of the United States before proceeding with a proposed activity. UBL reservoir and other features in the project area are jurisdictional waters of the Unites States and would be subject to Section 404 regulation.
- Section 402, which regulates discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program, administered by U.S. Environmental Protection Agency (EPA). In California, the State Water Resources Control Board (State Water Board) is authorized by EPA to oversee the NPDES program through the Regional Water Quality Control Boards (Regional Water Boards). The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits. A Storm Water Pollution Prevention Plan (SWPPP) and pollution prevention and monitoring program would be required for construction of the project to comply with the Construction General Permit and General Dewatering Permit, respectively, under Section 402.
- Section 401, under which applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate. In this case, the Regional Water Board must issue a certification to USACE or its applicant for USACE Section 404 action.

The State Water Board is the state agency with primary responsibility in California for implementing the CWA, which establishes regulations relating to water resources issues. Typically, all regulatory requirements are implemented by the State Water Board through nine Regional Water Boards

Figure 5
Tributaries to Upper Blue Lake
Upper Blue Lake Dam Seismic Retrofit Project

established throughout the state. The Central Valley Water Board, discussed in Section 3.3.2.2, *State*, is responsible for regulating discharges to the Mokelumne River and its tributaries.

3.3.2.2 State

The following state regulations related to hydrology and water quality would apply to implementation of the proposed project.

Porter-Cologne Water Quality Control Act of 1969

The Porter-Cologne Water Quality Control Act established the State Water Board and nine Regional Water Boards as the primary state agencies with regulatory authority over California water quality and appropriative surface water rights allocations. Under this act and the CWA, the state is required to adopt a water quality control policy and waste discharge requirements to be implemented by the State Water Board and nine Regional Water Boards. The State Water Board also establishes Water Quality Control Plans (Basin Plans) and statewide plans. The Regional Water Boards carry out State Water Board policies and procedures throughout the state. Basin Plans designate beneficial uses for specific surface water and groundwater resources and establish water quality objectives to protect those uses.

Central Valley Regional Water Quality Control Board

The Central Valley Water Board is responsible for implementing its Basin Plan (2018) for the Sacramento River and its tributaries, including the Mokelumne River and its tributaries. The Basin Plan identifies beneficial uses of the river and its tributaries and water quality objectives to protect those uses. Numerical and narrative criteria are contained in the Basin Plan for several key water quality constituents, including dissolved oxygen, water temperature, trace metals, turbidity, suspended material, pesticides, salinity, and radioactivity.

3.3.2.3 Local

The following local regulation related to hydrology and water quality would apply to implementation of the proposed project.

Alpine County General Plan 2017

Surface Water Quality

The *Alpine County General Plan* Conservation Element, Section C, addresses hydrology and water quality (Alpine County 2017). It includes the following goal related to surface water quality.

> **GP Goal No. 6** Improve and maintain the quality of Alpine County's surface water resources in cooperation with the Lahontan and Central Valley Regional Water Quality Control Boards.

3.3.3 Environmental Effects

Potential impacts of the proposed project on hydrology and water quality are discussed in the context of State CEQA Guidelines Appendix G checklist. Checklist Section IX, *Hydrology and Water Quality*, asks whether the project would result in any of the following conditions.

a. Violate any water quality standards or waste discharge requirements?

Ground-disturbing earthwork associated with all proposed project components in the project area could increase soil erosion rates and loss of topsoil, thereby potentially violating water quality standards for reservoir and in-stream surface water quality. Based on the work scope, the water quality parameter of concern is turbidity. However, as described in Chapter 2, *Project Description*, PG&E would implement Avoidance and Minimization Measure AMM-1: Implement Water Quality Protection Measures and Erosion and Sediment Control Plans in order to minimize the introduction of construction-related contaminants and mobilization of sediment into waters in and adjacent to the project area. Additionally, as described in Section 3.5, *Biological Resources*, PG&E would implement Mitigation Measure BIO-MM-4: Implement Cofferdam, Turbidity Curtain, and Construction Site Dewatering Restrictions, which ensures that sediment and turbid water do not enter UBL reservoir or Middle Creek. With adherence to Avoidance and Minimization Measure AMM-1 and implementation of Mitigation Measure BIO-MM-4, this impact would be less than significant.

b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?

Construction would begin with drawdown of the reservoir through the LLO to an elevation that can be moderated with a small cofferdam. The water between the cofferdam and the intake would be drained through the LLO down to the invert of the pipes. Remaining standing water would be pumped back (shallow dewatering) over the cofferdam into a sump discharge area within the reservoir that would be contained by a turbidity curtain.

These activities, along with excavation of foundation and other materials in the UBL dam retrofit area, are not expected to expose the local groundwater table. Historically, UBL reservoir was a natural lake, before the water level was raised by a dam across the outlet. Consequently, the groundwater level is presumably well below the existing dam foundation. Thus, deep dewatering would not be necessary. Furthermore, the proposed project activities would not involve groundwater extraction or the lowering of the local groundwater table.

In addition, excavation, filling, grading, and transporting soils are not likely to interfere substantially with groundwater recharge because construction would occur during the dry season when recharge is at its lowest. There would be no impact.

c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite?

d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite?

Under the proposed project, PG&E would extend the LLO intake upstream approximately 50 feet and place a 50-foot-wide by 175-foot-long rock fill buttress on the upstream side of UBL dam to restrict lateral movement of the embankment slope if it were to lose substantial shear strength during strong ground shaking. After project construction, final grading of the project site would return the site to a condition similar to the pre-project condition, except that there would be 50 additional feet of the dam extending into UBL reservoir with appurtenant upstream extension of the two LLO pipes and reconfiguration of the intake structure and trash rack. Drainage patterns within UBL reservoir would remain relatively unchanged.

During dam retrofit construction, the discharge piping would be routed around the work site and over the dam to a discharge point in Middle Creek. Based on field observations, Middle Creek immediately downstream of the UBL dam is mostly sand-dominated. The project could result in channel bed and bank scour from flows that are diverted away from the LLO and into Middle Creek, which would constitute a significant impact, especially during high flow events. However, PG&E would comply with all applicable flow pumping system requirements as specified in Avoidance and Minimization Measure AMM-1: Implement Water Quality Protection Measures and Erosion and Sediment Control Plans (described in Chapter 2), and in Mitigation Measure BIO-MM-6: Implement Flow Pumping System Requirements (as described in Section 3.5). Avoidance and Minimization Measure AMM-1 has provisions for protecting the discharge point in Middle Creek for the bypass piping from scour with energy dissipation structures; the measure also includes stringent turbidity monitoring protocols in Middle Creek.

In addition, Mitigation Measures HYDRO-MM-1 and HYDRO-MM-2 would ensure that the energy dissipation structure is installed correctly and that channel stability monitoring during construction would detect any deleterious changes to the bed and banks of Middle Creek at and downstream of the bypass discharge point. With adherence to Avoidance and Minimization Measure AMM-1, implementation of Mitigation Measure BIO-MM-6, Mitigation Measure HYDRO-MM-1, and Mitigation Measure HYDRO-MM-2[6], this impact would be less than significant.

Mitigation Measure HYDRO-MM-1: Ensure Stability of Energy Dissipation Structure during Initial Placement

A qualified geomorphologist with expertise in channel stability monitoring and erosion monitoring shall be present during the initial placement of the energy structure to ensure that it is appropriately placed in a suitable portion of Middle Creek that would not compromise available fish habitat (e.g., a low- or high-gradient riffle) or any other significant geomorphic channel units. In addition, the qualified geomorphologist would help determine the appropriate placement and shape (dimensions) of the structure to properly dissipate the energy from the bypass pipe, and to ensure the least amount of channel bed and bank scour.

Mitigation Measure HYDRO-MM-2: Conduct Channel Stability Monitoring in Middle Creek and Downstream of the Bypass Discharge Point

A qualified geomorphologist with expertise in channel stability monitoring and erosion monitoring shall conduct at least one survey channel stability monitoring survey after the installation of the energy dissipation structure. The survey shall be conducted at the location of the energy dissipation structure, and shall extend downstream approximately 800 feet to the confluence of Middle Creek and the spillway channel. The survey shall identify any areas that are experiencing significant depositional or erosional trends (if any), and recommend any remedial actions, either to the channel itself or the manner in which the bypass flow is delivered to the channel.

[6] Note that baseline geomorphic conditions of Middle Creek downstream of the dam have already been surveyed.

e. Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

The proposed project would not alter the capacity of existing or planned stormwater drainage systems. In addition, the proposed project would not provide substantial additional sources of polluted runoff, and most areas would return to their original, pre-project condition, as described above under checklist items *c* and *d*. There would be no impact.

f. Otherwise substantially degrade water quality?

As discussed for checklist item *a*, PG&E would comply with all applicable construction site BMPs as specified in Avoidance and Minimization Measure AMM-1: Implement Water Quality Protection Measures and Erosion and Sediment Control Plans and in Mitigation Measure BIO-MM-4: Implement Cofferdam, Turbidity Curtain, and Construction Site Dewatering Restrictions. Compliance with BMPs would substantially reduce the potential for construction-related erosion, sedimentation, and turbidity to adversely affect water quality in the project area.

The proposed project would involve the storage and use of toxic and other harmful substances near UBL reservoir (or in areas that drain to UBL reservoir or Middle Creek), which could result in discharge of these substances into the associated water bodies. Construction activities would involve the use of heavy machinery, cranes, compactors, and other construction equipment that use petroleum products such as fuels, lubricants, hydraulic fluids, and coolants, all of which can impair water quality and be toxic to fish and other aquatic organisms. Contamination of lake bed and channel bed and banks could result from construction activities, spills, or equipment malfunction. Spills of petroleum products and other pollutants related to machinery could occur during vehicle operation, refueling, parking, and maintenance. Improper handling, storage, or disposal of these materials could cause degradation of surface water quality if they are eventually washed into downstream water bodies. However, PG&E would comply with all applicable construction site hazardous materials control measures as specified in Avoidance and Minimization Measure AMM-2: Implement Hazardous Materials Control Measures (described in Chapter 2). This impact would be less than significant.

g. Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

The proposed project would not place housing within a 100-year flood hazard area as mapped by any regulatory agency. There would be no impact.

h. Place within a 100-year flood hazard area structures that would impede or redirect floodflows?

The proposed project would not place any structures that would impeded or redirect flood flows within a 100-year flood hazard area as mapped by any regulatory agency. There would be no impact.

i. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?

The purpose of the project is to improve the seismic stability of the UBL dam. Consequently, the proposed project aims to improve downstream flooding conditions which would thereby decrease the exposure of people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Upstream dam or levee failure and ensuing inundation would not pose a risk to the project area because there are no major water bodies upstream of the project area. There would be no impact.

j. Contribute to inundation by seiche, tsunami, or mudflow?

Because the proposed project, upon completion, would not alter the extent or depth of the lake, it would not cause an increase in the pre-existing seiche inundation hazard nor the pre-existing mudflow hazard. The project area is far from the coastline of the Pacific Ocean, and so there is no tsunami hazard. There would no impact.

3.4 Geology and Soils

3.4.1 Existing Conditions

This section discusses the existing conditions related to geology, soils, seismicity, and paleontological resources in the project area. The UBL dam is located at the head of Middle Creek, a tributary to the North Fork of the Mokelumne River, approximately 10 miles southwest of Markleeville and 4.1 miles south of Carson Pass in Alpine County, California (Figure 1). The project area is located at an elevation of approximately 8,100 feet above msl.

3.4.1.1 Geology

This section presents a summary of geology in the surrounding region and within the local area of UBL reservoir.

Regional Geologic Setting

The project area is located the central Sierra Nevada mountain range, immediately adjacent to the Sierra Nevada crest within the Sierra Nevada geomorphic province. The Sierra Nevada geomorphic province is a linear, tilted fault block almost 400 miles long that extends from northern Butte County to the Mohave Desert. In stark contrast to its steep eastern slope, its western slope is gentle. This western slope is deeply incised by rivers, and bedrock disappears beneath the sediments of the Central Valley. The upper elevation Sierra Nevada is composed of massive granites shaped by glaciation, such as is seen in Yosemite. Lower in the Sierra Nevada is the northwest-trending Mother Lode, which is made up of metamorphic rock containing gold-bearing veins. The Sierra Nevada disappears to the north beneath the Cenozoic volcanic rock of the Cascade Ranges. (California Geological Survey 2002:2.)

In general, the Sierra Nevada mountain range is composed of a huge mass of granite, a type of igneous rock created beneath the Earth's surface that was uplifted and eroded in the early Tertiary period and subsequently covered with volcanic rocks in the mid- to late-Tertiary period. Forces affecting the structure of the earth (in this area referred to as Basin and Range tectonic forces) started to shape the area around the late Tertiary period, and resulted in extension (pulling apart), faulting, and uplift of the range. These forces continue today. The higher elevations of the Sierra Nevada were subjected to glacial activities during the Quaternary period. (Hill 1975 as cited in Cirrus Ecological Solutions, LC 2002:4-6 and 4-7.)

Physiography

UBL reservoir and its surrounding drainage basin are located on the Carson Pass 7.5-minute USGS topographic quadrangle (U.S. Geological Survey 1992). Elevations in the area range from approximately 8,100 feet at the lake to 9,374 feet in the surrounding mountains. The normal maximum reservoir elevation is 8,137.5 feet with flashboards installed (8,135.9 feet without flashboards). Historically, UBL reservoir was a natural lake, before the water level was raised by a dam across the outlet. Topography is relatively flat where UBL reservoir is located and increases on all sides of the lake towards the surrounding hills and mountains. The glacially derived lake is bordered by steep walls on all sides (steepest to the east) except at the south end. Prominent peaks and landforms surrounding UBL reservoir are the Forestdale Divide to the north, Deadwood Peak to the west, and The Nipple to the east.

Geology of the Project Area

The geology in the vicinity of UBL reservoir has been mapped on a regional scale (Carlson et al. 1978; Dohrenwend 1982; Koenig 1963; McKee and Howe 1981; Saucedo 2005) and a local scale (AMEC 2013 as cited in SAGE Engineers 2018; Hagan et al. 2009). Based on the mapping performed by Hagan et al. (2009), the project area is entirely underlain by undifferentiated granitic rocks. The California Geological Survey (Saucedo 2005) further describes these rocks as Cretaceous age granodiorite. The California Geological Survey also shows an area of glacial till (Pleistocene and possibly Holocene) to the immediate west of UBL reservoir, and an area of glacial till (Pleistocene) to the southeast of UBL reservoir (a moraine deposit). To the northeast of UBL reservoir is The Nipple, where geology is dominated by primarily andesitic[1] rocks (Hagan et al. 2009).

Although not mapped, small amounts of Quaternary alluvium (alluvial or stream deposits of Quaternary age, either Pleistocene age [i.e., greater than 11,000 years old] or Holocene age [i.e., younger than 11,000 years old]) occur along the various drainage ways in the project area, based on ICF field observations.

3.4.1.2 Soils

Upper Blue Lake Dam

For the most part, soils within the project area are disturbed owing to dam construction. The UBL dam is composed of loose to medium dense silty sands and is buttressed on the downstream side at the maximum height section with a stacked dry masonry wall. There are four general soil/rock units in the vicinity of and comprising UBL dam that are considered significant to the analyses and construction of the design improvements: embankment fill, stacked (hand-placed) rock forming a buttressing wall on the downstream side of the dam in the vicinity of the maximum height section, glacial till (recessional moraine) deposits, and granitic bedrock which constitute the dam foundation (SAGE Engineers 2018). The glacial till (recessional moraine) deposits underlying the embankment are quite variable, but are generally described as dense to very dense silty sands and sands with varying amounts of gravel and occasional cobbles and boulders (AMEC 2013 as cited in SAGE Engineers 2018). Sands are generally well-graded. Boulders encountered in several of the borings performed by Woodruff (1999 as cited in SAGE Engineers 2018) and AMEC (2013 as cited in SAGE Engineers 2018) ranged from about 2 feet to more than 12 feet in diameter. The moraine deposits (excluding cobbles/boulders) were reported by Woodruff (1999 as cited in SAGE Engineers 2018). For additional soils information based on test pit exploration in the vicinity of the UBL dam, refer to SAGE Engineers 2018.

Middle Creek

The channel bed of Middle Creek downstream of the UBL dam is composed of alluvium, which is mostly sand in the upstream portion, transitioning to a mixture of boulders, cobbles, gravel, and

[1] Andesite is an extrusive rock intermediate in composition between rhyolite and basalt. Andesite lava is of moderate viscosity and forms thick lava flows and domes, such as The Nipple.

sand further downstream. The stream banks are composed of the Xerumbrepts-Cryumbrepts, wet association, 5 to 50 percent slopes (California Soil Resource Laboratory 2018).

The Xerumbrepts portion of this association is deep (the depth to a restrictive feature is more than 80 inches) and moderately well-drained. Parent material is outwash derived from granite. Typically, the surface layer is coarse sandy loam about 14 inches thick. The subsoil between 14 and 50 inches is coarse sandy loam. Cemented materials occur at a depth below 50 inches. (Natural Resources Conservation Service 2017.)

The Cryumbrepts, wet association portion of this association is deep (the depth to a restrictive feature is more than 80 inches) and poorly drained. Parent material is alluvium derived from granite. Typically, the surface layer is sandy loam about 17 inches thick. The subsoil between 17 and 25 inches is stratified sand to silt loam. Stratified sandy loam occurs at a depth below 25 inches. (Natural Resources Conservation Service 2017.)

The erosion hazard for the entire soil map unit is moderate. The wind erodibility group[2] for the entire soil map unit is 6 (Natural Resources Conservation Service 2017.)

Spoils Sites

The soils at Spoils Sites 2a and 2b, located immediately east of UBL reservoir, and at Spoils Site 1, at the boat ramp on the eastern edge of UBL reservoir, are mapped as the Lithic Cryumbrepts, 15 to 75 percent slope soil map unit (California Soil Resource Laboratory 2018).

The Lithic Cryumbrepts are shallow (19 to 20 inches to paralithic bedrock) and excessively drained. Parent material is Lahar derived from andesite. Typically, the surface layer is sandy loam about 12 inches thick. The subsoil between 12 and 19 inches is sandy loam. Bedrock occurs at a depth below 19 inches.

The erosion hazard for the entire soil map unit is severe. The wind erodibility group for the entire soil map unit is 8 (Natural Resources Conservation Service 2017).

It should be noted that all spoils sites have been anthropogenically altered to some degree and that the actual conditions may differ from the descriptions above depending on the presence of fill or loss of the upper soil horizons.

3.4.1.3 Seismicity

The project area is located within the Sierra Nevada and is potentially affected by seismic sources located within the Sierra Nevada mountains, the Sierra Nevada foothills fault system to the west, and the Sierra Nevada frontal fault system to the east. Most of the seismicity in the region is concentrated along the Sierra Nevada frontal fault system (Pacific Gas & Electric Company and Piedmont Sciences 2008, as cited in AMEC 2014). The project area is located in a region of California characterized by relatively moderate seismic activity (California Geological Survey 2016).

[2] Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. (Natural Resources Conservation Service 2017.)

Primary Seismic Hazards

The state considers two aspects of earthquake events as primary seismic hazards: surface fault rupture (disruption at the ground surface as a result of fault activity) and seismic ground shaking.

Surface Fault Rupture

The project area is not located in an Alquist-Priolo Earthquake Fault Zone (California Geological Survey 2015), and no active faults[3] have been identified (California Geological Survey 2010); therefore, the risk of surface fault rupture in the project area is considered low. The nearest major faults are as follows.

- Waterhouse Peak fault, a late Quaternary fault but possibly active[4] (Cotton, Shires and Associates and InfraTerra 2016: 28) located approximately 1 mile north of the project area.
- Tahoe-Sierra frontal fault zone, (an age-undifferentiated Quaternary fault located approximately 10 miles north of the project area.
- West Tahoe-Dollar Point fault zone, an active fault located approximately 15 miles north of the project area.
- Carson Range fault zone, consisting of the active Genoa and the Folger Peak faults and located approximately 10 miles east of the project area (California Geological Survey 2010).

Other smaller pre-Quaternary faults and Quaternary faults (age undifferentiated), including the Hope Valley fault (a pre-Quaternary fault), are located within a few miles of the project area (Hagan et al. 2009).

Waterhouse Peak Fault Parameters

As the Waterhouse Peak fault approaches UBL reservoir, the range-front topography is diminished, and essentially is reversed at UBL reservoir The volcanic/granitic contact is depositional rather than faulted, and the fault is not expressed within bedrock or Quaternary deposits south of UBL reservoir. The fault is not expressed west of UBL reservoir as previously mapped for other studies. In addition, the characteristic deeply weathered bedrock demarking the fault in many locations to the north is not observed at, or south of, UBL reservoir. Therefore the Waterhouse Peak fault does not extend to Upper Blue Lake dam or pose a surface rupture hazard to the dam (Cotton, Shires and Associates and InfraTerra 2016: 28-29).

Strong Ground Shaking

Unlike surface rupture, ground shaking is not confined to the trace of a fault but, rather, propagates into the surrounding area during an earthquake. The intensity of ground shaking typically diminishes with distance from the fault, but ground shaking may be locally amplified or prolonged by some types of substrate materials.

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[3] As defined under the Alquist-Priolo Act, an *active fault* is one that has had surface displacement within the Holocene epoch (the last 11,000 years); a *late Quaternary fault* is a fault that has undergone displacement during the past 700,000 years; a *Quaternary fault (age undifferentiated)* is one that has had surface displacement at some point during Quaternary time (the last 1.6 million years); and a *pre-Quaternary fault* is one that has had surface displacement before the Quaternary period.

[4] Based on Division of Safety of Dams criteria, the Waterhouse Peak fault should be considered active for purposes of evaluating seismic safety of UBL dam (Cotton, Shires and Associates and InfraTerra 2016: 28).

The probabilistic peak horizontal ground acceleration values for the study area are 0.26g (where *g* equals the acceleration of gravity) based on a probabilistic seismic hazard map that depicts the peak horizontal ground acceleration values exceeded at a 10 percent probability in 50 years (California Geological Survey 2008a). As a point of comparison, probabilistic peak horizontal ground acceleration values for the San Francisco Bay Area range from 0.4g to more than 0.8g. Therefore, the ground-shaking hazard in the study area is considered moderate.

Secondary Seismic Hazards

Secondary seismic hazards refer to seismically induced landsliding, liquefaction, and related types of ground failure. As discussed in Section 3.4.2.2, *Regulatory Setting*, the state maps areas that are subject to secondary seismic hazards pursuant to the Seismic Hazards Mapping Act of 1990. The state has not published seismic hazard mapping in the vicinity of the project area under the Seismic Hazards Mapping Program (California Geological Survey 2015). These hazards are addressed briefly below based on available information.

Landslide and Other Slope Stability Hazards

Most of the project area is located on gentle lake bottom topography. Consequently, the potential for slope failure, including seismically induced landsliding, is likely low. However, the soils at Spoils Sites 2a and 2b, located immediately east of UBL reservoir, and at Spoils Site 1, at the boat ramp on the eastern edge of UBL reservoir, are mapped as having a severe erosion hazard (Natural Resources Conservation Service 2017) and have moderately to highly susceptible to deep-seated landslides (California Geological Survey 2011) leading up to the Sierra Crest. Consequently, it can be assumed that the landslide hazard on the eastern edge of UBL reservoir is high.

Liquefaction

Liquefaction is the process in which soils and sediments lose shear strength and fail during seismic ground shaking. The vibration caused by an earthquake can increase pore pressure in saturated materials. If the pore pressure is raised to be equivalent to the load pressure, a temporary loss of shear strength results, allowing the material to flow as a fluid. This temporary condition can result in severe settlement of foundations and slope failure. The susceptibility of an area to liquefaction is determined largely by the depth to groundwater and the properties (e.g., grain size and density) of the soil and sediment within and above the groundwater. The sediments most susceptible to liquefaction are saturated, unconsolidated sand and silt within 50 feet of the ground surface (California Geological Survey 2008b).

In 2014, AMEC performed a preliminary seismic slope stability evaluation of the UBL dam's maximum height section, including a liquefaction triggering analysis of the earthfill based on subsurface investigation data collected in 2013. The results of the stability analysis indicated that the earthfill likely would liquefy under the postulated earthquake ground shaking, and that fully liquefied residual strengths would be insufficient to maintain stability of the upstream portion of the maximum height section of the dam (AMEC 2014).

Elsewhere within the project area, the potential for liquefaction is likely lower because of the coarseness of the sediments (the presence of numerous rock outcrops).

3.4.1.4 Paleontological Resources

As described in Section 3.4.1.1, *Geology*, the project area is entirely underlain by undifferentiated granitic rocks (Hagan et al 2009). The California Geological Survey further describes these rocks as Cretaceous age granodiorite (Saucedo 2005). The California Geological Survey also shows an area of glacial till (Pleistocene and possibly Holocene) to the immediate west of UBL reservoir, and an area of glacial till (Pleistocene) to the southeast of UBL reservoir (a moraine deposit). To the northeast of UBL reservoir is The Nipple, where geology is dominated by primarily andesitic rocks (Hagan et al. 2009). Although not mapped, small amounts of Quaternary alluvium occur along the various drainage ways in the project area.

Professional standards of practice adopted by the Society of Vertebrate Paleontology (2010) offer guidance for control and mitigation of adverse impacts on paleontological resources. Paleontological sensitivity is a qualitative assessment that takes into account the paleontological potential of the stratigraphic units present, the local geology and geomorphology, and any other local factors that may be germane to fossil preservation and potential yield. The Society of Vertebrate Paleontology considers an area to have a high potential (sensitivity) to contain fossils if it is a unit from which "vertebrate or significant invertebrate, plant, or trace fossils have been recovered." Paleontological resources are considered to be older than middle Holocene (i.e., older than approximately 5,000 years) (Society of Vertebrate Paleontology 2010:11).

The University of California Museum of Paleontology (2016) database contains no records for vertebrate fossils in sediments of Holocene age in Alpine County.

Most of the geological units in the vicinity of the UBL dam (embankment fill, stacked [hand-placed] rock forming a buttressing wall on the downstream side of the dam, and the granitic bedrock) are not considered suitable for the preservation of vertebrate fossils (granite and other plutonic rocks develop from cooling magma deep in the Earth's crust, an environment that is neither conducive to life, nor to the preservation of fossils).

California's Pleistocene sedimentary units—perhaps those that, like the glacial till within the vicinity of the UBL dam, record deposition in continental settings—are typically considered highly sensitive for paleontological resources because of the large number of recorded fossil finds in similar units throughout the state.

3.4.2 Regulatory Setting

3.4.2.1 Federal

No federal regulations apply to geologic hazards or paleontological resources in the project area. The following federal regulation is related to soils.

Clean Water Act Section 402 (National Pollutant Discharge Elimination System Program)

Section 402 is discussed under *Construction Activities Stormwater General Permit (2010-0014-DWQ Permit)* in the following section on state regulations.

3.4.2.2 State

Alquist-Priolo Earthquake Fault Zoning Act

California's Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (Public Resources Code Section 2621 et seq.) is intended to reduce risks to life and property from surface fault rupture during earthquakes. The Alquist-Priolo Act prohibits the location of most types of structures intended for human occupancy[5] across the traces of active faults and strictly regulates construction in the corridors along active faults (earthquake fault zones). It also defines criteria for identifying active faults, giving legal weight to terms such as *active*, and establishes a process for reviewing building proposals in and adjacent to earthquake fault zones.

Under the Alquist-Priolo Act, faults are zoned, and construction along or across them is strictly regulated if they are "sufficiently active" and "well defined." A fault is considered sufficiently active if one or more of its segments or strands shows evidence of surface displacement during Holocene time (defined for purposes of the act as referring to approximately the last 11,000 years). A fault is considered well-defined if its trace can be identified clearly by a trained geologist at the ground surface, or in the shallow subsurface using standard professional techniques, criteria, and judgment (Bryant and Hart 2007).

Seismic Hazards Mapping Act

Like the Alquist-Priolo Act, the Seismic Hazards Mapping Act of 1990 (Public Resources Code Sections 2690–2699.6) is intended to reduce damage resulting from earthquakes. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including strong ground shaking, liquefaction, and seismically induced landslides. Its provisions are similar in concept to those of the Alquist-Priolo Act: the state is charged with identifying and mapping areas at risk of strong ground shaking, liquefaction, landslides, and other corollary hazards; and cities and counties are required to regulate development within mapped seismic hazard zones.

Under the Seismic Hazards Mapping Act, permit review is the primary mechanism for local regulation of development. Specifically, cities and counties are prohibited from issuing development permits for sites within seismic hazard zones until appropriate site-specific geologic or geotechnical investigations have been carried out and measures to reduce potential damage have been incorporated into the development plans.

Construction Activities Stormwater General Permit (2010-0014-DWQ Permit)

Section 402 of the Clean Water Act mandates that certain types of construction activity comply with the requirements of EPA's NPDES program. EPA has delegated to the State Water Board the authority for the NPDES program in California, where it is implemented by the state's nine Regional Water Boards. Construction activity disturbing 1 acre or more must obtain coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction and other Land Disturbance Activities.

[5] With reference to the Alquist-Priolo Act, a *structure for human occupancy* is defined as one "used or intended for supporting or sheltering any use or occupancy, which is expected to have a human occupancy rate of more than 2,000 person-hours per year" (14 California Code of Regulations Section 3601[e]).

The Central Valley Water Board administers the NPDES stormwater permit program in the project area portion of Alpine County. Obtaining coverage under the General Permit requires that the project applicant take the following steps.

- File a Notice of Intent and other permit registration documents to obtain coverage under the General Permit before construction begins.
- Prepare and implement a SWPPP.
- Conduct inspections, prepare monitoring reports, and conduct pollution prevention and monitoring.
- File a notice of termination with the State Water Board when construction is complete and the construction area has been permanently stabilized.

The SWPPP describes proposed construction activities, receiving waters, stormwater discharge locations, and BMPs that will be used to reduce project construction effects on receiving water quality. The components of the SWPPP most relevant to geology and soils are erosion and sediment control measures.

Dischargers whose projects disturb 1 or more acres of soil, or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the General Permit Order 2010-0014-DWQ. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

Coverage under the General Permit is obtained by submitting permit registration documents to the State Water Board that include a risk level assessment and a site-specific SWPPP identifying an effective combination of erosion control, sediment control, and non-stormwater BMPs. The General Permit requires that the SWPPP define a program of regular inspections of the BMPs and, in some cases, sampling of water quality parameters.

2010 California Building Standards Code

The California Building Standards Code (Title 24 CCR) provides the minimum standards for structural design and construction. The Building Standards Code is based on the International Building Code, which is used widely throughout the United States and has been modified for California conditions with numerous, more detailed or more stringent regulations. The Building Standards Code requires that "classification of the soil at each building site will be determined when required by the building official" and that "the classification will be based on observation and any necessary test of the materials disclosed by borings or excavations." In addition, the Building Standards Code states that "the soil classification and design-bearing capacity will be shown on the (building) plans, unless the foundation conforms to specified requirements." The code provides standards for various aspects of construction, including excavation, grading, and earthwork construction; fills and embankments; expansive soils; foundation investigations; and liquefaction potential and soil strength loss. The Building Standards Code requires extensive geotechnical analysis and engineering for grading, foundations, retaining walls, and other structures, including criteria for seismic design.

California Public Resources Code

Several sections of the California Public Resources Code protect paleontological resources. Section 5097.5 prohibits "knowing and willful" excavation, removal, destruction, injury, and defacement of any paleontological feature on lands owned by or under the jurisdiction of the state or any county, city, district, or public corporation, except where the agency with jurisdiction has granted express permission.

3.4.2.3 Local

Alpine County General Plan 2017

Soils

The *Alpine County General Plan* Conservation Element, Section A, addresses soils and geological resources. It includes the following goal, policy, and objective related to soils.

GP Goal No. 1 Consider Soil and Related Resources

- **Policy No. 1** Require soils and geologic reports for all land development projects.
  - **Objective No. 1** Adopt a comprehensive erosion control and grading ordinance.

3.4.3 Environmental Effects

Potential impacts of the proposed project on geology and soils are discussed in the context of State CEQA Guidelines Appendix G checklist items. Checklist Section VI, *Geology and Soils*, asks whether the project would result in any of the following conditions.

a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

1. ***Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?***

The project area is not identified as being within an Alquist-Priolo Fault Zone (Bryant and Hart 2007). There is no evidence of recent (i.e., Holocene) faulting within the project area and no active faults are mapped to cut at or near the project area (California Geological Survey 2010, 2011). Furthermore, review of aerial photographs does not indicate the presence of lineaments or other features that would suggest the presence of recent faulting on or trending toward the project area. Accordingly, the project area is not subject to surface rupture hazard. There would be no impact.

2. ***Strong seismic ground shaking?***
3. ***Seismic-related ground failure, including liquefaction?***
4. ***Landslides?***

The purpose of the project is to improve the seismic stability of the upstream slope of the UBL dam, in the vicinity of the LLO. A concept design was prepared and presented to FERC and DSOD in 2017. Under the proposed project, PG&E would extend the LLO intake upstream approximately 50 feet and place a 50-foot-wide by 175-foot-long rock fill buttress on the upstream side of UBL dam to restrict lateral movement of the embankment slope if it were to lose substantial shear strength during strong ground shaking.

The ground-shaking hazard in the project area is moderate. However, potential impacts associated with ground shaking would be minimized because PG&E would be required to incorporate DSOD and FERC seismic safety policy standards into the project design for applicable features to minimize the ground-shaking hazards on associated project features. Structures must be designed to meet the regulations and associated standards. FERC and DSOD review and approval will be required for the final design of this project. The geotechnical studies, a requirement of the Building Standards Code, have been developed prior to construction activities and have served to inform the seismic design parameters.

Although ground shaking and liquefaction concerns are considered less than significant because of the incorporation of proper design techniques, a large earthquake on a nearby fault could cause minor to moderate ground shaking in the vicinity of the project area, potentially resulting in an increased risk of structural loss, injury, or death from the triggering of a landslide. As discussed in Section 3.4.1.2, *Soils*, the soils at Spoils Sites 2a and 2b, located immediately east of UBL reservoir, and at Spoils Site 1, at the boat ramp on the eastern edge of UBL reservoir, are mapped as having a severe erosion hazard (Natural Resources Conservation Service 2017) and have moderately to highly susceptible to deep-seated landslides (California Geological Survey 2011) leading up to the Sierra Crest. Consequently, it can be assumed that the landslide hazard on the eastern edge of UBL reservoir is high. Thus, there may be some potential for structural damage and the associated life and safety hazard that could rise to the level of a significant impact from landslides.

Implementation of Mitigation Measures GEO-MM-1 and GEO-MM-2 would reduce impacts associated with landslides to a less-than significant-level.

Mitigation Measure GEO-MM-1: Install Temporary Barricades at Base of Unstable Slopes

Prior to the initial use of Spoils Sites 1, 2a, or 2b, temporary barricades shall be placed at the base of the location where the steep topography leading upslope intersects the existing gravel road. The temporary barricades shall encircle the entire area where spoils would be placed. The width and height of the temporary barricades shall be determined by a professional engineer or engineering geologist. The dimensions of the temporary barricades shall be based on the size and potential travelling distance of the loose rock upslope.

Mitigation Measure GEO-MM-2: Ensure Stability of Slopes above Spoils Sites 1, 2a, and 2b

In addition to temporary barricades as described under Mitigation Measure GEO-MM-1, a professional engineer or engineering geologist shall certify that the slopes above Spoils Sites 1, 2a, or 2b, are stable enough to initiate work at these locations. If unstable rock masses pose a danger to workers and equipment downslope, then recommendations to improve stability shall be incorporated. These could include the use of wire mesh fencing to limit rock movement, and actual removal of the select individual rock masses that are determined to pose a threat to downslope workers and equipment.

b. Result in substantial soil erosion or the loss of topsoil?

Ground-disturbing earthwork associated with project components in the project area could increase soil erosion rates and loss of topsoil. Construction activities also could result in soil compaction and wind erosion effects that could adversely affect soils and reduce the revegetation potential at the staging areas and spoils sites. However, PG&E would comply with all applicable construction site BMPs as specified in Avoidance and Minimization Measure AMM-1: Implement Water Quality Protection Measures and Erosion and Sediment Control Plans (described in Chapter 2, *Project Description*). AMM-1 includes soil stabilization, sediment control, and wind erosion control BMPs to ensure soil erosion is minimized. This impact would be less than significant.

c. Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?

Improper grading or construction associated with improvements at the UBL dam could put people at risk as a result of ground failure. Improvement activities would generally involve grading, buttressing, and compacting. If buttress fill placement were not engineered appropriately, these activities could slope instability and result in ground failure. However, the project construction would be implemented in accordance with the requirements of the USACE permit, and DSOD and FERC seismic safety policy standards. In addition, the project area is fairly level overall and no habitable structures would be built. There would be no impact.

d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Expansive soils are not known to occur in the project area due to the low clay content of the mapped soils. In addition, the project design would conform to the requirements of the USACE permit, and DSOD and FERC seismic safety policy standards. There would be no impact.

e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?

The proposed project would not include a septic system. There would be no impact.

f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

If fossils are present in the project area, they could be damaged by earth-disturbing activities during construction. Excavation deeper than a few feet would most likely occur in certain locales of glacial deposits (glacial till). Substantial damage to or destruction of significant paleontological resources as defined by the Society of Vertebrate Paleontology (2010) would be a significant impact.

Implementation of Mitigation Measures GEO-MM-3 and GEO-MM-4 would reduce this impact to a less-than-significant level.

Mitigation Measure GEO-MM-3: Educate Construction Personnel in Recognizing Fossil Material

Prior to construction, PG&E will ensure that all construction personnel receive training provided by a qualified professional paleontologist who is experienced in teaching non-specialists to ensure that construction personnel can recognize fossil materials in the event any are discovered during construction.

Mitigation Measure GEO-MM-4: Stop Work if Substantial Fossil Remains are Encountered during Construction

If substantial fossil remains (particularly vertebrate remains) are discovered during earth-disturbing activities, the construction contractor will stop activities immediately until a state-registered professional geologist or qualified professional paleontologist can assess the nature and importance of the find and a qualified professional paleontologist can recommend appropriate treatment. Treatment may include preparation and recovery of fossil materials so that they can be housed in an appropriate museum or university collection and may also include preparation of a report for publication describing the finds. PG&E will be responsible for ensuring that recommendations regarding treatment and reporting are implemented.

3.5 Biological Resources

This section describes the biological resources in the project area and the proposed project's potential impacts on these resources. This section discusses the existing conditions in the project area; federal, state, and local regulatory framework for biological resources; and the potential for the proposed project to affect biological resources.

3.5.1 Methods

3.5.1.1 Review of Existing Information

The sources below were used to develop lists of special-status plant and animal species and to identify other sensitive biological resources (e.g., sensitive natural communities) that could be affected by the proposed project.

- California Native Plant Society's (CNPS's) online *Inventory of Rare and Endangered Plants of California* records search of the Carson Pass, Caples Lake, Mokelumne Peak, Pacific Valley, Ebbetts Pass, and Markleeville USGS 7.5-minute quadrangles (California Native Plant Society 2018).
- California Natural Diversity Database (CNDDB) records search of the Carson Pass, Caples Lake, Mokelumne Peak, Pacific Valley, Ebbetts Pass, and Markleeville USGS 7.5-minute quadrangles (California Department of Fish and Wildlife 2018a).
- USFWS lists of endangered and threatened species that may occur in the project area or be affected by the proposed project (U.S. Fish and Wildlife Service 2018a and 2018b).
- Survey for Special-Status Plants, Pacific Gas and Electric Company, Mokelumne River Hydroelectric Project, Amador and Alpine Counties, California (Pacific Gas and Electric Company 2015a).

The USFWS, CNDDB, and CNPS lists can be found in Appendix D.

3.5.1.2 Field Surveys

An ICF botanist/wetland ecologist and wildlife biologist conducted a survey of the project area on October 10, 2018. The biologists walked meandering transects throughout the project area and identified land cover types and potential habitat for special-status species. Lists of plant and animal species observed were recorded and representative photographs of the project area were taken. Lists of plants and animals observed in the project area are provided in Appendix E.

An ICF fish biologist conducted a reconnaissance-level survey of the project area, including the tributary streams and shoreline of the reservoir, on June 16 and 27, 2018. The biologist walked the tributary streams within and above the reservoir inundation zone to assess fish habitat and passage conditions for Lahontan cutthroat trout. The ICF fish biologist conducted additional surveys of the tributary streams and shoreline of the reservoir, and Middle Creek between UBL reservoir and Lower Blue Lake, on August 28 and September 20–21, 2018, as part of the consultation with USFWS for the project. Lists of fish species observed during the surveys were recorded and representative photographs of the project area were taken.

3.5.2 Existing Conditions

3.5.2.1 Physical Conditions

The project area for the proposed project encompasses the UBL dam and adjacent shoreline and proposed spoils sites (Figure 2). The approximately 6.18-acre project area is located in the High Sierra Nevada subregion of the California Floristic Province (Baldwin et al. 2012). The project area is relatively level, with elevations ranging from approximately 8,150 to 8,200 feet above mean sea level, although the surrounding region is mountainous. The dam is located at an elevation of approximately 8,100 feet.

Soil mapping units in the project area are Aquepts, Umbrepts and 0 to 15 percent slopes soils; Lithic Cryumbrepts, 15 to 75 percent slopes; Rock outcrop-Cryumbrepts association, 15 to 75 percent slopes; Xerumbrepts-Cryumbrepts, wet association, 5 to 50 percent slopes; and Granylith-Hargran-Rock outcrop complex, 8 to 30 percent slopes (Natural Resources Conservation Service 2018a). Inclusions of hydric soils may occur in drainageways and floodplains.

The project area is located in the Upper Mokelumne watershed hydrologic unit (hydrologic unit code 18040012) (U.S. Geological Survey 2018). The climate is temperate, with cold, snowy winters and warm summers. Precipitation occurs year-round, but most heavily between September and May. The average total annual precipitation is approximately 46.62 inches (Natural Resources Conservation Service 2018b).

Upper Blue Lake Reservoir

UBL had been enlarged (initially from 1872 to 1881, and again from 1899 to 1901) to provide maximum usable storage of approximately 7,300 acre-feet. The resultant UBL reservoir supplies PG&E's Mokelumne River Project (FERC Project No. 137), a series of four power developments located downstream on the North Fork of the Mokelumne River. The outlet of the reservoir has a maximum capacity of 62 cfs at full pool and supplies water to Middle Creek, which flows approximately 0.7 mile (3,500 feet) to Lower Blue Lake. During high runoff periods (e.g., water year 2011), inflows cause water to spill over the reservoir spillway and into Middle Creek.

PG&E operates the reservoir by capturing snowmelt runoff during spring (April to June) and releasing the water to Middle Creek through the LLO pipes from summer into fall, consistent with available runoff and storage, and ecological needs. Figure 6 shows the pattern of reservoir-level fluctuation for the period water year 2000 to water year 2018, which includes the current interim operational elevation restriction (8,122.5 feet) for the reservoir that was put in place during April 2016.

Most of the following descriptive information about the physical characteristics of UBL reservoir is from Calhoun (1944a, 1944b). UBL reservoir lies within the headwaters of the North Fork of the Mokelumne River. When full, the reservoir is approximately 1 mile long by 0.5 mile wide and has a surface area of approximately 343 acres. The average and maximum depths of the reservoir at full pool are 54 and 173 feet, respectively (Pacific Gas & Electric Company 2018a). UBL reservoir is oligotrophic (low in dissolved nutrients and high in dissolved oxygen [DO]) and deep. The water is clear and visibility often exceeds 30 feet.

Located near the crest of the Sierra Nevada, the reservoir is covered in ice for approximately 6 months of the year. The reservoir generally becomes ice free by May or June, depending on snow

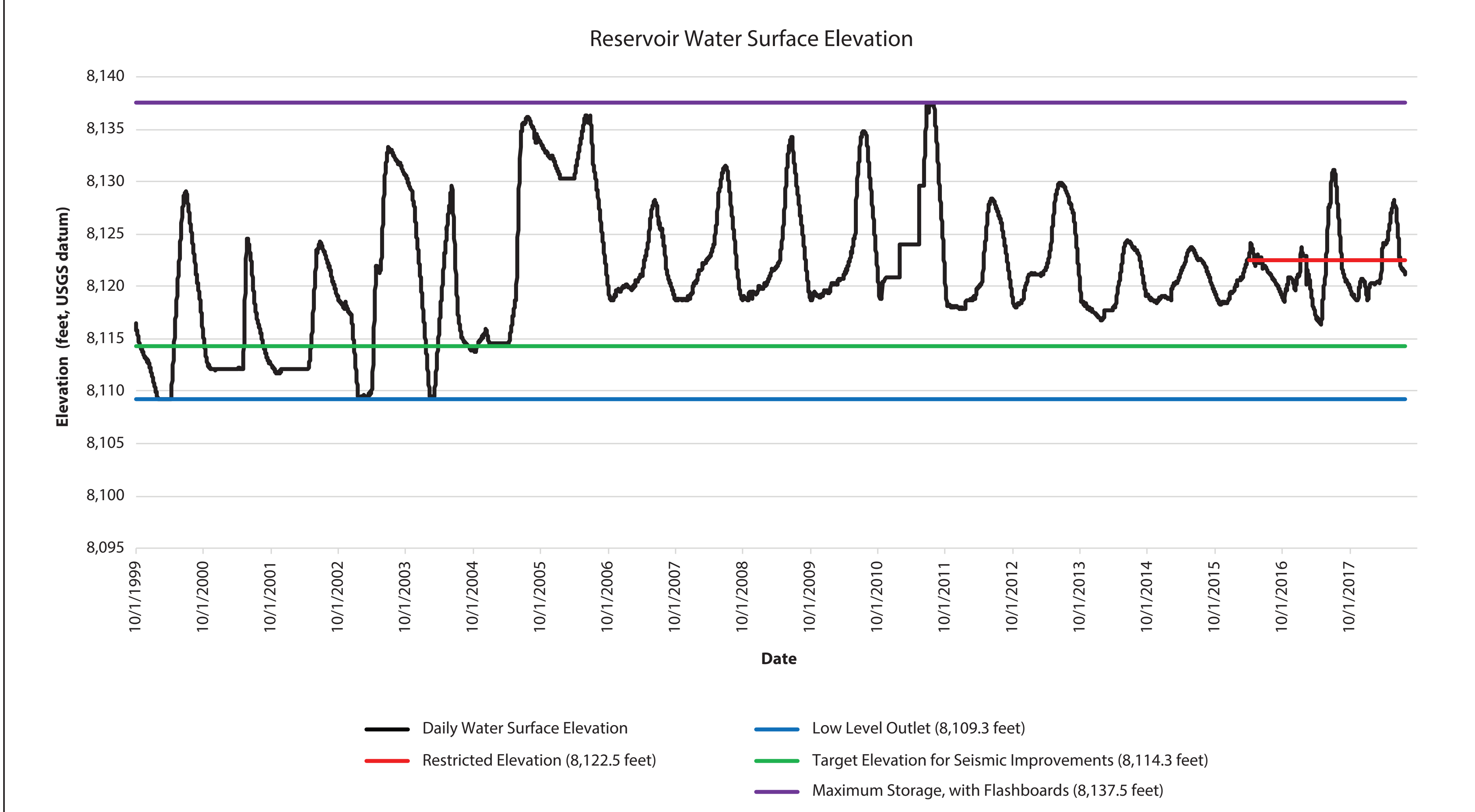

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Figure 6
Daily Reservoir Levels under Existing Conditions

levels the previous winter. Soon after the ice has melted, a thermocline (the transition layer between warmer mixed water at the reservoir's surface and cooler deep water below) typically forms approximately 13 to 20 feet below the surface and sinks progressively deeper throughout the summer to a depth of around 33 feet by September. Water temperatures are cold (surface temperatures reportedly warm to 68 degrees Fahrenheit [°F]), and DO levels remain above 5 milligrams per liter over most of its depth (Figure 7).

Prior to the construction of UBL dam in 1872, surface waters in the lake flowed out the natural outlet and downstream into Middle Creek. Following construction of UBL dam, surface releases have occurred infrequently when the reservoir is full and spilling over the spillway. When water is not spilling over the spillway, most or all of the flow in Middle Creek downstream of the dam is derived from releases through the LLO, the invert of which is located at elevation 8,109.3 feet. Consequently, the depth at which releases are made from the reservoir is a function of the reservoir's water surface elevation.

Perennial Stream (Middle Creek)

Middle Creek extends for approximately 0.7 mile (3,500 feet) from UBL dam to Lower Blue Lake. Middle Creek flows are supplied by springs and snowmelt runoff, by releases from UBL dam, and by infrequent, uncontrolled spills via the dam spillway. The hydrology is primarily snowmelt driven, with natural summer and fall flows augmented by releases of stored water from the reservoir. Stream flows are measured and recorded at the stream gaging station located approximately 1,200 feet downstream of UBL dam. Figure 8 shows the pattern of flows in Middle Creek for the period water year 2000 to water year 2018, which includes the current interim operational elevation restriction for the reservoir that was put in place April 2016.

The following information on the physical characteristics of Middle Creek is largely based on the characteristics observed in the established fish monitoring site located approximately 1,200 feet downstream from the dam and conducted by PG&E and its consultants as part of the FERC Project Number 137 Stream Ecology Monitoring Program (Pacific Gas & Electric Company 2017a). Middle Creek is characterized primarily by a single channel, with a sand and gravel bed interspersed with lesser amounts of bedrock. Runs are the dominant habitat type (40 percent), followed by riffles (35 percent) and pools (25 percent). Spawning habitat and cover (object cover, undercut banks, overhanging vegetation) is limited (i.e., each totaling 10 percent or less of stream area).

Pool habitats in Middle Creek provide Lahontan cutthroat trout and other fish species with important habitat refugia during periods of low flow, such as when wintertime sub-freezing temperatures cause Middle Creek to freeze, during periods of drought, or during periods of reduced flow at other times of the year. Based on a survey conducted by an ICF fish biologist in September 2018, residual depths of pool habitats (i.e., residual pool depths) in Middle Creek range from 0.9 to 3.0 feet (average 1.6 feet) based on measurements collected at 35 pools encountered between Lower Blue Lake and UBL dam. The fish biologist also determined that most (33 of 35) pool habitats are downstream of the stream gage or in the lower two-thirds of the inter-lake reach of Middle Creek.

Streamflow varies seasonally, with low flows occurring during late fall and winter and high flows occurring during summer when releases from the reservoir are made. In summer, flows are highly variable within the season and among years in response to the annual variability of snowpack and runoff in the watershed. In general, mean daily summer flows in Middle Creek have ranged from 1 to

89 cfs (Pacific Gas & Electric Company 2018b). Water temperatures are also highly variable between months and across years. For example, mean monthly temperatures (⁰F) range from the mid-30s during May to the low 60s during August (Pacific Gas & Electric Company 2010). Daily maximum water temperatures rarely exceed 70⁰F, with July typically being the warmest month. In some years, water temperatures in Middle Creek never exceed the established cold water objective of 68⁰F.

3.5.2.2 Land Cover Types in the Project Area

The designation of land cover types in the project area was based on the October 2018 survey. Figure 9 shows the locations of the mapped land cover types.

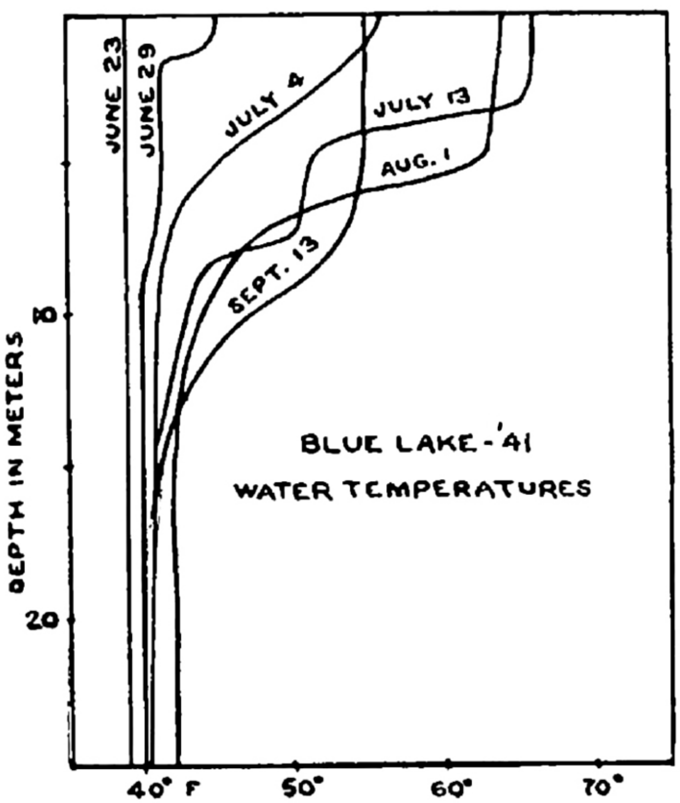
The project area supports both common and sensitive land cover types. Common land cover types are widespread vegetation communities with low plant species diversity. These types may reestablish naturally after disturbance, support primarily nonnative plant species, or be highly managed. They are not generally protected by agencies unless they provide habitat for special-status species (e.g., raptor foraging or nesting habitat, upland habitat in a wetland watershed). Common land cover types in the project area are lodgepole pine forest, little sagebrush scrub, and rock outcrop. The developed/disturbed cover type is not considered a vegetation community and is not sensitive.

Sensitive land cover types are rare vegetation communities with limited distribution. They may have high species diversity, high productivity, distinctive characteristics, or a declining status. Local, state, and federal agencies that regulate biological resources consider these types to be important, and compensation for loss of sensitive land cover types is generally required by these agencies. USFWS considers certain types, such as wetlands and riparian communities, important to wildlife, and USACE and EPA consider wetlands important for water quality and wildlife. Waters of the United States and waters of the State are regulated by USACE and the Regional Water Boards, respectively. CDFW maintains a database (the CNDDB) of rare habitat types throughout the state. The land cover types in the project area that are considered sensitive are Lemmon's willow thicket, reservoir shore (vegetated part of UBL reservoir), reservoir (open water part of UBL), and perennial stream (Middle Creek).

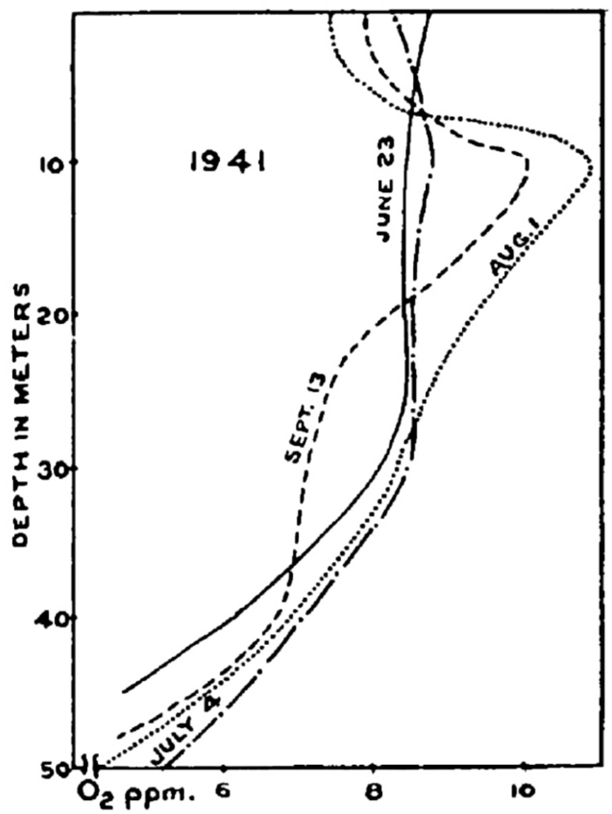
Locations of land cover types and the dominant plant species observed in land cover types within the project area are described below. A list of the plants observed in each part of the project area is provided in Appendix E.

Lodgepole Pine Forest

Lodgepole pine forest surrounds Middle Creek in the project area and is outside the edges of the project area at the temporary spoils site, as well as the proposed staging and parking areas. The canopy of this forest is dominated by lodgepole pine (*Pinus contorta* var. *murrayana*) associated with mountain hemlock (*Tsuga mertensiana*) and California red fir (*Abies magnifica* var. *magnifica*). Understory species include alpine gooseberry (*Ribes lasianthum*), mountain redtop (*Agrostis variabilis*), naked buckwheat (*Eriogonum nudum* var. *deductum*), and glaucous checker mallow (*Sidalcea glaucescens*). Riparian understory species, including Lemmon's willow (*Salix lemmonii*) and narrow leaved sedge (*Carex angusta*), occur at the creek edge.



Thermal stratification in Blue Lake, summer 1941.



Vertical distribution of dissolved oxygen in Blue Lake, summer 1941.

Source: Calhoun (1944a)

Figure 7
Thermal Stratification and Vertical Distribution of Dissolved Oxygen in Upper Blue Lake, Summer 1941

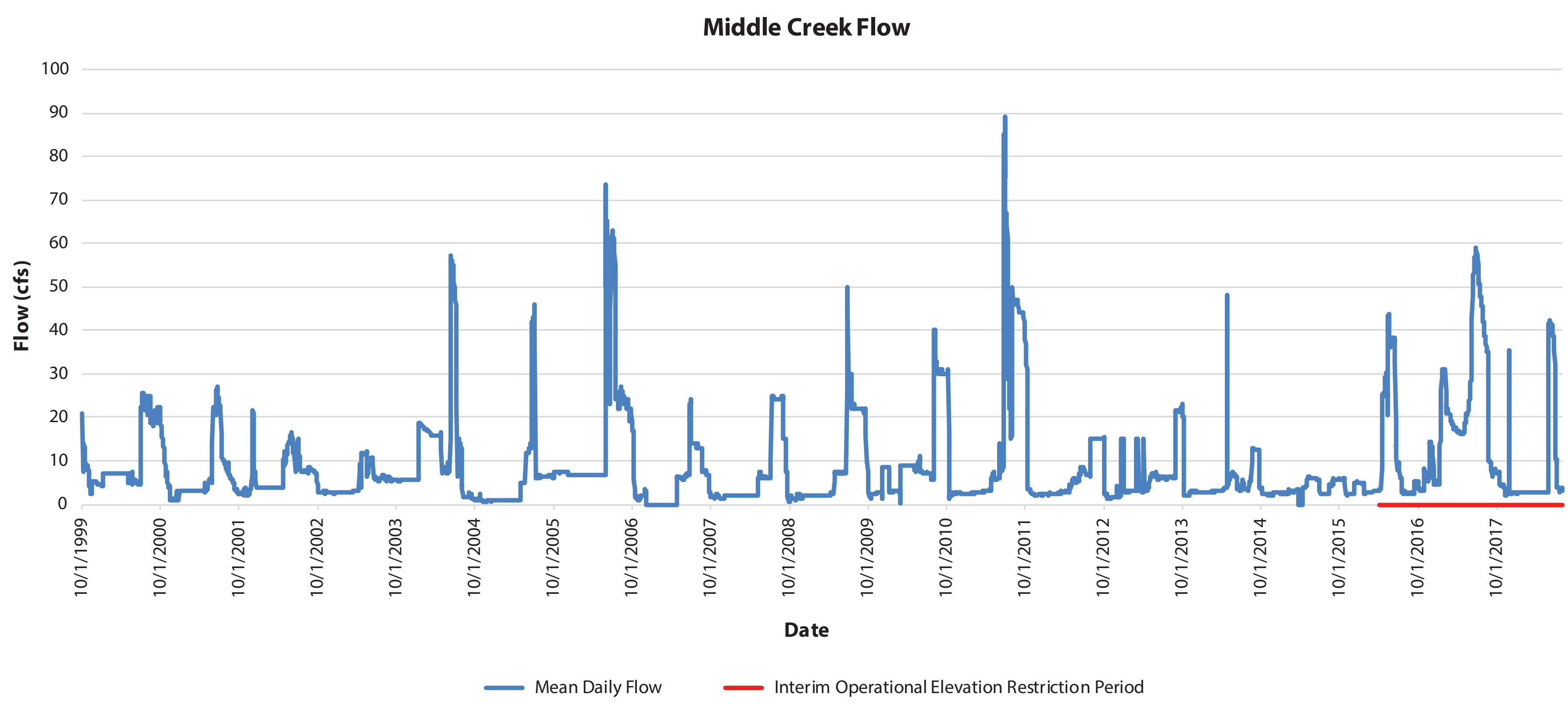


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Figure 8
Mean Daily Flow in Middle Creek Downstream of Upper Blue Lake Dam under Existing Conditions

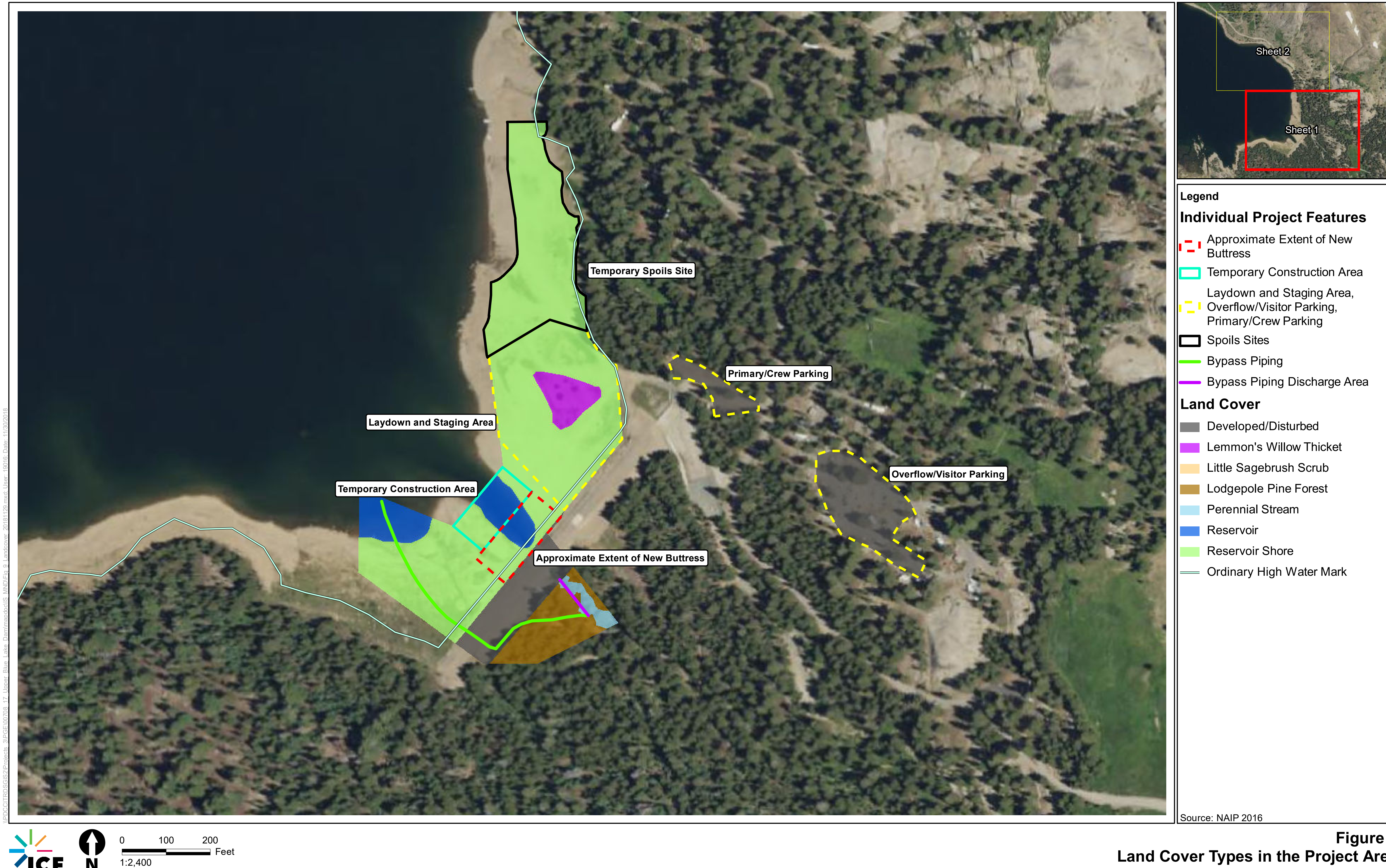

Figure 9
Land Cover Types in the Project Area
Sheet 1 of 2

Figure 9
Land Cover Types in the Project Area
Sheet 2 of 2

Lemmon's Willow Thicket

A patch of Lemmon's willow thicket occurs in the proposed staging/parking area within the ordinary high water mark (OHWM) of UBL. Lemmon's willow is the dominant overstory species, with herbaceous species in the understory, including annual hairgrass (*Deschampsia danthonioides*) and slender beak sedge (*Carex athrostachya*).

Little Sagebrush Scrub

Little sagebrush scrub occurs on the east site of UBL reservoir in and adjacent to Spoils Sites 1, 2a, and 2b. This community is sparsely vegetated, with few low sagebrush (*Artemisia arbuscula*) and gray mugwort (*Artemisia ludoviciana* var. *candicans*) shrubs, associated with Bloomer's goldenbush (*Ericameria bloomeri*), Oregon sunshine (*Eriophyllum lanatum* var. *integrifolim*), Gray's lovage (*Ligusticum grayi*), and Follett's monardella (*Monardella odoratissima* ssp. *glauca*). Spoils Site 1 also supports a sparse cover of Sierra gray willow (*Salix orestera*).

Rock Outcrop

Granitic rock outcrop is located within and at the edge of Spoils Site 2b. This is a primarily unvegetated area of rock.

Reservoir Shore

The reservoir shore land cover type refers to the UBL reservoir shore below the OHWM in the temporary spoils site, the new buttress area, and the proposed staging/parking area. This area is the shoreline that was exposed as a result of the drawdown of UBL reservoir in 2016 and is transitional between the forest habitat and the open water. The soil is primarily sandy with small gravel-sized rock. Dominant species in the reservoir shore include slender beak sedge, annual hairgrass, small flowered groundsmoke (*Gayophytum diffusum* ssp. *parviflorum*), and Brewer's lupine (*Lupinus breweri* var. *breweri*), associated with a variety of other herbaceous species, such as mountain redtop, blister sedge (*Carex vesicaria*), naked buckwheat, lowland cudweed (*Gnaphalium palustre*), Mexican rush (*Juncus mexicanus*), Sierra beardtongue (*Penstemon heterodoxus* var. *heterodoxus*), creeping buttercup (*Ranunculus flammula*), curvepod yellowcress (*Rorippa curvisiliqua*), and western mountain aster (*Symphyotrichum spathulatum* var. *spathulatum*).

Reservoir

The reservoir land cover type is the open water portion of UBL reservoir. This is an unvegetated cover type in the inundated portion of the lake. The reservoir is known to support Lahontan cutthroat trout, rainbow trout (*Oncorhynchus mykiss*), brook trout (*Salvelinus fontinalis*), and Lahontan redside (*Richardsonius egregius*). Rainbow-cutthroat trout hybrids (*Oncorhynchus clarkii x mykiss*), speckled dace (*Rhinichthys osculus*), Tahoe sucker (*Catostomus tahoensis*), and tui chub (*Siphateles bicolor*) may also occur in the reservoir. The reservoir provides habitat for benthic macroinvertebrates, an important food item for reservoir fish, including Lahontan cutthroat trout. (Calhoun 1944c).

Perennial Stream

The only perennial stream in the project area is Middle Creek, which originates at the UBL dam and is a tributary of the North Fork of the Mokelumne River. The segment of Middle Creek in the project area is a water of the United States. The fish community in Middle Creek comprises trout (brook, rainbow, Lahontan cutthroat), speckled dace, Lahontan redside, Tahoe sucker, and tui chub (Pacific Gas & Electric Company 2018c).

Developed/Disturbed

The developed/disturbed cover type includes existing roads, parking lots, and areas where vegetation has been removed.

3.5.2.3 Non-Wetland Waters of the United States and Waters of the State

The project area contains two features that are non-wetland waters of the United States and waters of the State, Middle Creek and UBL reservoir. For non-wetland water features such as rivers, streams, and channels, the extent of potential USACE jurisdiction is determined by identification of the OHWM, which is defined as "that line on shore established by the fluctuations of water and indicated by physical character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas" (33 Code of Federal Regulations Part 328.3[e]). This same extent qualifies as waters of the State.

A delineation of waters of the United States was conducted for UBL reservoir (Pacific Gas & Electric 2018d), and a preliminary assessment of Middle Creek below the dam was conducted during the October 2018 survey. The boundaries of the potential waters of the United States in the project area as shown on Figure 9 are pending submittal and subsequent verification by USACE Sacramento District.

3.5.2.4 Special-Status Species

Special-status species are plants and animals that are legally protected under the ESA, California Endangered Species Act (CESA), or other regulations, and species considered sufficiently rare by the scientific community to qualify for such listing. For the purposes of this document, special-status species fall into the following categories.

- Species listed or proposed for listing as threatened or endangered under ESA (50 Code of Federal Regulations, Parts 17.11 [listed animals] and 17.12 [listed plants], and various notices in the Federal Register (FR) [proposed species]).
- Species that are candidates for possible future listing as threatened or endangered under the ESA (81 FR 87246 December 2, 2016).
- Species listed or proposed for listing by the State of California as threatened or endangered under the CESA (14 CCR Section 670.5).
- Species that meet the definitions of rare or endangered under CEQA (State CEQA Guidelines Section 15380).
- Animals listed as California species of special concern on CDFW's Special Animals List (California Department of Fish and Wildlife 2018b).
- Animals that are fully protected in California under the California Fish and Game Code (Sections 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians]).

- Bats identified as medium or high priority on the Western Bat Working Group regional priority species matrix (Western Bat Working Group 2018a).
- Plants listed as rare under the California Native Plant Protection Act (California Fish and Game Code Section 1900 et seq.).
- Plants considered by CDFW and CNPS to be "rare, threatened, or endangered in California" (Rare Plant Ranks 1B and 2) (California Department of Fish and Wildlife 2018a; California Native Plant Society 2018).
- Plants identified by CDFW and CNPS about which more information is needed to determine their status, and plants of limited distribution (Rare Plant Ranks 3 and 4), (California Department of Fish and Wildlife 2018a; California Native Plant Society 2018), which may be included as special-status species on the basis of local significance or recent biological information.

Special-Status Plants

Twenty-three special-status plant species have been reported in the six USGS 7.5-minute quadrangles around the project area, although only 10 of these species are within approximately 5 miles of the project area (California Department of Fish and Wildlife 2018a; California Native Plant Society 2018). No plants were included on the USFWS lists. One additional special-status plant species, small bur reed (*Sparganium natans*), was not documented on the CDFW or CNPS lists but was found approximately 1.2 miles southeast of the project area during special-status plant surveys conducted for PG&E's Mokelumne River Hydroelectric Project (Pacific Gas and Electric Company 2015a). The 24 special-status plants documented on the CDFW or CNPS lists or in the PG&E report are listed in Table 3.5-1, including the scientific name, common name, status, distribution, habitat requirements, and potential for occurrence in the project area.

Five of the 24 special-status plants were identified as having low potential for occurrence in the project area because it lacks suitable habitat (i.e., pinyon-juniper woodland, desert scrub) or is not in a known elevational range for the species.

Eleven of the 24 special-status plants were identified as having moderate potential to occur in the project area, because suitable habitat is present, and eight were considered to have high potential, based on recorded occurrences within approximately 5 miles of the project area.

Table 3.5-1. Special-Status Plant Species with Potential to Occur in the Vicinity of the Upper Blue Lake Dam Seismic Retrofit Project Area

Common and Scientific Name	Legal Status[a] (Federal/State/CRPR)	Geographic Distribution	Habitat Requirements	Potential for Occurrence in Project Area[b]
Mountain bent grass *Agrostis humilis*	–/–/2B.3	Central and southern high Sierra Nevada, including portions of Alpine, Madera, Mono, Mariposa, Tuolumne Counties; Nevada, Oregon, Washington, and elsewhere	Alpine boulder and rock field, meadows and seeps, subalpine coniferous forest, sometimes on carbonate substrates; 8,760–10,500 feet; blooms July–September	Moderate. Potential habitat on reservoir shore and in lodgepole pine forest. No recorded occurrences within 5 miles of project area.
Three-bracted onion *Allium tribracteatum*	–/–/1B.2	Central high Sierra Nevada: Calaveras and Tuolumne Counties	Volcanic soils in chaparral, lower and upper montane coniferous forest; 3,600–9,840 feet; blooms April–August	Moderate. Potential habitat in lodgepole pine forest. No recorded occurrences within 5 miles of project area.
Woolly-leaved milk-vetch *Astragalus whitneyi* var. *lenophyllus*	–/–/4.3	Northern high Sierra Nevada with occurrences in Alpine, Butte, Nevada, Placer, Plumas, and Sierra Counties	Alpine boulder and rock field, rocky soils in subalpine coniferous forest; 7,000–10,000 feet; blooms July–August	Moderate. Potential habitat in lodgepole pine forest. No recorded occurrences within 5 miles of project area.
Small-leaved rockcress *Boechera microphylla*	–/–/3	Northern high Sierra Nevada, Great Basin: Alpine, Inyo, Mono, Modoc, and Plumas Counties; Nevada, Oregon, and elsewhere	Volcanic or granitic, rocky soils in pinyon-juniper woodland; 5,580–10,700 feet; blooms July	Low. No suitable habitat in project area. No recorded occurrences within 5 miles of project area.
Upswept moonwort *Botrychium ascendens*	–/–/2B.3	Southern high Cascade Range, and scattered occurrences elsewhere: Butte, El Dorado, Lassen, Mono, Modoc, Plumas, Shasta, Tehama, and Tulare Counties; Idaho, Oregon, Nevada, Washington, and elsewhere	Wet areas in lower montane coniferous forest; 4,900–8,500 feet; fertile July–August	High. Potential habitat in lodgepole pine forest. Nearest recorded occurrence is approximately 3.6 miles northwest of project area.
Mingan moonwort *Botrychium minganense*	–/–/2B.2	High Cascade Range, southern high Sierra Nevada	Lower montane coniferous forest, on creek banks; at 4,900–7,460 feet	Moderate. Potential habitat in lodgepole pine forest. No recorded occurrences within 5 miles of project area.

Common and Scientific Name	Legal Status[a] (Federal/State/CRPR)	Geographic Distribution	Habitat Requirements	Potential for Occurrence in Project Area[b]
Davy's sedge *Carex davyi*	–/–/1B.3	Northern and central high Sierra Nevada	Dry meadows and slopes in subalpine coniferous forest and upper montane coniferous forest; 4,900–10,500 feet; blooms June–September	High. Potential habitat in lodgepole pine forest. Nearest recorded occurrence is approximately 3.6 miles northwest of project area.
Porcupine sedge *Carex hystericina*	–/–/2B.1	Klamath Ranges in Lake County, formerly in Trinity County; Arizona, Idaho, Oregon, Washington, and elsewhere	Marshes and swamps along streambanks; 2,000–3,000 feet; blooms May–June	Low. Suitable habitat along Middle Creek, but project area is significantly above recorded habitat elevations. No recorded occurrences within 5 miles of project area.
Western single-spiked sedge *Carex scirpoidea* ssp. *pseudoscirpoidea*	–/–/2B.2	Alpine, Inyo, Mono, and Tuolumne Counties; Nevada, Utah, and elsewhere	Wet areas, often on carbonate in alpine boulder and rock field, meadows and seeps, and rocky areas in subalpine coniferous forest; 10,500–12,000 feet; blooms July–September	Low. Suitable habitat in rock outcrops, but project area is significantly below recorded habitat elevations. Nearest recorded occurrence is approximately 4.7 miles northwest of project area.
Alpine dusty maidens *Chaenactis douglasii* var. *alpina*	–/–/2B.3	Northern high Sierra Nevada, northern desert mountains in Alpine, El Dorado, Inyo, Mono, Siskiyou, Tulare, and Tuolumne Counties; Nevada, Oregon and elsewhere	Granitic soils in alpine boulder and rock field; 10,000–11,150 feet; blooms July–September	High. Potential habitat near rock outcrops. Nearest recorded occurrence is approximately 4.1 miles northwest of project area.
Fell-fields claytonia *Claytonia megarhiza*	–/–/2B.3	Northern and central high Sierra Nevada and Warner Mountains in Alpine, Fresno, Mono, Modoc, Mariposa, Nevada, and Tuolumne Counties; Colorado, Montana, Wyoming, New Mexico, Canada	Alpine boulder and rock field, rocky or gravelly substrates in subalpine coniferous forest; 8,530–11,600 feet; blooms July–September	Moderate. Potential habitat near rock outcrops around spoils site 4. No recorded occurrences within 5 miles of project area.

Common and Scientific Name	Legal Status[a] (Federal/State/CRPR)	Geographic Distribution	Habitat Requirements	Potential for Occurrence in Project Area[b]
Fiddleleaf hawksbeard *Crepis runcinata*	–/–/2B.2	Alpine, Inyo, Lassen, Mono, Modoc, Sierra Counties; Arizona, Nevada, Oregon, Washington, and elsewhere	Mojavean desert scrub, pinyon and juniper woodland, mesic, alkaline; 4,100–7,200 feet; blooms May–August	Low. No suitable habitat in project area. No recorded occurrences within 5 miles of project area.
Subalpine cryptantha *crymophila*	–/–/1B.3	Alpine, Mono, and Tuolumne Counties	Subalpine coniferous forest on volcanic, rocky substrates; 8,530–10,500 feet; blooms July–August	High. Potential habitat in lodgepole pine forest. Nearest recorded occurrences are approximately 5.4 miles southeast of project area.
Clustered-flower cryptantha *Cryptantha glomeriflora*	–/–/4.3	Alpine, Fresno, Inyo, Mono, Nevada, Sierra, Tulare, and Tuolumne Counties	Sandy soils derived from granite or volcanic substrates in Great Basin scrub, meadows and seeps, subalpine coniferous forest, upper montane coniferous forest; 5,900–12,300 feet; blooms June-September	Moderate. Potential habitat on reservoir shore and in lodgepole pine forest. No recorded occurrences within 5 miles of project area.
Tahoe draba *asterophora* var. *asterophora*	–/–/1B.2	Alpine, El Dorado, Mono, and Tuolumne Counties; also Nevada	Alpine boulder and rock field, subalpine coniferous forest; 5,900–11,500 feet; blooms July–August (September)	High. Potential habitat in lodgepole pine forest. Nearest recorded occurrence is approximately 3.9 miles northwest of project area.
Scribner's wheat grass *Elymus scribneri*	–/–/2B.3	Mono and Tuolumne Counties; Nevada, Arizona, and elsewhere	Alpine boulder and rock field; 9,500–13,780 feet; blooms July–August	High. Potential habitat around rock outcrops. Nearest recorded occurrence is approximately 3.1 miles west of project area.
Subalpine fireweed *Epilobium howellii*	–/–/4.3	Northern and central high Sierra Nevada	Wet meadows, seeps, in subalpine coniferous forest; 6,450–8,850 feet; blooms July–August	Moderate. Potential habitat in lodgepole pine forest. No recorded occurrences within 5 miles of project area.

Common and Scientific Name	Legal Status[a] (Federal/State/CRPR)	Geographic Distribution	Habitat Requirements	Potential for Occurrence in Project Area[b]
Hutchison's lewisia *kelloggii* sp. *hutchisonii*	–/–/3.2	Northern Sierra Nevada	Openings in upper montane coniferous forest; 5,900–7,000 feet; blooms July–August	Moderate. Potential habitat in lodgepole pine forest. No recorded occurrences within 5 miles of project area.
Kellogg's lewisia *Lewisia kelloggii* sp. *kelloggii*	–/–/3.2	Central and southern Sierra Nevada	Ridges and openings in upper montane coniferous forest; 4,800–7,760 feet; blooms May–July	Moderate. Potential habitat in lodgepole pine forest. No recorded occurrences within 5 miles of project area.
Three-ranked hump moss *Meesia triquetra*	–/–/4.2	Widespread, with occurrences from Humboldt and Lassen Counties south to Riverside Counties; Nevada, Oregon, and elsewhere	On soil in bogs and fens, meadows and seeps, moist sites in subalpine and upper montane coniferous forest; 3,970–9,700 feet; spores July	Moderate. Potential habitat on reservoir shore and in lodgepole pine forest. No recorded occurrences within 5 miles of project area.
Northern holly fern *Polystichum lonchitis*	–/–/3	Alpine, El Dorado, Siskiyou, and possibly Plumas and Trinity Counties; Arizona, Idaho, Nevada, Oregon, Utah, Washington	On granitic or carbonate substrates in subalpine and upper montane coniferous forest; 5,900–8,500 feet; blooms June-September	Moderate. Potential habitat in lodgepole pine forest. No recorded occurrences within 5 miles of project area.
Robbins' pondweed *Potamogeton robbinsii*	–/–/2B.3	Alpine, Fresno, Inyo, Lassen, Madera, Mono, Nevada, Sierra, Siskiyou, and Tuolumne Counties	Lakes and other deep water emergent wetlands; 5,020–10,820 feet; blooms July-August	High. Potential habitat in UBL reservoir. Nearest recorded occurrence is about 3.2 miles southeast of project area.
Small bur reed *Sparganium natans*	–/–/4.3	El Dorado, Lassen, Madera, Mariposa, Nevada, Placer, Plumas, Riverside, Sierra, Shasta, and Tuolumne Counties; Idaho, Oregon, Washington, and elsewhere	Bogs and fens, lake margins of marshes and swamps; 5,400–8,200 feet; blooms June-September	High. Potential habitat on reservoir shore. Nearest recorded occurrence is approximately 1.2 miles southeast of project area.
Golden violet *Viola purpurea* ssp. *aurea*	–/–/2B.2	East side of the Sierra Nevada Mountains and Mojave Desert, from Lassen County to San Diego County	Great Basin scrub and pinyon-juniper woodland, on dry, sandy slopes; 3,300–8,200 feet; blooms April-June	Low. No suitable habitat in project area. Nearest recorded occurrence is approximately 1.5 miles east of project area.

Common and Scientific Name	Legal Status[a] (Federal/State/CRPR)	Geographic Distribution	Habitat Requirements	Potential for Occurrence in Project Area[b]

Sources: California Department of Fish and Wildlife 2018a; California Native Plant Society 2018; Pacific Gas and Electric Company 2015a

[a] Status explanations:

Federal

–	=	No status

State

–	=	No status

California Rare Plant Rank

1B	=	Rare, threatened, or endangered in California and elsewhere.
2B	=	Rare, threatened, or endangered in California, but more common elsewhere.
3	=	Plants about which we need more information.
4	=	Plants of limited distribution.
0.1	=	Seriously endangered in California
0.2	=	Fairly endangered in California
0.3	=	Not very endangered in California

[b] Potential for Occurrence in Project Area

Low: The project area is within the species range, and no suitable habitat for the species occurs in the project area.

Moderate: The project area is within the species range, and suitable habitat for the species is present in the project area, but there are no records for the species within 5 miles of the project area.

High: The project area is within the species range, suitable habitat for the species is present in the project area, and there are one or more records of the species within 5 miles of the project area.

Special-status Animals

Based on the USFWS (2018a and 2018b) species lists and CNDDB (California Department of Fish and Wildlife 2018a) records search, 22 special-status animal species were identified as having potential to occur in the project area. Of the 22 special-status animal species identified, seven have a moderate or high potential to occur in the project area given their known range, presence of suitable habitat or reported occurrence in the project vicinity. The remaining 15 special-status animals have low to no potential to occur in the project area and are not discussed further. One additional special-status animal species, bald eagle (*Haliaeetus leucocephalus*), was not on the CNDDB list but was observed in the project area during a site visit with USFWS in June 2018. All special-status animals that were considered are listed in Table 3.5-2, which identifies their regulatory status, distribution, habitat requirements, and a rationale for their potential to occur in the project area. The eight special-status animal species that have a high or moderate potential to occur in the project area are discussed briefly below.

Western Bumble Bee

Western bumble bee is not protected under ESA or CESA but is considered rare under CEQA. Western bumble bee historically occurred throughout much of Northern California but now appears to be absent from much of this area (Evans et. al 2008:19). This bee nests underground and is associated with a wide variety of wildflowers including those in the genus *Melilotus*, *Cirsium*, *Trifolium*, *Centaurea*, *Chrysothamnus*, and *Eriogonum* (Koch et. al 2012). In the project area, western bumble could occur in the UBL shore area where flowering plants are present. Plants of the genus *Cirsium*, and *Eriogonum* were observed during the field survey (Appendix E).

Lahontan Cutthroat Trout

Lahontan cutthroat trout is federally listed as threatened. Lahontan cutthroat trout are endemic to lakes and streams of the Lahontan basin in northern Nevada, eastern California, and southern Oregon (U.S. Fish and Wildlife Service 2018d). Scattered, isolated populations within the historical range are currently found in the Carson, Humboldt, Quinn, Truckee, and Walker Rivers and in the Pilot Peak mountain range near the Nevada-Utah border (Moyle 2002; U.S. Fish and Wildlife Service 2018c). The species has been introduced into habitats outside its native range, including drainages in the upper Mokelumne (e.g., UBL reservoir), Owens, San Joaquin, Stanislaus and Yuba watersheds, for species conservation and recreational fishing purposes (Moyle 2002; U.S. Fish and Wildlife Service 1995). The species is protected wherever it is found (U.S. Fish and Wildlife Service 2018d).

Lahontan cutthroat trout are stream spawners. Spawning takes place from April through July, depending on streamflow, elevation, and water temperature. Spawning migrations of stream fish are limited, but lake-dwelling fish have been known to migrate many miles upstream to spawn. Stream fish mature in 2 to 3 years, whereas lake fish mature in 3 to 5 years. As with many other salmonid species, eggs are deposited in redds (nests) in stream gravels. Egg incubation requires water temperatures between 43 and 56°F and DO concentrations of at least 5 milligrams per liter, or high mortality can occur. Eggs generally hatch in 4 to 6 weeks, and fry emerge and begin feeding 2 to 3 weeks later. Some juveniles migrate downstream into lakes during their first year, whereas others remain in streams for 1 or more years provided that rearing conditions are suitable. Lahontan cutthroat trout fry in tributaries to UBL reservoir reportedly migrate to the reservoir from mid-August to mid-September (Calhoun 1944a).

Chironomid larvae and pupae are the primary food source of Lahontan cutthroat trout in the reservoir (Calhoun 1944c). Based on a study by Calhoun (1944b), the greatest concentration of benthic macroinvertebrates in the reservoir was found to be centered approximate elevation 8,090 feet, with abundance dropping off significantly above elevation 8,096 feet and below elevation 8,083 feet. Comparatively, the littoral fauna is very poor (i.e., above approximate elevation 8,110 feet), presumably as a result of the consolidated mixture of gravelly sand that occurs in this zone of the reservoir (Calhoun 1944b).

Table 3.5-2. Special-Status Animal Species with Potential to Occur in the Vicinity of the Upper Blue Lake Dam Seismic Retrofit Project Area

Common and Scientific Name	Legal Status (Federal/State/ Other)[a]	Geographic Distribution and Habitat Requirements	Potential for Occurrence in the Project Area[b]
Mono checkerspot butterfly *Euphydryas editha monoensis*	–/–/–	Eastern side of the Sierra Nevada; distribution centered in Mono County. Associated with riparian habitats.	None. Project area is outside of species known range.
Western bumble bee *Bombus occidentalis*	–/–/–	Historically occurred throughout much of northern California but appears to be absent from much of this area. Nests underground. Visits a wide variety of wildflowers including those in the genus *Melilotus*, *Cirsium*, *Trifolium*, *Centaurea*, *Chrysothamnus*, and *Eriogonum*.	Moderate. Suitable habitat present.
Lahontan cutthroat trout *Oncorhynchus clarkii henshawi*	T/–/–	Endemic to lakes and streams of the Lahontan basin in northern Nevada, eastern California, and southern Oregon, but now only found in scattered populations in the Carson, Humboldt, Quinn, Truckee, and Walker Rivers. The species has been introduced into habitats outside its native range, including the upper Mokelumne River drainage. Spawns in streams from April through July, depending on streamflow, elevation, and water temperature. Deposits eggs in redds (nests) in stream gravels.	High. Known to occur in Upper Blue Lake and Middle Creek.
Southern long-toed salamander *Ambystoma macrodactylum sigillatum*	–/SSC/–	High elevation meadows, ponds, and lakes in the Sierra Nevada, Cascade, and Klamath Mountains. Breeds in high mountain ponds and lakes. Adults utilize small mammal burrows and moist areas under logs and rocks.	Low. Presence of trout in Upper Blue Lake likely precludes salamander occurrence; has not been observed in the lake during Yosemite toad surveys.
Yosemite toad *Anaxyrus canorus*	T/SSC/–	Sierra Nevada from Blue Lakes region north of Ebbetts Pass in Alpine County to 3 miles south of Kaiser Pass in the Evolution Lake/Darwin Canyon area in Fresno County; 4,800-12,000 feet, mostly above 9,000 feet. Inhabits montane wet meadows and seasonal ponds associated with lodgepole pine and subalpine conifer forests. Breeds in shallow pools or lake margins, shelters in burrows or clumps of grass, sedges or willows.	High. Known to occur in Upper Blue Lake.

Common and Scientific Name	Legal Status (Federal/State/ Other)[a]	Geographic Distribution and Habitat Requirements	Potential for Occurrence in the Project Area[b]
Sierra Nevada yellow-legged frog *Rana sierrae*	E/T/–	Found in the Sierra Nevada above 4,500 feet from Plumas County to southern Tulare County. Isolated populations in Butte County and near Mono Lake, Mono County. Associated with streams, lakes, and ponds in montane riparian, lodgepole pine, sub-alpine conifer, and wet meadow habitats; also includes sunny river margins, meadow streams, isolated pools, and lake borders in the Sierra Nevada.	Moderate to High. Middle Creek provides suitable nonbreeding habitat and could disperse along the creek or the lake.
Bald eagle *Haliaeetus leucocephalus*	–/E, FP/P	Nests in Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Butte, Tehama, Lake, and Mendocino Counties and in the Lake Tahoe Basin. Reintroduced into central coast. Winter range includes the rest of California, except the southeastern deserts, very high altitudes in the Sierra Nevada, east of the Sierra Nevada south of Mono County, and some rangelands and coastal wetlands. In western North America, nests and roosts in coniferous forests, woodlands, grasslands, and wetland habitats within 1 mile of a lake, reservoir, stream, or the ocean; nests are normally built in upper canopy of large trees, such as conifers.	High. Observed flying over project area; no records for nests within 5 miles of the project area.
Great gray owl *Strix nebulosa*	–/E/–	Permanent resident of the Sierra Nevada from Plumas County south to the Yosemite area. Occasionally occurs in northwestern California in the winter and the Warner Mountains in the summer. Found in or near late successional coniferous forests bordering meadows; this provides cover and a cooler sub-canopy microclimate.	Low. No meadows in the project area.
Black-backed woodpecker *Picoides articus*	–/–/–	Sierra Nevada and Cascade Mountains to the Siskiyou Mountains. Coniferous forests, especially recently burned forests with wood-boring beetles.	Low. No recently burned conifer forest in the project area.
Willow flycatcher *Empidonax traillii*	–/E/–	Summers along the western Sierra Nevada from El Dorado to Madera County, in the Cascade and northern Sierra Nevada in Trinity, Shasta, Tehama, Butte, and Plumas Counties, and along the eastern Sierra Nevada from Lassen County to Inyo County. Riparian areas and large wet meadows with abundant willows. Usually found in riparian habitats during migration.	Low. No riparian or wet meadows with abundant willows in the project area.

Common and Scientific Name	Legal Status (Federal/State/ Other)[a]	Geographic Distribution and Habitat Requirements	Potential for Occurrence in the Project Area[b]
Fringed myotis *Myotis thysanodes*	–/–/WBWG-high	Found the length of the state, from the coast (including Santa Cruz Island) to above 5,900 feet in the Sierra Nevada. Records exist for the high desert and east of the Sierra Nevada; however, the majority of known localities are on the west side of the Sierra Nevada. Found in a wide variety of habitats from low desert scrub to high elevation coniferous forests. Roosts in crevices in buildings, underground mines, rocks, cliff faces, and bridges. Roosts in a variety of trees, particularly large, decadent trees and snags. Has been found in mixed deciduous/coniferous forest and in both redwood and giant sequoia habitat.	Moderate. Could roost in trees near the project area or forage in the project area.
Long-legged myotis *Myotis volans*	–/–/WBWG-high	Mountains throughout California, including ranges in the Mojave desert; found from the coast, to high elevation in the Sierra Nevada and White Mountains; central San Diego County, the Coast Range, and the transverse ranges between the Los Angeles basin and the Central Valley. Most common in woodlands and forests above 4,000 feet, but occurs from sea level to 11,000 feet. Uses abandoned buildings, cracks in the ground, cliff crevices, exfoliating tree bark, and hollows within snags as summer day roosts. Uses caves and mine tunnels for hibernation.	Moderate. Could roost in trees near the project area or forage in the project area.
Silver haired bat *Lasionycteris noctivagans*	–/–/WBWG-moderate	Found from the Oregon border south along the coast to San Francisco Bay and along the Sierra Nevada and Great Basin region to Inyo County. Also occurs in southern California from Ventura and San Bernardino Counties south to Mexico. May be found anywhere in California during spring and fall migrations. Primarily a forest bat that is associated with conifer and mixed conifer and hardwood forests. Nearly all maternity roosts are in natural hollows and bird excavated cavities of trees or under loose bark of large diameter snags. Roosting sites are generally at least 50 feet above the ground. Uses multiple roosts and change roosts frequently throughout the summer, indicating that clusters of large trees are necessary. Has been found hibernating in hollow trees, under sloughing bark, in rock crevices, and occasionally under wood piles, in leaf litter, under foundations, and in buildings, mines and caves.	Moderate. Could roost in trees near the project area or forage in the project area.

Common and Scientific Name	Legal Status (Federal/State/Other)[a]	Geographic Distribution and Habitat Requirements	Potential for Occurrence in the Project Area[b]
Gray-headed pika *Ochotona princeps schisticeps*	–/–/–	Boreal zones of the northern Sierra Nevada, from Mount Shasta south to Donner Pass at elevations from 5,000 to 9,000 feet. Occurs at high elevations, often above the tree line. Found in rocky areas at lower elevations. Associated with talus slopes and occasionally mine tailings; prefers talus-meadow interfaces.	Low. No talus slopes or talus-meadow interfaces in or near the project area.
Western white-tailed jackrabbit *Lepus townsendii townsendii*	–/SSC/–	Crest and eastern slope of the Sierra Nevada from the Oregon border to Tulare and Inyo Counties. Occurs in sagebrush, juniper, high elevation open meadow, and early successional stages of conifer habitat.	None. Project area is outside of species' known range.
Sierra Nevada mountain beaver *Aplodontia rufa californica*	–/SSC/–	Occurs from Mount Shasta east and south through the Sierra Nevada range and Mono Lake Basin, Mono County. Populations scattered and local. Slopes of ridges or gullies where there is abundant moisture, thick undergrowth, and soft soil for burrowing; forested areas from sea level to the timberline.	Low. May occur in the vicinity of the project area but unlikely to be present.
Sierra Nevada red fox *Vulpes vulpes necator*	C/T/–	Occurs in the Cascade Range, in Siskiyou County, and in the Sierra Nevada from Lassen County south to Tulare County. Coniferous forests, generally from 5,000 to 8,400 feet. Often associated with mountain meadows.	Low. May occasionally occur in the project area but would not den in the project area.
Fisher (west coast DPS) *Pekania pennanti*	–/T/–	Coastal mountains from Del Norte County to Sonoma Counties, east through the Cascades to Lassen County, and south in the Sierra Nevada to Kern County. Late successional coniferous forests and montane riparian habitats.	Low. May occasionally occur in the project area but would not den in the project area.
North American porcupine *Erethizon dorsatum*	–/–/–	Occurs in forests in the Sierra Nevada, Cascade, Coast, and Transverse Ranges. Found in coniferous forest and mixed woodlands. Den in hollow trees or rocky areas.	Low. May occasionally occur in the project area but would not den in the project area.
American badger *Taxidea taxus*	–/SSC/–	Throughout California, except for the humid coastal forests of northwestern California in Del Norte Humboldt Counties. Occurs in a wide variety of open, arid habitats but are most commonly associated with grasslands, savannas, and mountain meadows near timberline; they require sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground.	Low. No meadows in the project area.

Common and Scientific Name	Legal Status (Federal/State/ Other)[a]	Geographic Distribution and Habitat Requirements	Potential for Occurrence in the Project Area[b]
California wolverine *Gulo gulo luteus*	PT/T,FP/–	Klamath and Cascade Ranges south through the Sierra Nevada to Tulare County; Mount Whitney, Tulare County. Sighted in a variety of habitats from 1,600 to 14,200 feet. Most common in open terrain above timberline and subalpine forests.	Low. May occasionally occur during the winter or early spring when human presence is low or absent but is not expected to be present when construction occurs (late spring/early fall) because of moderately high human presence that is typical during this time.
Sierra marten *Martes caurina sierrae*	–/–/–	Occurs from eastern Siskiyou and northwestern Shasta Counties through the western slope of the Sierra Nevada to northern Kern County and the eastern slope of the Sierra Nevada to Inyo County. Mature coniferous or deciduous-coniferous forests. Uses cavities in large trees, snags, stumps, logs, or burrows, caves, and crevices in rocky areas for dens.	Low. May occasionally occur in the project area but would not den in the project area.

Common and Scientific Name	Legal Status (Federal/State/ Other)[a]	Geographic Distribution and Habitat Requirements	Potential for Occurrence in the Project Area[b]

[a]Status explanations:

Federal

–	=	no listing.
T	=	listed as threatened under the federal Endangered Species Act.
PT	=	proposed for listing as threatened under the federal Endangered Species Act.
C	=	candidate for listing under the federal Endangered Species Act.

State

–	=	no listing.
E	=	listed as endangered under the California Endangered Species Act.
FP	=	fully protected under the California Fish and Game Code.
SSC	=	species of special concern in California.
T	=	listed as threatened under the California Endangered Species Act.

Other

P	=	protected under the Bald and Golden Eagle Protection Act.
		Western Bat Working Group (WBWG) Priority
High	=	Species are imperiled or at high risk of imperilment.
Moderate	=	This designation indicates a level of concern that should warrant closer evaluation, more research, and conservation actions of both the species and possible threats. A lack of meaningful information is a major obstacle in adequately assessing these species' status and should be considered a threat.

[b] Potential for Occurrence in Project Area

Low: The project area is within the species range, and no suitable habitat for the species occurs in the project area.

Moderate: The project area is within the species range, and suitable habitat for the species is present in the project area, but there are no records for the species within 5 miles of the project area.

High: The species is known to occur in the project area or the project area is within the species range, suitable habitat for the species is present in the project area, and there are one or more records of the species within 5 miles of the project area.

Lahontan cutthroat trout are known to occur in Middle Creek and UBL reservoir (Calhoun 1944a; California Department of Fish and Wildlife 2017b; Pacific Gas & Electric Company 2017a). Until recently, CDFW planted hatchery Lahontan cutthroat trout in the reservoir to support the recreational fishery. From 2002 to 2013, CDFW stocked the reservoir with 10,000 fingerling (less than 5 inches) Lahontan cutthroat trout in all years except 2009 and 2011 (Pacific Gas & Electric Company 2018e.), as part of CDFW's "put and grow" fishery management strategy to provide angling opportunities in future years. Since 2014, CDFW has stocked only rainbow trout in the reservoir (Ewing pers. comm.).

Yosemite Toad

Yosemite toad is federally threatened and a California species of special concern. Yosemite toad occurs in higher elevation areas of the Sierra Nevada from the vicinity of Blue Lakes in Alpine County to the Evolution Lakes area in Fresno County (Thomson et. al 2016:72). Critical habitat for Yosemite toad was designated on August 26, 2016 (81 FR 59046). Yosemite toad hybridizes with western toad (now called California toad) in the Blue Lakes region and other areas in the northern part of Yosemite toad's range (Stebbins 1985:72, 2003:211). Although the toads at UBL reservoir are a hybrid population, they are referred to as Yosemite toads in this document.

Yosemite toad is associated with relatively open montane wet meadows with grasses, sedges (*Carex* spp.), rushes (*Juncus* spp.), or stands of willow (Thomson et. al 2016:72). Suitable breeding sites consist of shallow pools, lake margins, and quiet streams (Stebbins 2003:211). Lodgepole pine, whitebark pine (*Pinus albicaulis*), and subalpine conifer forests surrounding meadows are also used for cover (Jennings and Hayes 1994:53). Yosemite toads take refuge during the winter in rodent burrows (Thomson et. al 2016:72). Rodent burrows and spaces under logs and rocks are used as temporary refuge sites during the summer (Jennings and Hayes 1994:53; 78 FR 24498).

Yosemite toad is largely diurnal and usually active only in sunny areas (Stebbins 2003:211). Male toads emerge from winter hibernation sites as soon as snow-melt pools form (Thomson et. al 2016:71). The timing of emergence varies with elevation and local conditions, but generally occurs during May and June (Jennings and Hayes 1994:52; Thomson et. al 2016:71). Eggs are deposited in strings around short emergent vegetation in still water no more than 3 inches deep. Larvae hatch in 3 to 14 days and metamorphosis occurs within 40 to 60 days (Thomson et. al 2016:71). Yosemite toads are active into late September and early October, after which they enter hibernation sites. The majority of their life is spent in the upland habitats near breeding meadows (78 FR 24498).

Suitable upland habitat for Yosemite toad is located throughout the project area. Small areas of cover (boulders, vegetation clumps) and burrows of small mammals (mice and gophers) are present in portions of the project area, and Yosemite toads could disperse throughout the project area. There is no suitable breeding habitat in the project area but suitable breeding habitat is located along the western and northern shorelines of UBL reservoir. The breeding habitat consists of the reservoir edgewater and pooled areas along the western and northern reservoir shorelines. The project area is located entirely within designated critical habitat for Yosemite toad (81 FR 59046).

In 2002, 2009, 2010, 2011, 2012, 2014, 2017, and 2018, PG&E and its contractors conducted visual encounter surveys for Yosemite toad along the northern and western shorelines of the reservoir, which is referred to as Site 15. Additionally, the entirety of the UBL shoreline was surveyed in 2018. The surveys conducted from 2002 to 2014 were required as part of license conditions for the Mokelumne River Project (FERC Project Number 137) (Pacific Gas & Electric Company 2017b). The surveys conducted in 2017 and 2018 were to provide information for the proposed project. Yosemite toad was observed at Site 15 every year surveys were conducted except 2012 (Figure 10) (Pacific Gas & Electric Company 2017b; Drennan pers. comm.; Marlow pers. comm. #1, #2).

Sierra Nevada Yellow-legged Frog

Sierra Nevada yellow-legged frog (SNYLF) is one of two species of mountain yellow-legged frog in the Sierra Nevada, *Rana muscosa* and *R. sierrae*. SNYLF is federally listed as endangered and is state-listed as threatened. SNYLF occurs along the western Sierra Nevada north of the Monarch Divide in Fresno County and the eastern Sierra Nevada in Inyo and Mono Counties (78 FR 24475). Critical habitat for SNYLF was designated on August 26, 2016 (81 FR 59046). Although SNYLF is genetically distinct from the mountain yellow-legged frog, it shares similar habitat and ecology with the northern population (i.e., distinct population segment) of the mountain yellow-legged frog. Consequently, references to mountain yellow-legged frog below are applicable to SNYLF.

Mountain yellow-legged frog is highly aquatic species that is frequently found within a few feet of water. It inhabits riverbanks, meadow streams, isolated pools, and lake borders in the Sierra Nevada (Stebbins 2003:233). It is closely associated with montane riparian habitats in lodgepole pine, yellow pine (*Pinus ponderosa* complex), sugar pine, white fir, whitebark pine, and wet meadow vegetation types (Brown et. al 2014). Mountain yellow-legged frogs prefer open and sunny stream and lake margins with gently sloping banks that have rocks or vegetation to the water's edge (Stebbins 2003:233; Jennings and Hayes 1994:77).

At high elevations, breeding begins as soon as lakes and streams are free of snow and ice, usually from May through August (Stebbins 2003:233). Eggs are laid in clusters in shallow water, either unattached in quiet waters or attached to vegetation, rocks, gravel, or banks, or under banks of ponds, lakes, and streams (Jennings and Hayes 1994:74; Stebbins 2003:444). Depending on local conditions and site-specific variables, tadpoles often take 2 to 4 years to transform into frogs (79 FR 24259). At high elevations, mountain yellow-legged frogs and tadpoles overwinter under ice in lakes and streams for up to 9 months. (79 FR 24260).

SNYLF has never been observed in or along UBL reservoir during periodic surveys conducted by PG&E or its contractor from 2002 to 2018. The presence of predatory fish likely precludes SNYLF breeding in the reservoir, but juveniles or adults could occur along its shoreline on occasion.

Although not considered suitable breeding habitat, the shoreline of the reservoir provides suitable nonbreeding aquatic habitat, and the remainder of the project area provides suitable upland habitat for SNYLF. A habitat assessment and two visual encounter surveys for SNYLF were conducted at Middle Creek between UBL reservoir and Lower Blue Lake during July and August 2014. Middle Creek was determined to provide suitable habitat for SNYLF, but no frogs were observed during the surveys (Pacific Gas & Electric Company 2015b). Middle Creek is not considered suitable breeding habitat because of the presence of predatory fish, but Middle Creek is considered suitable nonbreeding habitat.

The closest occurrence of SNYLF is at a pond near the southeastern shore of UBL reservoir (Site 8 on Figure 11) (California Department of Fish and Wildlife 2018a). SNYLF were also recorded in a pond 0.4 mile west of UBL reservoir in 2004, 2008, 2009, 2010, and 2016 (California Department of Fish and Wildlife 2018a) and in another small pond in the same vicinity in 2004 and 2010 (Chellman pers. comm.). A population of SNYLF is also located approximately 1 mile south of UBL reservoir (known as Site 13 – Upper Blue Lake meadow and pond complex) (Pacific Gas & Electric Company

ICF

Figure 10
Locations of Yosemite Toad at Upper Blue Lake Reservoir from 2002 to 2018
Upper Blue Lake Dam Seismic Retrofit Project

ICF

Figure 11
Locations of Sierra Nevada Yellow-legged Frog near Upper Blue Lake Reservoir during 2009 and 2014 Surveys
Upper Blue Lake Dam Seismic Retrofit Project

2015b; California Department of Fish and Wildlife 2018a). Locations of SNYLF in the vicinity of the project area that were recorded during surveys for the Mokelumne River Project are shown in Figure 11.

Bald Eagle

Bald eagle is state listed as endangered and is fully protected by the California Fish and Game Code. Bald eagle is also protected under the federal Bald and Golden Eagle Protection Act. Bald eagle is a permanent resident and uncommon winter migrant in California (Zeiner et al. 1990a:122). The species breeds at coastal areas, rivers, lakes, and reservoirs with forested shorelines or cliffs in northern California. Wintering bald eagles are associated with aquatic areas containing some open water for foraging. Bald eagles nest in trees in mature and old growth forests that have some habitat edge and are somewhat close (within 1.25 miles) to water with suitable foraging opportunities. Bald eagles tend to select nest trees that are more than 1,640 feet from human development and disturbance (Buehler 2000). The species' breeding season is between February 1 and August 1. Bald eagles use snags or other hunting perches adjacent to large bodies of water or rivers to hunt for fish (Zeiner et al. 1990a:122).

A bald eagle was observed flying over and around UBL during a project site visit with USFWS on June 27, 2018. UBL provides suitable foraging habitat and bald eagles could perch in the trees around UBL. Bald eagles could occur year round in the vicinity of the project area but are most likely to be present when UBL reservoir is unfrozen and they can forage for fish in the lake. Because of the amount of human activity and disturbance at the reservoir, it is unlikely that bald eagles would nest in or near the project area. There are no records for bald eagle nests within 5 miles of the project area (California Department of Fish and Wildlife 2018a).

Fringed Myotis, Long-legged Myotis, and Silver-haired Bat

Fringed myotis is considered a high priority species in California by the Western Bat Working Group (2018a). Fringed myotis occurs throughout much of California from coastal areas to 9,350 feet in the Sierra Nevada, although it is most common at middle elevations (4,000 to 7,000 feet) (Brown and Pierson 1996; Western Bat Working Group 2005). Fringe myotis can be found in a wide range of habitats including desert scrub, mixed deciduous/conifer forest, and redwood and giant sequoia groves (Brown and Pierson 1996). Fringed myotis day and night roosts in mines, caves, crevices in buildings, bridges, tree hollows, and rock crevices (Brown and Pierson 1996; Western Bat Working Group 2005). Maternal colonies range from 10 to 2,000 individuals but large colonies are extremely rare (Western Bat Working Group 2005). There is one record for an occurrence of fringed myotis that is more than 5 miles northwest of the project area (California Department of Fish and Wildlife 2018a).

Long-legged myotis is considered a high priority species in California by the Western Bat Working Group (2018a). Long-legged myotis occurs throughout California primarily in coniferous forests but is also found seasonally in riparian and desert habitats (Western Bat Working Group 2018b). Day roosts include hollow trees, abandoned buildings, mines, rock crevices, and beneath exfoliating bark. Caves and mines are used for hibernation and may be used for night roosting (Brown and Pierson 1996; Western Bat Working Group 2018b). Maternity colonies consist of 200 to 500 individuals (Brown and Pierson 1996). There is one record for an occurrence of long-legged myotis that is more than 5 miles north of the project area (California Department of Fish and Wildlife 2018a).

Silver-haired bat is considered a moderate priority species in California by the Western Bat Working Group (2018a). Silver-haired bats occur primarily in the northern portion of California and at higher elevations in the southern and coastal mountain ranges (Brown and Pierson 1996) but may occur anywhere in California during their spring and fall migrations. They are associated with coastal and montane coniferous forests, valley foothill woodlands, pinyon-juniper woodlands, and valley foothill and montane riparian habitats (Zeiner et al. 1990b:54). Silver-haired bats roost in trees almost exclusively in the summer, and maternity roosts typically are located in woodpecker hollows. Maternal colonies range from several to about 75 individuals (Brown and Pierson 1996). There is one record for an occurrence of silver-haired bat that is more than 5 miles northeast of the project area (California Department of Fish and Wildlife 2018a).

3.5.2.5 Migratory Birds

Non-special-status migratory birds could nest in shrubs or trees in and adjacent to the project area. Land cover types in the project area that could support nesting birds are lodgepole pine forest, Lemmon's willow thicket, and little sagebrush scrub. The breeding season for most birds is generally from February 15 to August 31. The occupied nests and eggs of migratory birds are protected by federal and state laws, including the Migratory Bird Treaty Act and California Fish and Game Code Sections 3503 and 3503.5. USFWS is responsible for overseeing compliance with the Migratory Bird Treaty Act, and CDFW is responsible for overseeing compliance with the California Fish and Game Code and making recommendations on nesting bird protection.

3.5.2.6 Invasive Plant Species

Invasive plant species are species designated as federal noxious weeds by the U. S. Department of Agriculture, species listed by the California Department of Food and Agriculture, and invasive plants identified by the California Invasive Plant Council. Invasive plants displace native species, change ecosystem processes, alter plant community structure, and reduce wildlife habitat quality. The only invasive species observed during the October 2018 survey was bull thistle (*Cirsium vulgare*), which was found near the UBL dam on the lakeside. This species has a California Department of Food and Agriculture rating of C (state-endorsed holding action and eradication only when found in a nursery; action to retard spread outside nurseries at the discretion of the county agricultural commissioner) and a California Invasive Plant Council rating of Moderate (species with substantial and apparent ecological impacts, moderate to high rates of dispersal, establishment dependent on disturbance, and limited to widespread distribution) (Natural Resources Conservation Service 2003; California Invasive Plant Council 2018). No plant species designated as federal noxious weeds have been identified in the project area (Natural Resources Conservation Service 2010).

3.5.3 Regulatory Setting

3.5.3.1 Federal

The following federal regulations related to biological resources would apply to implementation of the proposed project.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) was enacted to address concerns about environmental quality. NEPA acts to ensure that federal agencies evaluate the potential environmental effects of proposed programs, projects, and actions before decisions are made to implement them, inform the public of federal agency proposed activities that have the potential to significantly affect environmental quality, and encourage and facilitate public involvement in the decision-making process.

Federal Endangered Species Act

The federal ESA of 1973 and subsequent amendments provide for the conservation of listed endangered or threatened species or candidates for listing and the ecosystems on which they depend. USFWS has jurisdiction over federally listed plants, wildlife, and resident fish.

Section 7 of the ESA provides a means for authorizing take of threatened and endangered species by federal agencies. *Take* is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct" (16 USC 1532[19]). Section 7 applies to actions that are conducted, permitted, or funded by a federal agency. Under ESA Section 7, the lead federal agency conducting, funding, or permitting an action must consult with USFWS or the National Marine Fisheries Service (NMFS) to ensure that a proposed action would not jeopardize the continued existence of an endangered or threatened species or destroy or adversely modify designated critical habitat. If a proposed action may affect a listed species or designated critical habitat, the lead agency is required to prepare a biological assessment evaluating the nature and severity of the expected effect. In response, USFWS or NMFS issues a biological opinion (BO), with one of the following determinations about the proposed action:

- May jeopardize the continued existence of one or more listed species (*jeopardy finding*) or result in the destruction or adverse modification of critical habitat (*adverse modification finding*).
- Will not jeopardize the continued existence of any listed species (*no jeopardy finding*) or result in adverse modification of critical habitat (*no adverse modification finding*).

The BO issued by USFWS or NMFS may stipulate mandatory *reasonable and prudent measures* and *terms and conditions*. If it is determined the proposed project would not jeopardize the continued existence of a listed species, USFWS or NMFS would issue an incidental take statement to authorize the proposed activity.

Clean Water Act

The CWA serves as the primary federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. The CWA empowers EPA to set national water quality standards and effluent limitations and includes programs addressing both point-source and nonpoint-source pollution. *Point-source pollution* is pollution that originates or enters surface waters at a single, discrete location, such as an outfall structure or an excavation or construction site. *Nonpoint-source pollution* originates over a broader area and includes urban contaminants in stormwater runoff and sediment loading from upstream areas. The CWA operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit; permit review is the CWA's primary regulatory tool. The following sections provide additional details on specific sections of the CWA.

Permits for Fill Placement in Waters and Wetlands (Section 404)

CWA Section 404 regulates the discharge of dredged and fill materials into waters of the United States, which are oceans, bays, rivers, streams, lakes, ponds, and wetlands, including any or all of the following.

- Areas within the OHWM of a stream, including nonperennial streams with a defined bed and bank and any stream channel that conveys natural runoff, even if it has been realigned.
- Seasonal and perennial wetlands, including coastal wetlands.

Applicants must obtain a permit from USACE for all discharges of dredged or fill material into waters of the United States, including adjacent wetlands, before proceeding with a proposed activity. USACE may issue either an individual permit evaluated on a case-by-case basis or a general permit evaluated at a program level for a series of related activities. General permits are preauthorized and are issued to cover multiple instances of similar activities expected to cause only minimal adverse environmental effects. The nationwide permits are a type of general permit issued to cover particular fill activities. Each nationwide permit specifies particular conditions that must be met for the nationwide permit to apply to a particular project.

Compliance with CWA Section 404 requires compliance with several other environmental laws and regulations. USACE cannot issue an individual permit or verify the use of a general permit until the requirements of NEPA, ESA, and the National Historic Preservation Act have been met. In addition, USACE cannot issue or verify any permit until a water quality certification or a waiver of certification has been issued pursuant to CWA Section 401.

Permits for Stormwater Discharge (Section 402)

CWA Section 402 regulates construction-related stormwater discharges to surface waters through the NPDES program, which is administered by EPA. In California, the State Water Board is authorized by EPA to oversee the NPDES program through the Regional Water Boards. The project area is located within the jurisdiction of the Central Valley Water Board.

NPDES permits are required for projects that disturb more than 1 acre of land. The NPDES permitting process requires the applicant to file a public notice of intent to discharge stormwater, and to prepare and implement a SWPPP. The SWPPP includes a site map and a description of proposed construction activities. In addition, it describes the BMPs that would be implemented to prevent soil erosion and discharge of other construction-related pollutants (e.g., petroleum products, solvents, paints, cement) that could contaminate nearby water resources. Permittees are required to conduct annual monitoring and reporting to ensure that BMPs are correctly implemented and effective in controlling the discharge of stormwater-related pollutants.

Water Quality Certification (Section 401)

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401.

Executive Order 11990: Protection of Wetlands

Executive Order 11990, signed May 24, 1977, requires federal agencies to prepare wetland assessments for proposed actions located in or affecting wetlands. Agencies must avoid undertaking new construction in wetlands unless no practicable alternative is available and the proposed action includes all practicable measures to minimize harm to wetlands.

Executive Order 13112: Prevention and Control of Invasive Species

Executive Order 13112, signed February 3, 1999, directs all federal agencies to prevent and control the introduction of invasive species in a cost-effective and environmentally sound manner. This executive order established the National Invasive Species Council, which is composed of federal agencies and departments, and a supporting Invasive Species Advisory Committee composed of state, local, and private entities. In 2008, the National Invasive Species Council released an updated national invasive species management plan that recommends objectives and measures to implement the executive order and prevent the introduction and spread of invasive species (National Invasive Species Council 2008). The executive order requires consideration of invasive species in NEPA analyses, including their identification and distribution, their potential effects, and measures to prevent or eradicate them.

3.5.3.2 State

The following state regulations related to biological resources would apply to implementation of the proposed project.

California Environmental Quality Act

CEQA (Public Resource Code Section 21000 et. sec) is the regulatory framework by which California public agencies identify and mitigate significant environmental effects. A project normally has a significant environmental effect on biological resources if it substantially affects a rare or endangered species or the habitat of that species; substantially interferes with the movement of resident or migratory fish or wildlife; or substantially diminishes habitat for fish, wildlife, or plants. The State CEQA Guidelines define rare, threatened, and endangered species as those listed under the ESA and CESA and any other species that meet the criteria of the resource agencies or local agencies (e.g., CDFW-designated species of special concern). The guidelines state that the lead agency preparing an Environmental Impact Report must consult with and receive written findings from CDFW concerning project effects on species listed as endangered or threatened. The effects of a proposed project on these resources are important in determining whether the project has significant environmental effects under CEQA.

California Endangered Species Act

CESA (California Fish and Game Code Sections 2050–2098) prohibits the take of listed endangered and threatened species. *Take* is defined as to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill. Section 2090 of CESA requires state agencies to comply with endangered species protection and recovery and to promote conservation of these species. CDFW administers the act and authorizes take through Section 2081 agreements (except for species designated as fully protected).

California Native Plant Protection Act

The California Native Plant Protection Act of 1977 (California Fish and Game Code Sections 1900–1913) prohibits importation of rare and endangered plants into California, take of rare and endangered plants, and sale of rare and endangered plants. The CESA defers to the plant protection act, which ensures that state-listed plant species are protected when state agencies are involved in projects subject to CEQA. In this case, plants listed as rare under the act are not protected under CESA but rather under CEQA.

Porter-Cologne Water Quality Control Act

The California Water Code addresses the full range of water issues in the state and includes Division 7, known as the Porter-Cologne Water Quality Control Act (Porter-Cologne Act) (California Water Code Sections 13000–16104). Section 13260 requires "any person discharging waste, or proposing to discharge waste, in any region that could affect the waters of the State to file a report of discharge (an application for waste discharge requirements)" with the appropriate Regional Water Board. Under this act, each of the nine Regional Water Boards must prepare and periodically update Water Quality Control Basin Plans (Basin Plans). Each Basin Plan sets forth water quality standards for surface water and groundwater, as well as actions to control nonpoint and point sources of pollution. Projects that affect waters of the State must meet the waste discharge requirements of the Regional Water Board. Pursuant to CWA Section 401, an applicant for a Section 404 permit to conduct any activity that may result in discharge into navigable waters must provide a certification from the Regional Water Board that such discharge will comply with state water quality standards. As part of the wetlands permitting process under Section 404, the project proponent would be required to apply for water quality certification from the Central Valley Water Board.

Section 13050 of the Porter-Cologne Act authorizes the State Water Board and the relevant Regional Water Board to regulate biological pollutants. The California Water Code generally regulates more substances contained in discharges and defines discharges to receiving waters more broadly than does the CWA.

3.5.3.3 Local

Alpine County General Plan

Alpine County General Plan Conservation Element Section E addresses threated, rare, or endangered plant species. Policy No. 9 addresses areas containing or suspected of containing rare, endangered, or threatened plants.

> **Policy No. 9:** Areas containing or suspected of containing rare, endangered, or threatened plants should not be disturbed without providing the California Department of Fish and Game a reasonable period of time within which to investigate, remove, or otherwise protect them.

General Plan Policy No. 13 specifically address the protection of critical habitat of all federally or state-listed sensitive, threatened, rare, or endangered wildlife.

> **Policy No. 13:** The County should provide the California Department of Fish and Game notice of all development that may encroach upon critical habitat of sensitive, threatened, rare, or endangered species with reasonable time for the Department to respond with recommendations for project alternatives and mitigation measures.

General Plan Policies No. 14a and 14b require the protection of important deer habitats and migration routes to the greatest extent feasible.

> **Policy No. 14a:** The County should provide The California Department of Fish and Game with notice of all development projects located within known or suspected critical summer or winter range or deer migration corridors within reasonable time for the Department to respond with recommendations for project alternatives and mitigation measures.

> **Policy No. 14b:** The County should encourage cluster development to protect wildlife habitats and migration routes by placing them in permanent open space in conjunction with approved cluster development.

3.5.4 Environmental Effects

The impact analysis for biological resources was conducted by evaluating the potential changes to existing biological communities and the effects on special-status species that could result from project implementation. The following activities could cause direct and indirect impacts of varying degrees on sensitive biological resources present in and near the project area.

- Reservoir drawdown.
- Cofferdam placement in reservoir.
- Bypass pipe placement to Middle Creek.
- Placement of an energy dissipater box in Middle Creek and discharge of water to Middle Creek from bypass pipe.
- Turbidity curtain placement in reservoir.
- Temporary dam placement.
- Staging of equipment and material for construction.
- Movement of construction equipment into and within the dam construction area and to spoils sites.
- Vegetation removal in rock fill buttress construction area.
- Construction of rock fill buttress, extensions of LLO pipes, and reconfiguration of the intake structure and trash rack in new footprint.
- Placement of excavated material at spoils sites.

The following assumptions were used in assessing project impacts on biological resources.

- All construction, staging (including vehicle parking), storage, and access areas would be restricted to the project area depicted in Figure 2.
- Use of existing roads for project access, the existing parking lot, and the existing campground for overflow and visitor parking would not affect adjacent vegetation communities beyond pre-project levels.
- Construction BMPs would be implemented to ensure that indirect effects on habitats outside of the project area are avoided or minimized.

Potential impacts of the proposed project on biological resources are discussed in the context of the State CEQA Guidelines Appendix G checklist. Checklist Section IV, *Biological Resources*, asks whether the project would result in any of the following conditions.

a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Impacts on land cover types and associated wildlife habitat were determined by overlaying the project footprint onto an aerial photograph of the land cover types in the project area.

Construction Effects on Special-Status Plants

Because special-status plant surveys of the project area have not yet been conducted, the absence of special-status plants cannot be verified. Therefore, project implementation could result in the removal of special-status plants if they are present in the project area. If special-status plants occur in the project area, loss of special-status plants could result from construction disturbance or placement of spoils in proposed spoils sites that are vegetated.

Construction of the rock fill buttress, LLO pipe extensions, and intake structure; use of the laydown and staging area within the OHWM of UBL reservoir; and placement of spoils in the temporary spoils site would be on the reservoir shore and in lodgepole pine forest where special-status plants could occur. Construction and staging activities could remove special-status plants, and placement of spoils could bury special-status plants, if any are present at the spoils sites. Construction activities and spoils placement could also result in alteration of occupied special-status plant habitat, if present, by removing existing vegetation or changing local topography and hydrology of the habitat. Although PG&E would implement Avoidance and Minimization Measure AMM-1: Implement Water Quality Protection Measures and Erosion and Sediment Control Plans, the impact on special-status plants could be significant. Implementation of Mitigation Measures BIO-MM-1 through BIO-MM-3 would reduce impact on special-status plants to a less-than-significant level.

Mitigation Measure BIO-MM-1: Retain Qualified Botanists to Conduct Floristic Surveys for Special-status Plants during Appropriate Identification Periods

PG&E will retain a qualified botanist to survey the project area to document the presence of special-status plants before project construction. The botanist will conduct a floristic survey that follows the CDFW botanical survey guidelines (California Department of Fish and Wildlife 2018c). All plant species observed will be identified to the level necessary to determine whether they qualify as special-status plants or are plant species with unusual or significant range extensions. The guidelines also require that field surveys be conducted when special-status plants that could occur in the area are evident and identifiable, generally during the reported blooming period. To account for different special-status plant identification periods, one or more series of field surveys may be required during spring and summer.

If any special-status plants are identified during the surveys, the botanist will photograph and map locations of the plants, document the location and extent of the special status–plant population on a CNDDB Survey Form, and submit the completed Survey Form to the CNDDB. The amount of compensatory mitigation required will be based on the results of these surveys. If no special-status plants are found, the botanist will document the findings in a letter report to

PG&E and CDFW and no further mitigation will be required. If special-status plants are found in the project area during the surveys and could be affected by project construction, Mitigation Measure BIO-MM-2 will be implemented.

Mitigation Measure BIO-MM-2: Implement Measures to Avoid or Compensate for Long-Term Effects on Special-Status Plants Documented in the Project Area

If special-status plant species are found during the surveys conducted under Mitigation Measure BIO-MM-1, PG&E will modify the project to avoid or minimize potential impacts on special-status plants to the extent practicable and in consideration of other design requirements and constraints (e.g., meeting project objectives and needs, avoidance of other sensitive resources).

If special-status plants cannot be avoided, PG&E will consult with CDFW to determine the appropriate compensatory measures for direct and indirect impacts that could result from project construction. Compensatory measures for loss of special-status plants, if required by CDFW, could include preserving and enhancing existing populations, establishment of offsite populations in a preservation area through seed collection or transplantation, and restoring or creating suitable habitat in sufficient quantities to achieve no net loss of occupied habitat or individuals. The preservation area will be preserved and managed in perpetuity. A mitigation and monitoring plan will be developed that describes how PG&E will compensate for unavoidable effects on special-status plants, including success criteria for the preservation area populations. Detailed information will be provided to CDFW on the location and quality of the preservation area, the feasibility of protecting and managing the area in perpetuity, and the responsible parties. Other pertinent information also will be provided, to be determined through future coordination with CDFW.

Mitigation Measure BIO-MM-3: Conduct Worker Environmental Awareness Training and Implement General Requirements

PG&E will retain a qualified biologist to develop and conduct a mandatory worker environmental awareness training (WEAT) about special-status species and other sensitive resources that could be encountered during project work (e.g., sensitive natural communities, special-status plants, Lahontan cutthroat trout, Yosemite toad, SNYLF). In addition, construction employees will be educated about the importance of controlling and preventing the spread of invasive plant infestations.

The biologist will prepare a handout that contains information (including photographs) about how to identify pertinent species, their habitat requirements, and the avoidance and minimization measures to be implemented. A biologist will provide the WEAT to all personnel before conducting project work and to new personnel as they are brought onto the project. Proof of personnel attendance will be kept on file by PG&E. Each worker will be provided with a copy of the handout and at least one copy will remain onsite throughout the duration of the project with the construction foreman.

General restrictions and guidelines that will be followed by project personnel are listed below. The project foreman will be responsible for ensuring that crew members adhere to these guidelines and restrictions.

- Before construction begins, the construction contractor will work with the project engineer and a biologist to identify the locations for the orange construction fencing, and will place stakes to indicate these locations. The fencing will be installed before construction activities are initiated, maintained throughout the construction period, and removed when construction is completed. The protected areas will be designated as environmentally sensitive areas and clearly identified on the construction plans.

- Work crews will be restricted to designated and clearly defined work areas and access routes. Staging of equipment and material sites will be restricted to designated areas.
- Vehicles will not exceed a speed of 10 miles per hour when traveling off paved roads.
- Vehicle access across streams and wetlands will be limited to existing roads and crossings.
- Laydown and staging areas will be located in previously developed or disturbed areas.
- All trash will be disposed of and removed from the work area daily. Workers will not feed or otherwise attract fish or wildlife to the work area.
- No pets or firearms will be allowed in the project area.
- Workers will look underneath vehicles and other heavy equipment for wildlife before moving vehicles or equipment to ensure that no animals are crushed.
- No wildlife or plants will be handled or removed from the site by anyone except approved biologists. Wildlife in project areas will be permitted to leave on its own, except as otherwise described in other mitigation measures for the project.
- Any worker who inadvertently injures or kills a federally listed species or finds one dead, injured, or entrapped will immediately report the incident to the project foreman, who will immediately report the incident to the PG&E biologist. Questions about wetlands, protected species, or mitigation measures should also be directed to the PG&E biologist.

Effects on Western Bumble Bee

Construction of the proposed project could result in the temporary loss of habitat and potential injury or mortality of western bumble bee if individuals or underground nests are covered with spoils. Habitat could be temporarily removed when spoils are placed at the temporary spoils site along the UBL shoreline. Suitable habitat, nests, and individuals are most likely to be present in the sparsely vegetated patches along the lakeshore. Rodent burrows were most commonly found in these patches. These areas and other areas containing rodent burrows would be avoided to minimize impacts on Yosemite toad (see discussion under *Construction Effects on Yosemite Toad and Sierra Nevada Yellow-legged Frog*). Because the areas that are most likely to be used by western bumble would be avoided during construction, this impact would be less than significant. No mitigation is required.

Effects of Reservoir Drawdown and Spoils Placement on Lahontan Cutthroat Trout Habitat in the Reservoir

As discussed in Chapter 2, *Project Description*, the reservoir would be drawn down to the target elevation of 8,114.3 feet by July 2019 to reduce water depths in the LLO approach channel and expose the shoreline area at the construction site. At the target elevation of 8,114.3 feet, the reservoir would have a maximum depth of 150 feet, a volume of approximately 14,551 acre-feet, and a surface area of approximately 228 acres. To facilitate meeting this target elevation, PG&E began drawing down the reservoir by increasing flows through the LLO in fall of 2018, and continued to drawdown the reservoir to elevation 8,111.3 feet, leaving approximately 400 acre-feet of water in the reservoir over the winter of 2018–2019 to meet downstream flow needs. As part of construction, dry spoils would be permanently placed and stored at the alternate boat ramp area within the normal maximum elevation of the reservoir. Lower reservoir storage and spoils placement in the reservoir could adversely affect fish and aquatic habitat in the reservoir.

Reservoir Drawdown: Under baseline conditions, the reservoir has rarely been drawn down to the proposed July 2019 target elevation of elevation 8,114.3 feet (Figure 12), and has never been drawn down to this elevation during July (Figure 13). Generally, lower reservoir storage can result in a multitude of biotic and abiotic responses in lakes and reservoirs, including effects on primary and secondary production, water quality (temperature and DO), cover for fish, and angling success (i.e., increased harvest). Dewatering of the littoral zone can reduce the abundance of benthic macroinvertebrates (an important food item for fish), reduce the abundance of benthic algae and macrophytes that provide attachment sites for aquatic invertebrates and cover for fish, and lead to erosion of the shoreline, which can further induce direct and indirect effects on lake biota (Carmignani and Roy 2017).

As discussed above, the natural basin of the reservoir is deep, and the reservoir has an abundance of cold, well-oxygenated water across nearly the entire water column. Therefore, the reservoir would continue to provide sufficient living space and suitable environmental conditions (temperature and DO) for Lahontan cutthroat trout after it has been drawn down to elevation 8,114.3 feet. In addition, drawing down the reservoir to elevation 8,114.3 feet would not dewater the primary habitat for benthic macroinvertebrates (the primary food item for Lahontan cutthroat trout) in the reservoir, which Calhoun (1944b) found in highest concentration to be between approximately elevation 8,083 and 8,096 feet. Although Calhoun (1944a, 1944b) observed that benthic macroinvertebrates were distributed throughout all reservoir depths, they were most abundant in the vicinity of the thermocline, which would be expected to form approximately 13 to 20 feet, and as deep as approximately 33 feet, below the reservoir surface. These findings, in combination with the fact that silt with varying amounts of wood particles dominates reservoir substrates below elevation 8,100 feet (Calhoun 1944b), suggest that habitat for benthic macroinvertebrates is present throughout all elevation strata in the reservoir below elevation 8,100 feet, and that the vertical distribution of benthic macroinvertebrates in the reservoir is governed by thermocline depth, rather than substrate conditions. Lahontan cutthroat trout in UBL reservoir subsist largely on chironomid larvae and pupae (Calhoun 1944c), which have a high reproduction rate and mature rapidly (Baxter 1977). Because chironomid larvae and pupae are known to quickly colonize disturbed or newly flooded habitats, especially during the summer (Baxter 1977), it is anticipated that benthic macroinvertebrates in the reservoir would likely respond to lower reservoir levels by colonizing lower elevation habitats in proximity to the thermocline. Therefore, no adverse effects on Lahontan cutthroat trout feeding success from reservoir lowering are anticipated. Furthermore, the lower reservoir levels that would occur over the winter of 2019–2020 following construction are not expected to adversely affect Lahontan cutthroat trout because the remaining volume and depth of water in the natural basin of UBL would provide sufficient habitat for fish and benthic macroinvertebrates below the surface ice.

It is anticipated that the dam seismic stability improvements would take approximately 4 months to complete. Once completed, the interim operational elevation restriction would be lifted and reservoir operation would return to storing water and maintaining minimum instream flows in Middle Creek in compliance with FERC Project Number 137 license requirements. This return to previous reservoir operation would restore habitat conditions for Lahontan cutthroat trout in the reservoir to conditions prior to implementation of the interim operational elevation restriction. Rising water levels in the reservoir would also inundate vegetation that has been growing in the exposed upper elevations of the reservoir inundation zone during the recent period of reduced reservoir storage, which could help to temporarily stimulate primary productivity in the reservoir through the release of nutrients as the inundated vegetation decays. Furthermore, the inundated vegetation would also temporarily increase available cover in the reservoir for young fish. Together, the expected increases in primary productivity and cover in the reservoir following reservoir filling would be expected to provide some temporary benefit to fish, including Lahontan cutthroat trout, in the reservoir following construction. The dam seismic stability improvements are not anticipated to have any other indirect effects on Lahontan cutthroat trout. This impact would be less than significant.

Spoils Placement: As discussed in Chapter 2, approximately 2,000–2,300 cubic yards of excavated materials would be hauled to one or more of three permanent spoils sites that are shown on Figure 2. Wet excavated material would be temporarily placed along the eastern shore of UBL reservoir and dry spoils would be permanently placed and stored at the alternate boat ramp area (Site 1 on Figure 2) within the normal maximum elevation of the reservoir. Although this material would be placed during the dry season while the reservoir is drawn down for construction, the permanent placement of spoils material at Site 1 would be on existing substrates that form the littoral area of the reservoir when this area is inundated. However, the placement of this material would not directly affect the primary food producing areas in the reservoir, which are found primarily below elevation 8,100 feet (discussed above). Therefore, spoils placement is not anticipated to affect the prey base for Lahontan cutthroat trout in the reservoir. This impact would be less than significant.

Effects on Lahontan Cutthroat Trout Habitat in Middle Creek from Changes in Flow and Water Temperature

Change in Middle Creek Flow: To facilitate meeting the target elevation of 8,114.3 feet by July 2019, PG&E began releasing additional water from the reservoir through the LLO in fall of 2018. PG&E also expects to have to release additional water from the reservoir through the LLO in winter and spring of 2019 to maintain reservoir levels during periods of snowmelt and increased runoff that otherwise would be captured by the reservoir. These extra releases have the potential to affect Lahontan cutthroat trout and aquatic habitats in Middle Creek through changes in wetted area, depth, velocity, and geomorphic processes such as erosion, sediment transport, and sediment deposition. Of greatest concern would be flow modifications that cause bank erosion or channel scour to accelerate in Middle Creek downstream of UBL reservoir or that are incompatible with the timing of sensitive life stages of Lahontan cutthroat trout (e.g., spawning).

The increased flow during fall of 2018 was inconsistent with natural flow conditions since there is limited precipitation (and subsequent increases in creek flow) at this time of year. However, the amount of additional water released from the reservoir during this drawdown period was relatively small (6–8 cfs) and was not of a sufficient magnitude to affect geomorphic processes to the extent that stream habitat for Lahontan cutthroat trout was adversely affected. Furthermore, because Lahontan cutthroat trout do not spawn in the fall, this flow increase did not affect Lahontan cutthroat trout spawning and may have benefitted Lahontan cutthroat trout by increasing the availability of habitat through increases in stream wetted area and depth at a time of year when low flows are often a limiting factor affecting salmonid populations.

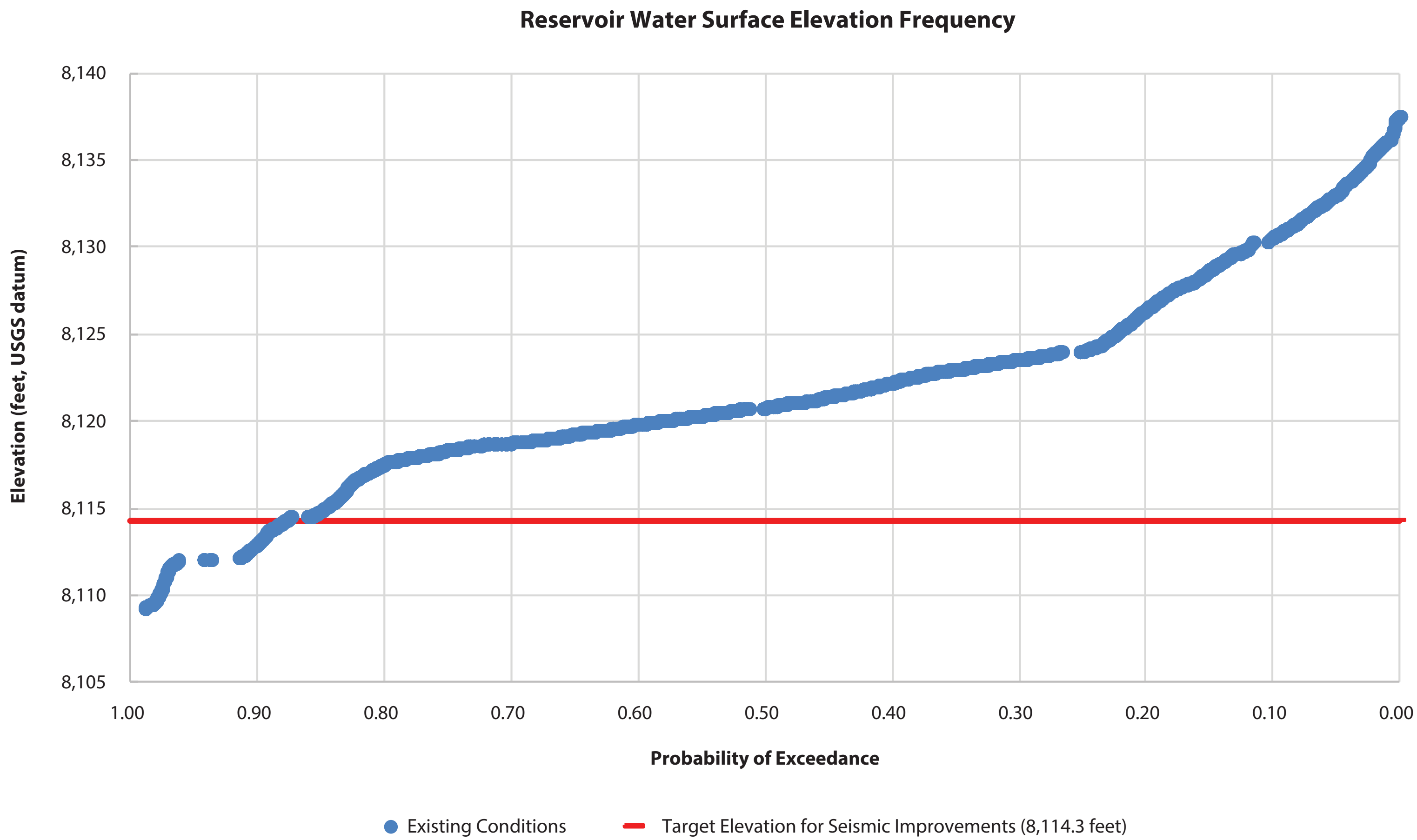

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Figure 12
Frequency of Reservoir Levels under Existing Conditions (Water Years 2000–2018)

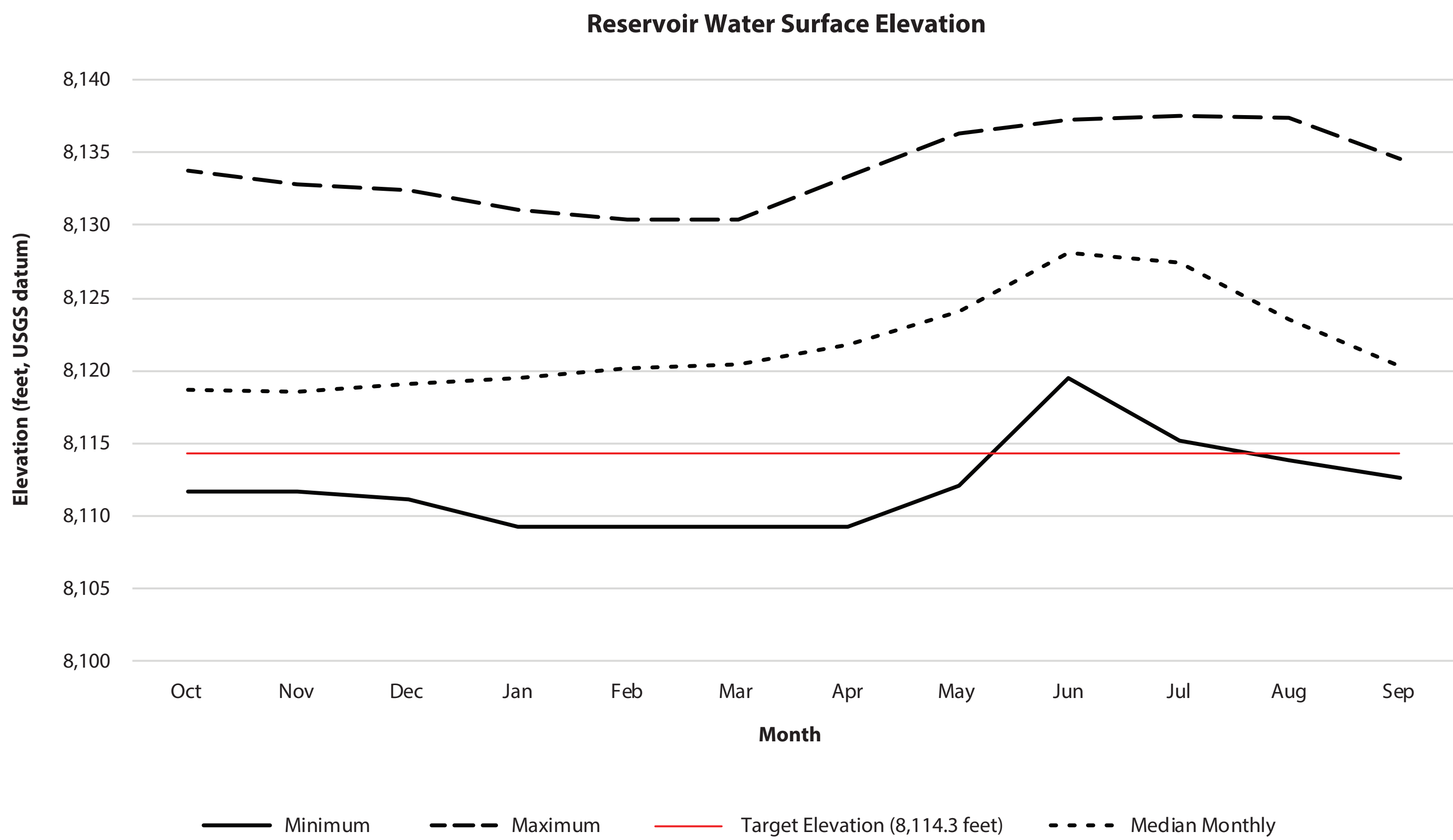


Figure 13
Monthly Reservoir Levels under Existing Conditions (Water Years 2000–2018)

As described in Chapter 2, the total maximum instantaneous flow that can be released through the LLO is 62 cfs when the reservoir is at full capacity (elevation 8,137.5 feet), and the maximum that can be released is incrementally lower at lower reservoir levels. Because PG&E would manage the reservoir to be at or below elevation 8,117.8 feet during winter and spring of 2019, the maximum instantaneous flow that would be expected to be released through the LLO would be approximately 40 cfs, which is within the range of Middle Creek spring flows under existing conditions (Table 3.5-3). Even if PG&E has to augment the LLO releases by pumping water from the reservoir to facilitate drawing down the reservoir for construction, the added releases (up to 15 cfs), together with the releases through the LLO, would not exceed the maximum instantaneous flow (62 cfs) that can be released through the LLO. Therefore, the additional flow releases to Middle Creek associated with lowering of the reservoir to the target elevation of 8,114.3 feet would not be expected to result in bank erosion or channel scour beyond that which occurs under existing conditions. The abundance of bedrock in Middle Creek also would likely limit the potential for bank erosion and channel scour from these augmented releases. This impact would be less than significant.

Table 3.5-3. Monthly Minimum, Median, and Maximum Stream Flow in Middle Creek under Existing Conditions

	Baseline Conditions (cubic feet per second)		
Month	**Minimum**	**Median**	**Maximum**
October	0.45	2.80	38.00
November	0.62	2.50	14.31
December	0.71	2.73	21.48
January	0.80	2.80	31.03
February	0.33	2.96	42.17
March	0.80	3.11	19.64
April	0.80	3.70	48.18
May	2.20	6.70	73.40
June	3.17	8.20	89.00
July	2.27	8.26	67.00
August	1.50	9.92	50.00
September	0.70	7.72	45.00

Change in Water Temperature: Lowering of the reservoir may also affect water temperatures in Middle Creek because of changes in reservoir release temperatures. As discussed in in Section 3.5.2.1, *Physical Conditions*, the depth at which water is released from the reservoir is dependent on the reservoir's water surface elevation. For example, at full reservoir capacity (elevation 8,137.5 feet), the LLO is approximately 28 feet (8.5 meters) below the water surface, while at the proposed target elevation of 8,114.3 feet, the LLO would be approximately 7 feet (2.1 meters) below the water surface. As shown on Figure 7, water temperatures in the reservoir decrease with increasing depth. At lower reservoir elevations, the LLO outlet is at a shallower depth (i.e., closer to the warmer surface waters of the reservoir); therefore, releases at a lower reservoir level potentially are warmer than they would be if the reservoir level was higher, although the degree to which temperatures would be warmer would depend on the magnitude of the difference between water levels. Specifically, greater difference between water levels is likely to result in greater temperature differences. However, as discussed in Section 3.5.2.1, water temperatures in the reservoir reportedly warm to 68°F, which is below what is considered to be the maximum optimal summer temperature of 72°F for Lahontan cutthroat trout. Therefore, Middle Creek water temperatures under reduced reservoir storage levels are not expected to adversely affect Lahontan cutthroat trout in Middle Creek. This impact would be less than significant.

Effects of Flow Interruption on Lahontan Cutthroat Trout in Middle Creek

As discussed in Chapter 2, PG&E began drawing down the reservoir through the LLO in summer of 2018 and will continue to draw down the reservoir to an elevation of 8,111.3 feet over the winter of 2018–2019. Drawing down the reservoir to elevation 8,111.3 feet would leave approximately 2 feet of water depth over the LLO, thereby keeping both pipes of the LLO full of water to prevent ice from blocking the LLO and interrupting flow releases to Middle Creek. Because PG&E would maintain reservoir storage at approximately 400 acre-feet throughout the winter of 2018–2019 by making weekly adjustments to the LLO valve position to match outflow to inflow, PG&E would ensure that minimum instream flow, or natural flow, in Middle Creek would be maintained until the spring of 2019, when natural flows increase in response to snowmelt and increased runoff. Although an exceptionally dry or cold winter could cause natural inflows to the reservoir to cease, pool habitats in Middle Creek would provide refuge habitat for Lahontan cutthroat trout in Middle Creek downstream of UBL dam (see discussion of pool habitats in Section 3.5.2.1, *Physical Conditions*). Furthermore, by maintaining 400 acre-feet of storage in the reservoir and making weekly adjustments to the LLO valve position, PG&E would have the ability to maintain small releases for Lahontan cutthroat trout in Middle Creek should natural inflows to the reservoir cease for brief periods. Therefore, the proposed 2018–2019 winter drawdown of the reservoir to elevation 8,111.3 feet is not expected to result in the interruption of flow releases to Middle Creek.

In addition, the proposed reservoir target elevation of 8,114.3 feet for construction would leave approximately 5 feet of water depth over the LLO. This water level is anticipated to provide a sufficient quantity of available storage in the reservoir to meet minimum instream flow requirements of up to 5 cfs through June 2020, while maintaining the reservoir level above the elevation of the LLO. Therefore, it is anticipated that releases to Middle Creek would continue uninterrupted through fall, winter, and spring following construction and that all releases would be made through the LLO (i.e., at no time would pumping of water from the reservoir over UBL dam be required to maintain minimum instream flows in Middle Creek). Evaluation and refinement of the reservoir target elevation during development of the 2019 summer and fall UBL drawdown plan, which would be presented to the Mokelumne ERC for approval prior to implementation, would further ensure that sufficient storage would be maintained in the reservoir to meet minimum instream flow requirements in Middle Creek until natural inflows to the reservoir resume. This impact would be less than significant.

Construction Effects on Lahontan Cutthroat Trout

The proposed project involves the following activities that could result in disturbance, injury, or mortality of Lahontan cutthroat trout in the reservoir: installing and removing turbidity curtains and a cofferdam, dewatering, excavation, grading, placing rock, installing and operating a flow pumping system, fish guiding, fish rescue and relocation, and operating heavy equipment on the dry reservoir bottom adjacent to the reservoir shoreline. Lahontan cutthroat trout, including fry and young juveniles, may be present in the LLO approach channel and adjacent reservoir shoreline areas and could be affected by these activities.

Noise, vibration, and other physical disturbances resulting from these activities can harass fish, disrupt or delay normal activities, or cause injury or mortality. The potential magnitude of effects depends on a number of factors, including the type and intensity of the disturbance, proximity of the action to the water body, timing of actions relative to the occurrence of sensitive life stages, and frequency and duration of activities. For most activities, the effects on Lahontan cutthroat trout would be temporary and limited to avoidance behavior in response to movements, noises, and shadows caused by construction personnel and equipment where such operations are close to the shoreline. However, survival of fry in nearshore areas may be altered if disturbance causes fish to leave protective habitat (e.g., increased exposure to predators), but such fish would be expected to find other suitable nearshore areas within close proximity to the disturbance. Injury or mortality may result from direct and indirect contact with humans and equipment, noise, and physiological stress.

Physical disturbance and injury would be most likely during in-water work. The following project actions that would involve in-water work.

- Installation of turbidity curtains and the cofferdam.
- Dewatering.
- Fish rescue and relocation.
- Installation and operation of a flow pumping system.

Installation of turbidity curtains and the cofferdam could entrap Lahontan cutthroat trout, particularly fry and juveniles. Any fish that become trapped inside of turbidity curtains would be exposed to increased levels of turbidity and suspended sediments that would result from the sump discharge, and could be injured or killed as a result of this exposure. In addition, fish trapped inside turbidity curtains would be at greater risk of exposure to predators because fish would be confined to the space between the turbidity curtain and the shoreline and would be without an escape route to deeper habitats within the reservoir. Any fish trapped between the cofferdam and UBL dam would be expected to be killed because these areas would be dewatered prior to construction.

As part of project construction, work would be done on the LLO approach channel and the existing LLO pipes would be extended into the reservoir by 50 feet. These project actions would require that all releases through the LLO be terminated temporarily during construction. Because flow to Middle Creek is maintained by releases through the LLO, a temporary pumping system would be installed in the reservoir and used to maintain minimum instream flows (2 to 5 cfs) in Middle Creek throughout construction. Fish, including Lahontan cutthroat trout, may be injured or killed in Middle Creek in the event of an equipment malfunction that interrupts flow to Middle Creek. In addition, operation of the flow pumping system would have the potential to entrain and kill lake-dwelling Lahontan cutthroat trout if intakes to the pumping system were not screened. Fry and small juveniles would be particularly vulnerable to entrainment because of their smaller size and weaker swimming ability.

Disturbance, injury, or mortality of Lahontan cutthroat trout would be a potentially significant impact. Implementation of Mitigation Measures BIO-MM-4 through BIO-MM-6 would reduce the potential impact to a less-than-significant level.

Mitigation Measure BIO-MM-4: Implement Cofferdam, Turbidity Curtain, and Construction Site Dewatering Restrictions

Any activity that temporarily dewaters or isolates (e.g., with a cofferdam or turbidity curtain) any segment of the lake will trigger implementation of the following conditions:

- The extent of the cofferdam footprint, placement of the turbidity curtains from the lakeshore, and lake dewatering will be limited to the minimum necessary to accommodate construction activities.
- Prior to closing the LLO of the lake and installing the cofferdam, a pumping system will be installed and operated in a such a way that flow in Middle Creek downstream of UBL dam will not be interrupted as flow through the LLO is reduced and eventually turned off (see Mitigation Measure BIO-MM-6: Implement Flow Pumping System Requirements).
- Prior to installing the cofferdam and discharging water to the sump discharge area in the lake during dewatering activities, turbidity curtains will be installed to prevent turbid water and sediment from entering the reservoir.
- Before the turbidity curtains and cofferdam are installed, any fish present in the area proposed for dewatering will be gently guided out of the work area (see Mitigation Measure BIO-MM-5: Guide and Rescue Fish from Affected Habitats), including the areas affected by the turbidity curtains and cofferdam, by using a net or nets (e.g., seines) in such a way that fish can escape the work area to suitable habitats in the reservoir unaffected by construction activities, to the extent practicable.
- As the cofferdam and turbidity curtains are being installed, the seines used to gently guide fish out of the work area will be positioned on the lake side of the turbidity curtains and cofferdam sites to prevent fish from re-entering the work area as the turbidity curtains, cofferdam, and any rock fill material, sheeting, and sand bags are installed. The seines will remain in place until installation of the turbidity curtains and cofferdam is completed, to the extent practicable.
- Dewatering of the construction site will commence only after the turbidity curtains and cofferdam have been installed. During dewatering, water will be either drained through the LLO or pumped back over the cofferdam into the sump discharge area within the reservoir, but behind the turbidity curtain.

Mitigation Measure BIO-MM-5: Guide and Rescue Fish from Affected Habitats

Initiating any activity that temporarily isolates or dewaters the shoreline of the reservoir will trigger implementation of the following conditions:

- After the flow pumping system is in place and before installation of the turbidity curtains and cofferdam are initiated, all fish will be guided with nets (e.g., seines) from work areas to be dewatered by qualified fish biologists who have authorization from CDFW and USFWS to guide fish, to the extent practicable. No fish will be captured or handled during fish guiding activities.
- Seining to guide fish from the work area will be repeated as necessary to ensure that all fish are successfully guided from the work area (see Mitigation Measure BIO-MM-4: Implement Cofferdam, Turbidity Curtain, and Construction Site Dewatering Restrictions) prior to turbidity curtains and cofferdam installation.

- During dewatering activities, a qualified fish biologist will be onsite to rescue and relocate any remaining fish trapped on the dam side of the cofferdam.
- The methods and equipment used to guide, rescue, and relocate fish out of the work area to be isolated and dewatered will be developed cooperatively by USFWS and PG&E. The methods will also specify the type, construction, and material of the nets used to guide and exclude fish from the work area, and the methods, protocols, and equipment used to collect, handle, and release fish as part of the fish rescue and relocation activities. Fish will not be captured or handled in any manner during fish guiding activities; fish will be handled only as part of any fish rescue and relocation efforts. Fish biologists will contact USFWS immediately in the event that any Lahontan cutthroat trout are found dead or injured following fish guiding or rescue and relocation activities.

Mitigation Measure BIO-MM-6: Implement Flow Pumping System Requirements

Any activity that requires that flow through the LLO to be reduced or terminated, or that requires pumps to be used to assist in drawing down the reservoir, will trigger implementation of the following conditions:

- When pumps are used to supply 100 percent of all flow in Middle Creek during construction, the following conditions will apply:
    - A pumping system that can pump and deliver the minimum instream flow to Middle Creek downstream of UBL dam will be installed and operated in such a way that uninterrupted flow in Middle Creek is maintained during construction.
    - The pumping system will include a backup system with automatic transfer capability to ensure that downstream flows are maintained uninterrupted in the event of any equipment malfunction.
- All intakes to the pumping system placed in the reservoir will be screened to protect lake-dwelling Lahontan cutthroat trout and other fish species from being entrained with water being pumped from the reservoir. Screens will be installed, operated, and maintained according to NMFS's fish screen criteria (National Marine Fisheries Service 2011), which apply to federally listed salmonid species and temporary pump intakes (U.S. Fish and Wildlife Service 2013). Fish screens meeting NMFS criteria have the following specifications:
    - A minimum effective surface area[1] of 2.5 square feet per cfs and a nominal maximum approach velocity[2] of 0.4 feet per second for fish screens with an automated cleaning device, or a minimum effective surface area of 1 square foot per cfs and a nominal maximum approach rate of 0.2 feet per second for fish screens with no automated cleaning device.

[1] *Effective surface area* - the total submerged screen area, excluding major structural members, but including the screen face material. For rotating drum screens, effective screen area consists only of the submerged area projected onto a vertical plane, excluding major structural members, but including screen face material. The minimum *effective screen area* is calculated by dividing the maximum screened flow by the allowable *approach velocity*.

[2] *Approach velocity* - the vector component of velocity that is perpendicular to the vertical projection of the screen face, calculated by dividing the maximum screened flow by the *effective screen area*. An exception to this definition is for end-of-pipe cylindrical screens, where the *approach velocity* is calculated using the entire *effective screen area*.

- A round or square screen mesh that is no larger than 2.38 millimeters (0.094 inch) in the narrow dimension, or any other shape that is no larger than 1.75 millimeters (0.069 inch) in the narrow dimension.

- The discharge piping will be routed around the work site and over the dam to a discharge point in Middle Creek, and the dam embankment at the pipe crossing locations will be protected with plastic to prevent erosion of the embankment in the event of an accidental break or leak in the pipe.
- The discharge point in Middle Creek will be located immediately downstream of the valve house and at a location that prevents any portion of Middle Creek that is normally wetted in the creek to be dewatered, as practicable.
- The outlet of the diversion will be positioned such that the discharge of water does not induce bank erosion or channel scour in Middle Creek.
- As the flow pumping system is brought online, flow being released through the LLO will only be terminated once it has been determined that flow from the bypass system can maintain the required minimum instream flow in Middle Creek. Similarly, prior to taking the flow pumping system offline following construction, PG&E will ensure that flow through the LLO is sufficient to meet the required minimum instream flow in Middle Creek.

Water Quality Effects on Lahontan Cutthroat Trout

Turbidity and Suspended Sediment: The proposed project involves the following construction activities that would disturb soil and sediments in or adjacent to the reservoir: cofferdam and turbidity curtain installation, soil excavation, drainage improvements, rock placement, use of machinery, and dewatering. Other potential sources of turbidity and suspended sediment include the placement and regrading of spoils at the alternate boat ramp area, the temporary placement of spoils at the shoreline areas (Figure 2), and the installation and operation of the temporary pump bypass, including the discharge to Middle Creek. These activities could increase erosion and mobilization of sediments, resulting in increased turbidity and suspended sediment in the reservoir and Middle Creek, and potential adverse effects on aquatic species and their habitat. The potential for these effects would be greatest during summer thunderstorms that could generate significant runoff.

Depending on the concentration and duration of exposure, suspended sediment can cause lethal, sublethal, and behavioral effects in fish (Newcombe and Jensen 1996). For salmonids, elevated turbidity and suspended sediment has been linked to a number of physiological and behavioral responses indicative of stress (Bisson and Bilby 1982; Sigler et al. 1984; Berg and Northcote 1985; Servizi and Martens 1992). High suspended sediment levels can cause gill trauma and impaired respiratory function. Very high levels can directly damage gill tissues, resulting in physical injury and even death. Behavioral effects include avoidance or abandonment of preferred habitat, changes in foraging ability, and increased predation risk. Indirect effects include the adverse effects of high concentrations of sediments on macroinvertebrates, the main prey of Lahontan cutthroat trout, and on spawning and rearing habitat for cutthroat trout in Middle Creek. Consequently, prey species and spawning habitat quantity and quality could be reduced if suspended sediment and turbidity levels substantially exceed ambient levels for prolonged periods.

These potential effects would largely be minimized or avoided by conducting most construction activities in the dry, which would be achieved by drawing down the reservoir before construction begins and by dewatering and isolating in-water work areas with a cofferdam. However, some activities, such as installing and removing the cofferdam and turbidity curtains, dewatering via the sump pumps or through the LLO, and installing and operating the bypass system, would require work in water. Therefore, these activities would have the potential to generate turbidity and suspended sediments.

Turbid water could also enter Middle Creek if a large summer storm results in the work area becoming flooded. A PG&E water management specialist reviewed daily storage and outflow data for UBL reservoir from 1980 to present to determine the extent of inflow that could be expected from summer thunderstorms. Sharp increases in inflow relative to the previous day from July to October were reviewed. The maximum single day inflow observed was 580 acre-feet during July 1998. Overall, the highest inflow days were observed during July (tail end of snowmelt) and October. The vast majority of days (97 percent) when inflows increased showed less than 100 acre-feet of inflow per day, and 50 percent of days showed inflow of less than 10 acre-feet per day. During all years, once snowmelt ended during July, there were no instances of a flow greater than 100 acre-feet per day being sustained for more than 2 days. Based on this data review, the potential for a summer storm to flood the work area is low.

To address effects of construction-related turbidity and suspended sediment, PG&E would implement Avoidance and Minimization Measure AMM-1: Implement Water Quality Protection Measures and Erosion and Sediment Control Plans. PG&E would also conduct turbidity monitoring as described in its draft *Upper Blue Lake Dam Seismic Retrofit Project Water Quality Monitoring Plan* (Appendix C), which would ensure performance of the SWPPP. With implementation of Avoidance and Minimization Measure AMM-1 and the water quality monitoring plan, the impact would be less than significant.

Contaminants: Project actions that involve the storage, use, or discharge of toxic and other harmful substances near water bodies (or in areas that drain to these water bodies) can result in contamination of these water bodies and potentially affect fish and other aquatic organisms. The operation of heavy equipment such as excavators, backhoes, dump trucks, cement trucks, bulldozers, and graders, and other construction equipment could result in accidental spills and leakage of fuel, lubricants, hydraulic fluids, and coolants in or near the reservoir. In addition, wet concrete and other construction materials may accidentally come into contact with water bodies or enter water bodies in surface water runoff during storms. Other sources of contaminants include the discharges from vehicle and concrete washout facilities, as well as nutrients, organic contaminants, and metals adsorbed[3] in suspended sediments that may be transported to the reservoir or Middle Creek. However, standard construction BMPs, including conducting most construction activities in the dry by drawing down the reservoir before construction begins, and by dewatering and isolating in-water work areas with a cofferdam and turbidity curtain, are expected to prevent contamination of water bodies, and their associated effects on fish, from occurring during project construction.

The potential magnitude of biological effects resulting from the accidental or unintentional discharge of contaminants depends on a number of factors, including the proximity of the discharge to water bodies; the type, amount, concentration and solubility of the contaminant; and the timing and duration of the discharge. Contaminants can affect survival and growth rates, as well as the reproductive success of fish and other aquatic organisms. The level of effect depends on species and

[3] Adsorption is the adhesion in an extremely thin layer of molecules (as of gases, solutes, or liquids) to the surfaces of solid bodies or liquids with which they are in contact.

life stage sensitivity, duration and frequency of exposure, condition or health of individuals (e.g., nutritional status), and physical or chemical properties of the water (e.g., temperature, DO).

To address potential effects on surface water quality from construction-related contaminants, PG&E would implement Avoidance and Minimization Measures AMM-1: Implement Water Quality Protection Measures and Erosion and Sediment Control Plans, and AMM-2: Implement Hazardous Materials Control Measures. With implementation of these avoidance and minimization measures, the impact would be less than significant.

Effects of Reservoir Drawdown on Yosemite Toad Eggs

As discussed in Chapter 2 *Project Description*, the reservoir would be drawn down to the target elevation of 8,114.3 feet by July 2019 to reduce water depths in the LLO approach channel and expose the shoreline area at the construction site. This level is below the baseline interim operational reservoir elevation restriction of 8,122.5 feet (i.e., existing conditions).If Yosemite toad eggs are present in or along the reservoir below the 8,122.5 elevation level as it is being lowered for dam retrofit work, egg stranding could result. The lowering of the reservoir would also reduce the amount of available breeding habitat for Yosemite toad, because the shallow pooled areas along the western shore would dry out. Because Yosemite toad has experienced widespread population declines (78 FR 24500–24501), loss of breeding potential would be a significant impact. PG&E would implement Mitigation Measure BIO-MM-7: Continue the Operations Practice of Not Drawing Down Upper Blue Lake Reservoir until after July 31 to Allow for Yosemite Toad Breeding Success and Mitigation Measure BIO-MM-8: Conduct a Genetics Study of the Upper Blue Lake Reservoir Yosemite Toad Population, which would compensate for the potential loss of Yosemite toad breeding potential and reduce the impact to to a less-than-significant level.

Mitigation Measure BIO-MM-7: Continue the Operations Practice of Not Drawing Down Upper Blue Lake Reservoir until after July 31 to Allow for Yosemite Toad Breeding Success

Once the UBL dam seismic retrofit has been completed, PG&E will not begin drawing down the reservoir until after July 31 of each year to allow Yosemite toad the opportunity to successfully breed in and along the reservoir. This operations practice will be included each year in the Upper Lakes Operation Plan, which contains the drawdown schedule for UBL reservoir, and will be continued in perpetuity. This operations practice could be waived in response to a dam safety issue (e.g., seepage) that required a fast drawdown or during a critically dry water year and the downstream flow requirement was not being met. To the extent possible, PG&E will use data from ongoing Stream Ecology Monitoring Program Yosemite toad surveys or other focused survey data to inform decisions if reservoir lowering is required prior to July 31 for reasons other than dam safety. If possible, the reservoir will not be lowered until toad eggs have hatched and larvae are able to follow the receding water level.

Mitigation Measure BIO-MM-8: Conduct a Genetics Study of the Upper Blue Lake Reservoir Yosemite Toad Population

To compensate for possible Yosemite toad egg stranding, PG&E will conduct a study to better understand the genetics of the hybrid Yosemite toad/California toad population at UBL reservoir. PG&E will prepare a study design for USFWS review and approval. The study will include obtaining samples from Yosemite toads for genetics analysis. PG&E or its contractor will obtain all necessary permits for conducting the study, and a reputable genetics lab will conduct the analysis. The methods and results of the study will be provided in a report to USFWS. The study will contribute to the knowledge of the Yosemite toad population in the northern extent of its range. Understanding the genetics of the population may contribute to new or improved management practices that benefit the population at UBL reservoir and other populations within this portion of the species range.

Construction Effects on Yosemite Toad and Sierra Nevada Yellow-legged Frog

Although the project area is considered suitable upland habitat for Yosemite toad and SNYLF, the portion of the reservoir where dam improvements would be implemented does not provide suitable aquatic breeding habitat for Yosemite toad or SNYLF.

Wet excavated material would be temporarily placed along the eastern shore of UBL reservoir and dry spoils would be permanently placed at the alternate boat ramp area (Spoils Site 1 in Figure 2). These two areas are considered upland habitat for Yosemite toad and nonbreeding aquatic habitat for SNYLF. Dry spoils would also be placed and stored along Blue Lakes Road at Spoils Sites 2a and 2b, which are considered upland habitat for Yosemite toad and SNYLF (Figure 2). All of these sites are located away from the known Yosemite toad breeding areas on the west and north sides of the reservoir (Figure 10). The placement of excavated material at Spoils Site 1 would not make the area unusable for Yosemite toad as upland habitat or for SNYLF as nonbreeding habitat, and may add substrate that could be used for cover. Spoils Sites 2a and 2b are an existing borrow area and a road turnout, respectively, along Blue Lakes Road (Figure 2). These areas are disturbed and provide low-quality Yosemite toad and SNYLF upland habitats. Individual toads and frogs could move through these areas but are unlikely to linger here because of the lack of cover. The placement of spoils at Spoils Sites 2a and 2b would change the substrate of these areas but would not make them unusable as upland habitat by Yosemite toad and SNYLF. Vehicle parking, staging of equipment and materials, and disturbance of work areas would be temporary and would not permanently alter suitable upland habitat.

There is potential for individual Yosemite toads to be present in the work area until September or October. SNYLF has never been observed in or along UBL reservoir during periodic surveys conducted by PG&E or its contractor from 2002 to 2018. The presence of predatory fish likely precludes SNYLF breeding in the reservoir and in Middle Creek, although juveniles or adults could occur along their respective shorelines on occasion.. Vehicle travel, staging of equipment and materials, and the placement of spoils could crush or bury burrows that provide suitable refuge habitat for Yosemite toads. Toads within the burrows could be crushed or trapped. Because Yosemite toad and SNYLF have experienced widespread population declines (78 FR 24500-24501, 79 FR 24261), injury or mortality of individual Yosemite toad and SNYLF would be a significant impact. Implementation of Mitigation Measure BIO-MM-3: Conduct Worker Environmental Awareness Training and Implement General Requirements and Mitigation Measure BIO-MM-9: Conduct Surveys and Implement Protective Measures for Yosemite Toad and Sierra Nevada Yellow-legged Frog would reduce potential construction effects on Yosemite toad and SNYLF to a less-than-significant level.

Mitigation Measure BIO-MM-9: Conduct Surveys and Implement Protective Measures for Yosemite Toad and Sierra Nevada Yellow-legged Frog

During the 2019 breeding season, a qualified biologist (i.e., a biologist with experience with Yosemite toad and its habitats) will conduct surveys for Yosemite toad eggs along the entire wetted perimeter of the reservoir. Additionally, a qualified biologist (i.e., a biologist with experience with Yosemite toad and SNYLF and their habitats) will conduct a preconstruction survey for Yosemite toad and SNYLF in the work area and within 500 feet of the work area within 24 hours of the start of work. Temporary and permanent spoils disposal areas will also be surveyed prior to the placement of spoils in these areas. Areas with burrow complexes within the work area and spoils sites will be flagged by the biologist. Flagging will be maintained for the duration of construction. The contractor will avoid driving, parking equipment, or placing materials or spoils in the flagged areas. The biologist will use lathe and flagging to mark a route to the southwest portion of the work area that avoids as many burrows as possible. During the WEAT, contractors will be directed to use the designated route.

The qualified biologist will remain on the project site for the duration of dam improvements to monitor work activities and ensure that no amphibians enter the work area or are harmed by construction activities. The biologist will ensure that lathe and flagging remains intact throughout construction, and will maintain a monitoring log throughout construction.

Effects of Flow Changes, Sedimentation and Contamination on Sierra Nevada Yellow-legged Frog Nonbreeding Habitat in Middle Creek

Flow Changes in Middle Creek: SNYLF was not observed in Middle Creek during surveys that were conducted during July and August 2014; however, the creek provides suitable nonbreeding habitat for the species. To facilitate meeting the target elevation of 8,114.3 feet by July 2019, PG&E began releasing additional water from the reservoir through the LLO in fall of 2018. PG&E also expects to have to release additional water from the reservoir through the LLO in winter and spring of 2019 to maintain reservoir levels during periods of snowmelt and increased runoff that otherwise would be captured by the reservoir. These additional releases could affect SNYLF if the timing of the increased flow is substantially different from natural conditions.

The increased flow that occurred in fall of 2018 was inconsistent with natural flow conditions because there is limited precipitation, and subsequent increases in creek flow, at this time of year. However, the amount of additional water released from the reservoir during this drawdown period was relatively small (6–8 cfs), and Middle Creek is not considered breeding habitat for SNYLF (i.e., tadpoles would not be present). Therefore, the increased flow in the fall likely did not affect SNYLF. The higher flow in winter and spring 2019 would coincide with natural conditions, when there is precipitation during the winter and when snow is melting during the spring and creek flows are naturally higher. If the winter of 2018–2019 is a very low water year, flow in Middle Creek could be reduced; however, PG&E would make weekly adjustments to the LLO valve position to match outflow to inflow, thereby ensuring that minimum instream flows, or natural flows, in Middle Creek are maintained throughout the winter of 2018–2019. Because higher winter and spring flows are similar to natural conditions, and flows are variable from year to year based on the amount of precipitation, snow pack, spring temperatures, and storms, SNYLF is not expected to be affected by a higher flow during winter and spring in Middle Creek.

As described in Chapter 2, *Project Description*, the total maximum instantaneous flow that can be released through the LLO is 62 cfs when the reservoir is at full capacity (elevation 8,137.5 feet), and the maximum that can be released is incrementally lower at reduced reservoir levels. Because PG&E would manage the reservoir to be at or below elevation 8,117.8 feet prior to initiating reservoir drawdown to meet the target elevation of 8,114.3 feet for construction, the maximum instantaneous flow that would be expected to be released through the LLO would be approximately 40 cfs, which is within the range of Middle Creek spring flows under baseline conditions (Table 3.5-3). Even if PG&E has to augment the LLO releases by pumping water from the reservoir to facilitate drawing down the reservoir for construction, the added releases (up to 15 cfs), together with the releases through the LLO, would not exceed the maximum instantaneous flow (62 cfs) that can be released through the LLO. Because the maximum flow that would be released would not exceed the maximum release when UBL reservoir is at full capacity, SNYLF is not expected to be affected by higher flow in Middle Creek prior to the start of dam improvements. The impact of flow changes on SNYLF nonbreeding habitat in Middle Creek would be less than significant.

Sedimentation or Contamination of Middle Creek: There is potential for material or sediment to enter Middle Creek during dam improvements, which could affect water quality in Middle Creek. Construction activities could result in erosion and mobilization of sediments, resulting in increased turbidity and suspended sediment in Middle Creek. Turbid water could be released in Middle Creek when the work area is being dewatered and remaining water is drained through the LLO. As discussed in Chapter 2 *Project Description*, a filter sock and/or turbidity curtain could be installed on the end of the discharge pipe and in Middle Creek, respectively, if necessary to prevent introducing turbid water to Middle Creek.

Turbid water could also enter Middle Creek if a large summer storm results in the work area becoming flooded. A PG&E water management specialist reviewed daily storage and outflow data for UBL reservoir from 1980 to present to determine the extent of inflow that could be expected from summer thunderstorms. Sharp increases in inflow relative to the previous day from July to October were reviewed. The maximum single day inflow was 580 acre-feet during July 1998. Overall, the highest inflow days were observed during July (tail end of snowmelt) and October. The vast majority of days (97 percent) when inflows increased were less than 100 acre-feet of inflow per day. In 50 percent of the days inflow was less than 10 acre-feet per day. During all years, once snowmelt ended during July, there were no instances of a flow greater than 100 acre-feet per day being sustained for more than 2 days. Based on this data review, the potential for a summer storm to flood the work area is low. If a large storm were to occur, the process for managing excess water in the work area would prevent turbid water in the work area from entering Middle Creek (see Chapter 2, Section 2.1.4, *Dewatering*).

To address the effects of sedimentation or the introduction of fuel, oil, and other contaminants into Middle Creek on SNYLF nonbreeding habitat, PG&E would implement Avoidance and Minimization Measure AMM-1: Implement Water Quality Protection Measures and Erosion and Sediment Control Plans, and AMM-2: Implement Hazardous Materials Control Measures. PG&E would also conduct turbidity monitoring as described in its draft *Upper Blue Lake Dam Seismic Retrofit Project Water Quality Monitoring Plan* (Appendix C), which would ensure performance of the SWPPP. Therefore, impacts of sedimentation and contamination on SNYLF nonbreeding habitat in Middle Creek would be less than significant.

Disturbance of Bald Eagle Foraging

A bald eagle was observed flying over and around UBL during a project site visit in June 2018. Although unlikely to nest at UBL, bald eagles could hunt for fish in the lake and perch from trees in and near the project area. Construction activities and noise, particularly helicopter use, could disturb bald eagles if they are foraging or are perched near the lake when these activities occur. Bald eagles may leave the UBL area as a helicopter approaches and fly to another lake to forage. While this would result in the eagle expending additional energy to travel to an alternative feeding area, this disturbance would not result in harm to the eagle. Therefore, this impact would be less than significant.

Disturbance of Nesting Migratory Birds

Construction activities would be implemented during the nesting season of migratory birds (generally February 15 through August 31) and could result in the disturbance of birds nesting in or near the project area. Although there would be no removal or pruning of shrubs or trees in the project area, construction disturbance close to active nests during the breeding season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to nest abandonment. In particular, use of helicopters to transport equipment, supplies, or personnel to the project site during the nesting season could be a substantial disturbance to birds nesting in or near the project area. This impact could be significant if it resulted in the reduction of local populations of migratory birds. To ensure that active nests are not disturbed and that the Migratory Bird Treaty Act and California Fish and Game Code are not violated, Mitigation Measure BIO-MM- 10 would be implemented. With implementation of this mitigation measure, the impact on nesting migratory birds would be less than significant.

Mitigation Measure BIO-MM-10: Conduct a Preconstruction Survey for Nesting Birds and Implement Protective Buffers around Active Nests.

If work is scheduled to begin during the nesting bird season (February 15 through August 31), one or more biologists will conduct a preconstruction survey for nesting birds no more than 14 days before the start of work. The start of work includes use of a helicopter to deliver equipment, supplies, or personnel to the project site or any other type of mobilization at the project site. If work does not begin within 14 days of the survey or construction activities stop for 14 days or more, work areas will be resurveyed for active nests. The project area and a 500-foot buffer around the project area will be surveyed. If an active nest is found in the survey area, the biologist will work with PG&E, and the resources agencies (USFWS and CDFW) if needed, to determine and establish no work buffers around the active nests to limit disturbance until the nest is no longer active. The extent of the buffers will depend on the level of noise or construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers. Suitable buffer distances may vary between species. Monitoring of active nests by a biologist may be required during high disturbance activities (i.e., helicopter use). Construction crew members will review a brochure on identifying and avoiding impacts on nesting birds. Should an active bird nest be found in the project area during work activities, all work will cease and the PG&E biologist will be contacted to establish an appropriate no work buffer zone.

Disturbance of Fringed Myotis, Long-legged Myotis, and Silver-haired Bat

No impacts on fringed myotis, long-legged myotis, or silver–haired bat would result from the proposed project, because no trees or other roosting habitat would be removed and construction would not prevent or interfere with other bat activities (i.e., drinking and foraging) because these activities occur at night when there would be no construction.

b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Construction Effects on Lemmon's Willow Thicket

Lemmon's willow thicket occurs in the area designated as the laydown and staging area within the OHWM of UBL. Movement of construction equipment and staging of construction materials could directly affect woody and herbaceous vegetation in the willow thicket. Construction activities could also result in alteration of Lemmon's willow thicket by changing the local topography and hydrology of the habitat. This would be a temporary impact during the construction period; the area would not be permanently altered.

Lemmon's willow thicket is a sensitive natural community identified by CDFW and is located within the OHWM of the lake, so it is also a water of the United States. This community would be regulated by CDFW and USACE. Temporary impacts on Lemmon's willow thicket would be significant even with implementation of Avoidance and Minimization Measure AMM-1: Implement Water Quality Protection Measures and Erosion and Sediment Control Plans and Mitigation Measures BIO-MM-3 (discussed above). However, the implementation of BIO-MM-11: Retain a Qualified Biologist to Conduct Periodic Monitoring during Construction would reduce the impact of construction on Lemmon's willow thicket to a less-than-significant level.

Mitigation Measure BIO-MM-11: Retain a Qualified Biologist to Conduct Periodic Monitoring during Construction

PG&E will retain a qualified biologist to conduct periodic construction monitoring in and adjacent to all sensitive habitats (i.e., willow thicket, reservoir, and stream) in the construction area. The biological monitor will assist the construction crew as needed to comply with all project implementation restrictions and guidelines. The monitor will inspect the orange construction fencing denoting the work area and environmentally sensitive areas at least once a week to ensure that fencing is intact and will notify the contractor of any repairs that are needed. The contractor will be responsible for maintaining the staked and flagged perimeters of the construction area and staging areas adjacent to sensitive biological resources. Each inspection will be documented in a monitoring log, which will be provided to and kept on file by PG&E.

Potential Spread of Invasive Plant Species

Project construction would have the potential to introduce and spread invasive plant species inside and outside of the project area. This would be of particular concern for wilderness areas near the project area and would be a significant impact. Although PG&E would implement Avoidance and Minimization Measure AMM-5: Implement Measures to Avoid the Spread of Noxious Weeds, the potential spread of invasive plants would be a potential impact. Mitigation Measure BIO-MM-12 would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-MM-12: Avoid the Introduction and Spread of Invasive Plants

PG&E or its contractor will be responsible for avoiding the introduction of new invasive plants and the spread of invasive plants previously documented in the project area. Accordingly, the following measures will be implemented during construction.

- Educate construction supervisors and managers on weed identification and the importance of controlling and preventing the spread of invasive weeds.
- Dispose of invasive species material removed during project construction offsite at an appropriate disposal facility to avoid the spread of invasive plants into natural areas.
- Minimize surface disturbance to the greatest extent feasible to complete the work

c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means?

Construction of the proposed project would result in direct impacts on waters of the United States, including non-wetland waters in reservoir (UBL reservoir) and perennial stream (Middle Creek). Both features are also considered waters of the State. Because the aquatic resources delineation had not been verified by USACE as of November 2018, the impact acreages in this discussion should be considered preliminary. The CWA Section 404 permit application (Pre-Construction Notification) and the aquatic resources delineation have been submitted to USACE, and the exact acreages of impacts associated with the placement of fill material into waters of the United States will be provided in the final application or permit.

Impacts were considered to be permanent if the project would result in the placement of permanent fill in these non-wetland waters and waters of the State. The project would result in approximately 0.476 acre of permanent impacts on non-wetland waters in reservoir habitat within the footprint of the rock fill buttress, extensions of LLO pipes, reconfiguration of the intake structure and trash rack below the OHWM of UBL reservoir, and placement of spoils below the OHWM at Spoils Site 1a. The project would not result in permanent impacts on waters in Middle Creek.

Impacts were considered to be temporary if fill would be removed following completion of construction and temporarily disturbed portions of non-wetland waters would be restored. Up to 3.754 acres of temporary impacts on non-wetland waters would result from cofferdam and temporary dam installations; use of the staging, parking, and the temporary spoils sites, all which would be located below the OHWM of UBL reservoir. Additionally, placement of an energy dissipater box in Middle Creek at the bypass pipe outlet would temporarily affect approximately 200 square feet of non-wetland waters.

Indirect impacts on water quality, such as increased turbidity and chemical runoff, may also result from project construction within the open water area of UBL reservoir and the portion of Middle Creek downstream of the discharge piping that would be used for the pumping system to draw down the lake. The turbidity curtain to be used in the lake would avoid a turbidity increase in UBL reservoir, and the screened floating suction hose would provide clean lake water to release into Middle Creek. Indirect impacts would be less than significant.

Temporary and permanent loss of reservoir would be a significant impact on federally protected non-wetland waters and waters of the State even with implementation of Avoidance and Minimization Measure AMM-1: Implement Water Quality Protection Measures and Erosion and Sediment Control Plans. Implementation of and Mitigation Measures BIO-MM-3, BIO-MM-11 BIO-MM-13, and BIO-MM-14 would reduce these impacts to a less-than-significant level.

Mitigation Measure BIO-MM-13: Avoid and Minimize Disturbance of Waters of the United States/Waters of the State

To the extent possible, PG&E will avoid and minimize impacts on waters of the United States and waters of the State by implementing the following measures. These measures will be incorporated into contract specifications and implemented by the construction contractor.

- Avoid construction activities in saturated or ponded natural wetlands and drainages during the wet season (spring and winter) to the maximum extent possible.
- Stabilize streams/drainages immediately upon completion of construction activities. Other waters of the United States will be restored in a manner that encourages vegetation to re-establish to pre-project condition and reduces the effects of erosion on the drainage system.
- Remove any debris or soils that are inadvertently deposited below the OHWM of the reservoir or perennial stream in a manner that minimizes disturbance of the bed and bank.
- Complete all activities promptly to minimize their duration and resultant impacts.

Mitigation Measure BIO-MM-14: Compensate for the Temporary and Permanent Loss of Waters of the United States/Waters of the State

To compensate for temporary impacts on waters of the United States and waters of the State in UBL reservoir and Middle Creek, all temporary fill will be removed and the lakeshore and creek bed will be restored to pre-project contours and conditions within 30 days following completion of construction activities.

To compensate for permanent loss of 0.476 acre of waters of the United States and waters of the State, PG&E will coordinate with USACE and the Regional Water Board. PG&E has unused compensatory mitigation credits from the Burt Read Meadow Restoration Project that could be applied to the proposed project. Alternatively, if USACE determines that the permanent loss of waters of the United States cannot be mitigated with the unused credits, PG&E will pay into the National Fish and Wildlife Foundation Sacramento District In-lieu Fee Program to ensure no net loss of wetland functions and values. The compensation ratio will be a minimum of 1:1 (1 acre of habitat credit for every 1 acre of impact) to ensure no net loss of habitat functions and values. The actual mitigation ratio and associated credit acreage may be modified based on USACE and Regional Water Board permitting, which will dictate the ultimate compensation for permanent impacts on waters of the United States and waters of the State.

PG&E will also implement the conditions and requirements of state and federal permits that will be obtained for the proposed project.

d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Effects of Reservoir Drawdown on Fish Movement

As discussed in Chapter 2 *Project Description*, the reservoir would be drawn down to the target elevation of 8,114.3 feet by July 2019 to reduce water depths in the LLO approach channel and expose the shoreline area in the construction area. Lower spring and summer reservoir levels from reservoir drawdown may influence fish passage into and out of the five reservoir tributaries: Granite, Middle, North, South, and West Creeks (Figure 5). When the reservoir level is high, lake-dwelling adults migrating to and from spawning grounds in tributary streams and juveniles emigrating from rearing areas to the reservoir have a shorter distance to travel within the relic channels to reach the mouths of tributary streams. When reservoir storage is high, inundation of the relic channels within the reservoir inundation zone ensures that hydrologic connectivity and fish passage conditions are adequate for fish movement. When reservoir storage is low, upstream migrating adults, downstream migrating post-spawn adults, and downstream migrating fry and juveniles have to negotiate longer channel segments within the reservoir inundation zone that are not inundated by the reservoir; these channel segments are unvegetated, lack cover from predators, and may become disconnected from upland segments of the tributary streams as a result of exposed sediments (e.g., critical riffles) or dry channel reaches.

The effect of lower reservoir levels on hydrologic connectivity and fish passage conditions in the relict channels is of greatest concern for post-spawning adults, fry, and juvenile Lahontan cutthroat trout, because the timing of their migration to the lake from upstream spawning and rearing areas would overlap the period when the reservoir would be drawn down. Because the gradient in these relict channels is generally flat and the channels are filled with fine sediment from having been inundated for many years, the most likely impediment trout would encounter would be channel segments that are dry or too shallow to pass fish. Fish encountering these passage impediments could be injured or killed if they become stranded in the tributary streams where they may be at a higher risk of mortality from predation or from unsuitable environmental conditions. Upstream migrating adults are not expected to be adversely affected by lower reservoir levels because the timing of their migration coincides with snowmelt runoff, which results in increased flows (and generally better passage conditions) in the exposed relic channels.

As part of the consultation with USFWS for the project, an ICF fish biologist conducted a survey of the five tributary streams within the reservoir inundation zone on August 28 and September 20, 2018, to assess the hydrologic connectivity, fish passage conditions, and occurrence of Lahontan cutthroat trout fry in these tributary streams following reservoir drawdown for the test pit excavations. The biologist observed that all tributary streams supported fry-sized trout, which, based on their small size (around 30 millimeters long) and coloration, appeared to be Lahontan cutthroat trout. In addition, the biologist observed that all tributary streams, although shallow (maximum depths of 1 to 3 inches), supported depths that were adequate for fry to move unimpeded within the channel. North and South Creeks (Figure 5) were the only streams observed to be hydrologically disconnected from the reservoir during the surveys. North Creek was found to be disconnected on both survey dates, while South Creek was found to be disconnected only during the September 20 survey. Surface flow in North Creek ceased relatively high up in the lake inundation zone at about elevation 8,138 feet, which is above the August and September median reservoir elevations of approximately 8,125 feet and 8,120 feet, respectively, under existing conditions (Figure 13). This suggests that the hydrologic disconnection of North Creek from the reservoir is a frequent occurrence under normal reservoir operations, and is especially likely during below normal water years such as 2018. By contrast, flow in South Creek was observed to cease a short distance upstream of the reservoir shoreline at the time of the survey at about elevation 8,118 feet. This lack of continuous surface flow may have prevented an unknown number of fry and juvenile Lahontan cutthroat trout in South Creek from emigrating to the reservoir. All other tributary streams (Middle, West, and Granite Creeks) (Figure 5) were observed to be hydrologically connected to the reservoir and lacked any obvious passage impediments for fry in the exposed relict channels.

These observations suggest that drawing down the reservoir to elevation 8,114.3 feet to facilitate project construction could interfere with the movement of Lahontan cutthroat trout between the reservoir and the tributary streams, and could potentially result in mortality of adult and juvenile Lahontan cutthroat trout if individuals become stranded or are exposed to increased predation. This is a potentially significant impact. Implementation of Mitigation Measure BIO-MM-15 would reduce the potential impact to a less-than-significant level.

Mitigation Measure BIO-MM-15: Monitor Fish Passage Conditions in Tributary Streams within the Reservoir Inundation Zone during Reservoir Drawdown, and Relocate Blocked Lahontan Cutthroat Trout to Upper Blue Lake Reservoir

A qualified fish biologist (i.e., a biologist with experience with salmonids and their habitat requirements) will visually monitor fish passage conditions in tributary streams within the reservoir inundation zone as the reservoir is being drawn down to facilitate construction activities.

If impediments (e.g., critical riffles, excessively shallow stream reaches, or dry channel segments) blocking the downstream movement of Lahontan cutthroat trout are observed within the inundation zone, the biologist will implement activities to rescue blocked fish and relocate them to the reservoir.

The methods and criteria used to monitor the streams for fish passage impediments and to conduct and terminate the fish rescue and relocation will be developed cooperatively by USFWS and PG&E. The methods will also specify the capture methods, type of materials that will be used, and protocols that will be followed to safely capture and relocate fish to the reservoir, while minimizing the potential for injury and mortality of rescued fish.

The qualified biologist will remain on the project site for the duration of work and as long as fish are observed to be blocked by impediments within the reservoir inundation zone. Monitoring and fish rescue and relocation activities will cease in the tributary stream if fish are no longer observed for 3 consecutive days or if surface flow in the tributary fails to reach the reservoir's maximum shoreline elevation (i.e., 8,137.5 feet).

Potential Obstruction of Wildlife Nursery Sites

Placement of spoils over nest sites of western bumble bee would impede the use of these areas as nursery sites. Spoils would not be placed in the sparsely vegetated areas along the lakeshore that the bees would most likely use. This would avoid or minimize the loss of western bumble bee nursery sites. The aquatic habitats in the project area do not provide breeding habitat for Yosemite toad or SNYLF. Therefore, the project would not impede nursery sites for these amphibians. Construction activities and disturbance could result in birds avoiding potential nesting sites in the project area. Although no vegetation that could provide nesting substrate would be removed, birds may avoid selecting nest sites in or near the project area because of construction noise and activities. Mammals could also avoid raising young near the project area as a result of construction activity. Because there are ample trees and shrubs in the surrounding area that could be used as nest sites for birds and undisturbed habitat in the project vicinity that could be used by mammals for rearing young, the impact on wildlife nursery sites would be less than significant.

e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Through compliance with state and federal regulations protecting sensitive biological resources, including waters of the United States and special-status species, the project would not conflict with any of the *Alpine County General Plan* policies. There would be no impact.

f. Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan?

There are no adopted or approved habitat conservation plans, natural community conservation plans for the project area. There would be no impact.

3.6 Air Quality

This section describes the existing conditions for air quality and analyzes the proposed project's impacts on air quality. The project area is in Alpine County, which is within the Great Basin Valleys Air Basin (GBVAB). The analysis focuses on the primary criteria pollutants that would be generated by construction of the proposed project, which are carbon monoxide (CO), particulate matter (PM10 and PM2.5), reactive organic gases (ROG), and nitrogen oxides (NO_X) (ozone precursors). Please refer to Section 3.7, *Greenhouse Gas Emissions*, for a discussion of greenhouse gas (GHG) emissions and climate change.

3.6.1 Existing Conditions

The GBVAB is north of the Mojave Desert, south of the Great Basin, and lies between the Sierra Nevada in the west and the California border in the east. The GBVAB has substantial elevation changes. Within the GBVAB are Death Valley, the lowest point in the Unities States at 282 feet below sea level, and Mount Whitney, the highest peak in the 48 states at 14,500 feet. This topography results in contrasting weather within the GBVAB. Pacific Storms bring winter snow to mountain peaks in the Sierra Nevada. Precipitation falls as rain just to the east of the Sierra Nevada crest, and conditions are arid to the south. Overall, due to the rural nature of Alpine County, low population density, and limited industry, air quality is generally good. Alpine County currently attains all state and federal air quality standards (California Air Resources Board 2017; U.S. Environmental Protection Agency 2018; Alpine County 2017).

3.6.2 Regulatory Setting

The Clean Air Act was first enacted in 1963 and has been amended numerous times in subsequent years (1965, 1967, 1970, 1977, and 1990). The Clean Air Act establishes federal air quality standards, known as national ambient air quality standards (NAAQS), and specifies future dates for achieving compliance. The Clean Air Act also mandates that the state submit and implement a State Implementation Plan for local areas not meeting those standards. The plans must include pollution control measures that demonstrate how the standards will be met. Because Alpine County currently attains all NAAQS, there are no applicable State Implementation Plan.

At the state level, the California Clean Air Act establishes the statewide air pollution control program. The California act requires all air districts in the state to endeavor to meet the California ambient air quality standards (CAAQS) by the earliest practical date. Unlike the federal Clean Air Act, the California Clean Air Act does not set precise attainment deadlines. Instead, the California act establishes increasingly stringent requirements for areas that require more time to achieve the standards. CAAQS are generally more stringent than the NAAQS and incorporate additional standards for sulfates, hydrogen sulfide, visibility-reducing particles, and vinyl chloride.

The CAAQS and NAAQS are listed together in Table 3.6-1.

Table 3.6-1. National and State Ambient Air Quality Standards

Criteria Pollutant	Average Time	California Standards	National Standards[a]	
			Primary	Secondary
Ozone	1-hour	0.09 ppm	None	None
	8–hour	0.070 ppm	0.070 ppm	0.070 ppm
Particulate matter (PM10)	24-hour	50 μg/m³	150 μg/m³	150 μg/m³
	Annual mean	20 μg/m³	None	None
Fine particulate matter (PM2.5)	24-hour	None	35 μg/m³	35 μg/m³
	Annual mean	12 μg/m³	12.0 μg/m³	15 μg/m³
Carbon monoxide	8-hour	9.0 ppm	9 ppm	None
	1-hour	20 ppm	35 ppm	None
Nitrogen dioxide	Annual mean	0.030 ppm	0.053 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppm	None
Sulfur dioxide[b]	Annual mean	None	0.030 ppm	None
	24-hour	0.04 ppm	0.014 ppm	None
	3-hour	None	None	0.5 ppm
	1-hour	0.25 ppm	0.075 ppm	None
Lead	30-day average	1.5 μg/m³	None	None
	Calendar quarter	None	1.5 μg/m³	1.5 μg/m³
	3-month average	None	0.15 μg/m³	0.15 μg/m³
Sulfates	24-hour	25 μg/m³	None	None
Hydrogen sulfide	1-hour	0.03 ppm	None	None
Vinyl chloride	24-hour	0.01 ppm	None	None

Source: California Air Resources Board 2016.

[a] National standards are divided into primary and secondary standards. Primary standards are intended to protect public health, whereas secondary standards are intended to protect public welfare and the environment.

[b] The final 1-hour sulfur dioxide rule was signed June 2, 2010. The annual and 24-hour standards were revoked in that same rulemaking. However, these standards remain in effect until 1 year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

ppm = parts per million.

μg/m³ = micrograms per cubic meter.

The project area is located within the local jurisdiction of the Great Basin Unified Air Pollution Control District (GBUAPCD). The GBUAPCD was established in 1974 with a joint powers' agreement among Alpine, Mono, and Inyo Counties. The GBUAPCD is responsible for enforcing federal, state, and local air quality regulations and ensuring that the GBVAB complies with the federal and state air quality standards. The GBUAPCD has jurisdiction over an area of approximately 13,975 square miles in Inyo, Mono, and Alpine Counties.

GBUAPCD has established the following district rules that may apply to the proposed project.

- **Rule 401—Fugitive Dust**. This rule requires reasonable precaution measures to prevent visible PM from being airborne, under normal wind conditions, beyond the source from which the emission originates.
- **Rule 402—Nuisance**. This rule prohibits the discharge of air contaminants, from any source, or other materials that cause injury, detriment, nuisance or annoyance to the public.

- **Rule 404-A—Particulate Matter**. This rule regulates the allowable concentration of PM discharged per standard dry cubic foot of exhaust gas. Concentrations may not exceed 0.3 grains per standard dry cubic foot of exhaust gas.
- **Rule 404-B—Oxides of Nitrogen**. This rule regulates the allowable concentration of NOx emitted in exhaust fumes to not exceed 250 parts per million by volume.
- **Rule 416—Sulfur Compounds and Nitrogen Oxides**. This rule controls the discharge of sulfur compounds and NOx. Sulfur compounds may not exceed 0.2 percent by volume, and nitrogen oxides may not exceed 140 pounds per hour.
- **Rule 417—Organic Solvents**. This rule prohibits the discharge of more than 15 pounds of organic materials into the atmosphere in 1 day, or more than 3 pounds in any 1 hour.

GBUAPCD does not have adopted CEQA guidelines for the analysis of air quality impacts, but recommends lead agencies rely on thresholds of significance adopted by the South Coast Air Quality Management District (SCAQMD) (Becknell pers. comm.). The SCAQMD CEQA Handbook provides significance thresholds for the operation and construction of projects (South Coast Air Quality Management District 2015). If the thresholds are exceeded, a potentially significant impact could result. These thresholds are provided in Table 3.6-2 and are used to analyze potential air quality impacts of the proposed project, consistent with GBUAPCD guidance.

Table 3.6-2. South Coast Air Quality Management District Air Quality Mass Daily Significance Thresholds

Pollutant	Construction (pounds/day)	Operation (pounds/day)
Nitrogen oxides	100	55
Reactive organic gases (	75	55
Particulate matter	150	150
Fine particulate matter	55	55
Sulfur oxides	150	150
Carbon monoxide	550	550

Source: South Coast Air Quality Management District 2015

The *Alpine County General Plan* Conservation Element, Section B, addresses air quality through the following goal (Alpine County 2017).

GP Goal No. 3. Meet or exceed federal and state air quality regulations.

3.6.3 Environmental Effects

Potential impacts of the proposed project on air quality are discussed in the context of the State CEQA Guidelines Appendix G checklist and SCAQMD significance thresholds recommended for use by GBUAPCD. Checklist Section III, *Air Quality*, asks whether the project would result in any of the following conditions.

a. Conflict with or obstruct implementation of the applicable air quality plan?

Because Alpine County currently attains all NAAQS, there are no applicable air quality attainment plans. The project would comply with all applicable GBUAPCD rules and the *Alpine County General Plan* goals. In addition, as shown in Table 3.6-3, the proposed project would not exceed any emissions thresholds during project construction or operation. Accordingly, impacts on an air quality plan would be less than significant.

b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

3.6.3.1 Construction

Project construction has the potential to affect ambient air quality through use of heavy-duty equipment, worker vehicle trips, truck hauling trips, and helicopter trips. Criteria pollutant emissions generated by these sources were quantified using information provided by the project proponent and emission factors from CalEEMod (version 2016.3.2) and the U.S. EPA (1980). It was assumed that construction would occur from June to September in 2019.

The project analysis assumed the project site would be fully accessible to vehicles via Blue Lakes Road. To reflect the possibility of (1) a late spring that delays the start of construction or (2) an early winter that requires accelerated completion of construction, a compressed construction schedule was created with shortened timelines for certain construction phases (e.g., placing the buttress rock, constructing the intake structure). During these shortened phases, the amount of construction equipment or daily hours of equipment use would increase. Emissions generated under the compressed schedule are considered a “worst-case” scenario and were also modeled to ensure air quality impacts under this possible alternative construction approach are fully evaluated.

Table 3.6-3 summarizes the estimated maximum daily emissions that would be generated by construction of the proposed project. The table also presents emissions under the worst-case compressed construction schedule condition. Please refer to Appendix F for all modeling assumptions and calculations.

Table 3.6-3. Maximum Daily Criteria Pollutant Emissions from Project Construction (pounds)

Scenario	ROG	NO_X	CO	SO_X	PM10	PM2.5
Project scenario	19	99	68	7	26	12
Compressed schedule (worst-case)	19	99	68	7	33	14
Threshold	75	100	550	150	150	55
Exceeds threshold?	No	No	No	No	No	No

ROG = reactive organic compounds;
NO_X = nitrogen oxides;
CO = carbon monoxide;
SO_X = sulfur oxides;
PM10 = particulate matter less than 10 microns in diameter;
PM2.5 = particulate matter less than 2.5 microns in diameter.
Please refer to Appendix F for modeling assumptions and calculations.

As shown in Table 3.6-3, construction of the proposed project would not generate criteria pollutant emissions in excess of GBUAPCD’s recommended thresholds. Emissions generated under a compressed schedule also would not result in exceedances of recommended thresholds. Accordingly, construction-related emissions would have a less-than-significant impact.

3.6.3.2 Operation

As described in Chapter 2, *Project Description*, the project site would be returned, as much as is reasonably practical, to its original condition following completion of construction activities,. All equipment and surplus materials would be removed from the project site. Operations and maintenance activities would be the same as pre-project conditions. Accordingly, there would be no change in emissions relative to existing conditions. This impact would be less than significant.

c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?

No single project is large enough by itself to result in regional nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. SCAQMD's (2003) air quality guidelines, which are recommended by GBUAPCD (Becknell pers. comm.), acknowledge that if a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts on the region's existing air quality conditions.

As shown in Table 3.6-3, construction of the proposed project would not generate criteria pollutant emissions in excess of GBUAPCD's recommended thresholds. In addition, operational activities would be the same as pre-project conditions; consequently, there would be no change in long-term operational emissions relative to existing conditions. Accordingly, neither construction nor operation of the proposed project would result in a cumulatively considerable or significant cumulative air quality impact. This impact would be less than significant.

d. Expose sensitive receptors to substantial pollutant concentrations?

Diesel Particulate Matter

Diesel-fueled engines used during construction could expose sensitive receptors to diesel particulate matter, which is considered carcinogenic. The nearest sensitive receptor to the project site is about 1.2 miles to the southeast. Diesel particulate matter generated during construction would dissipate as a function of distance and would be substantially reduced at the nearest receptor locations. Moreover, construction on the project site would occur for less than 110 days, which is significantly shorter than the 30-year exposure period typically associated with chronic cancer health risks (Office of Environmental Health Hazard Assessment 2015). Because operational activities would be the same as pre-project operations and maintenance activities, there would be no change in long-term exposure to diesel particulate matter emissions generated during routine maintenance. Consequently, neither construction- nor operation-related diesel particulate matter is expected to expose sensitive populations to substantial pollutant concentrations. This impact would be less than significant.

Localized Carbon Monoxide

Construction vehicles could expose sensitive receptors to localized CO. However, the nearest sensitive receptor to the project site is about 1.2 miles to the southeast. In addition, the campgrounds around UBL reservoir would be closed for the entire 2019 season to accommodate construction activities and construction activities themselves would be limited to the UBL dam area, which will be closed to the public. Therefore, the project would not contribute to or worsen localized CO concentrations within the project area from construction traffic.

Likewise, operations and maintenance activities would be the same as pre-project operations and maintenance activities. Implementation would neither generate new vehicle trips nor permanently alter or worsen the current congestion (i.e., no changes in level of service) on any streets in the project vicinity. Therefore, the project would not contribute to or worsen localized CO concentrations within the project area from operational traffic. This impact would be less than significant.

e. Create objectionable odors affecting a substantial number of people?

Although offensive odors rarely cause any physical harm, they can be unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and air districts. Odor emissions related to the proposed project would primarily occur during the construction period, when emissions from equipment may be evident in the area adjacent to the construction zone. The construction activities would be short term and are not likely to result in nuisance odors that would violate GBUAPCD Rule 402 nuisance standards. Similarly, operations and maintenance activities would be the same as pre-project operations and maintenance activities and would not result in substantial odor emissions. This impact would be less than significant.

3.7 Greenhouse Gas Emissions

This section describes the existing conditions for GHGs and analyzes the proposed project's impacts on climate change. The analysis focuses on the primary GHGs that would be generated by construction of the proposed project, which are carbon dioxide (CO_2), methane (CH_4), and nitrous oxides (N_2O). Please refer to Section 3.6, *Air Quality*, for a discussion of criteria pollutants and air quality impacts.

3.7.1 Existing Conditions

Unlike emissions of criteria and toxic air pollutants, which have local or regional impacts, emissions of GHGs have a broader, global impact. Global warming associated with the "greenhouse effect" is a process whereby GHGs accumulating in the atmosphere contribute to an increase in the temperature of the earth's atmosphere. The principal GHGs contributing to global warming and associated climate change are CO_2, CH_4, N_2O, and fluorinated compounds. Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, utility, residential, commercial, and agricultural sectors.

To simplify reporting and analysis, methods have been set forth to describe emissions of GHGs in terms of a single gas. The most commonly accepted method to compare GHG emissions is the global warming potential (GWP) methodology defined in the collective documents published by Intergovernmental Panel on Climate Change (IPCC). IPCC defines the GWP of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of CO_2 equivalents (CO_2e), which compares the gas in question to that of the same mass of CO_2 (CO_2 has a GWP of 1 by definition).

Table 3.7-1 lists the GWP of CO_2, CH_4, and N_2O; their lifetimes; and abundances in the atmosphere. The GWP values used in this report are based on the IPCC Fourth Assessment Report and United Nations Framework Convention on Climate Change reporting guidelines and are defined in Table 3.7-1. These GWP values are used in the California Air Resources Board's California inventory and *2017 Climate Change Scoping Plan*.

Table 3.7-1. Lifetimes and Global Warming Potentials of Principal Greenhouse Gases

Greenhouse Gas	Global Warming Potential (100 years)	Lifetime (years)	2016 Atmospheric Abundance
Carbon dioxide	1	50–200	400 ppm
Methane	25	9-15	1,834 ppb
Nitrous oxide	298	121	328 ppb

Sources: Intergovernmental Panel on Climate Change 2007; Blasing 2016.

3.7.2 Regulatory Setting

There is currently no federal overarching law specifically related to climate change or the reduction of GHG emissions. Under the Obama Administration, EPA had been developing regulations under the Clean Air Act pursuant to EPA's authority. There have also been settlement agreements between EPA, several states, and nongovernmental organizations to address GHG emissions from electric generating units and refineries, as well as the EPA's issuance of an "Endangerment Finding" and a "Cause or Contribute Finding."

California has adopted statewide legislation addressing various aspects of climate change and GHG emissions mitigation. Much of this legislation establishes a broad framework for the state's long-term GHG reduction and climate change adaptation program. The governor has also issued several executive orders related to the state's evolving climate change policy. Of particular importance are Assembly Bill (AB) 32 and Senate Bill (SB) 32, which outline the state's GHG reduction goals of achieving 1990 emissions levels by 2020 and a 40 percent reduction below 1990 emissions levels by 2030. Executive Order B-55-18, although not legislatively adopted, establishes a goal to achieve carbon neutrality as soon as possible, and no later than 2045.

At the local level, GBUAPCD has not adopted specific thresholds for evaluating GHG emissions from projects, but recommends lead agencies rely on thresholds of significance adopted by SCAQMD (Becknell pers. comm.). Although not formally adopted, SCAQMD recommends a GHG significance threshold of 10,000 metric tons of CO_2 equivalent emissions ($MTCO_2e$) per year for stationary source and industrial projects and a threshold of 3,000 $MTCO_2e$ per year for residential and commercial sector projects (South Coast Air Quality Management District 2008). SCAQMD recommends construction emissions be amortized over 30 years and added to operational emissions for comparison with these thresholds.

Alpine County has not adopted a climate action plan. The Conservation Element of the *Alpine County General Plan*, outlines a variety of policies to reduce GHG emissions (Alpine County 2017). The policies applicable to this project are presented here:

> Policy 16a: All new public, private facilities and residences should be designed to meet requirements of Title 24 of the State Energy Code.
>
> Policy 16b: In approving development permits the County should set requirements and/or make recommendations wherever possible that would improve energy conservation and save long-term costs.
>
> Policy 17a: Small scale hydro-electric power generation facilities should be developed where dams, canals, or pipelines exist or are constructed providing any losses of water to present beneficial uses can be determined insignificant.
>
> Policy 17b: Existing and proposed special service districts should consider power generation using locally available hydro, wind, or other resources among the services and facilities they would intend to provide.
>
> Policy 17c: All new lots or parcels intended to contain structures for human occupancy should be designed to allow for and protect maximum utilization of available solar and wind resources.

3.7.3 Environmental Effects

Potential impacts of the proposed project on greenhouse gas emissions are discussed in the context of the State CEQA Guidelines Appendix G checklist. Checklist Section VII, *Greenhouse Gas Emissions*, asks whether the project would result in any of the following conditions.

a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

3.7.3.1 Construction

The emissions generated during construction of the project were estimated using emission factors from CalEEMod (version 2016.3.2) and EPA (U.S. Environmental Protection Agency 1980). Project construction would require approximately 4 months in 2019. Emissions would be generated by helicopters, mobile and stationary offroad equipment, and employee and haul truck vehicles.

As discussed in Section 3.6, *Air Quality*, a compressed construction schedule with shortened timelines for certain construction phases (e.g., placing the buttress rock, constructing the intake structure) was created to reflect the possibility of (1) a late spring that delays the start of construction or (2) an early winter that requires early completion of construction. During these shortened phases, the amount of construction equipment or daily hours of equipment use would increase. Emissions generated under the compressed schedule were also modeled to ensure GHG impacts under this possible alternative construction approach are fully evaluated.

Table 3.7-2 summarizes the estimated GHG emissions that would be generated by construction of the project. The table also presents emissions under the worst-case compressed construction schedule condition. All emissions would be generated during 2019. Consistent with SCAQMD guidance, these emissions have been amortized over a 30-year project life for comparison with thresholds. Please refer to Appendix F for all modeling assumptions and calculations.

Table 3.7-2. Estimated GHG Emissions from Project Construction (metric tons)

Scenario	CO_2	CH_4	N_2O	CO_2e
Construction Emissions (2019)				
Project scenario	332	<0.1	<0.1	339
Compressed schedule	347	<0.1	<0.1	354
Amortized Emissions				
Project scenario	11.1	<0.1	<0.1	11.5
Compressed schedule	11.6	<0.1	<0.1	11.8
Threshold				3,000 10,000
Exceed Threshold?				No

CO_2 = carbon dioxide
CH_4 = methane
N_2O = nitrous oxide
CO_2e = carbon dioxide equivalent, which includes the relative warming capacity (i.e., global warming potential) of each greenhouse gas
Please refer to Appendix F for modeling assumptions and calculations.

As shown in Table 3.7-2, it is estimated that construction of the proposed project would generate approximately 339 $MTCO_2e$ and the compressed schedule would generate 354 $MTCO_2e$. Under both scenarios, the emissions generated during construction would primarily be the result of diesel-powered construction equipment (e.g., pump generators). Construction emissions would cease once construction of the proposed project is complete and, thus, they are considered short-term. Neither emissions of the proposed project nor emissions under the compressed schedule scenario would exceed SCAQMD's thresholds. Accordingly, construction-related GHG emissions would have a less-than-significant impact.

3.7.3.2 Operational GHG Emissions

As described in Chapter 2, *Project Description*, the project site would be returned, as much as is reasonably practical, to its original condition following completion of construction activities. All equipment and surplus materials would be removed from the project site. Operations and maintenance activities would be the same as existing conditions. Accordingly, there would be no change in emissions relative to existing conditions. This impact would be less than significant.

b. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

AB 32 establishes a statewide goal to reduce GHG emissions to 1990 levels by 2020. The California Air Resources Board adopted the AB 32 Scoping Plan as a framework for achieving AB 32 goals. The scoping plan outlines a series of technologically feasible and cost-effective measures to reduce statewide GHG emissions. Some reductions would need to come in the form of changes pertaining to vehicle emissions and mileage standards, whereas other reductions would come from changes pertaining to sources of electricity and increased energy efficiency at existing facilities. The remainder would need to come from state and local plans, policies, or regulations to lower carbon emissions, relative to business-as-usual conditions. The California Air Resources Board adopted the *2017 Climate Change Scoping Plan* in November 2017 to carry forward GHG emissions reduction measures from the AB 32 Scoping Plan, as well as identify new measures to help achieve the state's 2030 target across all sectors of the California economy.

Policies in the *2017 Climate Change Scoping Plan* are state programs that require no action at the local or project level. The project does not entail any features or elements that would obstruct implementation of these state programs. Moreover, as described under checklist item a, operations and maintenance activities would be the same as pre-project conditions. Accordingly, there would be no change in emissions relative to existing conditions. Short-term construction emissions would be minimal (339 to 354 $MTCO_2e$, depending on the construction approach) and would cease after construction in 2019. Accordingly, the project would not conflict with the achievement of the state's adopted GHG reduction goals under AB 32 and SB 32, or its long-term emissions reduction trajectory as articulated under Executive Order B-55-183. This impact would be less than significant.

3.8 Noise

3.8.1 Existing Conditions

3.8.1.1 Noise Background

Noise is commonly defined as unwanted sound that annoys or disturbs people and potentially causes an adverse psychological or physiological effect on human health. Because noise is an environmental pollutant that can interfere with human activities, evaluation of noise is necessary when considering the environmental impacts of a project.

Sound is mechanical energy (vibration) transmitted by pressure waves over a medium such as air or water. It is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient (existing) sound level. Although the decibel (dB) scale, a logarithmic scale, is used to quantify sound intensity, it does not accurately describe how sound intensity is perceived by human hearing. Because the human ear is not equally sensitive to all frequencies in the entire spectrum, noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called "A-weighting," expressed as "dBA" and referred to as "A-weighted decibels." Table 3.8-1 summarizes typical A-weighted sound levels for different noise sources.

In general, human sound perception is such that a change in sound level of 1 dB cannot typically be perceived by the human ear, a change of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level.

Different types of measurements are used to characterize the time-varying nature of sound. These measurements include the equivalent sound level (L_{eq}), the minimum and maximum sound levels (L_{min} and L_{max}), percentile-exceeded sound levels (such as L_{10}, L_{20}), the day-night sound level (L_{dn}), and the community noise equivalent level (CNEL). Sensitivity to noise increases during the evening and at night because excessive noise interferes with the ability to sleep, and the L_{dn} and CNEL values take this sensitivity into consideration by averaging cumulative noise exposure over a 24-hour period. L_{dn} and CNEL values differ by less than 1 dB. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such in this assessment.

For a point source such as a stationary compressor or construction equipment, sound attenuates based on geometry at a rate of 6 dB per doubling of distance. For a line source such as free-flowing traffic on a freeway, sound attenuates at a rate of 3 dB per doubling of distance (California Department of Transportation 2013a). Atmospheric conditions including wind, temperature gradients, and humidity can change how sound propagates over distance and can affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical energy also affects sound propagation. Sound that travels over an acoustically absorptive surface such as grass attenuates at a greater rate than sound that travels over a hard surface such as pavement. The increased attenuation is typically in the range of 1 to 2 dB per doubling of distance. Barriers such as buildings and topography that block the line of sight between a source and receiver also increase the attenuation of sound over distance.

Table 3.8-1. Typical A-weighted Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	100	Rock band
Jet flyover at 1,000 feet		
	100	
Gas lawnmower at 3 feet		
	90	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	70	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60	
		Large business office
Quiet urban daytime	50	Dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime		
	30	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
	10	
	0	

Source: California Department of Transportation 2013a

3.8.1.2 Vibration Background

Operation of heavy construction equipment, particularly the types used for pile driving and pavement breaking, create seismic waves that radiate along the surface of the earth and downward into the earth. These surface waves can be felt as ground vibration. Vibration from operation of this equipment can result in effects ranging from annoyance of people to damage of structures. Varying geology and distance results in different vibration levels containing different frequencies and displacements. In all cases, vibration amplitudes decrease with increasing distance.

Perceptible groundborne vibration is generally limited to areas within a few hundred feet of construction or vibration-generating activities. As seismic waves travel outward from a vibration source, they excite the particles of rock and soil through which they pass and cause them to oscillate. The actual distance that these particles move is usually only a few ten-thousandths to a few thousandths of an inch. The rate or velocity (in inches per second) at which these particles move is the commonly accepted descriptor of the vibration amplitude, referred to as the peak particle velocity (PPV). Table 3.8-2 summarizes typical vibration levels generated by construction equipment.

Table 3.8-2. Vibration Source Levels for Demolition and Construction Equipment

Equipment	PPV at 25 feet	PPV at 50 feet	PPV at 75 feet	PPV at 100 feet	PPV at 400 feet
Pile driver (impact)	1.518	0.5367	0.2921	0.1875	0.0237
Pile driver (sonic/vibratory)	0.734	0.2595	0.1413	0.0918	0.0115
Hoe ram	0.089	0.0315	0.0171	0.0111	0.0014
Large bulldozer	0.089	0.0315	0.0171	0.0111	0.0014
Loaded trucks	0.076	0.0269	0.0146	0.0095	0.0012
Jackhammer	0.035	0.0124	0.0067	0.0044	0.0005
Small bulldozer	0.003	0.0011	0.0006	0.0004	0.0033

Sources: California Department of Transportation 2013b and Federal Transit Administration 2018
PPV = peak particle velocity

Vibration amplitude attenuates over distance and is a complex function of how energy is imparted into the ground and the soil conditions through which the vibration is traveling. The following equation can be used to estimate the vibration level at a given distance for typical soil conditions (Federal Transit Administration 2018). PPV_{ref} is the reference PPV from Table 3.8-2.

$$PPV = PPV_{ref} x\ (25/Distance)^{1.5}$$

Tables 3.8-3 and 3.8-4 summarize guidelines developed by California Department of Transportation for damage and annoyance potential from transient and continuous vibration that is usually associated with construction activity. Equipment or activities typical of continuous vibration include excavation equipment, static-compaction equipment, tracked vehicles, traffic on a highway, vibratory pile drivers, pile-extraction equipment, and vibratory-compaction equipment. Equipment or activities typical of single-impact (transient) or low-rate repeated impact vibration include impact pile drivers, blasting, drop balls, “pogo stick” compactors, and crack-and-seat equipment.

Table 3.8-3. Guideline Vibration Damage Potential Threshold Criteria

	Maximum PPV (inches/second)	
Structure and Condition	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: California Department of Transportation 2013b
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory-compaction equipment.
PPV = peak particle velocity

Table 3.8-4. Guideline Vibration Annoyance Potential Criteria

	Maximum PPV (inches/second)	
Structure and Condition	**Transient Sources**	**Continuous/Frequent Intermittent Sources**
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

Source: California Department of Transportation 2013b
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory-compaction equipment.
PPV = peak particle velocity

3.8.1.3 Existing Noise Environment

The project area is in Alpine County, about 10 miles southwest of Markleeville (see Figure 1). The project area is surrounded by undeveloped land and recreational open space areas. It is located at the southern perimeter of UBL, approximately 1.2 miles away from the northernmost campsite (Site 17) at the Lower Blue Lake Campground and 1.7 miles away from the nearest residence, a cabin also located adjacent to Lower Blue Lake. For purposes of this analysis, the nearest offsite noise-sensitive receptor to the main project construction area is considered to be Campsite 17 at the Lower Blue Lake Campground, because people sleep at the campsite.

3.8.2 Regulatory Setting

No federal or state regulations related to noise would apply to the proposed project. The following local regulations related to noise would apply to implementation of the proposed project.

3.8.2.1 Alpine County General Plan

The Safety Element of the *Alpine County General Plan* details goals, policies, and criteria for evaluating new projects as they pertain to noise. According to Policy 24c, the Planning Commission may allow noise level standards to be exceeded for temporary activities (Alpine County 2017). Tables 3.8-5 and 3.8-6 specify the General Plan's maximum allowable noise levels generated by transportation and non-transportation sources.

Table 3.8-5. Noise Level Performance Standards for Noise-Sensitive Uses[a] Affected by Non-Transportation Projects

Noise Level Descriptor	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly equivalent sound level	50	45
Maximum level, decibels	70	65

Source: Alpine County 2017
[a] Sensitive uses are defined in Policy 24b as hospitals, clinics, schools, libraries, and residences.

Table 3.8-6. Maximum Allowable Noise Exposure Transportation Noise Sources

Land Use	Outdoor Activity Areas L_{dn}/CNEL, dB[a]	Interior Spaces L_{dn}/CNEL, dB	L_{eq}, dB[b]
Residential	60[c]	45	--
Transient Lodging	60[c]	45	--
Hospitals, Nursing Homes	60[c]	45	--
Theaters, Auditoriums, Music Halls	--	--	35
Churches, Meeting Halls	60[c]	--	40
Office Buildings	60[c]	--	45
Schools, Libraries, Museums	--	--	45
Playgrounds, Neighborhood Parks	70	--	--

Source: Alpine County 2017

[a] Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use.

[b] As determined for a typical worst-case hour during periods of use.

[c] When it is not possible to reduce noise in outdoor activity areas to 60 dB L_{dn} /CNEL or less using a practical application of best available noise reduction measures, an exterior noise level of up to 65 dB L_{dn} /CNEL may be allowed provided that available exterior noise level reduce measures have been implemented and interior noise levels are in compliance with this table.

CNEL = community noise equivalent level

dB = decibel

L_{dn} = day-night sound level

3.8.2.2 Alpine County Noise Ordinance

The Alpine County noise ordinance (County Code Section 18.68.090) establishes standards for maximum allowable noise exposure for certain zoned areas, as shown in Table 3.8-7.

Table 3.8-7. Maximum Allowable Noise Exposure by Zone

Zone	Maximum L_{eq} (15)[a]
Residential Neighborhood (RN[b]	65 dBA
Residential Estates (RE[b])	60 db(A)
Institutional (INS)	70 db(A)
Planned Development (PD)	70 db(A)
Commercial Recreational (CR)	75 db(A)
Commercial (C)	75 db(A)

Source: Alpine County 2018

[a] L_{eq} (15) refers to a 15-minute average L_{eq} noise level. This is comparable to a 1-hour L_{eq} when activities would take more than 1 hour.

[b] Includes all subcategories of these zoning districts.

db(A) = A-weighted decibels

[c] (A) refers to A-weighted scale.

Exceptions to the requirements of the noise ordinance are permitted for temporary or short duration activities where it can be shown that it is impractical or unreasonable to meet the noise requirements because of the type or nature of the activity. In granting an exception, the permitting or approval authority shall consider the potential impacts on adjacent properties and should impose reasonable conditions on the permit that are intended to mitigate (i.e., reduce) noise impacts. Examples of such conditions include modification of the locations of sound sources, buffering or muffling the sound source, modifying the activity, or limiting the time period (daily and total duration) of the activity.

Exemptions from the requirements of the noise ordinance are permitted for construction activities between 8:00 a.m. and 6:00 p.m. Monday through Friday and between 9:00 a.m. and 3:00 p.m. on Saturday and Sunday. Construction noise that does not exceed the maximum sound levels allowed in each zone is not subject to these time restrictions (Alpine County 2018).

3.8.3 Environmental Effects

Potential impacts of the proposed project on noise are discussed in the context of the State CEQA Guidelines Appendix G checklist. Checklist Section XII, *Noise*, asks whether the project would result in any of the following conditions.

a. Expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?

3.8.3.1 Construction Activity at the Dam Site

Construction of the proposed project would generate noise and would temporarily increase noise levels in the project area. Potential noise effects caused by project construction would depend on the type of construction equipment used, the timing and duration of the noise-generating activities, and the distances between construction noise sources and noise-sensitive receptors. To evaluate the impacts of construction activity, construction noise levels were estimated using equipment noise reference levels developed by the Federal Highway Administration (FHWA).

Table 3.8-8 shows the list of equipment that is expected to be used for project construction. For each type of equipment that is likely to be used for proposed project construction, the L_{max} sound level values and the typical acoustical utilization factors at a source-receiver distance of 50 feet are shown, as reported in FHWA's *Roadway Construction Noise Model User's Guide*. An equipment utilization factor is the percentage of time each piece of construction equipment is typically operated at full power over a specified time period (e.g. 1 hour) and is used to estimate L_{eq} values from the corresponding L_{max} values. Also shown in Table 3.8-8 are the L_{eq} values at a distance of 50 feet, which have been calculated based on the L_{max} values and utilization factors.

Table 3.8-8. Noise Levels of Equipment Proposed for Project Construction

Equipment	L_{max} at 50 feet (dBA)[a]	Acoustical Usage/Utilization Factor (percent usage)[b]	L_{eq} at 50 feet
Backhoe/Loader	78	40	74
Concrete Mixer Truck	79	40	75
Concrete Pump Truck	81	20	74
Crane	81	16	73
Bulldozer	82	40	78
Excavator	81	40	77
Generator	81	50	78
Grader	85	40	81
Pump	77	50	74
Scraper	84	40	80
Vacuum Truck	80	10	70
Tractor	84	40	80
Dump and Water Trucks [c]	76	40	72

Source: Federal Highway Administration 2006

[a] These values represent the loudest noise levels generated by each equipment type at a distance of 50 feet.

[b] The utilization factor is the percentage of time each piece of construction equipment is typically operated at full power over a specified time period.

[c] Represented by Dump Truck from FHWA *User's Guide*.

dBA = A-weighted decibels

L_{eq} = equivalent sound level

L_{max} = maximum sound level

To evaluate the overall construction noise from the simultaneous operation of multiple pieces of equipment, construction noise levels of three of the loudest pieces of equipment expected to be used during a single phase of project construction have been combined. Combining construction equipment noise levels in this manner ensures that the reasonable worst-case noise levels are evaluated.

The phase with the loudest proposed construction equipment is the access installation phase, when a bulldozer, grader and tractor would all be used. The combined noise level (L_{max} and L_{eq}) from the operation of these three pieces of equipment operating simultaneously has been calculated as a reasonable worst-case scenario. Average 1-hour L_{eq} values were calculated using the L_{max} values and utilization factors. Anticipated average (L_{eq}) and maximum (L_{max}) construction noise at various distances from the project site for this scenario based on sound attenuation of 6 dB per doubling of distance are shown in Table 3.7-9.

Table 3.8-9. Noise Levels of Equipment proposed for Project Construction

	Maximum Sound Level (dBA)	Utilization Factor	Leq Sound Level (dBA)
Construction Condition: Access Installation			
Source 1: Grader - Sound level at 50 feet =	85	40%	81.0
Source 2: Dozer - Sound level at 50 feet =	82	40%	78.0
Source 3: Tractor - Sound level at 50 feet =	84	40%	80.0
Calculated Data:			
All Sources Combined - Lmax sound level (dBA) at 50 feet =			89
All Sources Combined - Leq sound level (dBA) at 50 feet =			85

Distance Between Source and Receiver (feet)	Geometric Attenuation[a] (dB)	Calculated Lmax Sound Level (dBA)[b]	Calculated Leq Sound Level (dBA) [b]
50	0	89	85
100	-6	83	79
175	-11	78	74
200	-12	77	73
300	-16	73	69
400	-18	71	67
500	-20	69	65
600	-22	67	63
685	-23	66	62
700	-23	66	62
800	-24	65	61
900	-25	64	60
1000	-26	63	59
1200	-28	61	57
1400	-29	60	56
1600	-30	59	55
1800	-31	57	54
2000	-32	57	53
6000	-42	47	43
6300	-42	47	43

[a] Geometric attenuation based on 6 dB per doubling of distance.
[b] This calculation does not include the effects, if any, of local shielding from walls, topography or other barriers which may reduce sound levels further.
dB = decibel
dBA = A-weighted decibels
Leq = equivalent sound level
Lmax = maximum sound level

The closest noise-sensitive land use to the main project construction area (the dam) is Campsite 17 of the Lower Blue Lake Campground, located approximately 1.2 miles (approximately 6,300 feet) from the dam location. As shown in Table 3.8-9, L_{eq} noise levels at this distance could be approximately 43 L_{eq}.

As described in Section 3.8.2, *Regulatory Setting*, noise from construction activity is exempt from the limitations in the noise ordinance so long as activity is restricted to the hours of 8:00 a.m. and 6:00 p.m. Monday through Friday, and 9:00 a.m. and 3:00 p.m. on Saturday and Sunday. Construction for the proposed project would therefore be considered exempt during these hours, and no numerical noise thresholds would apply.

Construction for the project, however, is proposed to occur from 7:00 a.m. to 7:00 p.m. 7 days per week. Therefore, there would be a few hours per day during which construction activity would not be considered exempt, and the numerical noise thresholds for non-transportation noise sources from the County Code would apply.

Table 3.8-7 outlines the maximum allowable noise exposure by zone. Although the campground located south of the project site is not technically zoned as a residential neighborhood, this campground is a place where people sleep. Therefore, the Residential Neighborhood maximum allowable noise exposure level of 65 dBA L_{eq} is applied to project construction noise received by the campground and cabins. Therefore, outside of the exempt hours for construction, this noise limit of 65 dBA L_{eq} would apply to the proposed project.

Noise levels generated from project construction at the nearest noise-sensitive land use (Campsite 17) would be about 43 dBA L_{eq}. Because this noise level is below the 65 dBA limit for residential land uses, noise impacts from construction outside of the exempt daytime hours would not exceed allowable levels. Noise impacts from construction activity at the project site would be less than significant.

3.8.3.2 Nighttime Construction Noise from Generator Use

The use of construction equipment would mostly be limited to the hours of 7:00 a.m. to 7:00 p.m., with the exception of generators that would need to operate 24 hours per day to operate various pumps. During the daytime, generators would not be the loudest pieces of equipment operating, and, therefore, were not included in the combined construction noise modeling detailed in Table 3.8-9. However, because generators would be operating during the hours of 7:00 p.m. to 7:00 a.m., noise generated by them during these nighttime hours must be assessed.

The use of one generator would be needed to power the drawdown pump. The use of this generator during nighttime hours would not overlap with the pumps needed for dewatering or for the bypass because these activities would occur at a later time. The use of the pumps for dewatering and bypass activity, however, would overlap. For the purposes of modeling and assessing nighttime generator noise, it is assumed that these two generators would be operating simultaneously for 100 percent of the time period between 7:00 p.m. to 7:00 a.m.

At the nearest noise-sensitive land use, the campground located approximately 1.2 miles from the proposed project, noise levels from the simultaneous operation of these two generators would be approximately 42 dBA L_{eq}. This noise level would likely be further reduced by intervening topography and ground-absorption as the noise travels over this distance. Because this noise level would be well below the allowable level of 65 dBA L_{eq}, noise impacts from nighttime generator use would be less than significant.

Haul Truck Activity

There could be as many as 23 round-trip haul truck trips per day for proposed project construction. Specifically, during the mobilization phase, there may be as many as 21 haul trucks delivering rock material and 2 haul trucks delivering miscellaneous materials on a given day. Haul truck trips to deliver rocks, concrete, and other miscellaneous materials would also occur during other phases of construction, but the most truck trips per day would be during the mobilization phase.

Note that most haul truck trips would be during the exempt weekday daytime hours of 8:00 a.m. to 6:00 p.m., and that no haul truck trips are expected on Saturdays or Sundays. Therefore, most construction-related haul truck noise would be exempt from the noise ordinance, and would not result in significant noise impacts. However, it is possible that some trips would be during the earlier morning or evening non-exempt hours of 7:00 a.m. to 8:00 a.m. or 6:00 p.m. to 7:00 p.m. weekdays.

Blue Lakes Road is scheduled to be opened ahead of its normal opening date to allow as many of the deliveries for the proposed project as possible to be completed before the public is allowed into the Lower Blue Lake Campground. In addition, because of the narrow roads and the congested site, the rock delivery contractor will space the deliveries out as much as possible. No more than 5 truck trips would occur during a given hour on the road adjacent to the Lower Blue Lake Campground.

The nearest campsite in the Lower Blue Lake Campground is located approximately 15 feet from the centerline of the roadway that haul trucks would use to deliver materials to the project site. Between 2 and 5 haul trucks per hour would be expected over a 12-hour workday. Table 3.8-10 below shows the anticipated haul truck trips and the hourly L_{eq} noise levels at a distance of 15 feet from the roadway centerline (at the campsite) as calculated using the FHWA Traffic Noise Model.

Table 3.8-10. Expected Haul Truck Trips and Associated Noise

Time	Total Truck Trips	Equivalent Sound Level at Nearest Sensitive Receptor
7:00 a.m.	2	54.6
8:00 a.m.	4	57.6
9:00 a.m.	5	58.6
10:00 a.m.	5	58.6
11:00 a.m.	2	54.6
12:00 a.m.	4	57.6
1:00 p.m.	5	58.6
2:00 p.m.	3	56.4
3:00 p.m.	4	57.6
4:00 p.m.	4	57.6
5:00 p.m.	5	58.6
6:00 p.m.	3	56.4

As shown in Table 3.8-10, at a distance of 15 feet, noise from haul trucks trips over a 1-hour period would range from approximately 54.6 dBA L_{eq} to 58.6 dBA L_{eq}. The estimated 24-hour average noise level from these truck trips would be approximately 54.4 dBA L_{dn}. This noise level is below the allowable transportation noise threshold of 60 dBA L_{dn} for transient lodging in Alpine County. Therefore, truck noise from construction-related haul trucks would be below the allowable levels, and construction noise impacts from haul truck use would be less than significant.

Helicopter Construction Activity

Project engineers indicate that it might be necessary to use a helicopter to deliver materials to the project site. If necessary, the helicopter would fly from PG&E's Angels Camp yard to the Alpine County Airport in Markleeville, where it would load up with the equipment needed at the project site. From the Alpine County Airport, the helicopter would travel to the project site. It is anticipated that the helicopter would make two round-trips from the airport to the project site each day for a period of 3 days prior to the start of construction. At the end of each day, the helicopter would return to Angels Camp from the Alpine County Airport.

In addition to the possible use of a helicopter prior to project construction, it is also possible that a helicopter would be used 1 day every 2 weeks throughout the construction period. The helicopters would make one trip from Angels Camp to the Alpine County Airport, one round-trip to the project site, and one return trip to Angels Camp.

A large single-rotor helicopter overflight results in an L_{max} noise level of approximately 79 dBA at a distance of 500 feet (Nelson 1987:19/16). For the proposed project, all helicopter overflights would be for relatively short periods of time. The helicopter would not hover in a single location during the trips to and from Angels Camp, the airport, and the project site. In addition, there would be relatively few trips per day along each of the routes (back and forth from the yard to the airport, and back and forth from the airport to the project site). Consequently, the helicopter would not fly over any given noise sensitive land use more than two to four times during a single day.

Because there would be few helicopter overflights near any noise sensitive land use on a given day, because flights would be spread out over the day, and because the ambient noise increase associated with each overflight would be very short in duration, noise impacts from helicopter use during project construction would be less than significant.

3.8.3.3 Project Operations

After construction of the project is completed, full operational service would be restored to UBL and the modified access road would be restored to its original condition. The project would not increase roadway capacity. Operational noise would be the same as it is under existing conditions. Project operations would not result in noise levels in excess of thresholds and would have no noise impact.

b. Expose persons to or generate excessive groundborne vibration or groundborne noise levels?

Construction Activity

The operation of heavy-duty construction equipment can generate localized groundborne vibration and noise in areas adjacent to the construction areas. Groundborne vibration rarely causes damage to normal buildings, with the occasional exception of blasting or pile-driving during construction. For the proposed project, the use of impact or vibratory pile driving would not be required. Table 3.8-2 summarizes typical vibration velocity levels for the various types of construction equipment that may be used for the proposed project.

The equipment proposed for project construction with the greatest potential to generate vibration is a bulldozer. Based on the PPV reference levels shown in Table 3.8-2, vibration levels from a large bulldozer could be as high as 0.089 PPV at 25 feet. At a distance of 100 feet, vibration from this equipment would be reduced to below all damage and perceptibility thresholds identified in Tables

3.8-3 and Table 3.8-4. The nearest campsite is located approximately 1.2 miles from the construction areas where a bulldozer would be used, and the nearest residence is located more than 1.7 miles from these areas. Therefore, vibration levels from project construction would be below the applicable perceptibility and damage thresholds at nearby sensitive receptors. This impact would be less than significant.

Haul Truck Activity

Haul trucks would be used to deliver materials to and from the project site during project construction. These trucks would access the project site from the roadway that passes directly through Lower Blue Lakes Campground, and would come within approximately 15 feet of individual campsites. At a distance of 15 feet, a loaded truck can generate a vibration level of approximately 0.164 PPV inches/second (Federal Transit Administration 2018). This level is above the barely perceptible vibration level of 0.04 PPV inches/seconds for transient sources (such as a truck pass-by), but is below the distinctly perceptible threshold for transient sources of 0.25 PPV inches/second. Because haul truck trips would be intermittent and spread out over a given day, and would result in vibration levels below the distinctly perceptible threshold, vibration impacts from haul trucks during construction would be less than significant.

c. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

After construction of the project is completed, full operational service would be restored to UB: and the modified access road would be restored to its original condition. The project would not increase roadway capacity and noise generated by the project would be temporary and limited to the construction phase, as discussed under checklist item a. Operational noise would be the same as it is under existing conditions. There would be no impact related to a substantial permanent increase in ambient noise levels.

d. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

As discussed under checklist item a, much of the project construction would occur during the exempt hours of 8:00 a.m. to 6:00 p.m. Monday through Friday and 9:00 a.m. to 3:00 p.m. Saturday and Sunday. However, construction would be expected to occur from 7:00 a.m. to 7:00 p.m. daily, so some activities would occur during non-exempt hours. In addition, some of the generators used during construction would operate 24 hours per day.

During exempt and non-exempt hours, the combined noise level from the simultaneous operation of the three loudest pieces of equipment proposed for construction (a reasonable worst-case loudest condition) was modeled to be approximately 43 dBA L_{eq} at the nearest sensitive receptor. This noise level is below the 65 dBA L_{eq} noise threshold that would apply to construction noise in a residential area during the non-exempt hours of 7:00 a.m. to 8:00 a.m. and 6:00 p.m. to 7:00 p.m. on weekdays, and 7:00 a.m. to 9:00 a.m. and 3:00 p.m. to 7:00 p.m. on weekends. In addition, worst-case generator noise during the hours of 7:00 p.m. to 7:00 a.m. would be approximately 42 dBA L_{eq}. Noise from generators operating at night would, therefore, also be well below the allowable level of 65 dBA L_{eq}. Note that construction noise would likely be further reduced by intervening topography and ground-absorption as the noise traveled over the distance between the project site and the nearest receptor, which would reduce noise from construction and from generator operation.

Because project construction would not exceed allowable noise levels in Alpine County, any temporary increases in noise from construction activities would not be considered substantial. Therefore, potential construction noise impacts related to a substantial temporary increase would be less than significant.

e. Be located within an airport land use plan area, or, where such a plan has not been adopted, within two miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?

There are no public airports located within 2 miles of the project site. The closest public airport is the Lake Tahoe Airport, located more than 17 miles north of the project area. At this distance from the airport, the project is located well outside of all CNEL contours included in the *Lake Tahoe Airport Land Use Compatibility Plan*, and no people residing or working in the project area would be exposed to excessive aircraft noise (Lake Tahoe Airport Land Use Commission 2018). There would be no impact related to noise from public use airports.

f. Be located in the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?

Because there are no private airstrips located within the vicinity of the project area, no people residing or working in the project area would be exposed to excessive aircraft noise from these facilities. There would be no impact related to noise from private airstrips.

3.9 Recreation

3.9.1 Existing Conditions

This section discusses the existing conditions related to recreation in the project vicinity. Recreation is a mainstay of Alpine County's economy; almost all businesses in the county, except for ranching, rely on visitors to sustain them (Alpine County 2017:58).

3.9.1.1 Mokelumne Wilderness

UBL reservoir is located on land owned by PG&E within the Mokelumne Wilderness. The Mokelumne Wilderness is a 104,165-acre area that straddles the crest of the central Sierra Nevada within the Stanislaus, Eldorado, and Toiyabe National Forests. This area lies in portions of Calaveras, Alpine, and Amador Counties and is bordered by SR 4 on the south and SR 88 on the north. Watersheds drain into the Mokelumne River on the west slope of the Sierra Nevada, and to the Carson River on the east.

The Mokelumne Wilderness is a rugged landscape of scenic beauty. Hiking, camping, viewing nature, fishing, horseback riding, and cross-country skiing are popular activities within the wilderness. The Mokelumne Wilderness contains approximately 50 trailheads and wilderness access points, 40 campgrounds containing more than 1,000 campsites, 4 "sno-parks," and numerous day-use and all-terrain vehicle trails (U.S. Forest Service 2008). However, the Mokelumne Wilderness is less used than the adjacent Desolation and Carson-Iceberg wilderness areas (U.S. Forest Service 2000).

3.9.1.2 Upper Blue Lake Reservoir and Blue Lakes Area

PG&E manages recreational facilities for visitors at UBL reservoir, including four campgrounds and a boat launch. The campgrounds are the Upper Blue Lake Campground (32 campsites), the Upper Blue Dam Site Campground (10 sites), the Upper Blue Dam Site Expansion Campground (15 sites), and the Middle Creek Expansion Campground (35 sites). The Grouse Lake trailhead, which hikers use to access the 5.6-mile Grouse Lake trail, is located to the west of the UBL dam.

PG&E manages the UBL reservoir facilities as part of its Blue Lakes planning unit, which includes additional camping and day use amenities along Middle Creek and at Lower Blue Lake, Twin Lake, and Meadow Lake. The Blue Lakes area is a popular summertime recreation destination for camping, fishing, and nature viewing; however, the area is closed during the winter months because of heavy snowfall.

The Blue Lakes area is accessed via Blue Lakes Road, which winds approximately 13 miles from its junction with SR 88 through the Hope, Faith, and Charity Valleys. Blue Lakes Road is not cleared of snow during the winter months, when it is used as a snowmobile and cross-country ski trail.

3.9.2 Regulatory Setting

The following regulations related to recreation would apply to implementation of the proposed project.

3.9.2.1 Federal

Federal Energy Regulatory Commission

On October 11, 2001, FERC issued a new license to PG&E for the Mokelumne Project. The FERC license included the following USFS conditions related to recreation:

- Condition 19. Maintain recreation use data, conduct surveys, and consult with the Forest Service on the need for additional recreation facilities.
- Condition 20. Meet with the Forest Service every five years to consider the need for and timing of recreation facility rehabilitation.
- Condition 21. Designate a liaison to work with the Forest Service on planning and construction of recreation facilities, other major project works, and Project maintenance activities.
- Condition 26. Provide or improve numerous recreation facilities in the Blue Lakes area.

3.9.2.2 Local

Alpine County General Plan

The *Alpine County General Plan* (2017) recognizes recreation as the largest contributor to the economy of Alpine County and acknowledges the local water, animal life, open space, historic, and other resources as valuable to recreation and tourism. The General Plan includes goals and policies to protect those resources but does not contain any goals or policies specific to recreation, other than to oppose the acquisition of water rights that would adversely affect recreational uses and to ensure adequate emergency access to new recreational sites.

3.9.3 Environmental Effects

Potential impacts of the proposed project on recreation are discussed in the context of the State CEQA Guidelines Appendix G checklist. Checklist Section XV, *Recreation*, asks whether the project would result in any of the following conditions.

a. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Effects on recreation due to implementation of the proposed project would be temporary in nature and limited to the 2019 summer season during construction activities. No permanent impacts on recreation would result. However, for safety reasons, PG&E would need to close the UBL reservoir area to public use during construction. This closure would prevent public use of the four campgrounds, the boat ramp, and the Grouse Lake trailhead mentioned in Section 3.9.1, *Existing Conditions*, during the 2019 summer season. The Lower Blue Lake campground, located approximately 1.2 miles south of the project area, would remain open during construction activities. Once construction is complete, the temporarily closed recreational facilities around UBL reservoir would be re-opened, as would the Middle Creek Campground located downstream of UBL dam, which has been closed since 2016 because of inundation risk.

PG&E has already posted a notice on its website that all recreation facilities located around UBL reservoir will be closed for the 2019 season, and, as part of Avoidance and Minimization Measure

AMM-4: Implement Traffic Control Plan, PG&E would post signs at the intersection of SR 88 and Blue Lakes Road notifying the public of the campground closures. To further minimize construction impacts on recreational users in the area, PG&E would implement additional measures under AMM-4 to ensure that as many haul truck deliveries as possible are made before the Lower Blue Lake Campground is open for the season, and that haul truck traffic is limited, when feasible, to Monday through Thursday.

The proposed project would result in a temporary reduction in recreation opportunities in the region. However, because this impact on recreation would be temporary in nature and because of the other abundant recreation opportunities in the region (Mokelumne Wilderness), the closures at UBL reservoir would not increase the use of other recreational facilities such that substantial physical deterioration of the facilities would result or be accelerated. This impact would be less than significant.

b. Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

Implementation of the proposed project would involve the seismic retrofit of a dam; it would not include or require construction or expansion of recreational facilities. There would be no impact.

3.10 Hazards and Hazardous Materials

3.10.1 Existing Conditions

This section discusses the existing conditions related to hazards and hazardous materials in the project area.

3.10.1.1 Schools

No schools are located within or near the project area. The nearest school, Diamond Valley Elementary School in Markeleeville, is located more than 11 miles northeast of the project area. The population in Alpine County has been declining over the past several years, and no new schools are planned (Alpine County 2017:58, 59, and 138).

3.10.1.2 Known Sources of Hazardous Materials

The California Department of Toxic Substances Control's Envirostor database provides access to detailed information on hazardous waste facilities in California, including permitted activities, and corrective actions for site cleanup. According to the Envirostor database, the nearest potentially hazardous sites are an oil spill area at Kirkwood Meadows, approximately 8.2 miles northwest of the project area, and the Grover Hot Springs Disposal Site, a small, closed dump, approximately 7.7 miles northeast of the project area (California Department of Toxic Substances Control 2018).

Additionally, an Environmental Site Assessment was undertaken for the Blue Lakes Area in 2010 as part a different project, and the assessment concluded that there were no known hazardous materials within the project area (Smith pers. comm.).

3.10.1.3 Airports and Airstrips

The nearest public airport is the Lake Tahoe Airport, which is located more than 17 miles north of the project area. The nearest public airstrip is the Alpine County Airport, which is designated as a Limited Use Airport and consists of a paved airstrip, apron area, and tie downs. It is located approximately 11.5 miles northeast of the project area. The closest private airstrip is the Bear Valley Airport, which is located approximately 12.8 miles southwest of the project area.

The project area is not located within an airport land use plan. However, a helicopter flying out of Alpine County Airport may be used to access the project site once every two weeks, and if Blue Lakes Road is not cleared of snow by early June, a helicopter may be used to deliver drawdown pumping equipment and installation personnel to the project area. The Alpine County Airport is subject to the *Alpine County Airport Airport Layout Plan*.

3.10.1.4 Wildland Fires

The California Department of Forestry and Fire Protection (Cal-Fire) identifies fire hazard severity zones within both State Responsibility Areas and Local Responsibility Areas and maps these severity zones based on modeling of expected fire behavior over a 30-50 year period. The categories of Fire Hazard Severity Zones are "very high," "high," and "moderate." The project area falls within a State

Responsibility Area categorized as a moderate Fire Hazard Severity Zone (California Department of Forestry and Fire Protection 2007).

The project area is located on lands owned by PG&E. Wildland fire protection on private lands in California outside of local fire district jurisdictions is typically provided by Cal-Fire. However, Cal-Fire does not maintain a physical presence, such as a fire station or firefighting equipment, in Alpine County. As a result, Cal-Fire responsibility for fire protection has been delegated to federal agencies, specifically the U.S. Forest Service (USFS) and BLM by virtue of an intergovernmental agreement. The goal of this agreement is to efficiently allocate fire suppression resources among federal jurisdiction areas and private lands (Alpine County 2017).

The Sierra Front Interagency Fire Dispatch Center is located at the Minden Tahoe Regional Airport in Douglas County, Nevada, approximately 27 miles north-northeast of the project area. This facility has the capability to dispatch wildland fire suppression resources from the Nevada Division of Forestry, BLM, USFS, and Bureau of Indian Affairs. Aerial attack resources are also based at this location. Seasonal wildland firefighting crews have also been stationed at USFS facilities located in Markleeville, west of Kirkwood at the USFS Lumberyard in Amador County, and west of Bear Valley in the Arnold area of Calaveras County (Alpine County 2017).

3.10.1.5 Emergency Planning

The Alpine Fire Safe Council in 2018 published a draft *Community Wildfire Protection Plan*, which presents a coordinated planning effort to address the hazards of fire in the wildland-urban interface. The plan covers all of the communities in Alpine County, which the plan divides into four planning areas, Woodfords, Markleeville, Bear Valley, and Kirkwood. The plan identifies the wildland-urban interface zones within each planning area. The project area is not located within any of the identified WUI zones in Alpine County, nor is the area covered in any of the county's adopted or proposed community evacuation plans (Alpine Fire Safe Council 2018).

3.10.2 Regulatory Setting

3.10.2.1 Alpine County General Plan

Alpine County has adopted goals and policies related to hazards and hazardous materials. The *Alpine County General Plan* Safety Element addresses hazards that are known to have potential for causing injury to people or damaging property, including fire and hazardous materials (Alpine County 2017). The following relevant goals and policies address natural and human-made hazards.

Goal 20: Minimize the threat to lives and property posed by the possibility of wildland and structural fires within the wildland urban interface in the county.

Goal 25: Protect citizens and property from damage by hazardous materials including but not limited to harmful chemicals, radiation levels, gases, explosives, and hazardous waste.

- **Policy 25a:** Ensure the hazardous waste materials used in business and industry are properly handled and that information on their handling and use is available to fire and police protection agencies.
- **Policy 25b:** Ensure the hazardous waste generated in the county is properly planned for, handled, treated, and disposed of.

3.10.2.2 Alpine County Airport Airport Layout Plan

The *Alpine County Airport Layout Plan* is a scaled graphic representation of existing and future facilities that may be necessary for the airport to properly accommodate future demand, and contains detailed information on both airport and runway design criteria (Stantec 2005). It does not include any policies or requirements related to current operations.

3.10.3 Environmental Effects

Potential impacts of the proposed project related to hazards and hazardous materials are discussed in the context of the State CEQA Guidelines Appendix G checklist. Checklist Section VIII, *Hazards and Hazardous Materials*, asks whether the project would result in any of the following conditions.

a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or

b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Activities associated with the proposed project would involve use of hazardous materials, such as fuels and lubricants, for the operation of equipment and vehicles, primarily during construction. Fuels and lubricants have the potential to be released into the environment at construction sites and along haul routes, causing potential environmental and human exposure to these hazards. Although the types and quantities of hazardous materials that would be used during project construction are not considered acutely hazardous and would not pose a risk to human health or safety, release of hazardous materials without subsequent containment could create a hazardous condition for the environment. Implementation of a SWPPP and of Avoidance and Minimization Measure AMM-2: Implement Hazardous Materials Control Measures, described in Chapter 2, would ensure that hazardous materials are properly used and contained and that any spills are promptly cleaned up. Operation of the reservoir and retrofitted dam would not require the transport, use, or disposal of hazardous materials and, therefore, could not result in a reasonably foreseeable accident or upset of hazardous materials. This impact would be less than significant.

c. Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

As described in Section 3.10.1, *Existing Conditions*, the project area is not located near an existing or proposed school. The nearest school is more than 11 miles from the project area. There would be no impact.

d. Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

As described in Section 3.10.1, *Existing Conditions*, the nearest known hazardous materials site is located approximately 7.7 miles from the project area. Thus, the proposed project would not be located on a site included on a list of hazardous materials sites. There would be no impact.

e. Be located within an airport land use plan area or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area?

As described in Section 3.10.1, *Existing Conditions*, the project area is not located in an airport land use plan area or within 2 miles of a public or public use airport. If necessary, a helicopter may be used to deliver equipment to the project area at the beginning of construction and once every two weeks throughout the construction period, and this helicopter would fly out of the Alpine County Airport. The departure and arrival of the helicopter at the Alpine County Airport would be considered normal use of the airport and would be covered under existing regulations for the airport. There would be no impact.

f. Be located within the vicinity of a private airstrip and result in a safety hazard for people residing or working in the project area?

As described in Section 3.10.1, *Existing Conditions*, the project area is not located within the vicinity of a private airstrip. There would be no impact.

g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

As described in Section 3.10.1, *Existing Conditions*, the project area is not located within any of Alpine County's wildland-urban interface zones, nor is the project area covered in any of the County's adopted or proposed community evacuation plans. There would be no impact.

h. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Public access to UBL would be closed during construction of the proposed project. There are no residences within or adjacent to the project area, but there are residences intermixed with wildlands approximately 1.7 miles south of the project area (near Lower Blue Lake) and farther away to the east in the larger Hope, Faith, and Charity Valleys. The project area is located within a moderate Fire Hazard Severity Zone and, therefore, the risk of wildfire does exist. The most likely source of wildland fire ignition from the proposed project would be associated with operation of construction vehicles or welding equipment in the project area under dry conditions. As part of the proposed project, PG&E would implement Avoidance and Minimization Measure AMM-3: Implement Fire Hazard Prevention Measures, which would ensure that the potential for wildland fire caused by the project is minimized or eliminated. During post-construction operation of the reservoir and retrofitted dam, the use of equipment that could generate sparks would not be required; therefore, reservoir and dam operation would not result in any increased wildland fire risk. This effect would be less than significant.

3.11 Cultural Resources

3.11.1 Existing Conditions

The following contexts were summarized from the *Upper Blue Lake Dam Seismic Retrofit Project Cultural Resources Constraints Report* (Taggart 2019).

3.11.1.1 Prehistoric Context

Five periods of prehistory have been described for the Upper Mokelumne Watershed, each characterized by distinct settlement and subsistence patterns and technological innovation (see Table 3.11-1).

Table 3.11-1. Chronology of the West-Central Sierra Nevada

Period	Age Range (Calendar Years Before Present)
Recent Prehistoric II	610–100
Recent Prehistoric I	1,100–610
Late Archaic	3,000–1,100
Middle Archaic	7,000–3,000
Early Archaic	11,500–7,000

3.11.1.2 Ethnographic Context

The Washoe inhabited the eastern slopes of the Sierra Nevada north to Honey Lake and south to Antelope Valley . Hunting, gathering, and trade journeys took them over the crest, and sometimes into the western foothills, of the Sierra. Permanent settlements were located on valley floors averaging 4,500 feet in elevation. Summer camps were located on the margins of mountain meadows at higher elevations.

The Washoe are technically a Great Basin tribe, although they do not fit neatly into that category. The Washoe language is the only Great Basin tongue that is not of the Numic family. Their language is not genetically related to the Maiduan or Miwok stocks, but rather belongs to the Hokan stock, a language group centered in California and the American Southwest.

Additionally, the Washoe share many characteristics with California groups. They used many hunting techniques common to California and placed more emphasis on fishing and acorn gathering than did other Great Basin groups. Similar to other California groups, they used bedrock mortars and acorn mush paddles.

Many Washoe traits, however, show affinities with other Great Basin groups. Some hunting and fishing methods and tools are typical of those used in the Great Basin. Although they processed acorns and piñon nuts, they did not make use of cylindrical granaries use by California groups. Washoe villages had a Great Basin appearance, with dwellings made in the Great Basin style and villages lacking the multifamily houses and ceremonial structures typical of those found in California.

Permanent villages consisted of 2 to 10 family groups or households, with 2 to 4 households being the norm. Family groups and individuals ranged widely in highly divergent and independent subsistence strategies during the summer months, but tended to congregate at the home village during the winter. While most of the inhabitants vacated the village during summer, many of the elderly and young children often stayed in the village year-round. A set pattern of seasonal movement is not evident; movements were highly variable from year to year. Winter dwellings were semisubterranean, conical structures fashioned from wood poles and bark slabs. Summer shelters were dome-shaped and constructed of tule and brush woven together with willow.

The Washoe subsistence strategy was quite varied. Fishing in lakes and streams constituted an important part of their economy, with fish both eaten fresh and dried for storing. Game was taken year-round and consisted primarily of deer, pronghorn antelope, bighorn sheep, rodents, rabbits, and birds. Vegetal foods played an important role in the diet with a heavy reliance on piñon nuts and acorns, along with berries, bulbs, and roots.

The Washoe were involved in significant trade networks with their neighbors and often traveled great distances to obtain goods from outlying areas. They served as middlemen in the trade between California peoples and the populations of the interior Great Basin. Imported items from the Nisenan and Wintu included papam bulbs, acorns, skins, and marine shells. Exports to the Nisenan included salt, obsidian, piñon nuts, and rabbit skins.

3.11.1.3 History

This section is summarized from Baker (2003: 17–32). The history of Mokelumne River hydroelectric system begins in mining, not electric power generation. Water rights acquired during the early gold and silver booms in the Sierra established the foundation of a system of dams and canals whose purpose evolved from local mining to city water consumption to hydroelectric generation. From the early basic foundation, engineers spent the next 150 years expanding the system to wrest every drop out of their rights to the watershed. The complete engineering plan for the system dates to 1930 when PG&E engineer A. H. Mark Wart set forth the path for future development. His plans for Bear River, Electra, and West Point Powerhouses were subsequently realized by his protégées, I. C. Steele, Walter Dreyer, T. J. Corwin, and G. C. Green. The Mokelumne is somewhat unique among PG&E’s projects in California simply for the amount of diversions from small tributaries to the Mokelumne River, including diversions from the Bear River, Deer Creek, Tiger Creek, and Cole Creek.

Upper and Lower Blue Lakes at the head of the system are two of a number of high mountain lakes in Alpine County exploited for gold mining at lower elevations in Amador and Calaveras Counties. As early as 1856, miners were filing claims to both Upper and Lower Blue Lakes waters. Then, in 1859, silver was discovered in the Nevada Comstock Lode. Alpine County quickly developed into mining districts. The Blue Lakes basin became part of the Mokelumne District, which experienced its “rush” of miners in 1862.

Two towns, Summit City and Lower Summit City, were established by 1863 just northwest of Upper Blue Lake. By 1866, the town of Harmonial City was thriving between Upper and Lower Blue Lakes. Other towns were Round Top (between Caples and Blue Lakes) and KirkWood’s Station. Roads and trails connected the towns to emigrant and other trans-county roads. Lumbering and sawmills supplemented the local economy, with one mill being located at Upper Blue Lake. Summer grazing for cattle and sheep also became an area mainstay and centered around both Blue Lakes. Basque sheepherders kept their main camp between the two lakes. Many of their carvings on aspen trees around the project area are still visible today.

Two early travel routes were carved into the Blue Lakes area. One passed through Hope, Faith and Charity Valleys. A higher route opened later and closed earlier in the season. It passed near Red Lake and Lost Lake, then went to Upper Blue Lake and the town of Summit.

Silver mining in the vicinity quieted down by the mid-1870s, although gold mining in the lower-elevation counties below the Blue Lakes area flourished under hydraulic mining operations. This water-intensive technology made good use of the high-elevation resources and interest again focused on Blue Lakes water.

In 1870, the Sutter Canal and Mining Company started building the Amador Canal to supply water to the mines of Amador and Calaveras Counties. In 1874, its successor, the Amador Canal and Mining Company (ACMC) completed the canal nearly to Sutter Creek. As water demands increased, ACMC looked for ways to meet demand. Conflicting rights to water from Blue Lakes quickly surfaced. In 1875, ACMC and W. V. Clark acknowledged each other's claims to the water and prepared the following solution: ACMC could build dams and canals at its own expense and take the additional water storage created by the dams. They also agreed that W. V. Clark or his assignees could use the ACMC dams to build "permanent and substantial dams" to again increase storage. At such time, ACMC would still be entitled to its share of the water. In 1875, Amador Canal and Mining Company acted on the agreement and constructed timber crib dams at both Blue Lakes.

In 1899, Standard Electric Company purchased part of the capital stock of Blue Lakes Water Company and proceeded with its hydroelectric project. The success of the Blue Lake power plant encouraged Prince Andre to consider harnessing the waters of the high Sierra to power a hydroelectric plant capable of providing electricity to San Francisco. The result would be Electra Powerhouse, built using power from the new Blue Lakes Powerhouse. Water impounded at Upper Blue Lake exited the dam and flowed through Lower Blue Lake, then down Deer Creek to the Mokelumne River. From here, it was picked up by the Upper and Lower Standard Electric ditches and then carried to Electra Powerhouse.

UBL dam, State Dam #97-070, is located in Alpine County, 4.1 miles south of Carson Pass on Blue Creek. The Blue Lakes Water Company built the dam in 1872, and ACMC improved it by 1881. The original dam was an earthfill structure with a rip-rapped upstream slope. Its original outlet consisted of a wooden box culvert at the thickest section of the dam. Standard Electric Company replaced the original outlet with two 18-inch-diameter steel pipes encased in concrete around 1900. At the same time, the dam was raised 10 feet and a 160-foot-long hand placed rock wall was added to the thickest portion of the downstream slope. This work was conducted under the guidance of engineer W. R. Eckart. In 1905, an overflow spillway and flashboards were added to the dam. In 1929, the spillway crest was lengthened to 40 feet and the reservoir was raised to an elevation of 8137.5 feet. After that time, there were no major alterations to the dam.

A fish screen was added to the entrance to the outlet by the California Department of Fish and Game in 1939. In 1949, PG&E added rock to the riprap facing on the upstream face of the dam. In 1979, PG&E poured a 50-foot-long section of gunite on the upstream slope of the dam near the outlet to replace rocks that had been displaced by fisherman on the slope.

3.11.2 Regulatory Setting

3.11.2.1 Federal

The following federal regulation related to cultural resources would apply to implementation of the proposed project.

National Historic Preservation Act

Section 106 of the NHPA (16 U.S.C. Section 470f) requires federal agencies to evaluate the effects of their undertakings on historic properties, which are those properties listed or eligible for listing on the National Register of Historic Places. Implementing regulations at 36 CFR Part 800 require that federal agencies, in consultation with the SHPO, identify historic properties within the Area of Potential Effect (APE) of the proposed project and make an assessment of effects if any are identified. If the project is determined to have an adverse effect on historic properties, the federal agency is required to consult further with SHPO and the ACHP to develop methods to resolve the adverse effects. USACE's issuance of a CWA Section 404 permit for the proposed project constitutes an undertaking as defined by 36 CFR 800.16(y) and triggers compliance with Section 106 of the NHPA.

FERC, ACHP, SHPO, USFS, PG&E and other interested parties adopted a Programmatic Agreement (PA) that requires PG&E to develop and implement a Historic Properties Management Plan (HPMP) for operations and maintenance of the Mokelumne River Project. Pursuant to stipulations of the PA, PG&E has developed and implemented an HPMP in accordance with the Secretary of the Interior's standards and guidelines to manage historic properties within the APE established for the Mokelumne River Project. The HPMP guides programmatic compliance with Section 106 of the NHPA and directs PG&E to consult with stakeholders on behalf of the FERC when activities associated with License 137 have the potential to effect historic properties. As a project subject to FERC approval, the proposed project is subject to the provisions of the PA and HPMP.

In a letter dated September 11, 2018, USACE formally designated FERC as the lead federal agency for compliance with Section 106 of the NHPA (Fancher pers. comm.). As such, FERC is addressing Section 106 compliance for the project pursuant to the requirements of the Mokelumne River Project PA and HPMP.

3.11.2.2 State

The following state regulations related to cultural resources would apply to implementation of the proposed project.

California Environment Quality Act

Two categories of cultural resources are specifically called out in the State CEQA Guidelines. The categories are historical resources (State CEQA Guidelines Section 15064.5[b]) and unique archaeological sites (State CEQA Guidelines Section 15064.5[c]; California Public Resources Code Section 21083.2). Different legal rules apply to the two different categories of cultural resources. However, the two categories sometimes overlap where an archaeological historical resource also qualifies as a unique archaeological resource. In such an instance, the more stringent rules for unique archaeological resources apply, as explained below. In most situations, resources that meet the definition of a unique archaeological resource also meet the definition of a historical resource. As a result, it is current professional practice to evaluate cultural resources for significance based on their eligibility for listing in the California Register of Historical Resources (CRHR).

Historical resources are those meeting the following requirements.

- Resources listed in or determined eligible for listing in the CRHR (State CEQA Guidelines 15064.5[a][1]).
- Resources included in a local register as defined in Public Resources Code Section 5020.1(k), "unless the preponderance of evidence demonstrates" that the resource "is not historically or culturally significant" (State CEQA Guidelines Section 15064.5[a][2]).
- Resources that are identified as significant in surveys that meet the standards provided in Public Resources Code Section 5024.1[g] (State CEQA Guidelines Section 15064.5[a][3]).
- Resources that the lead agency determines are significant, based on substantial evidence (State CEQA Guidelines Section 15064.5[a][3]).

Unique archaeological resources, on the other hand, are defined in Public Resources Code Section 21083.2 as a resource that meets at least one of the following criteria.

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person. (Public Resources Code Section 21083.2[g])

The process for identifying historical resources is typically accomplished by applying the criteria for listing in the CRHR (14 CCR 4852). This section states that a historical resource must be significant at the local, state, or national level under one or more of the following four criteria.

1. It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
2. It is associated with the lives of persons important in our past.
3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values.
4. It has yielded, or may be likely to yield, information important in prehistory or history.

To be considered a historical resource for the purpose of CEQA, the resource must also have integrity. Integrity is the authenticity of a resource's physical identity, evidenced by the survival of characteristics that existed during the resource's period of significance.

Resources, therefore, must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling and association. It must also be judged with reference to the particular criteria under which a resource is eligible for listing in the CRHR (14 CCR 4852[c]). Integrity assessments made for CEQA purposes typically follow the National Park Service guidance used for integrity assessments for NRHP purposes.

Even if a resource is not listed or eligible for listing in the CRHR, in a local register of historical resources, or identified in an historical resource survey, a lead agency may still determine that the resource is an historical resource as defined in Public Resources Code Sections 5020.1j or 5024.1 (State CEQA Guidelines Section 15064.5[a][4]).

Resources that meet the significance criteria and integrity considerations must be considered in the impacts analysis under CEQA. Notably, a project that causes a substantial adverse change in the significance of an historical resource is a project that may have significant impact under CEQA (State CEQA Guidelines 15064.5[b]). A substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired. The significance of an historical resource is materially impaired if the project demolishes or materially alters any qualities as follows.

- Qualities that justify the inclusion or eligibility for inclusion of a resource on the CRHR (State CEQA Guidelines Section 15064.5[b][2][A],[C]).
- Qualities that justify the inclusion of the resource on a local register (State CEQA Guidelines Section 15064.5[b][2][B]).

California Health and Safety Code and Public Resources Code

Broad provisions for the protection of Native American cultural resources are contained in California Health and Safety Code, Division 7, Part 2, Chapter 5 (Sections 8010 through 8030).

Several provisions of the Public Resources Code also govern archaeological finds of human remains and associated objects. Procedures are detailed under Public Resources Code Sections 5097.98 through 5097.996 for actions to be taken whenever Native American remains are discovered. Furthermore, Section 7050.5 of the California Health and Safety Code states that any person who knowingly mutilates or disinters, wantonly disturbs, or willfully removes human remains in or from any location other than a dedicated cemetery without authority of law is guilty of a misdemeanor, except as provided in Section 5097.99 of the Public Resources Code. Any person removing human remains without authority of law or written permission of the person or persons having the right to control the remains under Public Resources Code Section 7100 has committed a public offense that is punishable by imprisonment.

Public Resources Code Chapter 1.7, Sections 5097.5–5097.9 define any unauthorized disturbance or removal of a fossil site or remains on public land as a misdemeanor and specify that state agencies may undertake surveys, excavations, or other operations as necessary on state lands to preserve or record paleontological resources

3.11.2.3 Local

No local regulations concerning cultural resources apply to the proposed project.

3.11.3 Methods

3.11.3.1 Records Search

The project components (dam site, staging area, and spoil disposal locations) were overlain on maps depicting the location of known cultural resource sites using PG&E's Confidential Cultural Resource Database (CCRD), which includes all known historic properties within the Mokelumne River Project's administrative boundary. These results were confirmed through a supplemental records search completed by the Central California Information Center (file number 10878K) in October 2018.

The records search and review of PG&E's CCRD indicates that the entire project area has been adequately surveyed in the past, with the exception of the Spoils Sites 2a and 2b. Five previous archaeological and built environment surveys have been completed in the project area.

Prior Studies

This section was summarized from the *Upper Blue Lake Dam Seismic Retrofit Project Cultural Resources Constraints Report* (Taggart 2019). The most recent inventory completed within the current project area is Far Western Anthropological Research Group's 2014 survey of UBL at the height of the recent drought. The drought resulted in historically low water levels in reservoirs that are part of the Mokelumne River Project and allowed for identification of resources that are typically inundated. The survey covered the in-reservoir portions of the current project area and failed to identify any cultural resources.

A study by Baker conducted in 2003 presents a detailed history of the Blue Lakes Basin and provides an evaluation of all built environment elements of the Mokelumne River hydroelectric system. The Baker study considers the individual significance and integrity of each resource and whether or not it contributes to the eligibility of two historic districts established within the FERC administrative boundary.

In 2005, Lynn Compas resurveyed portions of the Middle Creek Expansion Campground, which includes portions of the current project area. The survey, metal detecting, and further research was completed in support of the evaluation of resource CA-ALP-165H, which was recommended ineligible for the NRHP, as discussed below.

Despite being dated, a 1981 survey by Wirth provides the most comprehensive and systematic inventory of the FERC administrative boundary within the Upper Mokelumne watershed. The survey was informed by a significant amount of background research that sought to identify historic and prehistoric resources. A five-person crew intensively surveyed by walking 10–20 meter transects around the reservoir and hydroelectric facilities, and through the sites of existing recreation developments and proposed amenities (Upper Blue Lake Group Camp, Upper Blue Lake Dam Campground, and Middle Creek Expansion Campground). Upper Blue Lake was at less than one-third of capacity when surveyed, providing access to portions of the lakebed that are routinely inundated. A number of resources were documented, including one in the current project area (CA-ALP-165H).

Finally, Patti Johnson surveyed the Upper Blue Lake Basin in 1970, apparently the first PG&E-sponsored archaeological reconnaissance for the Mokelumne River Project. The report narrative indicates that the area around UBL and UBL dam were surveyed; however, the methods, intensity, and exact location is unclear. As a result, the report is best relied upon simply for context.

Resources

As a result of prior studies, two resources have been identified within the current project area: P-2-246 (CA-ALP-165H) and UBL Dam (P-2-663).

Site P-2-246 consists of a historic structure pad constructed of rough cut granite slabs with concrete mortar and associated historic artifacts including white improved earthenware fragments, glass fragments, and wire nails. The remains are located within the Middle Creek Expansion Campground (space 26). The Office of Historic Preservation has classified this resource with status code 6Y, which is used for resources that have been previously determined ineligible for the NRHP by consensus through the federal Section 106 process.

Resource P-2-663 corresponds to the UBL dam. The dam was originally constructed in 1872 and was improved in 1881, 1901, 1905 and 1929. Presently, the dam is 31 feet high and 790 feet long at its crest. The dam was evaluated in 2003 (Baker 2003) and was found to be ineligible for listing on the NRHP on an individual basis. Moreover, it was determined that the dam does not contribute to the eligibility of the Mokelumne River Rock-faced Dam Discontiguous Historic District. The State Historic Preservation Officer concurred with the eligibility determination in a letter dated May 7, 2003 (FERC030124A).

Although the Central California Information Center records search indicates that the Mokelumne River Rock-faced Dam Discontiguous Historic District (P-2-662) is within the project area, in fact the nearest contributing element of the district is Lower Blue Lake Dam, which lies approximately 1.6 air miles to the south of the current project area.

3.11.3.2 Native American Consultation

Tribal consultation for projects associated with the Mokelumne River Project has been undertaken on a programmatic level in cooperation with FERC and USFS over a period of many years, and is carried out under an adopted Programmatic Agreement that required PG&E to develop a Historic Properties Management Plan (HPMP) for operations and maintenance of the Mokelumne River Project. Consultation procedures for project activities that have the potential to affect historic properties on the Mokelumne River Project are detailed in the HPMP (Price, Flint and Baloian 2007). The HPMP identifies 16 individuals representing nine Native American groups that were consulted during the preparation of the HPMP and previous relicensing work (Price, Flint and Baloian 2007: Appendix C). The HPMP states that "Native American Consultation will be expanded should unavoidable impacts to prehistoric archaeological sites occur and no preservation measures area feasible" (Price, Flint and Baloian 2007:50). Consultation efforts undertaken during past studies, relicensing, and development of the HPMP failed to identify areas of concern to the consulting Native Americans in the current project area. Despite the absence of known Native American resources within the project area, as indicated by prior surveys, an ethnographic study, and past consultation efforts, supplemental Native American outreach was conducted nonetheless.

Native American stakeholders involved in the implementation of the Mokelumne River Project HPMP have been kept apprised of the seismic stability concerns with UBL dam dating back to early 2016. During a stakeholder meeting conducted on March 29, 2016, consulting Native Americans were made aware of the issue and the interim safety measures to be implemented immediately.

Subsequently, the issue was discussed at the May 9, 2017 stakeholder meeting. During the June 6, 2018 meeting, the proposed scope of work for the dam's seismic retrofit was discussed, along with associated campground closures and access restrictions during construction. Representatives from the Washoe Tribe of Nevada and California and Jackson Rancheria participated, while the meeting notes that discussed the project were shared with all invitees (including the Tuolumne Band of Me-Wuk Indians and the Ione Band of Miwok Indians).

The Native American Heritage Commission (NAHC) was contacted in the fall of 2018. In response, NAHC stated that a review of the Sacred Lands File failed to identify any known sites in the project area (Taggart 2019: Attachment 3). NAHC provided a single tribal contact (Washoe Tribe of Nevada and California), who was contacted by letter on November 9, 2018. A follow-up email was sent to the Washoe Tribe (in addition to the other Mokelumne HPMP stakeholders) on November 14, 2018. On December 20, 2018, Washoe Tribal Historic Preservation Officer Darrel Cruz and PG&E representative Mike Taggart spoke by phone about the nature of the project, efforts to identify historic properties, and the construction schedule. Mr. Cruz acknowledged past discussions about the seismic stability of the dam but did not identify any specific concerns with the project or nearby resources. Mr. Cruz, along with other Mokelumne stakeholders, will be kept apprised during the annual meeting of the project's progress.

3.11.3.3 Survey

Far Western Anthropological Research Group's 2014 survey of UBL covered much of the project area. A supplemental survey to inventory the three spoils disposal locations and confirm the previous findings in proximity to the dam was completed by Mike Taggart, RPA, on September 7, 2018. The survey used pedestrian transects spaced less than 5 meters apart and covered the soil disposal locations situated north of the dam. The dam and surrounding environs on the upstream dam face were examined at a cursory, reconnaissance level. The Middle Creek Campground was not re-surveyed because its use will be limited to parking in areas that are developed and largely paved over.

The pedestrian surveys conducted in 2014 and 2018 failed to identify any previously undocumented cultural resources. The two upland disposal sites (2A and 2B) are currently used for staging of materials and parking heavy equipment used for the routine operation of the PG&E hydroelectric facilities and campgrounds. All materials observed are contemporary. The northern-most disposal site, located at the alternative boat-ramp, was closely inspected and gave no indication of a cultural deposit.

A reconnaissance-level survey of the dam site and surrounding environs served to validate the prior survey results and resource documentation. The area on the northeastern abutment of the dam, where staging and temporary spoil stockpiling are proposed, currently functions as a broad access point and boat ramp for the lake. No new resources were observed.

3.11.4 Environmental Effects

Potential impacts of the proposed project on cultural resources are discussed in the context of State CEQA Guidelines Appendix G checklist items. Checklist Section V, *Cultural Resources*, asks whether the project would result in any of the following conditions.

a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

Results of the records search, consultation, and survey for the project concluded no historical resources are located within the project area. Consequently, the proposed project would result in no impact on historical resources and requires no mitigation.

b. Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to Section 15064.5?

No archaeological resources were identified within the area of impact through the records search, consultation, or surveys for this project. Sensitivity to encounter buried archaeological resources within the project area is low; however, it is still possible that significant buried archaeological materials are present on natural landforms in the project area. Disturbance or destruction of such as yet unidentified archaeological resources may result from ground-disturbing activities associated with the project. This direct effect would be significant; however, it would be reduced to a less-than-significant level with implementation of Mitigation Measures CUL-MM-1 and CUL-MM-2.

Mitigation Measure CUL-MM-1: Conduct Mandatory Cultural Resources Awareness Training for All Project Personnel

Before any ground-disturbing work commences, a qualified archaeologist will conduct a mandatory cultural resources awareness training for all construction personnel. The training will cover the types of materials that could be encountered and the inadvertent discovery protocol to follow in such an event. If new construction personnel are added to the project, the contractor will ensure that the new personnel receive the mandatory training before starting work

Mitigation Measure CUL-MM-2: Stop Work if Previously Unidentified Archaeological Resources are Encountered until a Qualified Archaeologist Assesses the Find and Native American Consultation Has Been Conducted

If previously unknown buried archaeological resources, such as chipped or ground stone artifacts, historic debris, building foundations, or human bone are inadvertently unearthed during ground-disturbing activities, work will stop at the location of the find and all areas within 100 feet of the find until a qualified archaeologist can assess the significance of the find. If avoidance is not possible, a qualified archaeologist will develop an appropriate treatment plan in consultation with the appropriate stakeholders. If the find is Native American in origin, consultation with local Native American representatives will be reinitiated.

c. Disturb any human remains, including those interred outside of formal cemeteries?

No known human remains are present within the project area. It is possible that buried human remains are present in the project area but were not identified during the archaeological surveys. Consequently, the potential exists that human remains could be encountered during ground-disturbing activities associated with the proposed action. This direct impact would be significant; however, it would be reduced to a less-than-significant level with implementation of Mitigation Measure CUL-MM-3.

Mitigation Measure CUL-MM-3: Stop Work in Case of Accidental Discovery of Buried Human Remains until Procedures in Public Resources Code Section 5097 Have Been Completed

In the event that human remains are discovered, all project-related ground disturbance will halt within 100 feet of the find and the Alpine County coroner will be notified immediately. If the coroner determines the remains to be Native American in origin, the coroner will be responsible for notifying the NAHC, which will appoint a most likely descendant (MLD) (Public Resources Code Section 5097.99). The project applicant and MLD will make all reasonable efforts to develop an agreement for the dignified treatment of human remains and associated or unassociated funerary objects (State CEQA Guidelines Section 15064.5[d]). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. The MLD will have 48 hours after being granted access to the site to make a recommendation (Public Resources Code Section 5097.98). If the MLD does not agree to the reburial method, the project will follow Public Resources Code Section 5097.98(e), which states, "the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American human remains with appropriate dignity on the property in a location not subject to further and future subsurface disturbance."

3.12 Tribal Cultural Resources

3.12.1 Existing Conditions

The approximately 6.18-acre project area is located at the head of Middle Creek, a tributary to the North Fork of the Mokelumne River, approximately 10 miles southwest of Markleeville and 4.1 miles south of Carson Pass in Alpine County, California. The project area encompasses the UBL dam and adjacent shoreline and proposed spoils sites. The project area is relatively level, with elevations ranging from approximately 8,150 to 8,200 feet above mean sea level, although the surrounding region is mountainous. The dam is located at an elevation of approximately 8,100 feet.

3.12.1.1 Ethnographic Context

The ethnographic context of the region is provided in Section 3.11.1.2, *Ethnographic Context*.

3.12.1.2 Buried Site Sensitivity

According to the Natural Resources Conservation Service (2018), soil units within the project area are Lithic Cryumbrepts and rock outcrop. Lithic Cryumbrepts consist of shallow sandy loam underlain by bedrock. Granite outcrop has no associated deposit. Potential for buried sites in the project area is extremely low.

3.12.2 Regulatory Setting

3.12.2.1 State Assembly Bill 52

Effective July 1, 2015, AB 52 amended CEQA to require that a lead agency provide notice to those California Native American tribes that request notice of projects proposed by the lead agency and that the lead agency consult with any tribe that responds to the notice within 30 days of receipt with a request for consultation.

Topics that may be addressed during consultation include tribal cultural resources, the potential significance of project impacts, type of environmental document that should be prepared, and possible mitigation measures and project alternatives.

Public Resources Code Section 21073 defines California Native American tribes as "a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of the Statutes of 2004." This includes both federally and non-federally recognized tribes.

Section 21074(a) of the Public Resource Code defines tribal cultural resources for the purpose of CEQA as either of the following:

1. Sites, features, places, cultural landscapes (geographically defined in terms of the size and scope), sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
    A. Included or determined to be eligible for inclusion in the California Register of Historical Resources.

B. Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.

2. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

Because criteria A and B also meet the definition of a historical resource under CEQA, a tribal cultural resource may also require additional consideration as a historical resource. Tribal cultural resources may or may not exhibit archaeological, cultural, or physical indicators.

Recognizing that California tribes are experts in their tribal cultural resources and heritage, AB 52 requires that CEQA lead agencies provide tribes that requested notification an opportunity to consult at the commencement of the CEQA process to identify tribal cultural resources. Furthermore, because a significant effect on a tribal cultural resource is considered a significant impact on the environment under CEQA, consultation is used to develop appropriate avoidance, impact minimization, and mitigation measures

3.12.3 Methods

No tribes have requested to consult under AB 52 on projects within the project vicinity (White pers. comm.). Therefore, no AB 52 consultation has been conducted. In the absence of tribes wishing to consult, information about potential impacts on tribal cultural resources was drawn from the results of a search of the NAHC Sacred Lands File and existing information about known archaeological resources and buried site sensitivity within the project vicinity.

3.12.3.1 Sacred Lands File Search and Correspondence with Native American Representatives

Tribal consultation for projects associated with the Mokelumne River Project have been undertaken on a programmatic level in cooperation with the FERC and USFS over a period of many years. Consultation procedures for project activities that have the potential to affect historic properties on the Mokelumne River Project are detailed in the HPMP (Price, Flint and Baloian 2007). The HPMP identifies 16 individuals representing nine Native American groups that were consulted during the preparation of the HPMP and previous relicensing work (Price, Flint and Baloian 2007: Appendix C). Consultation efforts undertaken during past studies, relicensing, and development of the HPMP failed to identify areas of concern to the consulting Native Americans in the current project area. Prior surveys, an ethnographic study and past consultation efforts have failed to identify places of concern within the current project area.

Native American stakeholders involved in the implementation of the HPMP have been kept apprised of the seismic stability concerns with UBL dam since early 2016. During a stakeholder meeting conducted on March 29, 2016, consulting Native Americans were made aware of the issue and the interim safety measures to be implemented immediately. Subsequently, the issue was discussed at the May 9, 2017 stakeholder meeting. During the June 6, 2018 meeting, the proposed scope of work for the dam's seismic retrofit was discussed, along with associated campground closures and access restrictions during construction. Representatives from the Washoe Tribe of Nevada and California and Jackson Rancheria participated, and the meeting notes that discussed the project were shared with all invitees (including the Tuolumne Band of Me-Wuk Indians and the Ione Band of Miwok Indians).

A letter was sent to the Native American Heritage Commission (NAHC) on October 11, 2018 requesting a Sacred Lands File search of the project vicinity and a Native American contact list. The NAHC responded on October 12, 2018, noting that their records did not indicate the presence of tribal cultural resources or sacred lands in the project vicinity. A request for comment letter was sent on November 9, 2018, to Darrel Cruz, the sole individual on the contact list. On December 20, 2018, Mr. Cruz and PG&E representative Mike Taggart spoke by phone about the nature of the project, efforts to identify historic properties and the construction schedule. Mr. Cruz did not identify any specific concerns with the project or nearby resources.

3.12.3.2 Records Search and Field Survey

A records search was conducted at the Central California Information Center in October 2018. Cultural surveys of the project area were conducted during 2014 and 2018, as discussed in Section 3.11.3.3, *Survey*. No eligible cultural resources were found to be located within the project area.

3.12.4 Environmental Effects

Potential impacts of the proposed project on tribal cultural resources are discussed in the context of State CEQA guidelines Appendix G checklist items. Section XVII of the checklist, *Tribal Cultural Resources*, asks:

> Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

a. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?

Results of the records search, consultation, and survey for the project concluded no historical resources are located within the project area. Consequently, the proposed project would result in no impact on historical resources and requires no mitigation.

b. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

No tribes have requested to consult under AB 52, and no known resources are located within the area of impact. There would be no impact.

3.13 Transportation/Traffic

3.13.1 Existing Conditions

For the purposes of the transportation/traffic analysis, the study area consisted of the project area and the haul routes between the project area and Bing Materials in Gardnerville, NV, including Blue Lakes Road and SR 88 between the intersection with Blue Lakes Road and the California-Nevada border.

Blue Lakes Road is classified as a "County Collector" and SR 88 is classified as a "State Highway" (Alpine County 2017:118). Blue Lakes Road provides access to recreational destinations and serves as a snowmobile route during winter road closures. SR 88 is an east-west, two-lane conventional highway beginning in Stockton at SR 99 and ending in Minden, NV. Truck traffic composes up to 13% of total traffic on SR 88 (Green Dot Transportation Solutions 2015:2-10 and 2-8).

Travel in Alpine County is primarily automobile-oriented due to the rural nature of the local communities, low development densities, and limited options for using alternative modes of transport. Level of Service (LOS) is a grading system used to rate a roadway segment's traffic flow characteristics, and acts as an indicator of roadway performance using a scale of A through F (Table 3.13-1).

Table 3.13-1. LOS Definitions/Characteristics

LOS	Description
A	Represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.
B	Stable flow, but the presence of others in the traffic stream begins to be noticeable.
C	Stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interaction with others in the traffic stream.
D	Represents high density, but stable flow.
E	Represents operating conditions at or near the capacity level.
F	Represents forced, or a breakdown in, traffic flow.

Source: Green Dot Transportation Solutions 2015:2-12.

LOS A through LOS C are considered to be acceptable, although some situations allow for LOS D and E in areas of short peak traffic impacts. LOS for rural highways is largely determined by roadway geometry factors such as grades, vertical and horizontal curves, and the presence of passing opportunities. Table 3.13-2 shows the average daily traffic LOS thresholds for the roadway types in the study area.

Table 3.13-2. Roadway Segment Average Daily Traffic Level of Service Thresholds

		Level of Service				
Functional Class	**Lanes**	**A**	**B**	**C**	**D**	**E**
County Collector	2	900	2,000	6,800	14,100	17,400
State Highway (Rural Minor Arterial)	2	1,200	2,900	7,900	16,000	20,500

Source: Alpine County 2017:114.

Table 3.13-3 shows the existing daily volume and LOS on roadway segments in the study area.

Table 3.13-3. Existing Level of Service on Roadways in the Study Area

Road	Segment	Roadway Type	Daily Volume	LOS
Blue Lakes Road	n/a	County Collector	760	A
SR 88	Nevada State Line	State Highway (Rural Minor Arterial)	4,350	C
	East Junction with SR 89		4,000	C
	West Junction with SR 89		3,800	C

Source: Alpine County 2017:121.
LOS = level of service; SR = State Route

3.13.2 Regulatory Setting

3.13.2.1 State

California Department of Transportation District 10 State Route 88 Transportation Concept Report

Each California Department of Transportation (Caltrans) district publishes transportation concept reports (TCRs) for the state highways within its jurisdiction. The purpose of a TCR is to determine how a highway will be developed and managed so that it delivers the targeted LOS and quality of operations that are feasible to attain over a 20-year period. A TCR establishes the "concept"—or desired—LOS for specific corridor segments. The TCR for SR 88 in Alpine County was published by Caltrans District 10 in 2013 and sets the concept LOS for SR 88 as LOS C, the standard LOS for rural highways (California Department of Transportation, District 10 2013).

3.13.2.2 Local

Alpine County General Plan

Transportation analysis in the study area is guided by policies and standards set by local jurisdictions. Because the study area is located in Alpine County, the proposed project would be required to adhere to the adopted policies in the Alpine County General Plan. The Circulation Element of the *Alpine County General Plan* (2017) identifies goals and policies related to circulation and infrastructure needs in Alpine County. The following goals and policies are applicable to the proposed project.

Goal 29: Develop and maintain an efficient, safe, and effective road system.

- **Policy 29b:** Implement and maintain LOS C on roadways… and at intersections… to ensure travel delays and congestion do not cause impacts to drivers.

Alpine County 2015 Regional Transportation Plan

The Alpine County 2015 Regional Transportation Plan was prepared by the Alpine County Local Transportation Commission. Its purpose is to provide a vision for the region, supported by transportation goals, for 10-year (2025) and 20-year (2035) planning horizons. The Regional Transportation Plan documents the policy direction, actions, and funding strategies designed to maintain and improve the regional transportation system. The following goal and objective are applicable to the proposed project.

Goal 1: Provide and maintain a safe, efficient, and convenient countywide roadway system that meets the travel needs of people and goods within the region and connecting to points beyond.

- **Objective:** Maintain Caltrans' desired LOS on all State highways.

Alpine County Active Transportation Plan

The Alpine County Active Transportation Plan was adopted by the Alpine County Local Transportation Commission on March 20, 2018. Its purpose is to identify existing and future infrastructure and programs related to active transportation, specifically, those which encourage people to walk and bike, and the features that keep pedestrians and bicyclists safe. The plan does not contain any goals, objectives, or proposed programs within the study area of the proposed project.

3.13.3 Environmental Effects

Potential impacts of the proposed project on transportation and traffic are discussed in the context of the State CEQA Guidelines Appendix G checklist. Checklist Section XVI, *Transportation/ Traffic*, asks whether the project would result in any of the following conditions.

a. Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

The primary measure of effectiveness for the performance of the circulation system in the study area is the designation of LOS on certain roadways. Pursuant to *Alpine County General Plan* Goal 29 and Policy 29b, significant impacts could result if the proposed project substantially reduced an existing LOS or reduced existing LOS to below C. During construction, the movements of crew, equipment, and material would result in temporary increases in traffic. The vehicles associated with project implementation are anticipated to travel on Blue Lakes Road and on SR 88 between the Nevada state line and the intersection with Blue Lakes Road which currently operate at LOS A and C, respectively. At the peak of the materials delivery phase of construction, which is anticipated to occur during June 2019, haul trucks are expected to make up to 23 round trips per day, and construction workers are anticipated to make up to 13 round trips per day in personal vehicles. The relatively low number of trips required to import construction materials and personnel over a relatively short duration of time would not substantially reduce existing LOS (LOS is discussed in more detail under checklist item *b*). Furthermore, PG&E would implement Avoidance and

Minimization Measure AMM-4: Implement Traffic Control Plan, which includes measures to minimize conflicts between construction traffic and recreational users. The traffic generated by haul trucks and personal vehicles, therefore, would not have a significant impact on localized traffic patterns, particularly during the recreation season. Construction activities themselves would be limited to the UBL dam area, which would be closed to the public, and would not degrade traffic or conflict with applicable plans, ordinances, or policies. Post-construction project operations of the reservoir and the retrofitted dam would not result in more traffic than existing conditions. This impact would be less than significant.

b. Conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways?

Congestion management in Alpine County is regulated through the LOS standards contained in the *Alpine County General Plan*. As indicated above for checklist item *a*, construction-related traffic impacts would be temporary. The roads providing access to the project area are SR 88, which currently operates at LOS C for all segments in the study area, and Blue Lakes Road, which currently operates at LOS A. The relatively small amount of traffic generated during the construction period, including haul truck trips and personal vehicle trips, would not change the current LOS on either roadway. For example, there is a difference of 8,100 average daily trips between an LOS C and LOS D for a State Route (Table 3.13-2). This impact would be less than significant.

c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

A helicopter flying out of Alpine County Airport may be used once every 2 weeks to access the project area, and, if Blue Lakes Road is not cleared of snow by early June, a helicopter may be used to deliver equipment and personnel to the project area for 3 days at the beginning of construction. Alpine County Airport is located approximately 11.5 miles northeast of the project area. The use of the helicopter would not affect air traffic patterns or cause any air traffic safety risks because the helicopter trips would be minimal and of short duration, the helicopter would not fly at altitudes that would affect regular air traffic patterns, and the operation of the helicopter would be subject to airport and air traffic control rules and regulations. This impact would be less than significant.

d. Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

The proposed project does not involve the alteration or design of any roadways, intersections, or incompatible uses that would result in hazardous traffic conditions. Design features would not increase hazards for motorists, bicyclists, or pedestrians. There would be no impact.

e. Result in inadequate emergency access?

There would be no lane closures involved with the proposed project that would constrict emergency access. Haul trucks accessing the project area would have the potential to briefly slow traffic during construction hours. However, the maximum number haul truck round trips per day would be only 23 during the busiest phase of construction, and a high volume of truck traffic already traverses SR 88 daily. As discussed under checklist items *a* and *b*, the addition of all project-related vehicle trips to roadways in the study area would not be substantial enough to alter LOS levels on SR 88 or Blue Lakes Road. Additionally, PG&E would implement Avoidance and Minimization Measure AMM-4:

Implement Traffic Control Plan to ensure traffic conflicts are avoided. Therefore, emergency access would be maintained during construction of the project. This impact would be less than significant.

f. Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

Construction of the proposed project would be temporary and would not conflict with any adopted policies, plans, or programs supporting alternative transportation. Additionally, there are no existing or planned formal bicycle or pedestrian facilities within the study area (Green Dot Transportation Solutions 2018:21), nor are there goals, objectives, or proposed programs applicable to alternative transportation within the study area (see *Alpine County Active Transportation Plan* in Section 3.13.2, *Regulatory Setting*). There would be no impact.

Chapter 4
Cumulative Impacts

4.1 Cumulative Projects

The State CEQA Guidelines Section 15355 defines cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." Pursuant to Guidelines Section 15130(b)(1)(A), the following projects have been identified as those past, present, and probable future projects producing related or cumulative impacts, including those projects outside the control of the lead agency. These projects (cumulative projects) consist of a culvert repair project and a campground rehabilitation project that could result in transportation and recreation impacts similar to those of the UBL project.

- **Alpine County Culvert Rehabilitation & Replacement.** The California Department of Transportation plans to replace and/or repair existing drainage systems at various locations along SRs 4, 88, and 89 in Alpine County, including at four locations within the UBL traffic study area along SR 88 between the intersection with Blue Lakes Road and the California-Nevada border.
- **Caples Lake Campground Rehabilitation.** During the summer of 2019, USFS plans construct a rehabilitation project at the Caples Lake Campground, which is located within the Mokelumne Wilderness. The campground will be closed to public use during construction.

4.2 Cumulative Impacts by Resource

The following analysis focuses on the potential for impacts identified in Chapter 3 to make a considerable contribution to significant cumulative impacts. The UBL project would not cause significant long-term impacts on the resources discussed in Chapter 3, *Environmental Setting and Impacts*. However, the project has the potential to incur temporary, short-term impacts during the construction period. The potential cumulatively considerable impacts on these resources, in combination with potential impacts from the local project described above (where applicable), are discussed below.

4.2.1 Hydrology and Water Quality

The cumulative impact context for evaluation of potential impacts on hydrology and water quality resources includes the improvements proposed under the proposed project only. There are no anticipated developments or improvements in the areas adjacent to the project area that have the potential to impact the local hydrology and water quality conditions or act in combination with the proposed project. The proposed project would comply with DSOD and FERC seismic safety policy standards, as well as state and federal water quality regulations and, therefore, the proposed project's contribution to any cumulative effect on local hydrology and water quality conditions would be minimized. All long-term project impacts would be reduced to a less-than-significant level through adherence to permit requirements, BMPs, and avoidance and minimization measures and with implementation of Mitigation Measures BIO-MM-4 and BIO-MM-6.

The purpose of the project is to improve the seismic stability of the UBL dam. By greatly improving the safety conditions at the dam, the proposed project would decrease the overall exposure of people or structures to a significant risk of loss, injury, or death involving flooding in the area. With implementation of Mitigation Measures BIO-MM-4: Implement Cofferdam, Turbidity Curtain, and Construction Site Dewatering Restrictions and BIO-MM-6: Implement Flow Pumping System Requirements, as well as Avoidance and Minimization Measures AMM-1: Implement Water Quality Protection Measures and Erosion and Sediment Control Plans and AMM-2: Implement Hazardous Materials Control Measures, all impacts are expected to be short-lived with no anticipated cumulative impacts on local hydrologic or water quality conditions.

4.2.2 Geology and Soils

The cumulative impact context for evaluation of potential impacts related to geology, soils, seismicity, and paleontological resources consists of the improvements proposed under the proposed project only. There are no anticipated development or improvements in the areas adjacent to the project area that have the potential to impact the local geologic, soils, seismic, and paleontological conditions or to act in combination with the proposed project. The proposed project would comply with DSOD and FERC seismic safety policy standards, as well as with state and federal water quality regulations; therefore, the proposed project's contribution to any cumulative effect on local geologic, soils, seismic, and paleontological conditions would be minimized. All long-term project impacts would be reduced to a less-than-significant level through adherence to permit requirements, BMPs, and avoidance and minimization measures, and with implementation of Mitigation Measures GEO-MM-1, GEO-MM-2, GEO-MM-3, and GEO-MM-4.

The purpose of the project is to improve the seismic stability of the UBL dam. By greatly improving the safety conditions at the dam, the proposed project would decrease the exposure of people or structures to a significant risk of loss, injury, or death from strong ground shaking. With implementation of Mitigation Measures GEO-MM-1, GEO-MM-2, GEO-MM-3, and GEO-MM-4, and Avoidance and Minimization Measure AMM-1, all impacts are expected to be short-lived with no anticipated cumulative impacts on local geologic, soils, and seismic conditions.

4.2.3 Biological Resources

There are no present or reasonably foreseeable future projects within the project area or at UBL reservoir. Various improvements to the dam structure were made in 2001, 2004, 2006, and 2007 (see Chapter 1, *Introduction*). These projects were limited in scope and duration, and the disturbance footprint consisted of the dam and associated structures. Therefore, the effects of these past projects on biological resources were limited. Because of the gap in time between these improvements and the proposed action, there are unlikely to be any residual effects that would contribute to effects from the proposed project. Therefore, the impacts of these past projects and the proposed project on biological resources would not be cumulatively considerable. No mitigation is required.

4.2.4 Air Quality

The State CEQA Guidelines indicate that, where available, the significance criteria established by local air districts may be relied upon to make the impact determinations. As discussed in Section 3.6.2 and 3.6.3, this analysis utilizes the significance criteria developed by SCAQMD to make its impact determinations, consistent with GBUAPCD guidance. SCAQMD guidance on addressing cumulative impacts for air quality states that: "Projects that exceed the project-specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant" (South Coast Air Quality Management District 2003). This guidance corresponds with State CEQA Guidelines Section 15064(h)(4), which states that the mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the project's incremental effects are cumulatively considerable. SCAQMD cumulative significance thresholds are the same as project-specific significance thresholds.

As explained in the analyses of Impacts a through e, the project would result in no significant air quality impacts. The proposed project would be consistent with applicable policies, would result in emissions below significance thresholds, would not expose sensitive receptors to substantial pollutant concentrations, and would not result in odors that affect nearby people. Therefore, given SCAQMD's direction that project-specific and cumulative impact determinations use the same criteria, the project's incremental contribution to cumulative impacts related to air quality would not be cumulatively considerable, and this impact would be less than significant. No mitigation is required.

4.2.5 Greenhouse Gas Emissions

Climate change is a global problem and GHGs are global pollutants, unlike criteria air pollutants such as ozone precursors, which are primarily pollutants of regional and local concern. Given the long atmospheric lifetimes of GHGs, GHGs emitted by many sources worldwide accumulate in the atmosphere. No single emitter of GHGs is large enough to trigger global climate change on its own. Rather, climate change is the result of the individual contributions of countless past, present, and future sources. Thus, GHG impacts are inherently cumulative, and the analysis in Section 3.7.3 is inclusive of cumulative impacts.

The State CEQA Guidelines indicate that, where available, the significance criteria established by local air districts may be relied upon to make the impact determinations. As discussed in Section 3.7.2, this analysis utilizes the significance criteria developed by SCAQMD to make its impact determinations, consistent with GBUAPCD guidance (Becknell pers. comm.). As discussed under Impact a, construction emissions would not exceed SCAQMD's thresholds. The project would not conflict with applicable policies described in the Scoping Plans for AB 32 and SB 32. Therefore, impacts of the project would not be cumulatively considerable, and this impact would be less than significant.

4.2.6 Noise

There are no other construction projects planned near the project area during project construction. Therefore, project noise would not be expected to combine with other project noise and would not contribute to cumulatively considerable impacts.

4.2.7 Recreation

There is one known project in the region that could have a similar effect on recreation. USFS plans to rehabilitate the Caples Lake Campground in 2019, during which time the campground will be unavailable for public use (U.S. Forest Service 2018). This would be a similar effect to that of the proposed project in that it would reduce the availability of developed campgrounds in the Mokelumne Wilderness. However, because this impact on recreation would be temporary in nature and because of the other abundant campsites in the region , the closures at UBL reservoir would not be anticipated to contribute to a cumulatively considerable recreation impact.

4.2.8 Hazards and Hazardous Materials

There are no other construction projects planned near the project area during project construction. Therefore, the project would not be expected to contribute to cumulatively considerable impacts related to hazards and hazardous materials.

4.2.9 Cultural Resources

Cumulative impacts on cultural resources could result when the impacts of the proposed project, in conjunction with other projects and development in the region, result in multiple or cumulative impacts on cultural resources. Because there are no present or reasonably foreseeable projects in the UBL reservoir area, the only impacts would result from the proposed project. The proposed mitigation measures for the project would reduce the potential adverse effects on cultural resources that may occur in the project area to a less-than-significant level.

4.2.10 Tribal Cultural Resources

Cumulative impacts on tribal cultural resources could result when the impacts of the proposed project, in conjunction with other projects and development in the region, result in multiple or cumulative impacts on tribal cultural resources in the area. Because there are no present or reasonably foreseeable projects in the UBL reservoir area, and because there are no known tribal cultural resources in the area, the project is unlikely to contribute to cumulatively considerable impacts on tribal cultural resources.

4.2.11 Transportation/Traffic

Caltrans may be implementing culvert improvements within the proposed project's transportation/traffic study area (along SR 88) during Fiscal Year 2019 (from July 2018 to June 2019) (California Department of Transportation 2018a). There may be some overlap between the timeframes of the proposed project and Caltrans' culvert replacement activities during June 2019. However, the CEQA document associated with the culvert replacement effort found that they would have no impact on transportation or traffic (California Department of Transportation 2018b). Therefore, the proposed project is not anticipated to contribute to any cumulatively considerable transportation or traffic impacts.

Chapter 5
Mandatory Findings of Significance

State CEQA Guidelines Section 15065 requires that a lead agency prepare an environmental impact report if any of the following conditions may result from a proposed project.

1. The project has the potential to substantially degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; substantially reduce the number or restrict the range of an endangered, rare, or threatened species; or eliminate important examples of the major periods of California history or prehistory.
2. The project has the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals.
3. The project has possible environmental effects that are individually limited but cumulatively considerable.
4. The environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly.

If the project proponent agrees to mitigation measures that would avoid any significant effects on the environment, or would mitigate significant effects to a point where clearly no significant effect on the environment would result from project implementation, an environmental impact report need not be prepared.

The proposed project would not result in any mandatory findings of significance. The proposed project would not result in significant effects on the environment; fish, wildlife, or plant species; endangered species; or cultural resources. Neither would the project cause long-term adverse environmental effects, cumulatively considerable effects, or adverse effects on humans. With the mitigation measures described in Chapter 3, *Environmental Setting and Impacts*, all environmental impacts would be reduced to a less-than-significant level. Please refer to individual resource sections in Chapter 3 for a complete discussion of the environmental impacts and associated mitigation.

Chapter 6
References

6.1 Chapter 1, Introduction

None.

6.2 Chapter 2, Project Description

Pacific Gas and Electric Company. 2013. *Good Housekeeping: Activity Specific Erosion and Sediment Control Plan (A-ESCP).* February. Prepared by PG&E Water Quality Group. San Ramon, CA.

———. 2018a. *Upper Blue Lake Dam Seismic Retrofit Project Water Quality Monitoring Plan*. FERC Project No. 137. Draft. October. San Ramon, CA.

SAGE Engineers. 2016. *Technical Memorandum: Updated Slope Stability and Deformation Analysis, Upper Blue Lake Dam*. Prepared for Pacific Gas & Electric Company. March 16.

6.3 Chapter 3, Environmental Setting and Impacts

6.3.1 Section 3.1, Introduction

None.

6.3.2 Section 3.2, Resources Not Likely to be Affected

Alpine County. 2017. *Alpine County General Plan*. Last revised: March 2017.

California Department of Conservation, California Geological Survey Minerals Program. 2013. *Publications of the SMARA Mineral Land Classification Project Dealing with Mineral Resources in California*. Available: https://www.conservation.ca.gov/cgs/Documents/Program-MRP/mlc/SMARA_Publications_March_2013.pdf. Accessed: November 25, 2018.

California Department of Conservation, Division of Land Resources Protection. 2017. *State of California Williamson Act Contract Land*. Available: ftp://ftp.consrv.ca.gov/pub/dlrp/wa/2016%20Statewide%20Map/WA_2016_11X17.pdf. Accessed: November 25, 2018.

California Department of Conservation. 2018. *Farmland Mapping and Monitoring Program: Search for Maps, Reports, and Data*. Available: https://www.conservation.ca.gov/dlrp/fmmp/Pages/county_info.aspx. Accessed: November 25, 2018.

California Department of Transportation. 2017. *List of Eligible and Officially Designated State Scenic Highways.* Available: http://www.dot.ca.gov/design/lap/livability/scenic-highways/. Accessed: November 27, 2018. Last updated: March 2017.

California Department of Transportation. 2018. *List of Officially Designated County Scenic Highways.* Available: http://www.dot.ca.gov/design/lap/livability/scenic-highways/. Accessed: November 28, 2018.

Stewardship Council. 2017. *Land Conservation and Conveyance Plan, PG&E Retained Lands at Blue Lakes Planning Unit*. Final.

6.3.3 Section 3.3, Hydrology and Water Quality

Alpine County. 2017. *Alpine County General Plan*. Revised March 2017.

California Department of Water Resources. 2003. California's Groundwater, Bulletin 118 – Update 2003. Sacramento, CA. Last Revised: 2018. Available: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/Statewide-Reports/Bulletin_118_Update_2003.pdf. Accessed: September 24, 2018.

California State Water Resources Control Board. 2011. 2010 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report)—Statewide. USEPA approved: October 11, 2011. Last Revised: October 10, 2017. Available: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml. Accessed: September 24, 2018.

Central Valley Regional Water Quality Control Board. 2018. *Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins (Fifth Edition)*. Last Revised: May, 2018. Available: https://www.waterboards.ca.gov/rwqcb5/water_issues/basin_plans/sacsjr_201805.pdf. Accessed: September 23, 2018.

Pacific Gas & Electric Company. 2018. Mean daily water surface elevation data for Upper Blue Lake and mean daily streamflow data for Middle Creek, 10/1/1999–9/30/2017. Excel file. San Ramon, CA.

SAGE Engineers. 2016. *Technical Memorandum: Updated Slope Stability and Deformation Analysis, Upper Blue Lake Dam*. Prepared for Pacific Gas & Electric Company. March 16.

U.S. Environmental Protection Agency. 2018. *How's My Waterway? Waters Nearest Upper Blue Lake, CA*. Last Revised: Unknown. Available: https://watersgeo.epa.gov/mywaterway/rlist.html. Accessed: November 14, 2018.

U.S. Geological Survey. 1978. *Hydrologic Unit Map, State of California*. Reston, VA.

6.3.4 Section 3.4, Geology and Soils

Alpine County. 2017. *Alpine County General Plan*. Revised March 2017.

AMEC Environment & Infrastructure, Inc. 2013. *Geologic and Geotechnical Investigation Report, Upper Blue Lake Dam, Alpine County, California*. Letter report prepared for Pacific Gas & Electric Company. December 30. As cited in: SAGE Engineers. 2018. *Test Pit Excavation Summary Report,* *Upper Blue Lake Dam Seismic Retrofit Project, Alpine County, California*. Draft. Prepared for Pacific Gas & Electric Company. Roseville and Oakland, CA. September 21.

AMEC Environment & Infrastructure, Inc. 2014. *Preliminary Seismic Stability Analysis of Upper Blue Lake Dam, Alpine County, California*. Letter report prepared for Pacific Gas & Electric Company. March 3.

Bryant, W. and E. Hart. 2007. Special Publication 42 Fault-Rupture Hazard Zones in California, Interim Revision. California Geological Survey. August.

California Geological Survey. 2002. *California Geomorphic Provinces*. Last revised: Unknown. Available: http:// https://www.coastal.ca.gov/coastalvoices/resources/California_Geomorphic_Provinces.pdf. Accessed: October 12, 2018.

———. 2008a. Ground Motion Interpolator. Last revised: 2018. Available: https://www.conservation.ca.gov/cgs/ground-motion-interpolator. Accessed: November 13, 2018.

———. 2008b. *Guidelines for Evaluating and Mitigating Seismic Hazards in California*. CDMG Special Publication 117A: Sacramento, CA. Last revised: Unknown. Available: http://www.conservation.ca.gov/cgs/shzp/webdocs/documents/sp117.pdf. Accessed: November 13, 2018.

———. 2010. 2010 *Fault Activity Map of California*. California Geological Survey, Geologic Data Map No. 6. Compilation and Interpretation by Charles W. Jennings and William A. Bryant. Graphics by: Milind Patel, Ellen Sander, Jim Thompson, Barbara Wanish, and Milton Fonseca. Available: https://www.conservation.ca.gov/cgs/Pages/Program-RGMP/2010_faultmap.aspx. Last revised: Unknown. Accessed: November 14, 2018.

———. 2011. *Susceptibility to Deep-Seated Landslides in California*. Map Sheet 58. Compiled by Charles James Wills, Florante G. Perez, and Carlos I. Gutierrez. Last revised: Unknown. Available: http://abclocal.go.com/three/kabc/kabc/110520_california_landslides_map.pdf. Accessed: November 13, 2018.

———. 2015. CGS Information Warehouse: Regulatory Maps. Last revised: Unknown. Available: http://maps.conservation.ca.gov/cgs/informationwarehouse/index.html?map=regulatorymaps. Accessed: November 13, 2018.

———. 2016. *Earthquake Shaking Potential for California, 2016*. Map Sheet 48. Compiled by David Branum, Rueven Chen, David M. Petersen and Charles James Wills. Last revised: 2016. Available: https://www.conservation.ca.gov/cgs/Documents/Publications/MS_048.pdf. Accessed: November 13, 2018.

California Soil Resource Laboratory. 2018. SoilWeb Earth. University of California, Davis. Last revised: Unknown. Available: http://casoilresource.lawr.ucdavis.edu/soilweb-apps/. Accessed: November 9, 2018.

Carlson, J. E., J. H. Stewart, D. Johannesen, and F. J. Kleinhampl. 1978. *Preliminary geologic map of the Walker Lake 1 degree by 2 degree quadrangle, Nevada – California*. Scale: 1:250,000. USGS Open-File Report OF-78-523.

Cirrus Ecological Solutions, LC. 2002. *Kirkwood Recirculated Revised Final Environmental Impact Report.* Volume 1: EIR and Appendices. Prepared for Alpine County Planning Department. October.

Cotton, Shires and Associates and InfraTerra. 2016. *Summary Report - Waterhouse Peak Fault Assessment, Phase III Detailed Geologic Mapping, Faulting and Seismicity Evaluation, and Additional Cosmogenic Age-Dating, Central Sierra Nevada, California*. Letter report prepared for Pacific Gas & Electric Company (Geosciences Department). March 25.

Dohrenwend, J. C. 1982. *Surficial geologic map of the Walker Lake 1 degree x 2 degrees quadrangle, Nevada-California*. Scale 1:250,000. USGS Miscellaneous Field Studies Map MF-1382-C.

Hagan, J. C., C. J. Busby, K. Putirka, and P. R. Renne. 2009. Cenozoic Palaeocanyon Evolution, Ancestral Cascades Arc Volcanism, and Structure of the Hope Valley–Carson Pass Region, Sierra Nevada, California. *International Geology Review* Vol. 51, Nos. 9–11, September–November 2009: 777–823.

Hill, M. 1975. *Geology of the Sierra Nevada, California Natural History Guides: 37*. 232 pp. As cited in: Cirrus Ecological Solutions, LC. 2002. *Kirkwood Recirculated Revised Final Environmental Impact Report*. Volume 1: EIR and Appendices. Prepared for Alpine County Planning Department. October.

Koenig, J. B. 1963. *Geologic Map of California, Walker Lake Sheet*. Scale 1:250,000. California Division of Mines and Geology.

McKee, E. H. and R. A. Howe. 1981. *Geologic Map of the Mokelumne Wilderness and Contiguous Rare II Further Planning Area, Central Sierra Nevada, California*. Scale: 1:62,000. U.S. Geological Survey Map MF-1201-A.

Natural Resources Conservation Service. 2017. *Websoil Survey*. Last revised: August 21, 2017. Available: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Accessed: November 9, 2018.

Pacific Gas & Electric Company (Geosciences Department) and Piedmont Sciences. 2008. *Regional Geology, Seismicity, and General Ground Motion Considerations for the Drum-Spaulding Hydroelectric System*. Prepared for Pacific Gas & Electric Company (Hydro Generation Department). As cited in: AMEC Environment & Infrastructure, Inc. 2014. *Preliminary Seismic Stability Analysis of Upper Blue Lake Dam, Alpine County, California*. Letter report prepared for Pacific Gas & Electric Company. March 3.

SAGE Engineers. 2018. *Test Pit Excavation Summary Report, Upper Blue Lake Dam Seismic Retrofit Project, Alpine County, California*. Draft. Prepared for Pacific Gas & Electric Company. Roseville and Oakland, CA. September 21.

Saucedo, G. J. 2005. *Geologic Map of the Lake Tahoe Basin*. Scale 1:100,000. California Geological Survey Regional Geologic Map No. 4.

Society of Vertebrate Paleontology Impact Mitigation Guidelines Revision Committee. 2010. *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources*. Last revised 2010. Available: https://vertpaleo.org/Membership/Member-Resources/SVP_Impact_Mitigation_Guidelines.aspx. Accessed: November 13, 2018.

University of California Museum of Paleontology. 2016. UCMP specimen search. Last revised: unknown. Available: http://ucmpdb.berkeley.edu/. Search of Alpine County. Accessed: November 14, 2018.

U.S. Geological Survey. 1992. Carson Pass Quadrangle, California, 7.5 Minute Series, Topographic Map, 1973, revised 1992.

Woodruff, J.W., 1999, 1999 Geotechnical Evaluation of Upper Blue Lake Dam, Alpine County, California, State Dam No. 97-070, FERC Project No. 137-CA, November. As cited in: SAGE Engineers. 2018. *Test Pit Excavation Summary Report, Upper Blue Lake Dam Seismic Retrofit Project, Alpine County, California*. Draft. Prepared for Pacific Gas & Electric Company. Roseville and Oakland, CA. September 21.

6.3.5 Section 3.5, Biological Resources

6.3.5.1 Published References

Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken (eds.). 2012. *The Jepson Manual: Vascular Plants of California*. Second edition. Berkeley, CA: University of California Press.

Baxter, R. M. 1977. Environmental Effects of Dams and Impoundments. *Annual Review of Ecology and Systematics* (8):255–283.

Berg, L. and T. G. Northcote. 1985. Changes in Territorial, Gill-flaring, and Feeding Behavior in Juvenile Coho Salmon (*Oncorhynchus kisutch*) Following Short-term Pulses of Suspended Sediment. *Canadian Journal of Fisheries and Aquatic Sciences* 42: 1410–1417.

Bisson, P. B. and R. E. Bilby. 1982. Avoidance of Suspended Sediment by Juvenile Coho Salmon. *North American Journal of Fisheries Management* 2: 371-374.

Brown, C., M. P. Hayes, G. A. Green, and D. C. Macfarlane (technical coordinators). 2014. *Mountain Yellow-legged Frog Conservation Assessment for the Sierra Nevada Mountains of California, USA*. July. U.S. Department of Agriculture. U.S. Forest Service, Pacific Southwest Region.

Brown, P.E. and E. D. Pierson. 1996. *Natural History and Management of Bats in California and Nevada*. Workshop sponsored by the Western Section of The Wildlife Society. November 13–15, 1996.

Buehler, D. A. (2000). *Bald Eagle (Haliaeetus leucocephalus)*, version 2.0. In *The Birds of North America* (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY. https://doi.org/10.2173/bna.506

Calhoun, A. J. 1944a. Black-spotted Trout in Blue Lake, California. *California Fish and Game* 30(1):22–42.

———. 1944b. The Bottom Fauna of Blue Lake, California. *California Fish and Game* 30(2):86–94.

———. 1944c. The Food of the Black-spotted Trout (*Salmo clarkii henshawi*) in Two Sierra Nevada Lakes. *California Fish and Game* 30(2):80–85.

California Department of Fish and Wildlife. 2017. *Blue Lake (Upper), Alpine County: 2005 Creek Census and Catchable Trout Evaluation Study*. North Region. Rancho Cordova, CA.

———. 2018a. *California Natural Diversity Database, RareFind 5*. Version 5.2.14. Search of the Carson Pass, Caples Lake, Mokelumne Peak, Pacific Valley, Ebbetts Pass, and Markleeville USGS 7.5-minute Quadrangles. Last Updated: September 30, 2018. Accessed: October 8, 2018.

———. 2018b. *Special Animals List.* November. Available: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406&inline

———. 2018c. *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities*. March 20, 2018. Available: < https://www.wildlife.ca.gov/Conservation/Survey-Protocols#377281280-plants.

California Invasive Plant Council. 2018. *The Cal-IPC Inventory*. Berkeley, CA. Available: http://www.cal-ipc.org/plants/inventory/.

California Native Plant Society. 2018. *Inventory of Rare and Endangered Plants (Online Edition, Version v8-03 0.39)*. Search of the Carson Pass, Caples Lake, Mokelumne Peak, Pacific Valley, Ebbetts Pass, and Markleeville USGS 7.5-minute Quadrangles. Available: http://www.rareplants.cnps.org. Last Updated: August 3, 2018. Accessed: November 8, 2018.

Carmignani, J. R. and A. H. Roy. 2017. Ecological Impacts of Winter Water Level Drawdowns on Lake Littoral Zones: A Review. *Aquatic Sciences* 79:803–824.

Evans, E., R. Thorp, S. Jepsen, and S. H. Black. 2008. *Status Review of Three Formerly Common Species of Bumble Bee in the Subgenus Bombus*. Prepared for the Xerces Society of Invertebrate Conservation. Available: http://www.xerces.org/wp-content/uploads/2009/03/xerces_2008_bombus_status_review.pdf.

Jennings, M. R., and M. P. Hayes. 1994. *Amphibian and Reptile Species of Special Concern in California*. Rancho Cordova, CA: California Department of Fish and Game, Inland Fisheries Division.

Koch, J., J. Strange, and P. Williams. 2012. *Bumble Bees of the Western United States*. U.S. Forest Service and Pollinator Partnership. Available: https://www.fs.fed.us/wildflowers/pollinators/documents/BumbleBeeGuideWestern2012.pdf.

Moyle, P. 2002. *Inland Fishes of California*. Berkeley: University of California Press.

Moyle, P. B., R. M. Yoshiyama, and R. A. Knapp. 1996. Status of Fish and Fisheries. Pages 953–973 in *Sierra Nevada Ecosystem Project: Final report to Congress*. Vol. 2, Assessments and scientific basis for management options. University of California, Davis: Centers for Water and Wildland Resources. Davis, CA.

National Invasive Species Council. 2008. *2008-2012 National Invasive Species Management Plan*. Available: http://www.invasivespeciesinfo.gov/council/mp2008.pdf. August 2008.

National Marine Fisheries Service. 2011. *Anadromous Salmonid Passage Facility Design*. NMFS, Northwest Region, Portland, Oregon. Available: http://www.westcoast.fisheries.noaa.gov/publications/hydropower/fish_passage_design_criteria.pdf. Accessed: June 21, 2018.

Natural Resources Conservation Service. 2003. *California State-Listed Noxious Weeds.* Available: http://plants.usda.gov/java/noxious?rptType=State&sort=sciname&statefips=06.

———. 2010. United States Department of Agriculture*. Federal Noxious Weed List*. Available: http://www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/weedlist.pdf. Last Updated: March 21, 2017.

———. 2018a. *Soil Survey for Eldorado National Forest Area, California, Parts of Alpine, Amador, El Dorado, and Placer Counties*. Version 11, September 12, 2018.

———. 2018b. *Climate Data for Alpine County, Blue Lakes Station, California*. Available: http://agacis.rcc-acis.org/. Accessed: November 19, 2018.

Newcombe, C. P. and J. O. T. Jensen. 1996. Channel Suspended Sediment and Fisheries: A Synthesis for Quantitative Assessment of Risk and Impact. *North American Journal of Fisheries Management* 16(4): 693-727.

Pacific Gas & Electric Company. 2010. *Mokelumne River Project 2009 Annual and Five-Year Water Temperature Monitoring Program Report*. FERC Project No. 137. January. Prepared by: HDR|DTA, Sacramento, CA.

———. 2015a. *Survey for Special-Status Plants, Pacific Gas and Electric Company, Mokelumne River Hydroelectric Project, Amador and Alpine Counties, California.* Final, December 2015. 00291.15. San Ramon, CA. Prepared by ICF International, Redding, CA.

———. 2015b. 2014 *Amphibian Surveys for Foothill Yellow-legged Frog (*Rana boylii*), Sierra Nevada Yellow-legged Frog (*Rana sierrae*) and Yosemite Toad-Western Toad (*Anaxyrus canorus-Anaxyrus boreas*)*. Prepared by PG&E with technical assistance from Garcia and Associates. San Ramon and San Francisco, CA.

———. 2017a. *Mokelumne River Project: Stream Ecology Monitoring Program (SEMP), 2016 Fish Population Monitoring Report*. FERC Project No. 137. January. San Ramon, CA.

———. 2017b. *10-Year Summary Report Stream Ecology Monitoring Program (SEMP) Amphibian Monitoring*. Prepared by PG&E with technical assistance from: Garcia and Associates. San Ramon and San Francisco, CA.

———. 2018a. *Upper Blue Lake Bathymetric Survey*. San Ramon, CA.

———. 2018b. Mean daily water surface elevation data for Upper Blue Lake and mean daily streamflow data for Middle Creek, 10/1/1999–9/30/2017. Excel file. San Ramon, CA.

———. 2018c. Fish sampling summary for Middle Creek (BLUE1) for SEMP 1 and SEMP 2 monitoring, 1999–2016. Excel file. San Ramon, CA.

———. 2018d. Upper Blue Lake Dam Seismic Retrofit Project Aquatic Resources Map. July. Prepared for the U.S. Army Corps of Engineers, Sacramento District. Sacramento, CA.

———. 2018e. Upper Blue Lake fish plants by CDFW, 2001–2015. Excel file. San Ramon, CA.

Servizi, J. A. and D. W. Martens. 1992. Sub-lethal Responses of Coho Salmon (*Oncorhynchus kisutch*) to Suspended Sediments. *Canadian Journal of Fisheries and Aquatic Sciences* 49(7):1389-1395.

Sigler, J. W., T. C. Bjornn, and F. H. Everest. 1984. Effects of Chronic Turbidity on Densities and Growth of Steelheads and Coho Salmon. *Transactions of the American Fisheries Society* 113:142–150.

Stebbins, R. C. 1985. *Western Reptiles and Amphibians* (Second Edition). New York, NY: Houghton Mifflin Company.

———. 2003. *Western Reptiles and Amphibians* (3rd ed.). New York, NY: Houghton Mifflin Company.

Thomson, R. C., A. N. Wright, and H. B. Shaffer. 2016. *California Amphibian and Reptile Species of Special Concern*. California Department of Fish and Wildlife. University of California Press. Oakland, CA.

U.S. Fish and Wildlife Service. 1995. *Lahontan Cutthroat Trout,* Oncorhynchus clarkii henshawi*, Recovery Plan*. Portland, OR.

———. 2013. *Endangered Species Act -Section 7 Consultation Programmatic Biological Opinion for Aquatic Restoration Activities in the States of Oregon, Washington and portions of California, Idaho and Nevada (ARBO II)*. FWS reference: OlEOFW00-2013-F-0090. Prepared by the Oregon Fish and Wildlife Office, Portland, OR.

———. 2018a. *Information for Planning and Consultation (IPaC). List of threatened and endangered species that may occur in the proposed project, and/or may be affected by the proposed project*. Sacramento Fish and Wildlife Office. Available: https://ecos.fws.gov/ipac/. Accessed: October 2, 2018.

———. 2018b. *Information for Planning and Consultation (IPaC). List of threatened and endangered species that may occur in the proposed project, and/or may be affected by the proposed project*. Reno Fish and Wildlife Office. Available: https://ecos.fws.gov/ipac/. Accessed: October 2, 2018.

———. 2018c *Species Fact Sheet: Lahontan Cutthroat Trout,* Oncorhynchus clarkii henshawi. Available: https://www.fws.gov/oregonfwo/Species/Data/LahontanCutthroatTrout/. Accessed: July 11, 2018.

———. 2018d. *Species Profile for Lahontan Cutthroat Trout (*Oncorhynchus clarkii henshawi*)*. Available: https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=E00Y. Accessed: July 11, 2018.

U.S. Geological Survey. 2018*. Science in Your Watershed, Locate Your Watershed, Watersheds in 18 California Region (Upper Mokelumne watershed 18040012)*. Available: https://water.usgs.gov/wsc/watershed_finder.html. Last Updated: February 20, 2018. Accessed: November 15, 2018.

Western Bat Working Group. 2005. Species information for fringed myotis (*Myotis thysanodes*). Available: http://wbwg.org/western-bat-species/.

———. 2018a. *Regional Bat Species Priority Matrix*. Available: http://wbwg.org/matrices/.

———. 2018b. Species information for long-legged myotis (*Myotis volans*). Available: http://wbwg.org/western-bat-species/.

Zeiner, D. C., W. F. Laudenslayer, Jr., and K. E. Mayer (eds.). 1990a. *California's Wildlife*. Volume 2: Birds. California Department of Fish and Game. Sacramento, CA.

———. 1990b. *California's Wildlife.* Volume III: Mammals*.* California Department of Fish and Game. Sacramento, CA.

6.3.5.2 Personal Communications

Chellman, Isaac. High Mountain Lake Environmental Scientist, California Department of Fish and Wildlife, Rancho Cordova, CA. July 26, 2018—email to Andie Herman, Senior Aquatic Biologist/Herpetologist, Pacific Gas & Electric Company, regarding locations of Sierra Nevada yellow-legged frog near Upper Blue Lake.

Drennan, Joe. Wildlife Ecologist. Garcia and Associates, San Francisco, CA. February 5, 2018—email to Clare Keane, Senior Aquatic Biologist, Pacific Gas & Electric Company, regarding results of 2017 Yosemite toad surveys at Upper Blue Lake Reservoir.

Ewing, Ben. District Fisheries Biologist, California Department of Fish and Wildlife, Rancho Cordova, CA. June 25, 2018—email to Clare Keane, Senior Aquatic Biologist, Pacific Gas & Electric Company, regarding species currently stocked in Upper Blue Lake.

Marlow, Karla. #1 Wildlife Biologist. Garcia and Associates, San Francisco, CA. June 11, 2018—email to Clare Keane, Senior Aquatic Biologist and Andie Herman, Senior Aquatic Biologist, Pacific Gas & Electric Company, regarding results of June 6, 2018 Yosemite toad surveys at Upper Blue Lake Reservoir.

Marlow, Karla. #2 Wildlife Biologist. Garcia and Associates, San Francisco, CA. June 24, 2018—email to Clare Keane, Senior Aquatic Biologist and Andie Herman, Senior Aquatic Biologist, Pacific Gas & Electric Company, regarding results of June 14 and 21, 2018 Yosemite toad surveys at Upper Blue Lake Reservoir.

6.3.6 Section 3.6, Air Quality

6.3.6.1 Published References

Alpine County. 2017. *Alpine County General Plan*. March.

California Air Resources Board. 2016. *Ambient Air Quality Standards.* Last Revised: May 4, 2016. Available: http://www.arb.ca.gov/research/aaqs/aaqs2.pdf. Accessed: October 16, 2018.

———. 2017. *Area Designations Maps/ State and National*. Last Revised: October 18, 2017. Available: http://www.arb.ca.gov/desig/adm/adm.htm. Accessed: October 16, 2018.

Office of Environmental Health Hazard Assessment. 2015. *Air Toxics Hot Spots Program: Risk Assessment Guidelines and Guidance Manual for Preparation of Health Risk Assessments*. February. Available: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf. Accessed: October 16, 2018.

South Coast Air Quality Management District. 2003. *Cumulative Impacts White Paper, Appendix A.* Available: http://www.aqmd.gov/docs/default-source/Agendas/Environmental-Justice/cumulative-impacts-working-group/cumulative-impacts-white-paper-appendix.pdf?sfvrsn=4. Accessed: November 20, 2018.

———. 2015. *SCAQMD Air Quality Significance Thresholds.* Diamond Bar, CA. Revised: March 2015. Available: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf. Accessed: October 16, 2018.

U.S. Environmental Protection Agency. 1980. *Supplement NO. 10 for Compilation of Air Pollution Emission Factors, Third Edition (Including Supplements 1-7).* Available: https://www3.epa.gov/ttn/chief/ap42/oldeditions/3rd_edition/ap42_3rdsup10_feb1980.pdf. Accessed: November 28, 2018.

———. 2018. *Nonattainment Areas for Criteria Pollutants (Green Book)*. Last Revised: September 30, 2018. Available: https://www.epa.gov/green-book. Accessed: October 16, 2018.

6.3.6.2 Personal Communications

Becknell, Jonathan. 2018. Air Quality Specialist II. Great Basin Unified Air Pollution Control District, Bishop, CA. September 21, 2018—E-mail to Darrin Trageser, Air Quality and Climate Change Specialist. ICF, Sacramento, CA.

6.3.7 Section 3.7, Greenhouse Gas Emissions

6.3.7.1 Published References

Alpine County. 2017. *Alpine County General Plan*. March.

Blasing, T. J. 2016. *Recent Greenhouse Gas Concentrations*. DOI: 10.3334/CDIAC/atg.032. Updated April 2016.

California Air Resources Board. 2016. *LCFS Workgroups and Subprograms*. May. Available: https://www.arb.ca.gov/fuels/lcfs/workgroups/workgroups.htm. Accessed: November 20, 2018.

———. 2017. *California's 2017 Climate Change Scoping Plan*. November. Available: https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed: November 20, 2018.

Intergovernmental Panel on Climate Change. 2007. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor and H. L. Miller (eds.). Available: https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html. Accessed: November 20, 2018.

South Coast Air Quality Management District. 2008. *Interim CEQA GHG Significance Threshold for Station Sources, Rules and Plans*. Available: http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2. Accessed: November 27, 2018.

6.3.7.2 Personal Communications

Becknell, Jonathan. 2018. Air Quality Specialist II. Great Basin Unified Air Pollution Control District, Bishop, CA. September 21, 2018—E-mail to Darrin Trageser, Air Quality and Climate Change Specialist. ICF, Sacramento, CA.

6.3.8 Section 3.8, Noise

Alpine County. 2017. *Alpine County General Plan*. March.

———. 2018. *Alpine County Code*. Available: https://www.codepublishing.com/CA/AlpineCounty/?AlpineCounty18/AlpineCounty1868.090.html. Accessed: October 10, 2108.

California Department of Transportation. 2013a. *Technical Noise Supplement to the Traffic Noise Analysis Protocol.* Available: http://www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013A.pdf. Accessed: October 10, 2018.

———. 2013b. *Transportation and Construction Vibration Guidance Manual*. Available: http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf. Accessed: October 10, 2018.

Federal Highway Administration. 2006. *FHWA Roadway Construction Noise Model User's Guide.* FHWA-HEP-05-054. January. Available: https://www.fhwa.dot.gov/ENVIRonment/noise/construction_noise/rcnm/rcnm.pdf. Accessed November 29, 2018.

Federal Transit Administration. 2018. *Transit Noise and Vibration Impact Assessment.* FTA-VA-90-1003-06. Office of Planning and Environment. Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Accessed: November 29, 2018.

Lake Tahoe Airport Land Use Commission. 2018. *Lake Tahoe Airport Land Use Compatibility Plan.* Available: https://www.cityofslt.us/DocumentCenter/View/11222/ALL-DOCS-FOR-UPLOAD?bidId=. Accessed: October 10, 2018.

Nelson, P (ed.). 1987. *Transportation Noise Reference Book*. Butterworths: London.

6.3.9 Section 3.9, Recreation

Alpine County. 2017. *Alpine County General Plan*. Last revised: March 2017.

U.S. Forest Service. 2000. *Mokelumne Wilderness Management Guidelines*. Placerville, CA. March.

U.S. Forest Service. 2008. *A Guide to the Mokelumne Wilderness.* Vallejo, CA. Available: https://www.fs.usda.gov/wps/portal/fsinternet/cs/detailfull/!ut/p/z1/jZBPC4JAEMU_jVdnMgvrtkGgFXoI_zSX0NhWQ11Ra-nbJ1mHIMt3e8PvPZgHBBFQGd8yEbeZLOO88weaH9Ez0ZkEbLXAtbHdz3zHxF4QPgHjZZmFnm0HbrDDN0Bj8jggNjY_DNDv-hAI_jwAvxtcWxYcNkAil0k_GSuTqSWAan7mNa_1a92d07atmqWGGiqldCGlyLl-koWG3yKpbFqIPkmoCt-P8GJSclcPC6CIvw!!/dz/d5/L2dBISEvZ0FBIS9nQSEh/?position=Not%20Yet%20Determined.Html&pname=Stanislaus%20National%20Forest-%20Maps&ss=110516&navtype=BROWSEBYSUBJECT&pnavid=null&navid=360000000000000&ttype=detailfull&cid=fsm91_057728. Accessed: December 4, 2018.

6.3.10 Section 3.10, Hazards and Hazardous Materials

6.3.10.1 Published References

Alpine County. 2017. *Alpine County General Plan*. Last Revised: March 2017.

Alpine Fire Safe Council. 2018. *Alpine County Community Wildfire Protection Plan*. Draft. Markleeville, CA. Available: http://www.alpinefiresafecouncil.org/. Accessed: November 30, 2018.

California Department of Forestry and Fire Protection, Fire and Resource Assessment Program. 2007. *Alpine County Fire Hazard Severity Zones in SRA.* Adopted November 7. Available: http://frap.fire.ca.gov/webdata/maps/alpine/fhszs_map.2.pdf. Accessed: November 28, 2018.

California Department of Toxic Substances Control. 2018. Envirostor. Available: https://www.envirostor.dtsc.ca.gov/public/. Accessed: October 12, 2018.

Stantec. 2005. *Alpine County Airport Airport Layout Plan*. Administrative Draft. Prepared for Alpine County. Sacramento, CA. June.

6.3.10.2 Personal Communications

Smith, Justin. Senior Land Planner. Pacific Gas and Electric Company. November 15, 2018—Email to Sara Martin, ICF.

6.3.11 Section 3.11, Cultural Resources

6.3.11.1 Published References

Baker, C. L. 2003. *National Register of Historic Places Evaluation, Mokelumne River Hydroelectric System, FERC No. 137, Alpine, Amador, and Calaveras Counties, California.* Sacramento, CA. Prepared for Pacific Gas & Electric Company, San Francisco, CA.

Price, B.A., S. S. Flint, and R. Baloian. 2007. *Historic Properties Management Plan for the Mokelumne River Project (FERC No. 137) in Alpine, Amador, and Calaveras Counties, California.* Fresno, CA. Prepared for Pacific Gas and Electric Company, Auburn, CA.

Taggart, Michael. 2019. *Upper Blue Lake Dam Seismic Retrofit Project Cultural Resources Constraints Report*. Pacific Gas & Electric Company, San Francisco, CA.

6.3.11.2 Personal Communications

Fancher, Zachary. Senior Project Manager, Enforcement/Special Projects Branch. U.S. Army Corps of Engineers, Sacramento District. September 11, 2018—Letter to Kimberly Bose, Federal Energy Regulatory Commission.

6.3.12 Section 3.12, Section Tribal Cultural Resources

6.3.12.1 Published References

Natural Resources Conservation Service. 2018. *Soil Survey for Eldorado National Forest Area, California, Parts of Alpine, Amador, El Dorado, and Placer Counties*. Version 11, September 12, 2018.

Price, B.A., S. S. Flint, and R. Baloian. 2007. *Historic Properties Management Plan for the Mokelumne River Project (FERC No. 137) in Alpine, Amador, and Calaveras Counties, California.* Fresno, CA. Prepared for Pacific Gas and Electric Company, Auburn, CA.

6.3.12.2 Personal Communications

White, Nicholas. Water Resource Control Engineer. Central Valley Regional Water Quality Control Board. November 14, 2018—Email to Justin Smith, PG&E.

6.3.13 Section 3.13, Transportation/Traffic

Alpine County. 2017. *Alpine County General Plan*. Last Revised: March 2017.

California Department of Transportation, District 10. 2013. *State Route 88 Transportation Concept Report*. Available: http://www.dot.ca.gov/d10/tcr.html. Accessed: December 4, 2018.

Green Dot Transportation Solutions. 2015. *Alpine County 2015 Regional Transportation Plan*. Chico, CA. Prepared for the Alpine County Local Transportation Commission, Markleeville, CA.

Green Dot Transportation Solutions. 2018. *2018 Alpine County Active Transportation Plan*. Prepared for the Alpine County Local Transportation Commission, Markleeville, CA.

6.4 Chapter 4, Cumulative Impacts

6.4.1.1 Published References

California Department of Transportation. 2018a. *SB 1 Provides Almost Half a Billion Dollars for New State Highway Maintenance Projects This Fiscal Year*. District 10 News Release, September 27, 2018. Available: http://www.dot.ca.gov/d12/news/News%20Release%20New%20SB%201%20Maintenance%20Projects%20Fiscal%20Year%2018%20%2019.pdf. Accessed: November 30, 2018.

California Department of Transportation. 2018b. *Alpine County Culvert Rehabilitation & Replacement Initial Study with Proposed Negative Declaration*. Stockton, CA. April.

South Coast Air Quality Management District. 2003. *Cumulative Impacts White Paper, Appendix A.* Available: http://www.aqmd.gov/docs/default-source/Agendas/Environmental-Justice/cumulative-impacts-working-group/cumulative-impacts-white-paper-appendix.pdf?sfvrsn=4. Accessed: November 20, 2018.

U.S. Forest Service. 2018. *Caples Lake Campground*. Available: https://www.fs.usda.gov/recarea/eldorado/recarea/?recid=78524. Accessed: December 5, 2018.

6.4.1.2 Personal Communications

Becknell, Jonathan. 2018. Air Quality Specialist II. Great Basin Unified Air Pollution Control District, Bishop, CA. September 21, 2018—E-mail to Darrin Trageser, Air Quality and Climate Change Specialist. ICF, Sacramento, CA.

6.5 Chapter 5, Mandatory Findings of Significance

None.

Chapter 7
List of Preparers

This chapter lists the individuals who contributed to the preparation of the initial study. This list is consistent with the requirements set forth in CEQA (PRC §15129).

7.1 Pacific Gas and Electric Company

Name, Title	Project Role
Chirag Mehta, Project Manager	Project Manager
Trevor McGuckin, Project Engineer	Responsible Engineer
Justin Smith, Senior Land Planner	Senior Land Planner

7.2 ICF

Name	Project Role
Monique Briard	Project Director
Sara Martin	Project Manager
Alex Angier	GIS Analysis
Dave Buehler	Noise
Jennifer Haire	Biological Resources—Wildlife
Christiaan Havelaar	Cultural Resources
Jeff Kozlowski	Biological Resources—Fisheries
Tim Messick	Graphics
Corrine Ortega	Publications Specialist
Jeff Peters	Hydrology, Water Quality, Geology, and Soils
Sacha Selim	GIS Analysis
Paul Shigley	Editor
Elizabeth Scott	Noise
Darrin Trageser	Air Quality and Greenhouse Gas Emissions
Ellen Unsworth	Paleontological Resources
Lisa Webber	Biological Resources—Botany
Elliott Wezerek	Air Quality and Greenhouse Gas Emissions
Nicole Williams	Peer Review
Laura Yoon	Air Quality and Greenhouse Gas Emissions

Appendix A
Environmental Checklist

Appendix A
Environmental Checklist

1. **Project Title:** Upper Blue Lake Dam Seismic Retrofit Project
2. **Lead Agency Name and Address:** Central Valley Regional Water Quality Control Board
   11020 Sun Center Drive, #200
   Rancho Cordova, CA 95670
3. **Contact Person and Phone Number:** Nicholas White, P.E.
   (916) 464-4856
4. **Project Location:** Upper Blue Lake Dam, Alpine County
5. **Project Sponsor's Name and Address:** Pacific Gas & Electric Company
   Attn: Justin Smith
   2730 Gateway Oaks Drive, Suite 220
   Sacramento, CA 95833
6. **General Plan Designation:** Open Space
7. **Zoning:** Agriculture
8. **Description of Project:**

   Pacific Gas & Electric Company (PG&E) is proposing to construct the Upper Blue Lake Dam Seismic Retrofit Project at Upper Blue Lake reservoir in Alpine County. A preliminary seismic slope stability evaluation of the dam that was conducted in 2014 indicated that the dam would likely liquefy during an earthquake. The purpose of the proposed project is to improve the seismic stability of the upstream slope of the dam by placing a rock fill buttress approximately 50 feet wide on the upstream face of the dam.
9. **Surrounding Land Uses and Setting:**

   In general, the Blue Lakes area (including Upper Blue Lake and Lower Blue Lake) is characteristic of high-elevation granite basins in the Sierra Nevada. Granite outcrops are a prominent feature of the area, and there are numerous outcrops, ridges, and peaks of younger volcanic rock. The dominant vegetation type is Sierra Nevada mixed conifer forest. Recreation uses of the area primarily consist of camping, hunting, fishing, hiking, swimming, off-highway vehicle use, and boating. Developed campgrounds, day use areas, and boat ramps owned and operated by PG&E are located at both lakes, as are trailheads to the adjacent Mokelumne Wilderness. The land surrounding PG&E's Upper Blue Lake and Lower Blue Lake parcels consists of both private property and national forest system lands managed by the El Dorado National Forest.
10. **Other Public Agencies Whose Approval is Required:**

    U.S. Fish and Wildlife Service

    U.S. Army Corps of Engineers
11. **Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, has consultation begun?**

    No tribes have requested consultation with the lead agency for projects in Alpine County pursuant to Public Resources Code section 21080.3.1.

A.1 Environmental Factors Potentially Affected

The environmental factors checked below would potentially be affected by this project (i.e., the project would involve at least one impact that is a "Potentially Significant Impact"), as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agricultural and Forestry	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology/Soils
☐ Greenhouse Gas Emissions	☐ Hazards and Hazardous Materials	☐ Hydrology/Water Quality
☐ Land Use/Planning	☐ Mineral Resources	☐ Noise
☐ Population/Housing	☐ Public Services	☐ Recreation
☐ Transportation/Traffic	☐ Tribal Cultural Resources	☐ Utilities/Service Systems
☐ Mandatory Findings of Significance	☒ None After Incorporation of Mitigation	

A.2 Aesthetics

I. Aesthetics	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings along a scenic highway?	☐	☐	☐	☒
c. Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒
d. Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.3 Agricultural and Forestry Resources

II. Agricultural and Forestry Resources	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
In determining whether impacts on agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts on forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project, and forest carbon measurement methodology provided in the Forest Protocols adopted by the California Air Resources Board. Would the project:				
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b. Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?	☐	☐	☐	☒
c. Conflict with existing zoning for, or cause rezoning of forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☐	☒
d. Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e. Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.4 Air Quality

III. Air Quality	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
When available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a. Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d. Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e. Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.5 Biological Resources

IV. Biological Resources	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f. Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.6 Cultural Resources

V. Cultural Resources	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	☐	☐	☐	☒
b. Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to Section 15064.5?	☐	☒	☐	☐
c. Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.7 Geology and Soils

VI. Geology and Soils	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
1. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
2. Strong seismic ground shaking?	☐	☒	☐	☐
3. Seismic-related ground failure, including liquefaction?	☐	☒	☐	☐
4. Landslides?	☐	☒	☐	☐
b. Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c. Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☐	☒
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒
f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.8 Greenhouse Gas Emissions

VII. Greenhouse Gas Emissions	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.9 Hazards and Hazardous Materials

VIII. Hazards and Hazardous Materials	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c. Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d. Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e. Be located within an airport land use plan area or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f. Be located within the vicinity of a private airstrip and result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.10 Hydrology and Water Quality

IX. Hydrology and Water Quality	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Violate any water quality standards or waste discharge requirements?	☐	☒	☐	☐
b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite?	☐	☒	☐	☐
d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite?	☐	☒	☐	☐
e. Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒
f. Otherwise substantially degrade water quality?	☐	☐	☒	☐
g. Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h. Place within a 100-year flood hazard area structures that would impede or redirect floodflows?	☐	☐	☐	☒
i. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j. Contribute to inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.11 Land Use and Planning

X. Land Use and Planning		Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:					
a.	Physically divide an established community?	☐	☐	☐	☒
b.	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c.	Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.12 Mineral Resources

XI. Mineral Resources	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.13 Noise

XII. Noise	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?	☐	☐	☒	☐
b. Expose persons to or generate excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e. Be located within an airport land use plan area, or, where such a plan has not been adopted, within two miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f. Be located in the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.14 Population and Housing

XIII. Population and Housing	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	☐	☐	☐	☒
b. Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c. Displace a substantial number of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.15 Public Services

XIV. Public Services	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:				
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.16 Recreation

XV. Recreation	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
b. Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.17 Transportation/Traffic

XVI. Transportation/Traffic	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐
b. Conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☒	☐
d. Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e. Result in inadequate emergency access?	☐	☐	☒	☐
f. Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.18 Tribal Cultural Resources

V. Tribal Cultural Resources	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
a. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☐	☐	☒
b. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.19 Utilities and Service Systems

XVII. Utilities and Service Systems	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or would new or expanded entitlements be needed?	☐	☐	☐	☒
e. Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒
g. Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

A.20 Mandatory Findings

XVIII. Mandatory Findings of Significance	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	☒
b. Does the project have impacts that are individually limited but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☐	☐	☐	☒
c. Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

Please refer to Chapters 3 and 4 for a complete discussion of the environmental impacts.

Appendix B

PG&E Activity-Specific Erosion and Sediment Control Plans

Appendix B-1

Good Housekeeping

Good Housekeeping

Activity Specific Erosion and Sediment Control Plan
(A-ESCP)

If Cumulative Soil Disturbance Changes,
Contact the Environmental Field Specialists (EFS)
For Re-Evaluation of Storm Water Protection Needs

Prepared by

PG&E Water Quality Group

February 2013

TABLE OF CONTENTS

Attachments

1.0 WHAT IS COVERED UNDER THIS A-ESCP?

1.1 Good Housekeeping

This A-ESCP sets forth minimum Best Management Practices (BMPs) for Good Housekeeping[1] at all PG&E construction projects (which includes all permitted, non-permitted, and maintenance projects). If specific environmental concerns are encountered, or if the procedures contained within this A-ESCP prove ineffective, contact your local Environmental Field Specialist (EFS).

1.2 Typical Good Housekeeping BMPs

Minimum BMPs for Housekeeping on all PG&E projects include the following:

- Product and Materials Inventory (See Section 2.1)
- Stockpile Management (See Stockpile Management A-ESCP)
- Liquid Pollutant Storage (See Section 2.2)
- Construction Material Storage (See Section 2.3)
- Tracking Controls (See Section 2.4)
- Concrete and Other Rinse and Wash Waters (See Section 2.5)
- Sanitation Facilities (See Section 2.6)
- Waste Disposal Containers (See Section 2.7)
- Hazardous and Non-Hazardous Spills (See Section 2.8)
- Spill Kits and Clean Up Materials (See Section 2.9)
- Vehicle and Equipment Storage and Maintenance (See Section 2.10)
- Airborne Pollution Control (See Section 2.11)

1.3 Site Conditions Covered in this A-ESCP

This document is applicable to all PG&E projects, and must be used as a reference for specific Good Housekeeping Practices.

1.4 Scheduling Good Housekeeping BMP Installation

Planning for storm water pollution prevention is required for all PG&E construction projects throughout the year. Good Housekeeping BMPs must be implemented on all projects, regardless of time of year.

[1] Landscape Materials have additional requirements. If the construction project includes such materials, contact the Stormwater Group

2.0 BEST MANAGEMENT PRACTICES

The purpose of this A-ESCP is to specify appropriate Good Housekeeping BMPs for all construction projects that are exempt from coverage under the CGP. It is recommended that construction activities are scheduled to minimize soil disturbing activities during rain events.

The BMPs for the project should be installed in areas similar to those shown on the Typical BMP Use Detail, Attachment A.

Detailed cut-sheets on each BMP are provided in Attachment B.

Good Housekeeping BMPs should be followed to protect storm water runoff from construction associated chemicals and/or pollutants and to maintain a clean construction site.

2.1 Product and Materials Inventory

Description:
Consider this BMP if there are products or end products are produced, used, or expected to be used on site that are not designed to be outdoors.

Requirements:
- Conduct an inventory of the products and materials and consider delivery, storage, spill prevention, and cleanup requirements for those products.
- Consider the quantity, physical characteristics (e.g., liquid, powder, solid), and locations of each potential pollutant source handled, produced, stored, recycled, or disposed of at the site.
- Consider the degree to which pollutants associated with those materials may be exposed to and mobilized by contact with storm water.
- Consider the direct and indirect pathways that pollutants may be exposed to storm water or authorized non-storm water discharges.
- This shall include an assessment of past spills or leaks, non-storm water discharges, and discharges from adjoining areas.
- Ensure retention of sampling, visual observation, and inspection records.
- Ensure effectiveness of existing BMPs to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:
- WM-1 – Materials Delivery and Storage
- WM-2 – Material Use

Materials properly contained

Materials needing covered storage

2.2 Liquid Pollutant Storage

Description:
Consider this BMP if there are any of the following on the construction site:
- Petroleum products such as oils, fuels, grease, cold mix asphalt, and tar
- Glues, adhesives, and solvents
- Cleaning products
- Herbicides, pesticides, and fertilizers
- Paints, stains, and curing compounds
- Vehicle and equipment fluids such as anti-freeze, exhaust fluid, washer fluid, or battery acid
- Soil binders or amendments
- Sewage or line flushing/sanitizing agents
- Other hazardous or toxic substances

Requirements:
- Minimize the amount of hazardous materials stored at the construction site.
- Store hazardous liquids, wastes, and all chemicals in watertight containers with appropriate secondary containment to prevent any spillage or leakage, or in a completely enclosed storage shed.
- Cover all temporary containment facilities prior to forecast rain, at the end of each day, and during non-work days.
- Do not mix waste or hazardous materials. Doing so may complicate or inhibit disposal and recycling options and can result in dangerous chemical reactions.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:
- NS-9 – Vehicle and Equipment Fueling
- WM-1 – Material Delivery and Storage
- WM-2 – Material Use
- WM-4 – Spill Prevention and Control
- WM-6 – Hazardous Materials/Waste Management
- WM-10 – Liquid Waste Management

Properly contained in secondary containment

Improperly placed and stored on the ground

2.3 Construction Material Storage

Description:
Consider this BMP if any of the following are expected to be on the construction site:
- Asphalt
- Cement
- Dry mix concrete
- Fertilizer, Herbicides, or Pesticides
- Grease
- Soil amendments
- Any other construction materials not designed to be exposed to weather or rain.

Requirements:
- Minimize exposure of construction materials to precipitation. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks etc.).

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:
- Stockpile Management A-ESCP
- WM-1 – Material Delivery and Storage
- WM-2 – Material Use
- WM-3 – Stockpile Management
- WM-4 – Spill Prevention and Control
- WM-6 – Hazardous Materials/Waste Management
- WM-7 – Contaminated Soil Management

Properly wrapped in plastic, on pallet, and on plastic

Improperly Placed and stored on the ground

2.4 Tracking Controls

Description:
Consider this BMP if the following occurs on the construction site:
- Vehicle or equipment traffic to or from a construction, laydown, borrow, disposal, or staging area has the potential to contaminate the vehicle's tires with mud or sediment.
- Connections of non-stabilized access roads or any of the above connect to a paved roadway.
- Internal traffic areas, within a construction site, may lead to sediment laden discharge into storm drain systems or surface waters.

Requirements:
- Use 3" to 6" rock as much as 12" thick in the Construction Entrance to dislodge sediment and contain the sediment within the void areas of the rock.
- Limit traffic to using the entrance at all times. Block all other potential access locations.
- Slope entrance away from the adjoining roadway or provide drainage to prevent stormwater from conveying trapped sediments to the roadway.
- Build entrance with adequate length (50' min), width, (20') and turning radii (25').
- Inspect adjacent roadways daily and sweep or vacuum (SE-7) as needed.
- Include a sediment trap where water runs off of the entrance.
- Maintain the entrance by replacing or freshening rock as needed.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:
- SE-7 – Street Sweeping and Vacuuming
- SE-10 – Storm Drain Inlet Protection
- TC-1 – Stabilized Construction Entrance
- TC-2 – Stabilized Construction Roadway
- TC-3 – Tire Wash

Effective large angular material

Small ineffective material

2.5 Concrete and Other Rinse and Wash Waters

Description:
Consider this BMP if rinsing or washing any of the following is required on the construction site:

- Concrete, stucco, plaster, mortar, grout, tile, or gunite delivery, placement, finishing, pumping, or transporting equipment.
- Paint containers, sprayers, brushes, rollers, mixers, pumps, or cleaning supplies.
- Drywall materials, tools, texture guns and pumps, hoses, and waste.
- Tile mastic, grout, cuttings, or cleaning tools and equipment.
- Construction equipment, vehicles, tools, and materials.
- Cutting, grinding, coring, drilling, or re-finishing of any construction materials using water as a lubricant or coolant.
- Any other materials or equipment that may need to be washed or rinsed.

Requirements:

- Do not allow rinse or wash water to come into contact with the ground or paved surfaces.
- Rinse and wash water shall not be conveyed or dumped into any drain, inlet, or surface water.
- All concrete washout materials, including the water, cement, sand, and gravel shall be disposed of at a proper facility.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- NS-3 – Paving and Grinding Operations
- WM-4 – Spill Prevention and Control
- WM-6 – Hazardous Materials/Waste Management
- WM-8 – Concrete Waste Management
- WM-10 – Liquid Waste Management

Commercially available washout

Poorly located, installed, and maintained

2.6 Sanitation Facilities

Description:
Consider this BMP if the following are located at the construction site:

- Portable toilets
- Sanitary waste storage
- Hand wash stations

Requirements:

- Locate away from drainages and inlets (50’ if possible).
- Provide a tray to contain spills and minor leaks.
- Service and maintain facilities regularly to avoid overuse and overfilling.
- Protect from tipping, especially in high wind areas.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- WM-4 – Spill Prevention and Control
- WM-6 – Hazardous Materials/Waste Management
- WM-9 – Sanitary/Septic Waste Management
- WM-10 – Liquid Waste Management

Properly placed on tray and tied down

Poor location and protection

2.7 Waste Disposal Containers

Description:
Consider this BMP if the following present at the construction site:

- Construction debris
- Garbage
- Contaminated soil
- Demolition waste
- Concrete, stucco, mortar, drywall, or any other waste

Requirements:

- Cover waste disposal containers at the end of every day and prior to the onset of precipitation.
- Prevent discharges from waste disposal containers to the storm drain system or surface waters.
- Contain and securely protect stockpiled waste materials form wind and rain at all times unless actively being used.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- WM-5 – Solid Waste Management
- WM-6 – Hazardous Materials/Waste Management
- WM-7 – Contaminated Soil Management
- WM-8 – Concrete Waste Management

Large properly covered dumpster

Overused and improperly covered even during rain

2.8 Hazardous and Non-Hazardous Spills

Description:
Consider this BMP if the following occur on the construction site:

- Any breach, malfunction, leakage, or spill of a potential pollutant.

Requirements:

- Keep spill cleanup kits on-site and with fueling and maintenance vehicles at all times.
- If safe to do so, stop the spill, and begin cleanup immediately.
- Clean the contaminated area and any soil or materials contaminated by the spill.
- Notify the EFS and project foreman.
- If rain is forecast, cover the spill and contaminated areas prior to the onset of precipitation.
- Clean the spill with absorbents. Do not wash the spill with water.
- Store and dispose of cleanup materials, contaminated materials, and recovered spilled material in accordance with federal, state, can local requirements.

To determine if the spill is reportable, contact the EFS. After hours or if the local EFS are unavailable, call the following 800 number: **800-874-4043.**

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- NS-3 – Paving and Grinding Operations
- NS-9 – Vehicle and Equipment Fueling
- WM-1 – Material Delivery and Storage
- WM-2 – Material Use
- WM-4 – Spill Prevention and Control
- WM-6 – Hazardous Materials/Waste Management
- WM-8 – Concrete Waste Management
- WM-9 – Sanitary/Septic Waste Management
- WM-10 – Liquid Waste Management

Large, hazardous spill

Contaminated soil properly prepared for disposal

2.9 Spill Kits and Clean-up Materials

Description:
Consider this BMP if the following are located or performed at the construction site:
- Any construction activity
- Any stored equipment or liquids
- Any equipment or vehicle maintenance, repair, or fueling

Requirements:
- Equipment and materials for cleanup of spills shall be available on site and spills and leaks shall be cleaned up immediately and disposed of properly.
- All personnel must be trained to know where Spill Kits are kept.
- Have Spill Kit within reach during activities with potential to release pollutants, such as vehicle and equipment fueling and maintenance.
- All fueling and maintenance vehicles are required to have Spill Kits on board.
- Spill Kits should have a combination of All Absorbent (typically gray) pads and booms to absorb and retain oils, coolants, solvents and water and Oil Only (typically white) booms and pads to absorb only oil along with dry absorbent (kitty litter), gloves, and disposal bags.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:
- NS-3 – Paving and Grinding Operations
- NS-9 – Vehicle and Equipment Fueling
- WM-1 – Material Delivery and Storage
- WM-2 – Material Use
- WM-4 – Spill Prevention and Control
- WM-6 – Hazardous Materials/Waste Management
- WM-8 – Concrete Waste Management
- WM-9 – Sanitary/Septic Waste Management
- WM-10 – Liquid Waste Management

Typical Spill Kit contents

Hydraulic hose leak and absorbent deployment

2.10 Vehicle and Equipment Storage and Maintenance

Description:
Consider this BMP if there are any of the following on the construction site:

- Any vehicles or equipment being stored, fueled, or maintained.

Requirements:

- Allow only properly maintained vehicles and equipment onto the site.
- Place all equipment and vehicles, which are to be fueled, maintained, or stored in a designated area fitted with appropriate BMPs.
- Clean leaks immediately and properly dispose of leaked material or contaminated soil.
- A Spill Kit should be on each site and on every fueling or maintenance truck, and be easily accessible during fueling or maintenance activities.
- All site personnel should know where the Spill Kit is located.
- Designate one area for fueling and maintenance activities and inspect regularly for spills.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- WM-4 – Spill Prevention and Control
- WM-6 – Hazardous Materials/Waste Management
- WM-10 – Liquid Waste Management
- NS-9 – Vehicle and Equipment Fueling

Generator on secondary containment

Hydraulic tank leaking onto ground

2.11 Airborne Pollution Control

Description:
Consider this BMP if the following occurs on the construction site:

- Any construction activity with the ability to create any airborne pollution, including:
  - Sediment
  - Nutrients
  - Trash
  - Metals
  - Bacteria
  - Oil and grease
  - Organics

Requirements:

- Control all sources of potential airborne pollutants.
- Provide a water truck on-site during any time there is potential for dust (including winter).
- Cover or wet all stockpiles with potential for wind erosion.
- Respond quickly if dust or airborne pollutants are observed.
- Properly contain trash.

Associated BMPs and Other Plans:
For additional detail and guidance, refer to the following:

- EC-2 – Preservation of Existing Vegetation
- EC-7 – Geotextiles, Plastic Covers, and Erosion Control Blankets/Mats
- EC-16 – Non-Vegetative Stabilization
- NS-3 – Paving and Grinding Operations
- SE-7 – Street Sweeping and Vacuuming
- WM-3 – Stockpile Management
- WM-5 – Solid Waste Management

Water truck filling station

Uncontrolled dust

2.12 Where to Obtain BMP Materials

BMP products in Table 1 can be obtained through PG&E materials warehouses using project order numbers and established materials codes. Should the materials be unavailable from PG&E warehouses, BMP materials and products may be obtained from sources shown below, but may be obtained elsewhere depending on location and urgency of need.

TABLE 1
BMP PRODUCTS INFORMATION

Category	Product Name	Units
Certified Weed-Free Straw Mulch (EC-6)	Weed-Free Straw	Bales
Geotextiles and Mats (EC-7) Geotextile Fabric	Mirafi 600	Rolls: 12.5’ x 360’ 17.5’ x 238’
Geotextiles and Mats (EC-7) Jute Mat	Eco-Jute	Rolls: 4’ x 225’
Geotextiles and Mats (EC-7) Plastic Sheeting	Visqueen	Rolls: 20 or 40’x 100’; 10ml thick
Silt Fence (SE-1)	Caltrans Grade Silt Fence	100 feet with 36-inch wood posts at 6 foot spacing
Fiber Roll (SE-5)	Sediment Log Type II	25 foot rolls x 6 or 9” diameter
Gravel Bags (SE-6)	Roc Soc	mono filament
Inlet Protection (SE-10) Gravel Bag	Same as SE-6	
Inlet Protection (SE-10)	Same as SE-5	

Example suppliers include Reed & Graham, White Cap, and Curlex. Other options may include feed stores, retail building supply stores, or hardware stores.

3.0 BMP INSPECTION AND MAINTENANCE

BMP installation, inspection and maintenance will be performed by the PG&E construction crew. BMPs should be inspected daily during construction activities. In the event that BMPs appear to require maintenance or are not functioning as expected, the BMP will be maintained, repaired, or replaced to correct the deficiency.

4.0 WHOM TO CALL

If the project receives a written notice or order from any regulatory agency, immediately contact your local EFS for further direction.

Contact the local EFS if any of the following conditions occur:
- Visually cloudy/muddy water is observed leaving the work or staging area
- Discharge or spill of hazardous substance

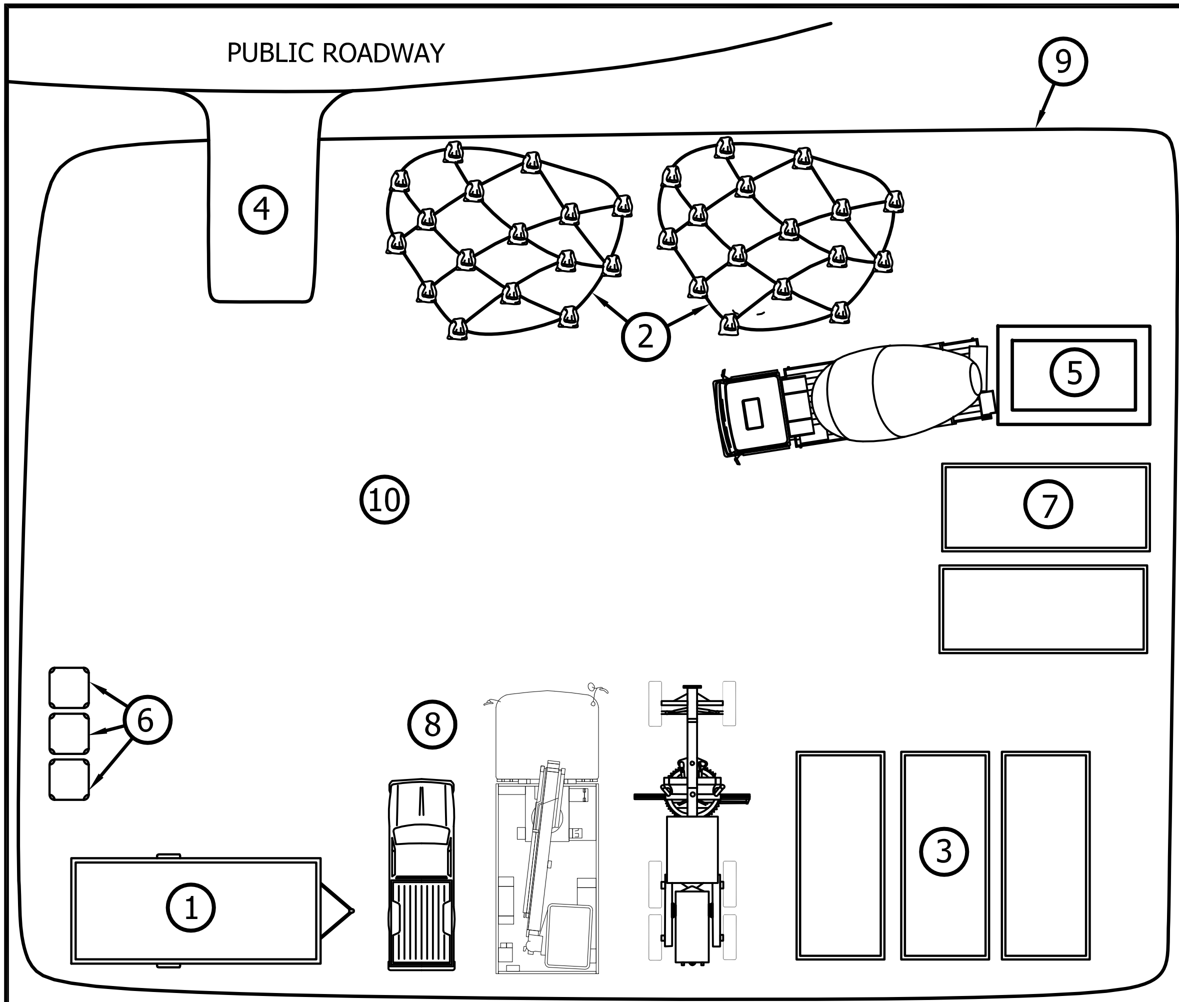
After hours or if the local EFS are unavailable, call the following 800 number:
800-874-4043.

5.0 POST-CONSTRUCTION

Upon completion of construction within the project area:

- Remove all temporary, non-biodegradable BMPs.
- Remove all construction equipment from the site.
- Clear all staging areas of any debris, construction materials, and contaminants.
- Return all drainage ways to their pre-construction line and grade.
- Cover disturbed soil areas with a combination of temporary and permanent vegetative stabilization.

Attachment A Typical BMP Installation Map



1. CONSTRUCTION TRAILER:
KEEP PRODUCT INVENTORY, SPILL KIT, MSDS SHEETS, SWPPP OR ESCP AND INSPECTION REPORTS, AND EMERGENCY CONTACT PHONE NUMBERS. REFER TO SECTIONS 2.1, 2.8, AND 2.9

2. COVERED STOCKPILES:
REFER TO STOCKPILE MANAGEMENT A-ESCP.

3. CONSTRUCTION STORAGE CONTAINERS:
KEEP LIQUID POLLUTANTS AND MATERIALS NOT MEANT FOR OUTSIDE STORAGE. ALTERNATIVES INCLUDE STORING SUCH MATERIALS ON SECONDARY CONTAINMENT WITH WEATHERPROOF COVER. REFER TO SECTIONS 2.2 AND 2.3.

4. STABILIZED CONSTRUCTION ENTRANCE
REFER TO SECTION 2.4.

5. WASHOUT
CONCRETE, PAINT OR OTHER RINSE WATERS. REFER TO SECTION 2.5.

6. SANITATION FACILITIES
REFER TO SECTION 2.6.

7. WASTE DISPOSAL CONTAINERS
REFER TO SECTION 2.7.
8. VEHICLE STORAGE AND MAINTENANCE
REFER TO SECTION 2.10.

9. PERIMETER CONTROL
SILT FENCE (SE-1), FIBER ROLL (SE-5), GRAVEL BAG BERM (SE-6) OR OTHER FUNCTIONING ALTERNATIVE.

10. AIR POLLUTION CONTROL/STABILIZED ROADWAY
CONTROL ALL AIRBORNE POLLUTANTS AT ALL TIMES AND MAINTAIN GRAVEL SURFACE TO SUPPORT CONSTRUCTION TRAFFIC WITHOUT TRACKING OR SEDIMENT LADEN DISCHARGE. REFER TO SECTION 2.11.

NOT TO SCALE

Planning-Engineering-Surveying-SWPPP
BT Consulting Incorporated
phone: (530) 672-2316 www.gobtc.net
P.O. Box 304 Shingle Springs, CA 95682

TYPICAL BMP USE DETAIL

A-ESCP - GOOD HOUSEKEEPING

GH-01

Attachment B PG&E Best Management Practice (BMP) Cut-sheets

The following BMP Fact Sheets are included in the Plan by reference only and can be found in Appendix C of the Field Manual. A full version of the Field Manual that includes the cut-sheets is located on SharePoint.

EC-2	Preservation of Existing Vegetation
EC-6	Straw Mulch
EC-7	Geotextiles, Plastic Covers, and Erosion Control Blankets/Mats
EC-16	Non-Vegetative Stabilization
SE-1	Silt Fence
SE-5	Fiber Rolls
SE-6	Gravel Bag Berm
SE-7	Street Sweeping and Vacuuming
SE-10	Storm Drain Inlet Protection
NS-3	Paving and Grinding Operations
NS-9	Vehicle and Equipment Fueling
TC-1	Stabilized Construction Entrance/Exit
TC-2	Stabilized Construction Roadway
TC-3	Tire Wash
WM-1	Material Delivery and Storage
WM-2	Material Use
WM-3	Stockpile Management
WM-4	Spill Prevention and Control
WM-5	Solid Waste Management
WM-6	Hazardous Materials and Waste Management
WM-7	Contaminated Soil Management
WM-8	Concrete Waste Management
WM-9	Sanitary/Septic Waste Management
WM-10	Liquid Waste Management

Attachment C Requirement Summary Table

Good Housekeeping

Best Management Practices to Reduce Environmental Impacts

Good Housekeeping practices apply to all PG&E projects throughout the year. Employees and Contractors shall follow good housekeeping Best Management Practices (BMPs) to protect storm water runoff from construction associated chemicals and/or pollutants and to maintain a clean construction site. Additional detail is provided in the Good Housekeeping Activity Specific Erosion and Sediment Control Plan (A-ESCP).

No.	Good Housekeeping Requirement	A-ESCP Section
1	Inventory products and materials and consider delivery, storage, spill prevention, and cleanup requirements.	2.1
2	Use effective BMPs to reduce or prevent pollutants in all water discharges.	2.1
3	Minimize the amount of hazardous materials at the site and store hazardous liquids, wastes, and all chemicals in watertight containers with appropriate secondary containment to prevent any spillage or leakage, or store in a completely enclosed storage shed.	2.2
4	Cover liquid pollutant containment BMPs prior to rain, at the end of each day, and during non-work days.	2.2
5	Do not mix wastes and/or hazardous materials.	2.2
6	Minimize exposure of materials that have potential to emit pollutants to precipitation.	2.3
7	Install, monitor, and maintain a stabilized entrance/exit, ensure that traffic uses the stabilized entrance/exit and monitor adjacent roadways for tracking.	2.4
8	Do not allow rinse or wash water (concrete rinse, paint wash, etc.) to contact the ground and/or paved surfaces nor allow rinse or wash water to be directed or dumped into any drain inlet or surface water and properly dispose of all rinse and/or wash water.	2.5
9	Properly locate, secure, and maintain sanitation facilities which includes providing a spill/leak tray.	2.6
10	Cover waste disposal containers at the end of each day and prior to and during precipitation.	2.7, 2.10
11	Monitor, maintain, and prevent discharges from waste disposal containers to the storm drain system or surface waters.	2.7
12	Contain and protect stockpiled waste materials.	2.7, 2.10
13	Keep spill cleanup kits on-site, with fueling and maintenance vehicles, and accessible at all times and train all personnel with regard to the location, use, and contents of the spill kit(s). If safe, stop and clean spills (with absorbents) immediately, notify the Environmental Field Specialist (EFS), dispose of materials properly, and cover the spill or contaminated area prior to precipitation.	2.8, 2.9, 2.10
14	Properly maintain vehicles, clean leaks immediately, and dispose of materials properly. Fuel and maintain vehicles and equipment in a proper, designated area and monitor the area regularly.	2.10
15	Control dust and other airborne pollutants and respond quickly to airborne pollutant observation. Provide a water truck if there is potential for dust and cover or wet stockpiles that have potential for wind erosion.	2.11
16	Monitor BMPs daily during construction activity and repair, replace, and/or maintain BMPs to correct any deficiencies.	3.0
17	Upon completion, remove temporary, non-biodegradable BMPs and equipment from the site. Clear debris, construction materials, and contaminants and return drainage ways to their pre-construction line and grade, and cover disturbed soil areas with a combination of temporary and permanent vegetative stabilization measures.	5.0

Appendix B-2

Laydown/Staging Area Construction

Laydown/Staging Area Construction

Activity Specific Erosion and Sediment Control Plan
(A-ESCP)

If Cumulative Soil Disturbance Changes,
Contact PG&E Environmental Operations - Environmental Field Specialists (EFS)
For Re-Evaluation of Storm Water Protection Needs

Prepared by

PG&E Storm Water Program Group

January 2011

TABLE OF CONTENTS

Attachments

1.0 WHAT IS COVERED UNDER THIS A-ESCP?

1.1 Laydown/Staging Area Construction

This Activity Specific Erosion and Sediment Control Plan (A-ESCP) is applicable to routine laydown/staging area construction activities that are not near sensitive habitat, surface waters or wetlands, or located along steep slopes. If you encounter one of those conditions, contact your local Environmental Field Specialist (EFS). This A-ESCP sets forth minimum Best Management Practices (BMPs) for laydown/staging area construction.

1.2 Project Activities

Typical activities performed might include the following:

- Trim vegetation as needed to clear work area
- Mobilize equipment and materials
- Blade to establish level base
- Install perimeter fencing
- Install gravel at entrance/exit and/or laydown surface
- Demobilize

1.3 Site Conditions Not Covered in this A-ESCP

This is a small project that should not include nearby site conditions such as:

- Nearby water bodies
- Wetlands/vernal pools
- Environmentally sensitive areas or protectable vegetation
- Steep slopes

Should any of these conditions be visible or become apparent in the near vicinity during mobilization activity, contact your local EFS for further direction.

1.4 Scheduling BMP Installation

Planning for storm water pollution prevention is required for all PG&E construction and maintenance projects throughout the year. However during the dryer summer months between June and September, for short duration projects (projects less than one week in duration), erosion and sediment control BMPs may not have to be implemented unless there is a possibility of precipitation. Storm water pollution prevention planning must be done prior to starting the project and erosion and sediment control BMPs must be on hand in the event there is a sudden rain event, but only need to be deployed if precipitation occurs. Good housekeeping and tracking control BMPs must be implemented for all projects, regardless of time of year.

For longer duration projects, and all small construction projects from October to May, BMPs shall be installed prior to the soil disturbing activities, maintained during soil disturbing activities and removed at the conclusion of soil disturbing activities.

2.0 BEST MANAGEMENT PRACTICES

The purpose of this A-ESCP is to specify appropriate stormwater BMPs for laydown/staging area construction. It is recommended that construction activities are scheduled to minimize soil disturbing activities during rain events.

The BMPs for the project should be installed in areas similar to those shown on the Typical BMP Installation Map; Attachment A.

Detailed cut-sheets on each BMP are provided in Attachment B.

In addition to the activity specific erosion and sediment control BMPs recommended in this A-ESCP, good housekeeping BMPs should be followed to minimize contamination of stormwater runoff with construction associated chemicals and to maintain a clean construction site (refer to the Good Housekeeping A-ESCP).

2.1 Where to Obtain BMP Materials

BMP products in Table 1 can be obtained through PG&E materials warehouses using project order numbers and established materials codes.

TABLE 1
BMP PRODUCTS INFORMATION

Category	Supplier	Product Name	Units
Certified Weed-Free Straw Mulch (EC-6)	Reed & Graham	Weed-Free Straw	Bales
Geotextiles and Mats (EC-7) Geotextile Fabric	Reed & Graham	Mirafi 600	Rolls: 12.5' x 360' 17.5' x 238'
Geotextiles and Mats (EC-7) Jute Mat	Reed & Graham	Eco-Jute	Rolls: 4' x 225'
Geotextiles and Mats (EC-7) Plastic Sheeting	Reed & Graham	Visqueen	Rolls: 20 or 40'x 100'; 10ml thick
Silt Fence (SE-1)	Reed & Graham	Caltrans Grade Silt Fence	100 feet with 36-inch wood posts at 6 foot spacing
Fiber Roll (SE-5)	Curlex	Sediment Log Type II	25 foot rolls x 6 or 9" diameter
Gravel Bags (SE-6)	Reed & Graham	Roc Soc	mono filament
Inlet Protection (SE-10) Gravel Bag	Reed & Graham	Same as SE-6	
Inlet Protection (SE-10)	Curlex	Same as SE-5	

2.2 Erosion Control

Erosion control practices consist of source control measures designed to prevent soil particles from becoming dislodged and transported in storm water runoff.

Soil-disturbing activities will be addressed as follows:

TABLE 2

BMP Number	BMP Name
EC-2	Preservation of Existing Vegetation
EC-7	Geotextiles and Mats
EC-16	Non-Vegetative Stabilization

For BMP installation procedures refer to the cut-sheets in Attachment B.

EC-2 Preservation of Existing Vegetation

Vegetation is one of the most effective erosion controls. Protecting existing vegetative cover on the site is a cost-effective, beneficial erosion control measure. For small construction projects, preservation of existing vegetation is most easily accomplished by limiting the work area and disturbed soil areas to the extent practicable. Details for implementation of this BMP are in the cut-sheets found in Attachment B. Key points are:

- Install fencing, barriers, or other markings to delineate vegetated areas to be preserved
- Suitable areas include but are not limited to: slopes, areas on site where no construction activity is planned, and areas near watercourses
- Locate staging and laydown areas outside of the drip line of existing trees
- Remove any fencing, barriers, or markings after the project is completed

Preserve vegetation between construction areas and sensitive areas whenever possible.

Provide for preservation of existing vegetation prior to the commencement of clearing and grubbing operations or other soil disturbing activities.

EC-7 Geotextiles and Mats

Geotextiles and mats come in many different types. This plan covers the use of three types:

- Geotextile fabrics – for shielding soil from flowing water
- Plastic sheeting – for covering stockpiles from rain impacts
- Jute mats – for shielding soil from rain impacts on steep slopes and embankments

Geotextile Fabrics – Geotextile fabrics are used to protect soil from flowing water. Fabric is laid over the soil in areas where the flowing water is concentrated and moving fast enough to cause erosion. Details for installation of this product are in the cut-sheets found in Attachment B. Key points are:

- Can be used on slopes or in channels
- Must prepare the site to ensure complete contact of the fabric with the soil
- Should be installed vertically down-slope and overlapped
- Must be properly anchored using anchor trenches and pins/nails
- Can be left in place at the end of the project if it is covered by rock or gravel, otherwise it should be removed

Plastic Sheeting – Generally, plastic sheeting should be used only as a covering for stockpiles or for very small graded areas for short periods of time (e.g., to protect against an imminent storm). Details for installation of this product are in the cut-sheets found in Attachment B. Key points are:

- Plastic sheeting should have a minimum thickness of 6 mils
- Secure with gravel bags or other weights placed no more than 10 ft apart
- Inspect frequently because plastic degrades quickly and is easily damaged by wind
- Keep secure so fragments will not be blown into electrical equipment
- Must be removed at the end of the project


Plastic sheeting over stockpiles properly and improperly secured.

Jute Mats – Jute is used mostly to protect slopes and embankments. It is made of natural fiber and can be left in place at the completion of the project to maintain protection of slopes until vegetation is reestablished. Jute is less effective than geotextiles and is usually used in conjunction with vegetation. The details of installation are the same as geotextile fabrics.

Jute mat used to protect soil on slope and embankment.

EC-16 Non-Vegetative Stabilization (Gravel)

Non-vegetative stabilization methods are used for temporary or permanent stabilization of areas where vegetative options are not feasible due to proposed use, soil/climate conditions, time constraints, or other factors. There are many methods of non-vegetative stabilization. This section covers gravel mulch. Also see previous discussion of geotextiles and mats, above.

Gravel mulch is a non-degradable erosion control product, as opposed to degradable straw and wood mulch, composed of washed and screened coarse to very coarse gravel. Details of installation and practices are provided on the cut-sheets in Attachment B. Key points are:

- Gravel should be sized based on slope, rainfall, and upgradient run-on conditions. Inadequately sized gravel mulch may wash away with runoff
- Should be installed at a minimum 2” depth
- If permanent, a weed control fabric should be placed prior to installation

Gravel stabilization being installed.

2.1 Sediment Controls

Sediment controls filter storm water and trap soil particles before they move offsite. Table 3 has a selection of BMPs used to filter storm water.

TABLE 3

BMP Number	BMP Name
SE-1	Silt Fence
SE-6	Gravel Bag Berm
TC-1/2	Stabilized Construction Entrance/Exit/Roadway
WM-3	Stockpile Management
WM-8	Concrete Waste Management

For BMP installation procedures refer to the cut-sheets in Attachment B.

SE-1 Silt Fence

Silt fence is one of the most commonly used BMPs. It traps sediment by intercepting and detaining small amounts of sediment laden sheet flow runoff from disturbed areas to promote sedimentation behind the fence. It can be used in the following applications:

- Along the perimeter of a staging/laydown area
- Below the toe or down-slope of exposed erodible slopes
- Along drainage ways and channels to prevent sediment from entering these areas
- Around stockpiles

Details for installation of this product are in the cut-sheets found in Attachment B. Key points are:

- Used principally in areas where sheet flow occurs
- Install along a level contour, perpendicular to slope, so water does not flow along fence causing a concentrated flow
- Provide room for runoff to pond behind fence
- Bury bottom of fencing material to prevent water from running underneath
- Overlap ends of fence so flow is not concentrated in gaps between adjacent sections
- Stakes should be on the down-slope side of the fence
- Turn the ends of the fence uphill to prevent storm water from flowing around fence

Silt fence reinforced with gravel bags.

SE-6 Gravel Bag Berm

Gravel bags are a good option for use in concentrated flow areas because their weight will keep them in place. Gravel bags can be formed into berms or check dams in channels. They may be suitable for:

- Diverting water running onto or off of the project site
- Slowing water on disturbed slopes
- Below the toe of slopes
- As sediment traps in channels
- Around temporary stockpiles including those on paved areas

The details for installation of this product are in the cut-sheets found in Attachment B. Key points are:

- Installation can be labor intensive
- Degraded gravel bags may rupture when removed, spilling contents
- Easily damaged by construction equipment
- Must be removed at end of project

Gravel bags used to slow sheet flow run-on into the lined swale, and as check dams to slow flow within the swale.

2.2 Tracking Controls

Tracking of mud and dirt onto public roads must always be controlled at construction sites. Access roads, parking lots, and other onsite vehicle transportation routes should be stabilized after they are graded if they will be used during or after periods of rain. The tracking control measures are:

TABLE 4

BMP Number	BMP Name
TC-1/2	Tracking Control

For BMP installation procedures refer to the cut-sheets in Attachment B.

TC-1/TC-2 Tracking Control

Tracking of mud and dirt onto public roads must always be controlled at construction sites. Access roads, parking lots, and other onsite vehicle transportation routes should be stabilized after they are graded if they will be used during or after periods of rain.

Tracking controls consist of preventing or reducing the tracking of sediment off-site by vehicles leaving the construction area. Tracking control BMPs include TC-1 Stabilized Construction Entrance/Exit and TC-2 Stabilized Construction Roadway. Details of tracking control BMPs are in the cut-sheets found in Attachment B.

Tracking control is important for any construction project large or small. Track-out of mud, rock, or dirt onto paved streets is visible to the public and any city or county staff will identify this as a storm water violation. Pictured below is an example of a construction entrance/exit that is well maintained in which no muddy wheel tracks are visible on the pavement.

Clean and well maintained construction entrance/exit.

Depending on the size of your project, tracking control can be accomplished in various ways. If you are working on a very small, short duration project, tracking control can be as simple as sweeping during and at the end of the day. Sites that have a construction entrance/exit that transitions from dirt to pavement may require more attention. Pictured here is an example of a construction entrance before and after stabilization.

Construction entrance/exit before and after installation.

Larger sites may require the use of temporary construction roadways. Temporary roads should follow the contours of the natural terrain to the maximum extent possible. Roadways should be graded to prevent runoff from leaving the construction site. Drainage should flow across the roadway width to one or both sides of the roadway, where a trench may be dug and stabilized to direct concentrated flow or a gravel bag berm may be installed along the perimeter of the road.

Make the tracking control fit the size of the project.

2.3 Good Housekeeping BMPs

Good housekeeping covers general practices that keep a construction site clean and neat. It also designates specific areas where such things as refueling can be done safely so that any incidental spills will not end up in storm water runoff from the site. The good housekeeping practices covered in this plan are:

TABLE 5

BMP Number	BMP Name
WM-3	Stockpile Management
WM-8	Concrete Waste Management

WM-3 Stockpile Management

Stockpile management procedures are designed to reduce or eliminate air and storm water pollution from soil, paving and construction materials stockpiles. Details for implementing stockpile management practices are on the cut-sheets provided in Attachment B. Stockpile management requirements include:

- Protection of stockpiles must be implemented during the entire year, not just during the rainy season
- All stockpiles should be covered prior to the onset of rain and in windy conditions
- Protect the perimeter of stockpiles from storm water run-on
- Inspect frequently because plastic degrades quickly and is easily damaged by wind
- Keep secure so fragments will not be blown into electrical equipment

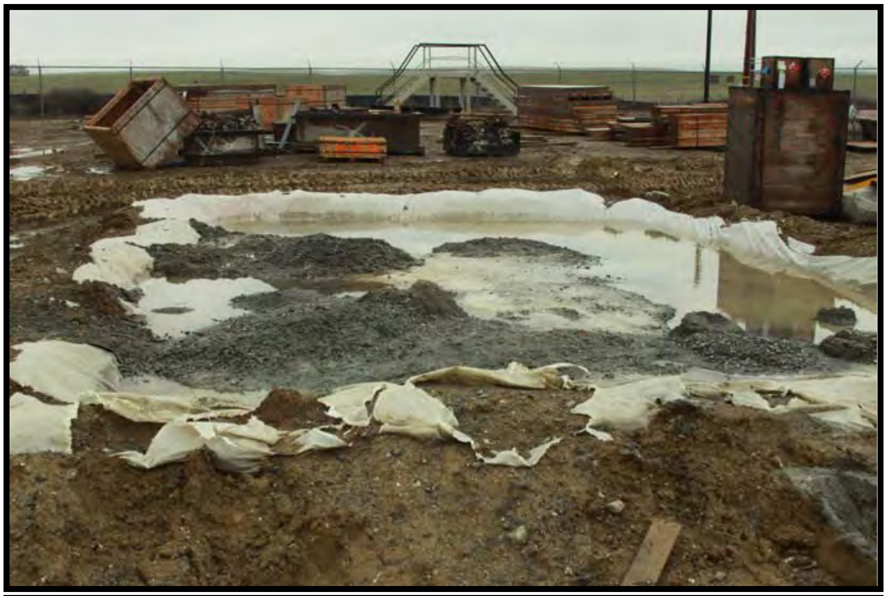
Proper securing of plastic sheeting.

WM-8 Concrete Waste Management

Concrete waste can alter the chemical properties of stormwater; therefore it's important to manage concrete washout and cutting operations to minimize contact with site run-on and runoff. Where offsite washout of concrete wastes is not possible, designated on-site washouts should be provided. Details for implementing WM-8 Concrete Waste Management are provided on the cut-sheets found in Attachment B. Key points are:

- Contain wash out of concrete wastes to evaporate and properly dispose of solids
- Washout areas should be lined to protect the ground and constructed with sufficient volume to contain wastes, washout, and rainwater
- Do not allow excess concrete to be dumped onsite, except in designated areas
- Must have adequate volume so rain events do not overfill containment

Two alternatives for containing concrete washout water.



Adequate volume and maintenance are essential to prevent a release of high pH water from temporary concrete washout containments.

3.0 BMP INSPECTION AND MAINTENANCE

BMP installation, inspection and maintenance will be performed by the PG&E construction crew. BMPs should be inspected daily during construction activities. In the event that BMPs appear to require maintenance or are not functioning as expected, the BMP will be repaired or replaced to correct the deficiency.

4.0 WHOM TO CALL

If the project receives a written notice or order from any regulatory agency, contact your local EFS for further direction immediately.

Contact the local EFS if any of the following conditions occur:

- Visually cloudy/muddy water is observed leaving the work area
- Discharge or spill of hazardous substance

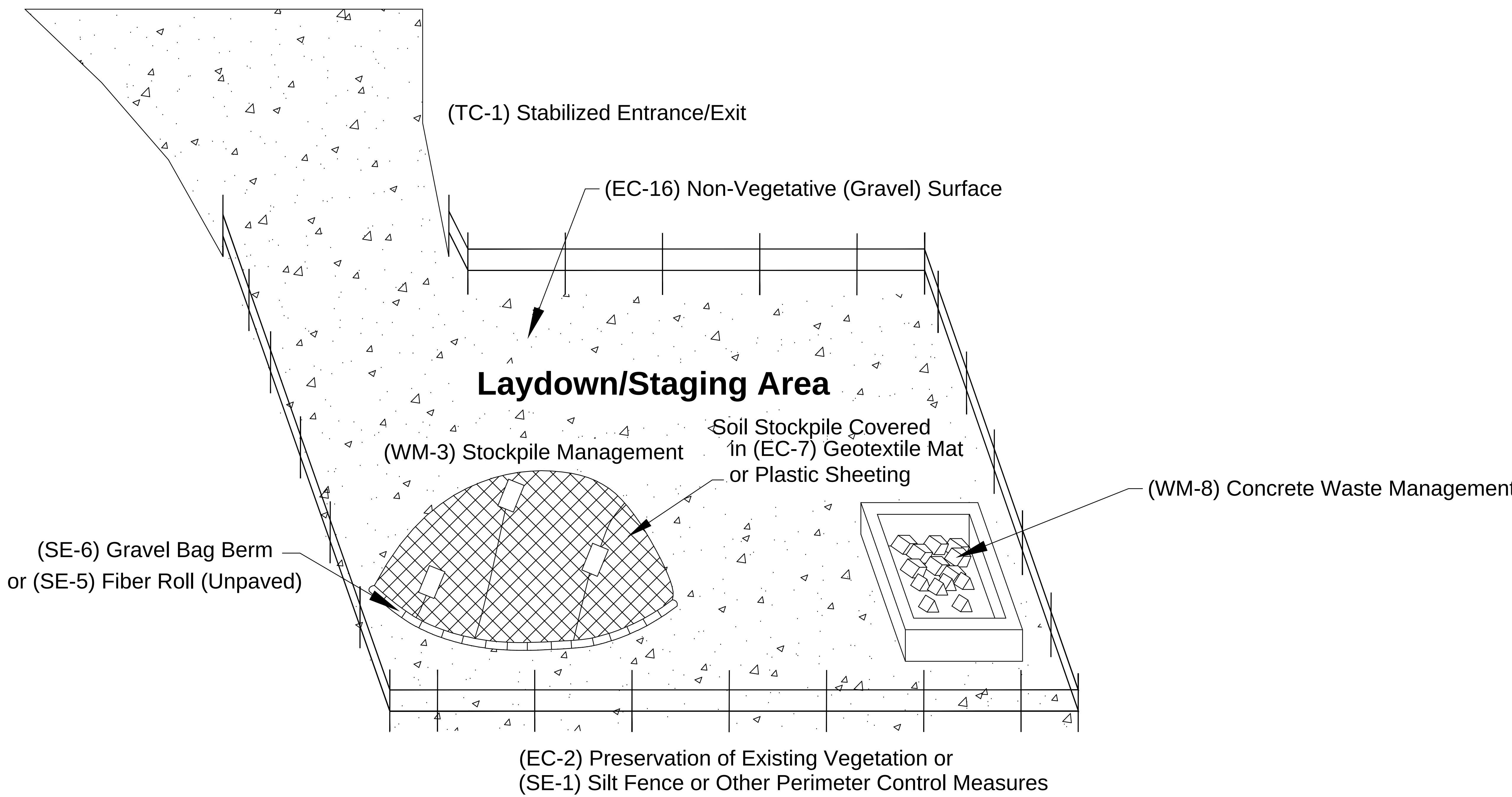
After hours or if the local EFS are unavailable, call the following 800 number: **800-874-4043.**


Contact your local EFS if any release of fuels or waste occurs.

5.0 POST-CONSTRUCTION

Upon completion of construction within the project area, all temporary, non-biodegradable BMPs will be removed. All construction equipment will be demobilized and removed from the site.

Attachment A Typical BMP Installation Map



ETIC ENGINEERING

A-ESCP LAYDOWN/STAGING AREA TYPICAL BMP USE MAP
PACIFIC GAS AND ELECTRIC COMPANY

FIGURE: 1

Attachment B PG&E Best Management Practice (BMP) Cut-sheets

Cut-sheets for BMPs described in this A-ESCP are included in this attachment, as follows:

EC-2 Preservation of Existing Vegetation
EC-7 Geotextiles and Mats
EC-16 Non-Vegetative Stabilization
SE-1 Silt Fence
SE-6 Gravel Bag Berm
TC-1 Stabilized Construction Entrance/Exit
TC-2 Stabilized Construction Roadway
WM-3 Stockpile Management
WM-8 Concrete Waste Management

When

This BMP is applicable to projects when:

- There are areas onsite where no construction activity is planned or will occur later
- Areas to be preserved are in the immediate vicinity of the construction site. Mark as appropriate before clearing and grubbing or other soil disturbance activities begin
- Areas with vegetation that can be preserved to protect against soil erosion, such as on steep slopes, watercourses, and building sites in wooded areas
- Areas designated as Environmentally Sensitive Areas (ESAs), or where federal, state, or local government regulations require preservation, such as wetlands, vernal pools, marshes, etc. These areas are typically flagged by a qualified biologist

How

Use the following measures as applicable:

- Preserve existing vegetation whenever possible
- If necessary, contact the project Environmental Representative for clarification regarding areas to be preserved
- Whenever possible, minimize disturbed areas by locating temporary roadways to avoid stands of trees and shrubs, and follow existing contours to reduce cutting and filling
- Locate construction materials, equipment storage, and parking areas outside the drip line of any tree to be retained
- Consider the impact of grade changes to existing vegetation and the root zone
- Remove any markings, barriers, or fencing after project is completed

Maintenance and Inspection

To preserve vegetation, maintain the clearly marked limits of disturbance during construction.

- Routinely inspect barriers during construction
- Repair or replace barriers as needed during construction

Mark vegetated area to be preserved

This slope should have been protected and will now be susceptible to erosion.

Ensure that vegetation protection barriers are adequate in length and delineation.

When

Use the following methods when disturbed soils may be particularly difficult to stabilize or access, including the following situations:

- Steep slopes, generally steeper than 1:3 (V:H)
- Slopes where the erosion hazard is high
- Slopes and disturbed soils where mulch must be anchored
- Disturbed areas where plants are slow to develop adequate protective cover
- Channels with high flows
- Channels intended to be vegetated
- Slopes adjacent to water bodies of Environmentally Sensitive Areas (ESAs)
- Blankets and mats are generally not suitable for excessively rocky sites or areas where the final vegetation will be mowed (because staples and netting can catch in mowers)

Plastic results in 100 percent runoff; their use is limited to:

- o Covering stockpiles
- o Covering small graded areas for short periods, such as through an imminent storm event, until an alternative protection measure is implemented

How

Proper site preparation is essential to ensure complete contact of the blanket or matting with the soil:

- Grade and shape the area of installation
- Remove all rocks, clods, vegetation, or other obstructions, so that the installed blankets or mats have complete, direct contact with the soil
- Prepare seedbed by loosening topsoil
- Seed the area before blanket installation for erosion control and re-vegetation. Seeding after mat installation is often specified for turf reinforcement application. When seeding before blanket installation, re-seed all check slots and other areas disturbed during installation. Where soil filling is specified, seed the matting and the entire disturbed area after installation and before filling the mat with soil
- Use u-shaped wire staples, metal geotextile stake pins, or triangular wooden stakes to anchor mats and blankets to the ground surface
- Drive wire staples and metal stakes flush to the soil surface
- All anchors should be 6 inches to 18 inches long and have sufficient ground penetration to resist pullout. Longer anchors may be required for loose soils
- For installation on slopes, consult the manufacturer's recommendations. Generally:
  - o Begin at the top of the slope and anchor the blanket in a 6 inch deep by 6 inch wide trench. Backfill trench and tamp earth firmly

- Unroll the blanket down slope in the direction of water flow
- Overlap the edges of adjacent parallel rolls 2 inches to 3 inches and staple every 3 feet
- When blankets must be spliced, place blankets end-over-end (shingle style) with 6-inch overlap. Staple through overlapped area, approximately 12 inches apart
- Lay blankets loosely and maintain direct contact with the soil. Do not stretch
- Staple blankets sufficiently to anchor blanket and maintain contact with the soil. Place staples down the center and stagger with the staples placed along the edges

- Remove and dispose of blankets and mats before applying permanent soil stabilization measures

Maintenance and Inspection

- Routinely inspect areas treated with temporary soil stabilization before and after significant forecasted storm events. Immediately repair any failures. Maintain areas treated with temporary soil stabilization to provide adequate erosion control. Re-apply or replace temporary soil stabilization on exposed soils when greater than 10 percent of the previously treated area becomes exposed or exhibits visible erosion
- If washout or breakage occurs, reevaluate the original materials installation. Repair damage to the slope or channel. If appropriate, re-install the material or implement a revised BMP

Several types of Erosion Control Blankets.

Remove all rocks, clods, vegetation, or other obstructions to install the blankets or mats.

Installed blankets or mats need to have direct contact with the soil in order to be effective.

Be sure to use enough staples to adequately secure the blankets or mats.

When

Non-vegetative stabilization methods are used for temporary or permanent stabilization of areas prone to erosion and should be used only where vegetative options are not feasible; examples include:

- Areas of vehicular or pedestrian traffic such as roads or paths
- Temporary heliport pads
- Arid environments where vegetation would not provide timely ground coverage, or would require excessive irrigation
- Rocky substrate, infertile or droughty soils where vegetation would be difficult to establish
- Areas where vegetation will not grow adequately within the construction time frame

There are several non-vegetative stabilization methods and selection should be based on site-specific conditions.

- **Decomposed Granite** is a permanent erosion protection method that consists of a layer of stabilized decomposed granite placed over an erodible surface. This material is most often used for roadways and walkways
- **Degradable Mulches** of various types can be used for temporary non-vegetative stabilization; examples include straw mulch, compost, wood chips, or hydraulic mulch
- **Geotextiles and Mats** can be used for temporary non-vegetative stabilization; an example includes items such as jute netting. These BMPs are typically manufactured from degradable or synthetic materials and are designed and specified based on their functional longevity, i.e., how long they will persist and provide erosion protection. All geotextiles and mats should be replaced when they exceed their functional longevity or when permanent stabilization methods are instituted
- **Gravel Mulch** is a non-degradable erosion control product that is composed of washed and screened coarse to very coarse gravel

See also EC-6 Straw Mulch, EC-7 Geotextiles and Mats, and EC-8 Wood Mulching.

How

Non-vegetated stabilization should be used in accordance with the following general guidance:

- Should be used in conjunction with other BMPs, including drainage, erosion controls, and sediment controls
- Non-vegetated stabilization measures should be implemented as soon as the disturbance in the areas they are intended to protect has ceased

Jute Netting

- Used where project construction activities have exposed soils through the removal of existing vegetation and other permanent stabilization techniques such as revegetation, gravel or paving will not be implemented

- Used for additional stabilization in areas where it is expected that the native vegetation will re-establish itself over time
- Remove large clods of dirt and stones and do not over compact the soil
- If being used in conjunction with seeding (revegetation), seed mix and fertilizer (if used) should be applied before installing the jute netting
- On slopes:
    - Apply jute netting by unrolling it down the slope and terminate at level area
    - Secure jute at top by laying at least 6 inches of material below grade at least 6 inches deep
    - Fold 6 inches of netting under itself and secure with staples or stakes
- Secure with staples every 18 to 24 inches. The steeper the slope the closer the staples should be placed to each other
- Overlap all seams at least 2 to 6 inches

Decomposed Granite Stabilization

- If used for a road or path should be installed on a prepared base
- Should be mixed with a stabilizer if used for roads or pathways, or on slope applications
- Though porous it is recommended to prevent standing water on or next to a decomposed granite road or pathway

Gravel Mulch

- Should be sized based on slope, rainfall, and upgradient run-on conditions. Stone size should be increased as potential for erosion increases (steeper slopes, high intensity rainfall)
- If permanent, a weed control fabric should be placed prior to installation
- Should be installed at minimum 2 inch depth
- Should completely cover all exposed surfaces
- If not properly screened and washed, can contain fine material that can erode and/or create dust problems

Rock Slope Protection

- When using rock slope protection, rock size and installation method should be specified by an engineer

Maintenance and Inspection

- For temporary and permanent installations, require inspection periodically and after major storm events to look for signs of erosion or damage to the stabilization
- All damage should be repaired immediately
- Rake out and add decomposed granite or gravel as needed to areas subject to rill erosion. Inspect upgradient drainage controls and repair/modify as necessary to control run-on to stabilized areas

Place filter fabric down before installing gravel or decomposed granite for stabilization.

Compact gravel or decomposed granite for additional stability.

When

Silt fences are temporary linear sediment barriers of permeable fabric designed to intercept and slow the flow of sediment-laden sheet flow runoff. Silt fences allow sediment to settle from runoff before water leaves the construction site.

Silt fences are placed:

- Below the toe of exposed and erodible slopes
- Down slope of exposed soil areas
- Around temporary stockpiles
- Along streams and channels
- Along the perimeter of a project

How

Construct silt fences with a setback of at least 3 feet from the toe of a slope in areas suitable for temporary ponding or deposition of sediment. Where a 3-foot setback is not practicable, construct as far from the toe of the slope as practicable.

- Generally, use silt fences in conjunction with erosion controls up slope to provide effective control, particularly for slopes adjacent to water bodies or Environmentally Sensitive Areas
- Construct the length of each reach (length of fence) so that the change in base elevation along the reach does not exceed 1/3 the height of the barrier; each reach should not exceed 500 feet. The last 6 feet of the reach should be turned up slope
- The maximum length of slope draining to the silt fence should be 200 feet or fewer
- Excavate a trench for the bottom of the silt fence that is not wider or deeper than necessary
- Key in, or bury the bottom of silt fence fabric at least 12 inches deep in trench and tamp into place. If it is not feasible to trench along the slope contour, use sand bags or backfilling to key in the bottom of the fabric
- Install fence post at least 12 inches below grade on down slope side of trench
- Silt fences should not be considered for installation below slopes steeper than 1:1 (horizontal:vertical) or that contain a high number of rocks or loose dirt clods

Maintenance and Inspection

- Repair or replace split, torn, slumping, undercut, or weathered fabric
- Inspect silt fences before and after each storm event and routinely throughout the rainy season
- Remove accumulated sediment when it reaches 1/3 of the barrier height. Incorporate removed sediment into the project at appropriate locations or dispose of at a PG&E-approved site

- Remove and dispose of silt fences that are damaged and become unsuitable for the intended purpose and replace with new silt fence barriers
- Remove silt fence when the upgradient area is stabilized. Fill and compact post-holes and anchorage trench, remove sediment accumulation, and grade fence alignment to blend with adjacent ground

Silt fence installed at the toe of an erodible slope for perimeter control.

Silt fence needs to be properly keyed in 12 inches below the ground surface.

When

A gravel bag berm consists of a single row of gravel bags that are installed end-to-end to form a barrier across a slope to intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide some sediment removal. Gravel bags can also be used where flows are moderately concentrated, such as ditches, swales, and storm drain inlets (Storm Drain Inlet Protection to divert and/or detain flows). Gravel bag berms are appropriate for perimeter site control or along streams, channels, storm drain inlets, or around stockpiles to intercept sediment laden storm water and non-storm water runoff.

- Where it is desirable to filter sediment in runoff. Note that gravel bag berms are generally more permeable than sand bags. Sand bag barriers should be used where it is desirable to block and pond flows (e.g., for containment of non-storm water flows)
- Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow
- On a project-by-project basis to maximize effectiveness
- With other BMPs to maximize sediment containment

How

When used as a linear control for sediment removal:

  - Install along a level contour
  - Space rows 8 to 20 feet apart
  - Turn ends of gravel bag row up slope to prevent flow around the ends
  - Use in conjunction with temporary soil stabilization controls up slope to provide effective control

- When used for concentrated flows:
  - Stack gravel bags to required height. When the height requires 3 rows or more, use a pyramid approach
  - Overlap upper rows of gravel bags with overlap joints in lower rows
- Construct gravel bag barriers with a setback of at least 3 feet from the toe of a slope. Where a 3-foot setback is not practicable, construct as far from the toe of the slope as practicable

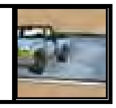
Maintenance and Inspection

- Inspect gravel bag berms before and after each storm event and routinely throughout the rainy season
- Reshape or replace gravel bags as needed
- Repair washouts or other damages as needed
- Inspect gravel bag berms for sediment accumulation and remove sediments when accumulation reaches 1/3 of the berm height. Incorporate removed sediment into the project at appropriate locations or dispose of it at a PG&E-approved site
- Remove gravel bag berms when no longer needed. Remove

sediment accumulation, and clean, re-grade, and stabilize the area. Incorporate removed sediment into the project at appropriate locations or dispose of it at a PG&E-approved site

Gravel bag berm used for perimeter control.

Gravel bag check dams installed to slow the water down and encourage sediments to drop out.



When

Tracking controls reduce offsite tracking of sediment and other pollutants by providing a stabilized entrance at defined construction site entrances and exits and/or providing methods to clean up sediment or other materials to prevent them from entering a storm drain by sweeping or vacuuming.

- Stabilize entrances on a project-by-project basis in addition to other BMPs
- Implement sweeping or vacuuming when sediment is tracked from the project site onto public or private paved roads, typically at points of site exit
- Use stabilized entrances and/or sweeping at construction sites:
    - Where dirt or mud is tracked onto public roads adjacent to water bodies
    - Where poor soils are encountered, such as soils containing clay
    - Where dust is a problem during dry weather conditions

How

<u>Stabilized Construction Entrances</u>

- Limit the points of entrance/exit to the construction site by designating combination or single-purpose entrances and exits. Require all employees, subcontractors, and others to use them. Limit speed of vehicles to control dust
- Grade each construction entrance/exit to prevent runoff from leaving the construction site
- Route runoff from stabilized entrances/exits through a sediment-trapping device before discharge
- Design stabilized entrance/exit to support the heaviest vehicles and equipment that will use it
- Select construction access stabilization (aggregate, asphaltic concrete, and concrete) based on longevity, required performance, and site conditions
- Use of constructed or constructed/manufactured steel plates with ribs for entrance/exit access is permitted
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 inches deep, or place aggregate to a depth recommended by a geotechnical engineer. Use crushed aggregate of more than 3 inches but fewer than 6 inches
- If possible, construct aggregate area with a minimum length of 50 feet and width of 30 feet

<u>Street Sweeping and Vacuuming</u>

- Routinely inspect potential sediment tracking locations, at least daily
- Sweep or vacuum visible sediment tracking as needed
- Manual sweeping is appropriate for small projects. For larger

projects, use sweeping methods that collect removed sediment and material

- If not mixed with debris or trash, incorporate the removed sediment into the project or dispose of it at a PG&E-approved disposal site

Maintenance and Inspection

Stabilized Construction Entrance

- Inspect routinely for damage and assess effectiveness. Repair if access is clogged with sediment
- Sweep where tracking has occurred on roadways, on the same day. Do not use water to wash sediment off the streets. If water must be used, it should be captured to prevent sediment-laden water from running off the site
- Keep all temporary roadway ditches clear

Street Sweeping and Vacuuming

- Inspect inlet and outlet access points routinely and sweep tracked sediment as needed
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous
- After sweeping, properly dispose of sweeper wastes

Depending on the project area soil types, these metal plates may be sufficient enough to prevent track out onto paved roads.

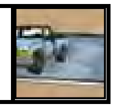
Regularly clean the plates to prevent buildup of sediments, mud, or construction debris from being tracked onto the paved road.

Manufactured metal plates knock dirt off vehicles before exiting a site.

One way to prevent bypassing would be to install a barrier such as safety cones or K-rails.

For rocked construction entrances/exits, use crushed aggregate of more than 3 inches but fewer than 6 inches.

Traditional rocked construction entrance/exit.



When

Access roads, subdivision roads, parking areas, and other onsite vehicle transportation routes should be stabilized immediately after grading, and frequently maintained to prevent erosion and control dust.

This BMP should be applied for the following conditions:

- Temporary Construction Traffic:
  - Phased construction projects and offsite road access
  - Construction during wet weather
- Construction roadways and detour roads:
  - Where mud tracking is a problem during wet weather
  - Where dust is a problem during dry weather
  - Adjacent to water bodies
  - Where poor soils are encountered

How

Areas that are graded for construction vehicle transport and parking purposes are especially susceptible to erosion and dust. The exposed soil surface is continually disturbed, leaving no opportunity for vegetative stabilization. Such areas also tend to collect and transport runoff waters along their surface. During wet weather, they often become muddy and can generate significant quantities of sediment that may pollute nearby streams or be transported offsite on the wheels of construction vehicles. Dirt roads can become so unstable during wet weather that they are virtually unusable.

Efficient construction road stabilization not only reduces onsite erosion but also can significantly speed onsite work, avoid instances of immobilized machinery and delivery vehicles, and generally improve site efficiency and working conditions during adverse weather.

Permanent roads and parking areas should be paved as soon as possible after grading. As an alternative where construction will be phased, the early application of gravel or chemical stabilization may solve potential erosion and stability problems. Temporary gravel roadway should be considered during the rainy season and on slopes greater than 5 percent.

Temporary roads should follow the contour of the natural terrain to the maximum extent possible. Slope should not exceed 15 percent. Roadways should be carefully graded to drain transversely. Provide drainage swales on each side of the roadway in the case of the crowned section or one side in the case of the super elevated section. Simple gravel berms without a trench can also be used.

Installed inlets should be protected to prevent sediment laden water from entering the storm sewer system (see SE-10, Storm Drain Inlet Protection). In addition, the following criteria should be considered:

- Road should follow topographic contours to reduce erosion of the roadway

- The roadway slope should not exceed 15 percent
- Chemical stabilizers or water are usually required on gravel or dirt roads to prevent dust
- Properly grade roadway to prevent runoff from leaving the construction site
- Design stabilized access to support heaviest vehicles and equipment that will use it
- Stabilized roadway using aggregate, asphalt concrete, or concrete based on longevity, required performance, and site conditions. The use of cold mix asphalt or asphalt concrete grindings for stabilized construction roadway is not allowed
- Coordinate materials with those used for stabilized construction entrance/exit points
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 inch depth

Maintenance and Inspection

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, impact weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation
- Keep all temporary roadway ditches clear
- When no longer required, removed stabilized construction roadway and re-grade and repair slopes
- Periodically apply additional aggregate on gravel roads
- Active dirt construction roads are commonly watered three or more times per day during the dry season

Install filter fabric, place stabilization materials and compact.

In areas where run-on onto the road may be an issue install BMPs such as fiber rolls or silt fence to protect the road.

Stabilized construction road.

When

Use this BMP when projects require stockpiled soil and paving materials. The stockpile management practices differ based on forecasted weather or terrain.

- Protection of stockpiles must be implemented whenever there is a potential for transport of materials by a water source (forecast precipitation, windy conditions, or any non-storm water runoff)

How

Use one or more of the following options to manage stockpiles and prevent stockpile erosion and sediment discharges for storm water and non-storm water runoff/run-on:

  - Return stockpile to the excavation if precipitation is forecast
  - Protect stockpiles from storm water run-on with temporary perimeter sediment barriers such as berms, silt fences, fiber rolls, covers, sand/gravel bags, or straw bale barriers, as appropriate
  - Remove or temporarily store stockpiles in a protected location offsite

- **Stockpiles should be covered, stabilized, or protected with a perimeter sediment barrier before the onset of precipitation**
- Secure plastic coverings tightly. Ensure no plastic is blown into electrical equipment
- Keep stockpiles organized and surrounding areas clean
- Protect storm drain inlets, watercourses, and water bodies from stockpiles, as appropriate
- Implement dust control practices as appropriate on all stockpiled material

Maintenance and Inspection

Repair and/or replace covers and perimeter containment structures as needed. Plastic sheeting requires frequent inspection for sun and wind damage.

This stockpile should have perimeter control around it. Such as, fiber rolls, a gravel bag berm, or silt fencing.

Stockpile covered with plastic and secured with large rocks. Where more than one sheet of covering is required, overlap sheets and secure at seam.

This stockpile should be covered even though it has perimeter control.

Silt fence as stockpile perimeter control.

When

Use for projects where concrete, mortar, cement, and stucco are used or where slurry or concrete wastes are generated by construction activities, including:

- Sawcutting
- Coring/drilling
- Grinding, re-finishing, or patching
- Encasing conduit in concrete
- Tower footings

For managing concrete curing compounds, see the BMPs on Material Use (WM-2) and Hazardous Waste Management (WM-6). For managing paving, grinding, and sawcutting operations, see NS-3 Paving and Grinding Operations.

How

Install storm drain protection at any down gradient inlets that the activity might impact. See SE-10 Storm Drain Inlet Protection.

- Avoid mixing excess amounts of concrete
- **Do not wash residue or particulate matter into a storm drain inlet or watercourse**
- The following options should be used for concrete truck chute and/or pump and hose washout:
    - If available, arrange to use an existing concrete washout station. Upon entering the site, concrete truck drivers should be instructed about onsite practices
    - **Concrete Washouts:** Washout stations can be plastic lined temporary bermed areas designed with sufficient volume to completely contain all liquid and waste concrete materials plus enough capacity for rainwater. The designated area must be located away from storm drain inlets or watercourses
    - **Bucket Washout:** Manually rinse the chute into a wheelbarrow, plastic bucket, or pail, and then empty the bucket into the concrete truck barrel or on top of the placed concrete
- Locate washout at least 50 feet from storm drains, open ditches, or water bodies if possible
- Stockpile concrete demolition waste in accordance with WM-3 Stockpile Management

Maintenance and Inspection

- Responsible personnel should ensure that all concrete truck drivers are instructed about project practices when the trucks arrive onsite
- Clean designated washout areas as needed, or minimally when the washout is 75 percent full, to maintain sufficient capacity throughout the project duration
- Clean any designated onsite washout areas and remove all debris upon project completion. Dispose of concrete waste according to WM-5 Solid Waste Management

- Inspect routinely, when applicable activities are underway, to ensure that concrete washout does not overflow

Portable self contained concrete washouts are easy to maintain.

Cover during rain events.

Service the washout when approximately 75% full.

Self contained concrete washout.

Construct a concrete washout by placing a support structure (such as hay bales) to form a basin and line with a thick (minimum 6 mil) plastic.

Service the washout when approximately 75% full.

Make sure the washout doesn't become a waste bin for other construction debris.

Inspect concrete washout regularly for holes and integrity of the hay bales or support features.

Replace plastic after each servicing and replace hay bales as needed.

Lined concrete washout.

Appendix B-3

Dirt and Gravel Access Road Maintenance – Mountain Regions

Dirt and Gravel Access Road Maintenance – Mountain Regions

Activity Specific Erosion and Sediment Control Plan
(A-ESCP)

Should the approach provided in this document prove unsuccessful,
contact PG&E Environmental Operations - Environmental Field Specialists (EFS)
for Re-Evaluation of Storm Water Protection Needs

Prepared by:
PG&E Storm Water Program Group

December, 2012

TABLE OF CONTENTS

Attachments

1.0 WHAT IS COVERED UNDER THIS A-ESCP?

1.01 Introduction

Properly designed and maintained road surfaces and drainage systems can reduce adverse effects to water resources by facilitating natural hydrologic function. Roads and drainage systems normally deteriorate because of traffic, weather, and the effects of maintenance. Roads may occasionally become saturated by new groundwater springs and seeps after a wildfire or unusually wet periods. Many such conditions can be corrected by timely maintenance. However, while routine maintenance may be needed to ensure the road performs as designed, it can also be a source of soil disturbance and sediment production (e.g., grading of inside ditches and road surfaces can significantly increase sediment production rates). Less aggressive maintenance may be desired to minimize disturbance of stable sites.

The purpose of this A-ESCP is to provide direction to crews responsible for the maintenance of dirt and gravel access roads in mountainous regions where year round and seasonal specific access is required. The applicability of this document is limited to the maintenance of existing access roads, and not meant for the construction of new roads.

1.02 Special Considerations

Specific regions, watersheds and areas may have additional requirements under the Federal Energy Regulatory Commission (FERC) License, US Forest Service (USFS) Road Maintenance Specifications, USFS Water Quality Management Plan, Regional Water Quality Control Board, land owner's requirements, Timber Harvesting Plans (THP) or other local agency regulations (including but not limited to air quality, naturally occurring asbestos, and noxious weeds). These additional requirements may take precedence over this guidance and may need to be incorporated into maintenance programs.

Any work in a waterway not specifically limited to maintaining the original line and grade of the facility may result in the need for a Regional Water Quality Control Board 401 Certification, US Army Corps of Engineers 404 Permit, and/or Department of Fish and Game 1600 Streambed Alteration Agreement. Contact the Environmental Field Specialist (EFS) if there is any question regarding the need for such permitting.

The use of any road, especially those that may cross an area under an existing THP, may be under the requirements of the 2012 California Forest Practice Rules, Title 14, California Code of Regulations, Chapters 4, 4.5 and 10 or updated version. The THP identifies measures to protect all Class I, II, III, and IV Watercourses through the designation of Water Course Protection Zones (WCPZ), which may or may not be flagged, and will only be flagged prior to Timber Harvest. While PG&E access through these areas does not constitute Timber Harvest, a typical THP requires that any roads designated within an approved THP not be used, built, or maintained at any time when such activity could result in the release of turbid water, regardless of the fact that the activity may not be specific to timber harvesting. Roads within the THP area should be maintained and used only during dry seasons. Any activities during the wet season should be limited to emergency and necessary use per the requirements of the specific FERC License, which may be in conflict with the requirements of the specific THP. In these situations, contact the EFS or Land Planner for guidance.

1.02 Preparation

Before beginning any road maintenance activity, consider the following:

- Locate and designate excess soil areas before operations begin.
  - Do not place excess soil:
    - in or near areas that convey runoff.
    - on slopes with a risk of failure or in areas subject to overland flow.
    - outside PG&E easements or PG&E property.
  - Provide adequate erosion protection of excess soil.
- Schedule operations when rain, runoff, wet soils, snowmelt, or frost melt are less likely.
  - Schedule maintenance during periods when soil is moist and vegetation is green, but water is not running in drainages or crossings.
  - Complete all necessary stabilization measures prior to predicted precipitation that could result in surface runoff.
- Maintain and repair all vehicles and equipment to eliminate and prevent leaks. (See Best Management Practices (BMP) Fact Sheets NS-9, WM-4, WM-6, and WM-7; refer to Attachment B to locate referenced BMP Fact Sheets).
  - If any leak is observed, remove or repair the equipment immediately.
  - Clean up all spills and dispose of contaminated soils or other materials properly.
- Preserve existing vegetation to the extent possible.
- In some instances, especially where native surface access roads connect to public paved roads, Street Sweeping (SE-7) and Stabilized Construction Entrances (TC-1) may be necessary during maintenance operations or if regular use warrants such (refer to Attachment B).

2.0 BEST MANAGEMENT PRACTICES AND PROCEDURES

Stormwater pollution risk from road maintenance activities can be managed by using the appropriate techniques from the following list adapted as needed to local site conditions:

2.01 Surface Blading
2.02 Ditch Cleaning
2.03 Slide and Minor Slope Failure Repair
2.04 Surface Repair
2.05 Shoulder Maintenance
2.06 Dust Abatement
2.07 Minor Drainage Structures
2.08 Roadside Vegetation
2.09 Miscellaneous Structures
2.10 Snow Removal
2.11 Where to Obtain BMP Materials

2.01 SURFACE BLADING

Description:
Surface blading is keeping a native or aggregate roadbed in a condition to facilitate traffic and provide proper drainage. It includes maintaining the crown or slope of the roadway, shoulder, drainage dips, lead-off ditches, berms, turnouts, and providing a level of smoothness appropriate to the facility's required uses.

Requirements:
- Surface blading shall be focused in spring and fall, when adequate soil moisture is available. If adequate soil moisture does not exist, a water truck may be required to maintain proper soil moisture or for dust control.
- The existing roadbed, including turnouts, shall be bladed; shaped to reasonably conform to the previous cross section; and scarified, if required, to eliminate previously established ruts.
    - On roads with a roadside ditch and drainage structures, the road surface shall slope toward the roadside ditch.
    - On roads without roadside ditches, the road shall slope toward the downhill side, ensuring that concentrated flow paths are not generated by grading operations. Any windrows or berms created by blading on the downhill side of the road shall be back bladed and blended into the existing surface or removed to a feasible location.
- Existing aggregate surfacing material shall be bladed to conserve material and to prevent segregation of particle sizes.
- Water shall be applied during scarifying or blading where sufficient moisture is not present to prevent segregation or to enable compaction.
- Undesired rocks or other material remaining on the roadway surface after the final blading shall be disposed of properly.
- At intersections, the roadbeds of side roads shall be graded for a reasonable distance to ensure proper blending of the two surfaces.
- Drainage dips and lead off ditches shall be cleaned and maintained to conform reasonably to their previous line, grade and cross section.
- Berms shall be repaired by placing selected material as needed to restore the berm to its original condition.
- Do not permit sidecasting of any excess materials (the practice of angling the blade to dispose of waste material over an embankment).
    - Excess road material must be blended back into the road or be removed to a designated, prepared, and protected disposal site.
- When blading near a surface water (canal, stream, etc.), ensure that loose materials are not deposited into the waterway.

Examples:

Native Material Bladed Access Road

Imported Material Bladed Access Road

Do not permit sidecasting

Safety berm left in place

2.02 DITCH CLEANING

Description:
Ditch cleaning is removing and disposing of sediments and organic materials from the roadside ditches to provide an unobstructed drainage reasonably conforming to previous line, grade, and cross section.

Requirements:

- Materials removed from the ditch, if suitable, may be blended into existing native road surface or shoulder in conjunction with surface blading operations. Slough material from ditch cleaning operations shall not be blended into aggregate surfaced roads.
- Materials not suitable for blending back into the road surface must be removed to a designated, prepared and protected disposal site.
- When possible, ditch maintenance efforts should be limited to times when ditches do not have running water.
- Do not undercut uphill slopes.
- Protect existing vegetation not restricting drainage or vehicular passage. (refer to EC-2, Attachment B).
- Leave uphill slopes fully vegetated during all operations (See detail RM-01, Attachment A).
- Ensure that all loose materials are removed from ditch.
- If conditions exist that require ditch cleaning when water is flowing, as when groundwater, snow melt, or surface water is conveyed in the ditch, the maintenance crew must employ a temporary sediment control device. Options include:
    - Providing an excavated sediment trap downstream from work area. Locate excavated materials from sediment trap away from concentrated flows and sensitive areas (See detail RM-02, Attachment A).
    - Placing temporary sand or gravel bag check dams in ditch downstream of the work area. Prior to demobilizing, remove trapped sediment and bags from ditch (See detail RM-03, Attachment A).
    - Diverting flows using temporary conveyance around work area. Upon completion of maintenance, remove temporary diversion(s). Options for diversion include temporary pipe or temporary plastic lined ditch. Sand bags may be used to direct flow into the temporary diversion.

Examples:

Cleared ditch without undercutting uphill slope

Native grasses left on uphill slope to dissipate energy coming off of slope.

2.03 SLIDE AND MINOR SLOPE FAILURE REPAIR

Description:

- Slide repair is the removal and disposal of material, such as soil, rock, and vegetation, which cannot be routinely handled by a motor grader during ditch cleaning and surface blading operations.
- Minor slope failure repair is the repair and stabilization to uphill or downhill slopes as necessary to maintain safe passage. Projects that cannot be implemented without additional equipment or personnel, beyond that which is typically available for maintenance, may need additional review by the EFS for compliance with permits and agreements.
- Slide and minor slope repair include excavation, loading, hauling, placing, and compacting of waste or replacement material. This includes the development of small disposal or borrow areas which should be reviewed for environmental sensitivity and concentrated flows.

Requirements:

- Operator shall stage material removed from slides away from any sensitive areas and cover it until it can be permanently removed or spread, compacted, and stabilized.
- Material shall not be blended into the road unless determined suitable.
- Trees and brush destroyed in the slide shall be chipped and spread over exposed soils at the slide location to the extent possible.
- The slope which contributed the slide material will be reshaped as practicable to reduce future sliding.
- When filling depressions or washouts, selected material shall be placed in layers and compacted.
- Existing aggregate surfacing will be salvaged when practical and re-laid after depressions have been filled.
- Damaged road surfaces shall be repaired and the roadway shall be shaped so as to reasonably conform to its original cross section.
- If determined necessary, rock slope protection, gabion baskets, or other slope stabilization techniques shall be incorporated to protect the area from further slide or slope failure (See details RM-04 and RM-05, Attachment A).
- Excess road material must be blended back into the road surface or removed to a designated, prepared, and protected disposal site.
- Remaining exposed soils shall be seeded with suitable seed and covered with a suitable soil cover such as Straw Mulch (EC-6), Geotextiles (EC-7), or Wood Mulch (EC-8), (refer to Attachment B).

Examples:

Slide material removed from culvert entrance

Gabion baskets used to stabilize downhill slope

2.04 SURFACE REPAIR

Description:
Surface repair is patching potholes or small areas on road surfaces. It includes preparing the area to be patched and furnishing and placing all necessary materials (including base and other work required to patch the surface).

Materials:

- In certain instances, materials must be approved by the local jurisdiction (e.g., if work is planned on Forest Service Lands, confirm that materials meet their requirements).

Requirements:
Aggregate Surfacing Repair

- Aggregate material shall be placed on well compacted subgrade.
- Often times, potholes reoccur due to standing water or poorly prepared subgrade.
- Adequate moisture should be applied to allow compaction, and resist material segregation.
- If mechanical compaction equipment is unavailable, wheel roll materials with the heaviest vehicle available.
- Additional work to limit standing or running water in the repair area may be necessary to ensure that the repairs are more permanent.
- It is important to scarify the road surface material within 12" of the pothole to allow better integration of the repair material with the existing material.
- Small rills can turn into gullies quickly, and must be filled with suitable material and compacted to prevent re-occurrence.

Examples:

Road surface after several weeks of heavy rain and repeated use.

Gullies must be filled with suitable materials to prevent re-occurrence and expansion.

2.05 SHOULDER MAINTENANCE

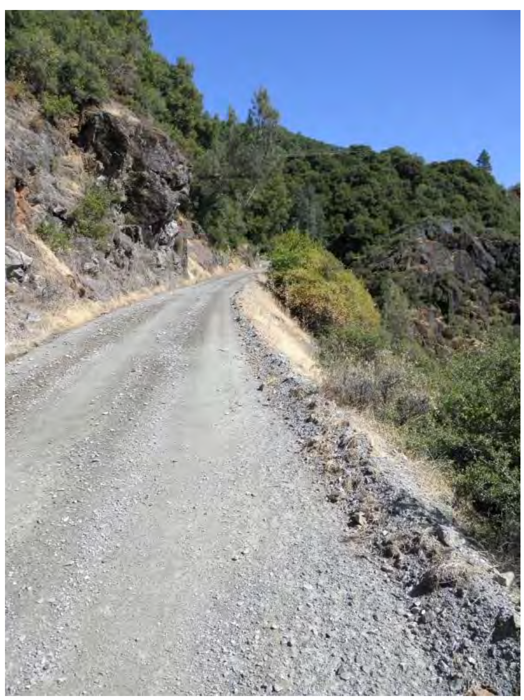
Description:
Shoulder maintenance consists of keeping the portion of the roadway adjacent to a driving surface in a reasonably smooth condition and level with the driving surface in order to provide lateral support to the surface. Shoulder maintenance may require blading, furnishing, and placing additional material.

Requirements:

- Replace material as necessary. Blade and shape the entire width of the shoulder to drain away from the driving surface. The shoulder material shall be moistened if necessary to ensure reasonable compaction and graded flush with the driving surface edge.
- Prior to treatment, it may be necessary to replace material lost or moved since the last application.
- Do not sidecast shoulder materials over embankments.
- Preserve existing vegetation that is not restricting drainage or passage.

Examples:

Inside shoulder in good repair



Outside shoulder with additional windrowed material for future needs and safety

2.06 DUST ABATEMENT

Description:
Dust abatement is keeping a road surface, that has not been treated with bituminous materials, in such condition that dust is kept to a minimum.

Materials:
Water is most commonly used for temporary dust abatement; however, maintenance personnel may use other materials to meet long term dust abatement needs. If working on Forest Service Lands, water shall be obtained only from sources approved in advance by the Forest Service. Water application shall be conducted in a manner that does not unnecessarily damage the source, if using surface water (e.g., pond, lake, stream, etc.), or cause unnecessary water pollution. When seasonal watering operations are complete, the surface water source shall be restored as near as possible to its natural condition, if applicable.

The use of additives, such as Dust-Off or Earthbind may be appropriate for more permanent applications to suppress dust throughout the season, if approved for use by the local jurisdiction, Forest Service, or other land owner.

Requirements:
- Water
  - The rate of application shall be such that the water will not run off the surface and cause unnecessary waste, erosion or surface water pollution.
  - Water shall be applied as often as necessary to abate dust.
- Soil Additive
  - Can be applied by standard water truck or may require special application equipment.
  - Must not be applied during precipitation, or within 72 hours of forecast precipitation.
  - Extreme care must be taken when applied near sensitive areas and adjacent to waterways.
  - Must be applied according to the manufacturer's requirements, instructions and specifications.

Examples:

Water application to control dust

This dry road still looks wet, and remains dust free several weeks after application of chemical dust suppressant.

2.07 MINOR DRAINAGE STRUCTURES

Description:
Minor drainage structures include culverts, water bars, overside drains, inlets, outlets, adjacent channels, existing riprap, trash racks, roadside ditches, and drop inlets.

Requirements:

- All drainage structures and related channels shall be inspected and maintenance shall be accomplished as early as possible in the spring, following any significant runoff, and prior to the beginning of winter storms.
- Ditches, culverts, and other drainage facilities shall be kept clear and functioning.
- Clear inlet and outlet channels, inlet trash racks, and drop inlets of loose material that could cause plugging of the structure or prevent the free flow of water.
- Vegetative and other debris shall be placed in designated and protected disposal sites away from sensitive areas and waterways.
- If outlet riprap was originally placed to dissipate water energy, it shall be maintained in good condition including the replacement of riprap if necessary.
- Make necessary repairs to ensure the proper functioning of the head walls, aprons, inlet assemblies, overside drains, riprap, trash racks, and other facilities related to the drainage structure.
- Erosion around culvert inlets, headwalls, or drop inlets shall be corrected by placing riprap or other suitable materials in the affected area.
- The use of dry stacked concrete sacks can be used at inlets or outlets as a headwall and inlet protection (See detail RM-06, Attachment A). Water shall be applied to the sacks to begin the curing process prior to departure.
- Excavation of a sediment trap at culvert inlets will allow sediment to fall out prior to entering the culvert.
- Rock outlet protection and the incorporation of a sediment trap may be necessary (See detail RM-07, Attachment A).
- If culvert replacement is necessary:
    - Extend culvert past toe of slope, not just to edge of travelled way
    - Compact all culvert backfill to avoid settling
    - Replace inlet and outlet protection
    - Remove old material, including old culvert to a suitable location

Examples:

Replaced culvert with dry stacked concrete bag headwall

Rock lined outlet protection with sediment trap

2.08 ROADSIDE VEGETATION

Description:
Maintenance of roadside vegetation includes removal of brush or tree growth or other obstructions to visibility or passage. Re-vegetation of previously vegetated slopes shall be performed as necessary to minimize erosion.

Requirements:

- All trees that have fallen across the roadway shall be removed from the roadway and away from drainages and sensitive areas.
- Brush and seedling trees that encroach upon the roadway area must be cleared for proper sight distance and vehicle passage when they constitute a hazard. Low shrubs and brush which are not a hazard, provide cover, and reduce erosion shall not be removed. Removed brush and seedling trees shall be chipped or hauled to a designated disposal site away from sensitive areas and concentrated drainage.
- Where possible, native vegetation shall be chipped and used as mulch over exposed soils generated by the removal of the vegetation.

Examples:

Vegetation removal and recycling as mulch


Warning sign blocked by vegetation

2.09 MISCELLANEOUS STRUCTURES

Description:
Maintenance of miscellaneous structures includes inspection and maintenance of retaining walls, guardrails, cattle guards, fences, gates, and any other similar structures that have been previously installed to ensure the safe and efficient operation of the road.

Requirements:

- All miscellaneous structures shall be inspected annually and necessary maintenance performed.
- Retaining Walls
    - Where practicable, broken or damaged member shall be repaired or replaced. Damaged wall foundations and ends shall be repaired.
- Guard Rails
    - Broken posts and damaged railing shall be replaced. Anchors shall be tightened.
- Cattle guards
    - Broken rails or posts shall be repaired or replaced. Tie in fences will be sound and secured to the wings. Damage to the wings shall be repaired and the wing replaced if necessary. Loose rails shall be welded or bolted back in place.
    - Excess material carried into the cattle guard shall be removed when drainage is blocked or when it reaches six inches from the bottom of the cattle guard frame. Drainage into and from the cattle guard shall be kept open. Foundation defects shall be repaired.
- Fences
    - Wire fences shall be tightened if loose. Broken strands of wire or wood railings shall be replaced. Rotted or broken posts shall be replaced.
- Gates
    - Gates shall be kept in good repair and made to swing easily. Hinges or latches shall be repaired if not operating properly. Hinges shall be oiled.

Examples:

Access gate in need of repair

Cattle guard in good repair

2.10 SNOW REMOVAL

Description:
Snow removal includes all work in connection with the snow removal operation.

Requirements:

- Care must be taken to avoid damage to parked or stalled vehicles.
- Snow shall be removed from the full roadway width to provide storage space for the next storm.
- Snow windrows placed in front of culverts, or other types of drainage structures shall be removed to allow melting snow and rainfall adequate drainage from the roadway.
- Use of a crawler-type tractor is prohibited from removing snow from stabilized roadways (paved, aggregate surface, or cement treated bases). Crawler-type tractors are permissible on other than above-mentioned roadways if a 12-inch snow cushion is retained.
- Use of end loaders with digging teeth mounted on the cutting edge of the bucket is prohibited.
- Damage to trees adjacent to the roadway will be kept at a minimum when blowing snow.
- Extreme care must be taken by equipment operators to avoid damage to berms, guardrails, or other obstacles which may be covered with snow.
- Snowplows, or blowers, shall be equipped with adjustable skid shoes to prevent damage to the road surfaces. Loss of the road surface shall require replacement in kind.
- A thin layer of snow shall always be left in order to protect the gravel or native road surface below.

Examples:

Snow plow after overnight snowfall

Snow removal with road grader

2.11 Where to Obtain BMP Materials

BMP products should be obtained through PG&E materials warehouses using project order numbers and established materials codes. Should the materials be unavailable from PG&E warehouses, BMP materials and products shown below can be obtained from sources shown, but may be obtained elsewhere depending on location and urgency of need. Other options may include feed stores, retail building supply stores, or hardware stores.

TABLE 1
BMP PRODUCTS INFORMATION

Category	Secondary Supplier	Product Name	Units
Straw Mulch (EC-6)	Reed & Graham	Certified Weed-Free Straw	Bales
Geotextiles and Mats (EC-7) Geotextile Fabric	Reed & Graham	Mirafi 600	Rolls: 12.5' x 360' 17.5' x 238'
Geotextiles and Mats (EC-7) Jute Mat	Reed & Graham	Eco-Jute	Rolls: 4' x 225'
Geotextiles and Mats (EC-7) Plastic Sheeting	Reed & Graham	Visqueen	Rolls: 20 or 40'x 100'; 10ml thick
Silt Fence (SE-1)	Reed & Graham	Caltrans Grade Silt Fence	100 feet with 36-inch wood posts at 6 foot spacing
Fiber Roll (SE-5)	Reed & Graham	Curlex Sediment Log Type II	25 foot rolls x 6 or 9" diameter
Gravel Bags (SE-6)	Reed & Graham	Roc Soc or Monofilament Bags	Each
Inlet Protection (SE-10) Gravel Bag	Reed & Graham	Roc Soc or Monofilament Bags	Each
Inlet Protection (SE-10)	Reed & Graham	Silt Sack	Each
Spill Kits	White Cap	55 Gal Universal Gen. Purpose Spill Kit	Each
Dust Control	White Cap	Soiltac	
Concrete Bags	White Cap		
Gabion Basket	Reed & Graham		
Aggregate Materials			
Vegetation Protective Fencing			
Re-bar			

3.0 BMP & PROCEDURES INSPECTION & MAINTENANCE

Roadways and drainages shall be monitored and inspected by PG&E personnel during use, and, at a minimum, during the spring and fall to determine the extent of maintenance, drainage repair, vegetation removal, and other work that needs to be completed. Roadway inspection and maintenance shall be performed by the PG&E personnel. Maintenance shall be conducted as described in Section 2.0 and the details in Attachment A.

4.0 WHOM TO CALL

If the project receives a written notice or order from any regulatory agency, contact your local EFS for further direction immediately.

Contact the local EFS if any of the following conditions occur:

- Visually cloudy/muddy water is observed leaving the work area,
- Hazardous substance(s) is/are discharged or spilled, and/or
- Slope or other failure(s) with potential to discharge are observed.

After hours or if the local EFS are unavailable, call the following 800 number: **800-874-4043.**

5.0 POST-CONSTRUCTION

Upon completion of construction within the project area:

- All temporary, non-biodegradable BMPs shall be removed.
- All construction equipment shall be demobilized and removed from the site.
- All staging areas shall be cleared of any debris, construction materials, and contaminants.
- Any native soil removed from the roadway or ditches shall be spread in a non-sensitive area and covered. Soil cover can be hydromulch, straw, or native chipped materials.

Attachment A Activity Specific Installation Details

The following installation details are included to illustrate installation techniques. It is noted that specific installation of any facility must consider the restrictions of the installation site, and that modifications to the following may be required given local conditions.

The following details are included in this Plan

ROAD MAINTENANCE DETAILS
Roadside Ditch Maintenance

RM-01

When

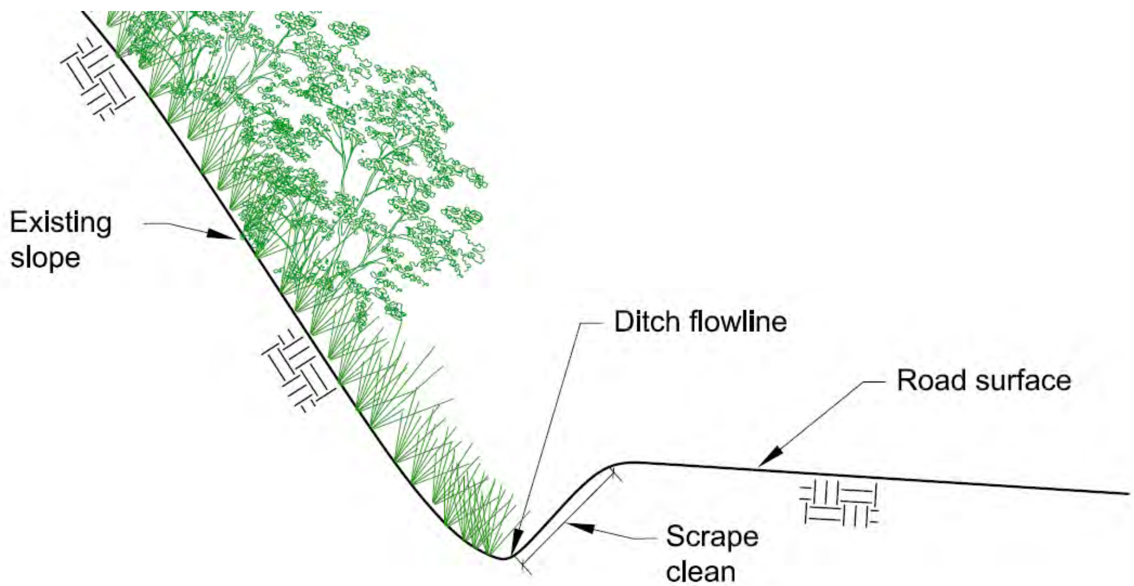
This detail is applicable to projects when:

- An access road has a roadside ditch in need of cleaning for adequate drainage.

How

Use the following measures as applicable:

- Pull deposited sediments and vegetative materials from the ditch, being careful not to undercut the uphill slope or remove any of the vegetation from the uphill slope.
- Blend suitable materials back into road surface.
- Move unsuitable materials to a designated and protected disposal site, away from any sensitive areas or flows.
- Take caution to ensure sediment from the operation is not discharged into any surface waters.
- If water is running, employ temporary sediment controls downstream of work or use a temporary bypass pipe to divert water around the work area.
- Avoid creating low spots that may fill with water, saturating the shoulder and road.
- If ditch drains to a sensitive waterway, leave all vegetation in ditch as sediment filter for 50’ upstream of discharge. However, if drainage is impeded, clean ditch and immediately place an erosion control mat or blanket per EC-7, found in Appendix C of the Field Manual into the ditch for at least 50’ upstream of the discharge.



Maintenance and Inspection

To ensure adequate drainage, inspect and maintain roadside ditches in the spring and fall to verify proper drainage and repair ditches back to their original line and grade as needed.

ROAD MAINTENANCE DETAILS
Sediment Trap

RM-02

When

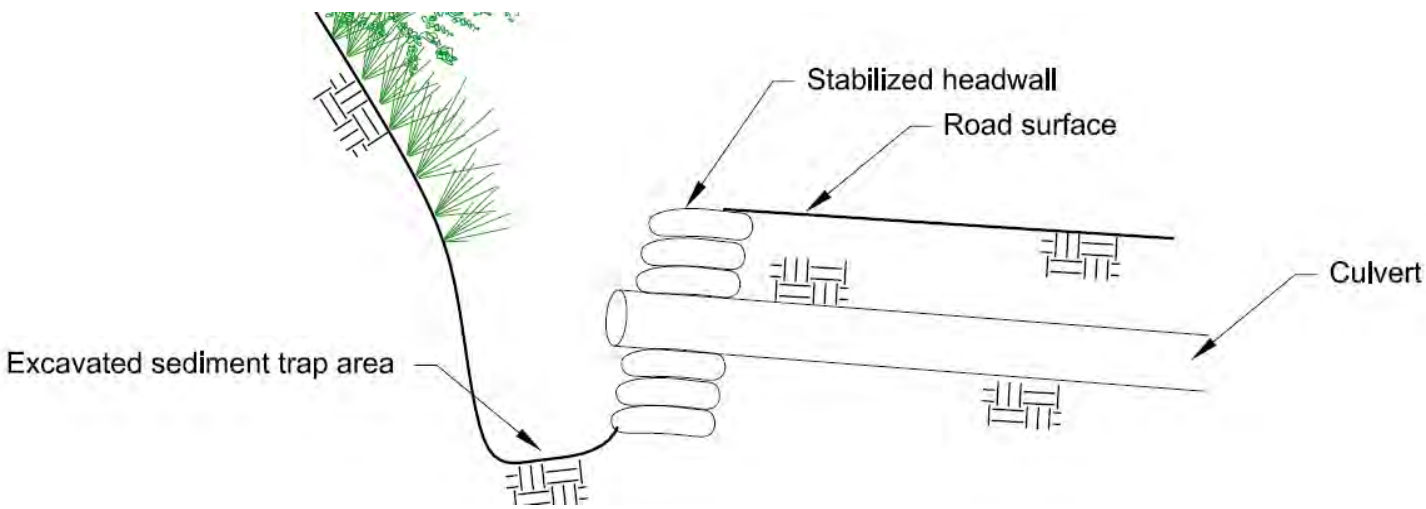
This detail is applicable to projects when:

- There is a need to remove sediment from runoff.
- Drainages or culverts discharge into sensitive water bodies.
- Adequate room exists.
- Armoring or a control structure exists.

How

Use the following measures as applicable:

- Sediment traps can be created in several ways, including:
  - Excavate an area sized to accommodate a settling zone at culvert inlet, below the flow line, as an area for water to pond and sediment to settle prior to entering the culvert. Size may be limited by space available.
  - Excavate an area at a culvert outlet or end of a drainage ditch and line with rock to protect existing soils, ensuring that flow returns to the existing channel, or is converted to sheet flow.
- Adding temporary gravel bags to allow ponding in any flow path, being careful to avoid channel lining erosion or overtopping.
- Excavated materials must be disposed of properly, away from sensitive areas and concentrated flows.
- Traps shall be small enough that a failure will not cause damage to buildings, interrupt the use of roads or utilities or cause injury or loss of life.
- Traps shall be installed in natural depressions, where possible.
- Traps must be constructed with an outlet pipe or stabilized spillway to convey flow to existing channels without potential for additional erosion.
- Trap sides should be constructed with slopes of 3:1 or flatter.
- Traps should be free of standing water within 72 hours to prevent vector production.



Maintenance and Inspection

To ensure adequate drainage and sediment capacity, sediment traps should be inspected regularly for sediment buildup and cleaned when accumulated sediment reaches 1/3rd the height of the trap. Inspect for seepage, damage, or obstructions and repair as necessary.

ROAD MAINTENANCE DETAILS
Temporary Check Dam

RM-03 

When

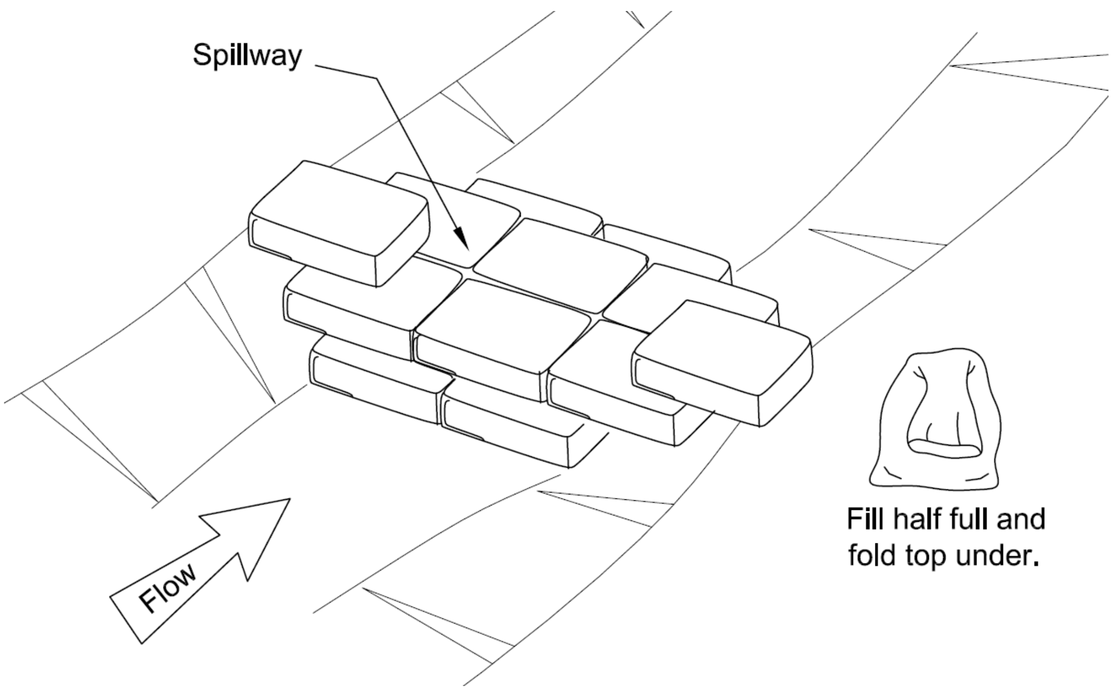
This detail is applicable to projects when:

- Work must be done during times when water is flowing in roadside ditches.
- Velocity must be reduced in a channel.
- Ditch flows to a sensitive water body.
- Ditch or channel is flowing with sediment.
- Erosion is occurring in a ditch or channel.

How

Use the following measures as applicable:

- Fill bags half full with sand or gravel.
- The base course may have to be several rows wide, depending on the height of the check dam, and bags should be staggered to prevent the passage of water between bags.
- Place bags end to end, with open end of bag folded under, or tied off.
- Provide a gap at the top of the check dam to channel water over the middle of the check rather than around, which could lead to bank erosion.
- Protect overflow splash area with additional bags to prevent scouring.
- The spacing of the check dams should be such that the top of the down gradient dam is at the same elevation as the bottom of the up gradient dam allowing pools to form between dams.
- Remove when work is complete.



Maintenance and Inspection

Inspect regularly for buildup of sediment and remove accumulated sediment when it reaches 1/3rd the height of the check dam. If left for several months, bags will deteriorate and need to be replaced. Confirm that the check dam is not leading to additional erosion. Replace missing, damaged, or degraded bags.

ROAD MAINTENANCE DETAILS
Gabion Basket Slope Stabilization

RM-04

When

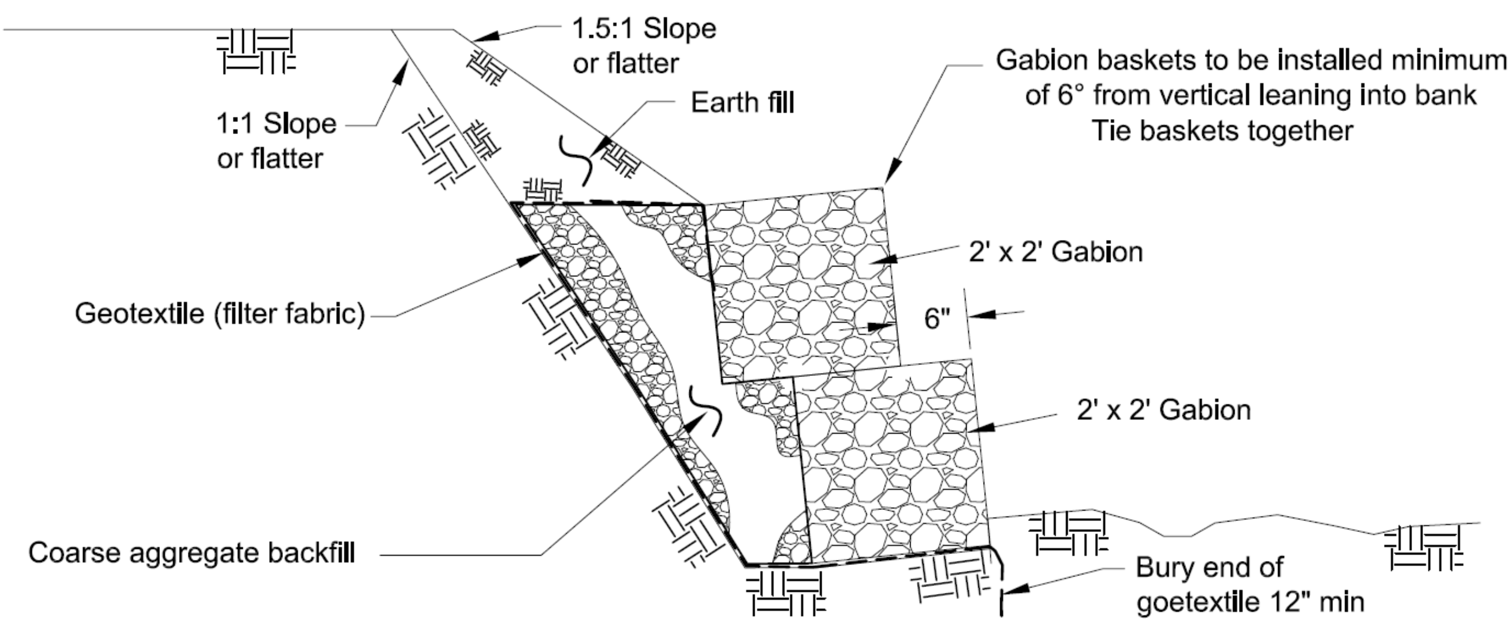
This detail is applicable to projects when:

- There is a minor slope failure.
- A gravity retaining system will provide global soil stability.
- The earth retained is no more than 4' in height.
- Walls higher than 4', or in areas with questionable global soil stability should be reviewed by a geotechnical or civil engineer to determine the applicability of gabion basket stabilization.

How

Use the following measures as applicable:

- Grade the area in preparation of the basket installation and compact soil.
- Place filter fabric under basket and up the exposed bank.
- Backfill between existing soil and gabion with course aggregate backfill.
- Tie adjacent baskets together per the manufacturer's instructions.
- Wrap filter fabric over aggregate backfill prior to placing compacted earth fill.
- Place mulch or other soil cover on exposed soils.
- Ensure that rock is either native, or supplied by weed-free facility.

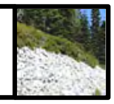


Maintenance and Inspection

To ensure continued vehicle passage and slope stability, the baskets should be inspected at least every 5 years and maintained or replaced as necessary. Inspect for damage to baskets and erosion beneath baskets and on slopes and repair as necessary.

ROAD MAINTENANCE DETAILS
Rock Slope Protection (RSP)

RM-05



When

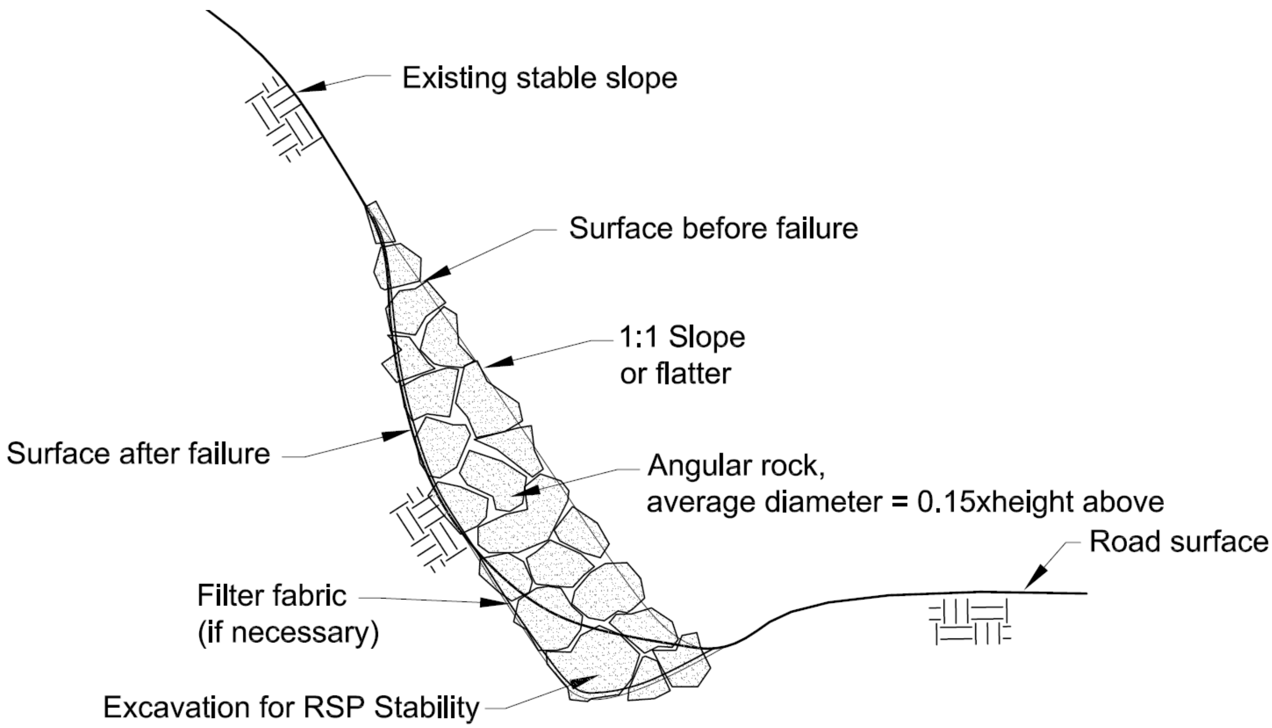
This detail is applicable to projects when:

- There is a minor slope failure.
- Slope at failure does not exceed 1:1.
- Despite vegetative efforts, slope continues to erode, causing increased roadside ditch maintenance needs.
- Rock can be placed from toe of slope upward to existing vegetation.
- An appropriate source of rock is available.
- Vegetation will not adequately grow.

How

Use the following measures as applicable:

- Key in bottom of slope at least 1 rock diameter.
- Average rock diameter should be a minimum of 6” and 0.15 x repair height.
    - Example: 10’ high repair area uses 1.5’ rock at bottom decreasing to 6” at top.
- Rock should be angular and irregular, not rounded.
- Fabric should only be used if soil is very fine or saturated, otherwise, place rock and native grasses and shrubs in voids if possible.
- Ensure that rock is provided by a weed free facility.



Maintenance and Inspection

Once placed, RSP should be checked at least every 5 years to confirm that it has not been undercut and that no voids have established. Voids should be filled with similar rock.

ROAD MAINTENANCE DETAILS
Dry Stacked Concrete Sack Headwall

RM-06

When

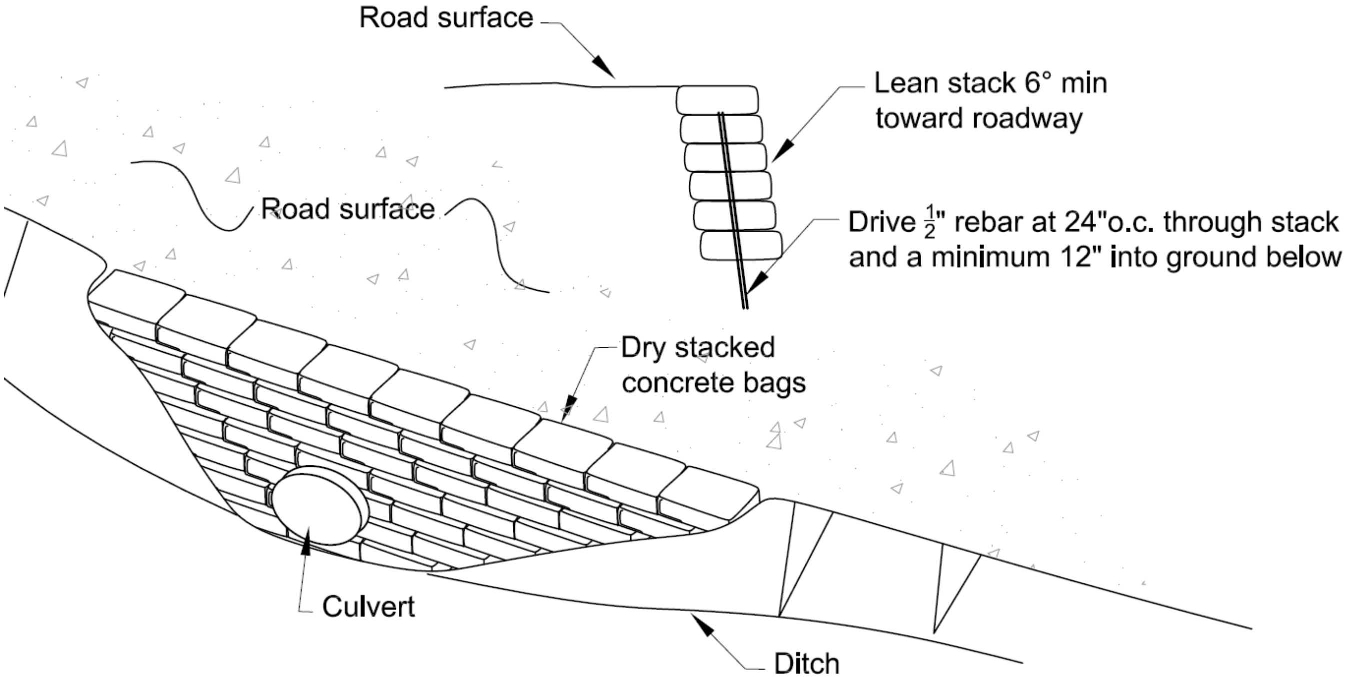
This detail is applicable to projects when:

- Space is limited and a headwall is needed to maintain the road edge and width at a culvert crossing.
- An area in front of the culvert is used as a sediment trap.
- Scouring occurs at the culvert entrance.

How

Use the following measures as applicable:

- Excavate 12” below the culvert entrance, and begin placing concrete sacks, complete with paper tightly against each other in a staggered pattern.
- Stack sacks as tightly as possible against the culvert, opening some bags if necessary to fill any gaps.
- Compact backfill as wall is built, being careful not to dislodge sacks.
- Prior to placing last row, drive ½” rebar through sacks, vertically and into ground below.



Maintenance and Inspection

Headwall should be inspected regularly to ensure that water does not erode soil from under wall and any damaged shall be repaired. Culvert should be kept free of debris and the area in front of the culvert should be excavated and maintained as a sediment trap.

ROAD MAINTENANCE DETAILS
Culvert and Channel Outlet Protection

RM-07

When

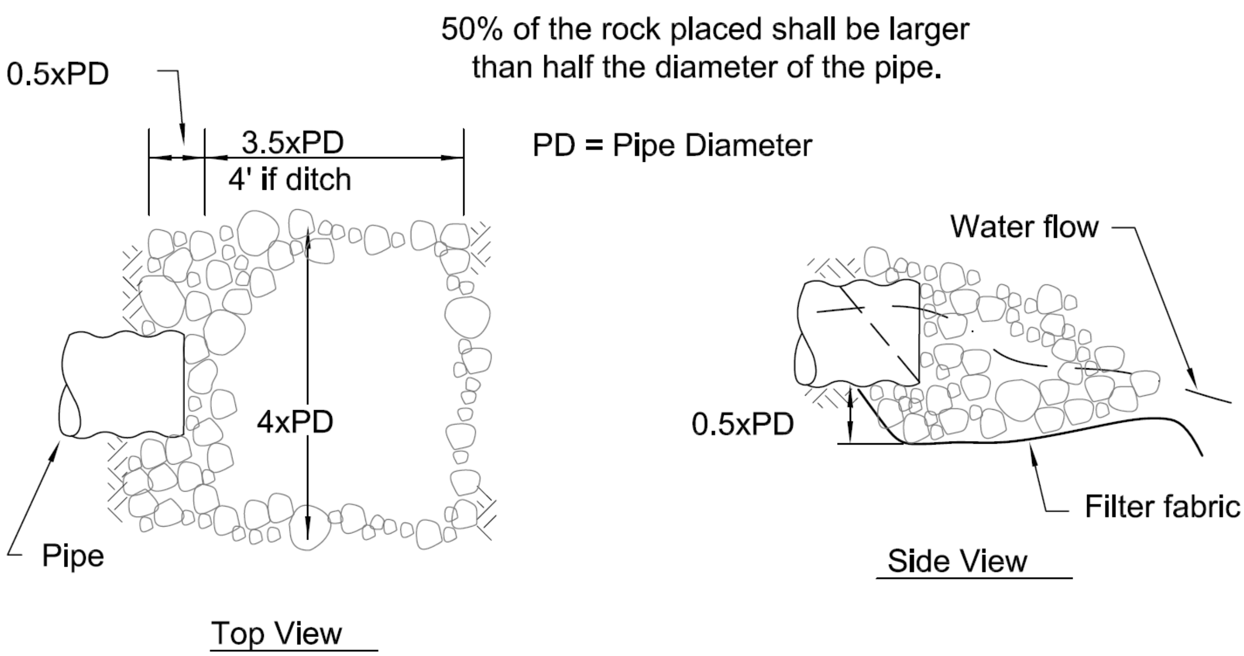
This detail is applicable to projects when:

- There is an outlet from a pipe, drain, culvert, slope drain, diversion ditch, swale or other conduit or channel with velocity and energy sufficient to erode the next downstream reach.

How

Use the following measures as applicable:

- Grade the area in preparation of rock placement and compact soil.
- Place filter fabric under rock.
- Use angular rock and place as shown in the detail below.
- Align apron with receiving water and straight throughout the length.
- Ensure that rock is from a weed free facility.



Maintenance and Inspection

Inspect regularly for buildup of sediment and remove as needed. Inspect for displacement of rock or damage to fabric and repair or replace as necessary. If rock is dislodged regularly replace with larger rock. Inspect for scour beneath rock and around the outlet. Repair damage to slopes or fabric.

Attachment B PG&E Best Management Practice (BMP) Cut Sheets

The following BMP Fact Sheets are included in the Plan by reference only and can be found in Appendix C of the Field Manual.

EC-2	Preserve Existing Vegetation
EC-6	Straw Mulch
EC-7	Geotextiles, Plastic Covers, and Erosion Control Blankets/Mats
EC-8	Wood Mulch
SE-7	Street Sweeping
TC-1	Stabilized Construction Entrances
NS-9	Vehicle Equipment and Fueling
WM-3	Stockpile Management
WM-4	Spill Control
WM-6	Hazardous Waste Management
WM-7	Contaminated Soil Management

Appendix B-4

Stockpile Management

Stockpile Management

Activity Specific Erosion and Sediment Control Plan
(A-ESCP)

For questions or concerns, please contact your assigned PG&E Environmental Field Specialist (EFS)

Prepared by:
PG&E Construction Stormwater Group

March 2017

TABLE OF CONTENTS

Attachments

Attachment A **Activity Specific Installation Details**

SP-01 Typical Stockpile Placement
SP-02 Hydraulic Stabilization
SP-03 Typical Plastic or Fabric Cover Restraints

References

Referenced BMP Fact Sheets

EC-3 Temporary Hydraulic Mulch
EC-5 Soil Binders
EC-6 Straw Mulch
EC-7 Geotextiles, Plastic Covers, and Erosion Control Blankets/Mats
EC-9 Earth Dikes and Drainage Swales
SE-1 Silt Fence
SE-5 Fiber Rolls
SE-6 Gravel Bag Berm
TC-1 Stabilized Construction Entrance/Exit
TC-2 Stabilized Construction Roadway
WE-1 Wind Erosion Control
WM-3 Stockpile Management
WM-5 Solid Waste Management
WM-7 Contaminated Soil Management
WM-8 Concrete Waste Management

1.0 WHAT IS STOCKPILE MANAGEMENT?

1.1 Introduction

Stockpile management includes Best Management Practices (BMPs) to minimize erosion and sediment transport originating from stockpiles.

All PG&E Project Teams, Crews, and Subcontractors are **required** to be familiar with the information contained within this A-ESCP

Stockpiles may include, but are not limited to, the following materials: soil, aggregate base, construction debris, demolition debris, any metal debris, or a combination thereof.

GOAL: Prevent rainfall from contacting stockpile materials and transporting sediment and other pollutants offsite or to surface waters.

Sediment in stormwater is pollution!

1.2 Requirements for All Stockpiles

- Have BMP materials on site **before** rain events!
- Stockpile protection must take place year-round
- Perimeter controls must be installed around stockpiles (may include earthen berms, straw wattles, or silt fence)
- Cover soil stockpiles with soil binders (such as Gorillasnot) or plastic sheeting
- Locate stockpile away from drainage systems such as swales and drainage inlets

1.3 Planning for Work Involving Stockpiles

- If using soil binders, ensure binders and a water source are present on site at all times during the project including a water truck or water buffalo used to spray the stockpiles.
- If using plastic sheeting, ensure plastic sheeting and associated tie down materials are available on site at all times.

1.4 Definitions

High Risk Stockpiles Specific types of stockpiles that require additional protection because they contain any of the following materials: contaminated soil (TPH, PCBs, etc.), Portland cement, concrete rubble, fly ash, stucco, hydrated lime, and cut back or cold mix asphalt. Specific management for these and similar materials are located in Section 2.2.

Active Stockpiles Active stockpiles are defined as scheduled to be used or accessed within 14 days.

Inactive Stockpiles If a pile is not scheduled to be used within 14 days, it immediately becomes inactive and must be stabilized.

Soil Binders Soil binders are glue-like products sprayed onto soil stockpiles and is the preferred method to stabilize stockpiles. Soil binders may be combined with hydromulch per the manufacturer's specifications. Many soil binders require a minimum curing time to be fully effective and typically need at least 24 hours to cure prior to a rain event. Do not use soil binders within 100' of any surface water source, including diches and storm drain inlets without contacting your assigned EFS.

Plastic Sheeting Plastic sheeting is a rolled product held down using ropes or other means to cover stockpiles. Plastic sheeting should be avoided when possible as it is hard to manage, increases runoff, breaks down quickly in sunlight, and can become airborne during high winds causing damage to power lines and other substation equipment.

2.0 STOCKPILE MANAGEMENT PROCEDURES

The following procedures are intended to address activities related to most stockpile management situations. Although your project may not include all such activities, the project shall follow the procedures contained within this section that apply to your project.

2.1 Active and Inactive Stockpiles

Requirements:

- Inactive stockpiles must be stabilized **at all times.**
- All active stockpiles must be stabilized prior to and during a rain event

Protect From Rain

- Stockpiles must be stabilized to protect from rainfall (splash) erosion, and surface flow erosion.
- Stabilization materials include:
    - Soil Binders (EC-5), or combined with Temporary Hydraulic Mulch (EC-3) if necessary
    - Plastic Covers (EC-7)
    - Erosion Control Blankets (EC-7)

Stockpile Perimeter Controls

- All stockpiles should be protected with perimeter controls such as:
    - Silt Fences (SE-1)
    - Fiber Rolls (SE-5), commonly called Straw Wattle
    - Gravel Bag Berms (SE-6)
    - Earth Dikes and Drainage Swales (EC-9)
- Provide a minimum 50' separation from concentrated flows of stormwater, drainage courses, and storm drain inlets. If space is limited to less than 50', provide additional diversion or protection adjacent to the concentrated flow.

Protect From Wind

- In windy areas for stockpiles susceptible to wind erosion, stockpiles should be securely and temporarily stabilized at the end of every day, and kept wet during working hours to minimize wind erosion. **Do not apply so much water that runoff occurs.**
- Consider if plastic sheeting may come into contact with electrical equipment if it dislodges from the stockpile, and use alternatives if necessary.

Example Photos

Figure 1. Cover pulled back for access during use

Figure 2. Soil binder and mulch application prior to rain

Figure 3. Stockpile stabilized with soil binder and temporary hydraulic mulch

Figure 4. Stockpile stabilized with erosion control blanket

2.2 High Risk Stockpiles

Description:

High risk stockpiles may include visible and non-visible pollutants including, but not limited to:

- Concrete (pH and metals) and asphalt (petroleum) rubble
- Contaminated soil (TPH, PCBs, etc.)
- Cold mix asphalt, aka “cut-back” (petroleum based contaminates)
- Hazardous construction materials
    - Construction waste such as retired transformers
    - New construction materials waiting for installation such as liming agents or gypsum
- Treated wood waste (TWW)
- Soil amendments
    - Fly ash or Hydrated lime
- Fertilizers (ammonium nitrate, urea, anhydrous ammonia, etc.)

Requirements:

High risk stockpiles require additional considerations, some of which include:

- Placing stockpiles in areas that will not have any run-on. If such a location is unavailable, protect from run-on using a diversion ditch or gravel bag berm;
- Containing any possible run-off from the pile by creating a berm or basin to collect stormwater runoff downslope of the stockpile;
- Containing any runoff from piles likely to include non-visible pollutants prior to leaving the project site. If run-off cannot be contained, contact the EFS and collect samples of the runoff for laboratory analysis;
- Bagging and placing contaminated materials on pallets to be stored under cover until they can be moved to a legal collection facility, if possible; and
- Place stockpile on an impervious surface such as pavement, trench plate, or plastic sheeting.

<u>Example Photos</u>

Figure 5. Contaminated stockpile under cover

Figure 6. Concrete rubble stockpile in need of cover

2.3 Where to Obtain BMP Materials

BMP products should be obtained through PG&E materials warehouses using project order numbers and established materials codes. Should the materials be unavailable from PG&E warehouses, BMP materials and products shown below can be obtained from sources shown, but may be obtained elsewhere depending on location and urgency of need.

TABLE 1
BMP PRODUCTS INFORMATION

Category	Product Name	Units
Hydraulic Mulch (EC-3)	Flexterra FGM	Bales
Soil Binders (EC-5)	Soiltac, Gorillasnot	5 gallon buckets
Straw Mulch (EC-6)	Certified Weed-Free Straw	Bales
Geotextiles and Mats (EC-7) Geotextile Fabric	Mirafi 600	Rolls: 12.5' x 360' 17.5' x 238'
Geotextiles and Mats (EC-7) Jute Mat	Eco-Jute	Rolls: 4' x 225'
Geotextiles and Mats (EC-7) Plastic Sheeting	Visqueen	Rolls: 20 or 40'x 100'; 10ml thick
Silt Fence (SE-1)	Caltrans Grade Silt Fence	100 feet with 36-inch wood posts at 6 foot spacing
Fiber Roll (SE-5)	Curlex Sediment Log Type II	25 foot rolls x 6" or 9" diameter
Gravel Bags (SE-6)	Roc Soc or Monofilament Bags	Each
3/8" Nylon Rope	3/8" Nylon Rope	100' or 500'

Example suppliers include Reed & Graham, White Cap, and Curlex. Other options may include feed stores, retail building supply stores, or hardware stores. If you are still having trouble contact your project EFS for assistance.

3.0 INSPECTION AND MAINTENANCE REQUIREMENTS

- It is required that at a minimum, active stockpiles be inspected weekly, prior to forecast rain events, daily during extended rain events, and after the conclusion of rain events.
- During certain conditions it may be necessary to inspect stockpiles covered with plastic sheeting or rolled product more frequently (for example, high winds or extreme heat).

- Repair, re-apply, and/or replace linear sediment barriers, stabilization, and/or covers as needed to keep them functioning properly.
- Sediment shall be removed when it reaches one-third of the perimeter control height.
- Contaminated soil stockpiles or stockpiles with the potential to discharge visible and/or non-visible pollutants offsite should be inspected for signs of potential contaminate or pollutant discharge.
  - Should a discharge be observed that is likely to contain pollutants, notify the EFS for sampling requirements.
- If spilled or leaking hazardous materials contact soil stockpiles, implement appropriate spill control equipment and procedures to completely clean up the pollutant to prohibit additional soil contamination or pollutant discharge from the site. If the extent of the impact of the pollutant is unknown, contact your EFS as soil testing may be necessary.

4.0 TROUBLESHOOTING

Contact your local EFS if any of the following conditions occur:
- Visually cloudy/muddy water is observed leaving the work area;
- Observed sheen, discoloration, foam, odor, or other pollutant indicator;
- Hazardous substance(s) is/are discharged or spilled; or
- There is potential for a non-visible or any other pollutant discharge.

After hours, call: **(800) 874-4043.**

If the project receives a written notice or order from any regulatory agency, immediately contact your local EFS for further direction.

Troubleshooting Guide	
Field Condition – Stockpile Management	**Common Solutions Are:**
Soil stockpile erodes	Cover stockpile with plastic sheeting or spray with a soil stabilizer. Protect with a temporary perimeter sediment barrier around the stockpile
Stockpile is in flow line	Remove stockpile from drainage path or protect with a berm, dike, or temporary diversion device
Storm water run-on impacts the stockpile	Protect the stockpile by using temporary perimeter sediment barriers such as berms, dikes, silt fencing, or sandbags
Wind causes erosion and or blowing dust	Cover stockpile or spray with a soil stabilizer. Use a water application to suppress dust
Field Condition – Soil Binders	**Common Solutions Are:**
Slope was improperly dressed before application	Roughen embankment and fill areas by rolling with a crimping or punching type roller or track walking where rolling is impractical. Pre-wet the areas of application.

Troubleshooting Guide	
Coverage is inadequate	Follow recommended application rates. Count the number of bags of the product to ensure the correct amount of material is implemented. Reapply to the areas
Sprayed areas degrade or become ineffective	Follow recommended application rates. Consider other or additional BMPs. Reapply binder as necessary
Sprayed slope has spot failures	Repair slopes and re-spray damaged areas
Portions of the sprayed area have been disturbed	Keep workers and equipment off sprayed areas. Repair and re-spray areas that have been damaged
Binder fails to penetrate soil	Roughen soil and pre-wet to manufacturer's recommendations. Reapply to areas where necessary
Soil binder is washed off slope	Allow at least 24 hours for the materials to dry before a rain event. Follow manufacturer's recommendations. Reapply as necessary
Excessive water flows across stabilized surface.	Use other BMPs to limit flow onto stabilized area. Use other BMPs to reduce slope lengths. Do not use to stabilize areas with swift moving concentrated flows
Field Condition – Erosion control blankets	**Common Solutions Are:**
Improper anchoring	Dig trench along the top and bury the blankets. Use staples to anchor according to manufacturer's recommendations
Undercutting due to inadequate preparation	Prepare the soil surface. Remove rocks, clods and other obstructions. Fill in rills in uneven areas to promote good contact between mat and soil
Excessive water flow across stabilized surface	Use other BMPs to limit flow onto stabilized area. Use other BMPs to reduce slope lengths. Do not use to stabilize areas with swift moving concentrated flows
Field Condition – Straw wattle	**Common Solutions Are:**
Runoff flows under the fiber roll or daylight shows under fiber roll	Trench-in rolls to a depth of 4 in and stake. Place compacted soil along the uphill side of the fiber roll
Runoff flows between fiber rolls	Ensure that fiber rolls are butted tightly together and staked
There is excessive sediment accumulation	Remove accumulated sediment. Apply soil stabilization measures to contributing areas
Field Condition – Wind Erosion	**Common Solutions Are:**
Excessive dust leaves the site	Increase frequency of water application. Consider using a palliative or binder on inactive areas
Watering for dust control causes erosion	Reduce water pressure on the water truck. Check watering equipment to ensure that it has a positive shutoff. Water less frequently
Sprayed areas are ineffective at limiting dust	Re-spray areas and ensure that the application rate is proper

5.0 POST-CONSTRUCTION

Upon completion of construction within the project area:

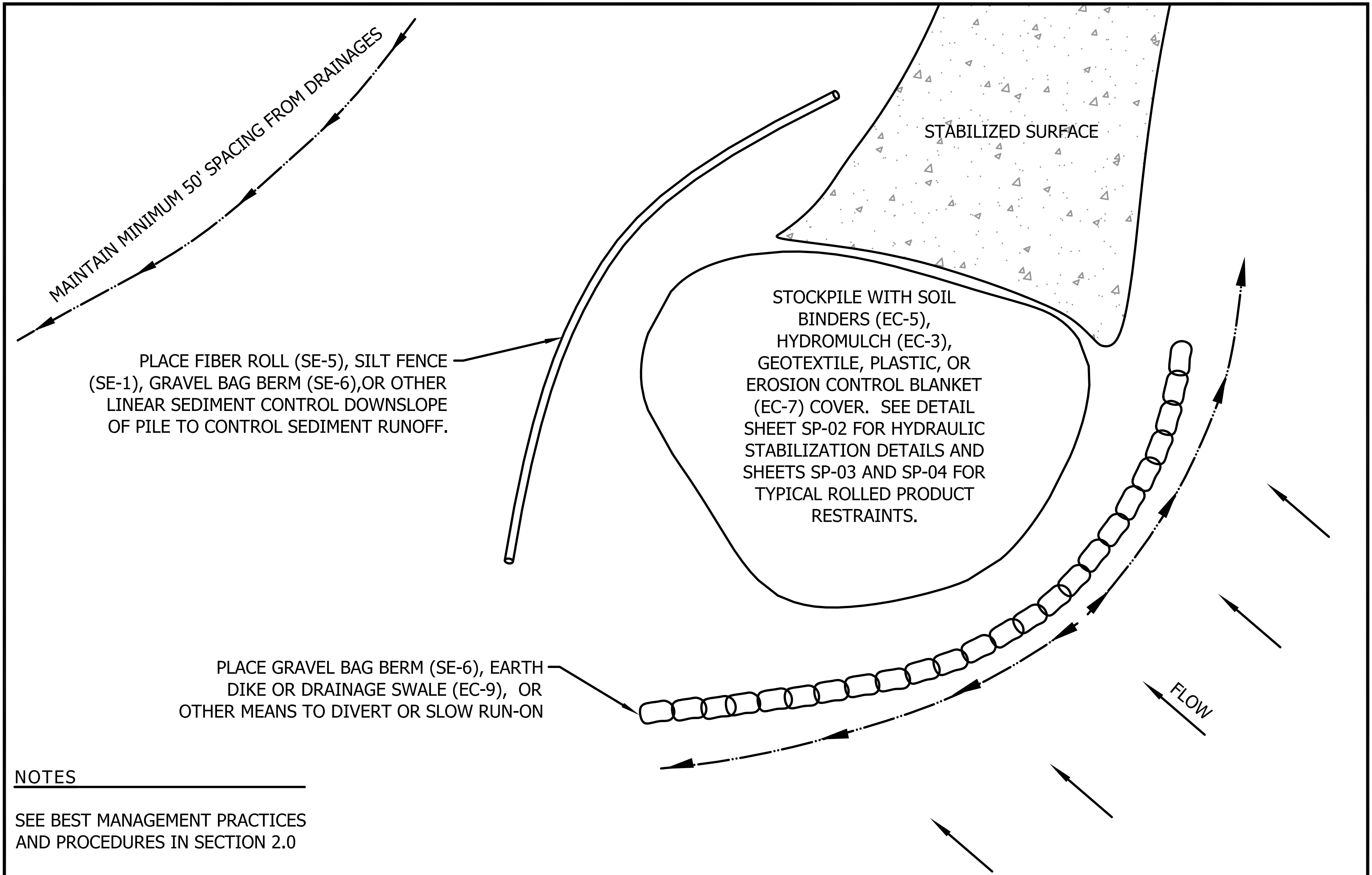
- Remove all temporary, non-biodegradable BMPs;
- Remove all construction equipment from the site;
- Clear all staging areas of any debris, construction materials, and contaminants;
- Return all drainage ways affected by any stockpiles or stockpile to their pre-construction line and grade; and
- Cover disturbed soil areas with temporary and/or permanent stabilization.

Attachment A Activity Specific Installation Details

The following installation details are included to illustrate installation techniques. It is noted that specific installation of any facility must consider the restrictions of the installation site, and that modifications to the following may be required given local conditions.

The following details are included in this Plan

SP-01 Typical Stockpile Placement
SP-02 Hydraulic Stabilization
SP-03 Typical Plastic or Fabric Cover Restraints



NOTES

SEE BEST MANAGEMENT PRACTICES AND PROCEDURES IN SECTION 2.0

NOT TO SCALE

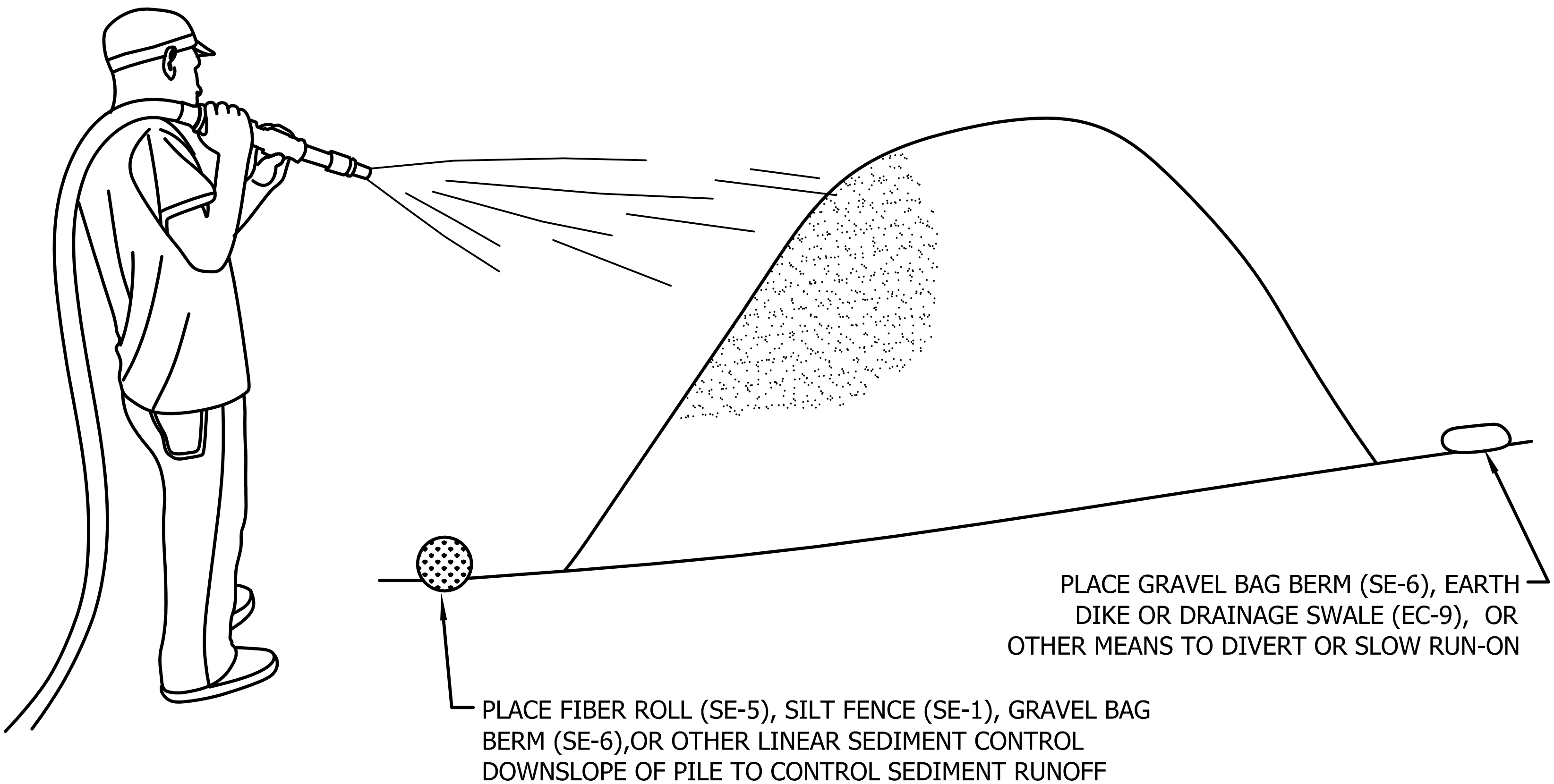
Pacific Gas and Electric Company

TYPICAL STOCKPILE PLACEMENT

A-ESCP - STOCKPILE MANAGEMENT

SP-01

PRODUCT	DURATION	APPLICATION RATE	DILUTION RATE	NOTES
SOILTAC	6 MONTHS	1 GAL / 220 S.F.	9 PARTS WATER TO 1 PART PRODUCT	APPLY IN 2 PASSES
FLEXTERRA FGM	6 MONTHS	1 BALE / 800 S.F.	1 BALE TO 125 GAL WATER	SPECIAL EQUIPMENT / VENDOR REQUIRED



NOTES

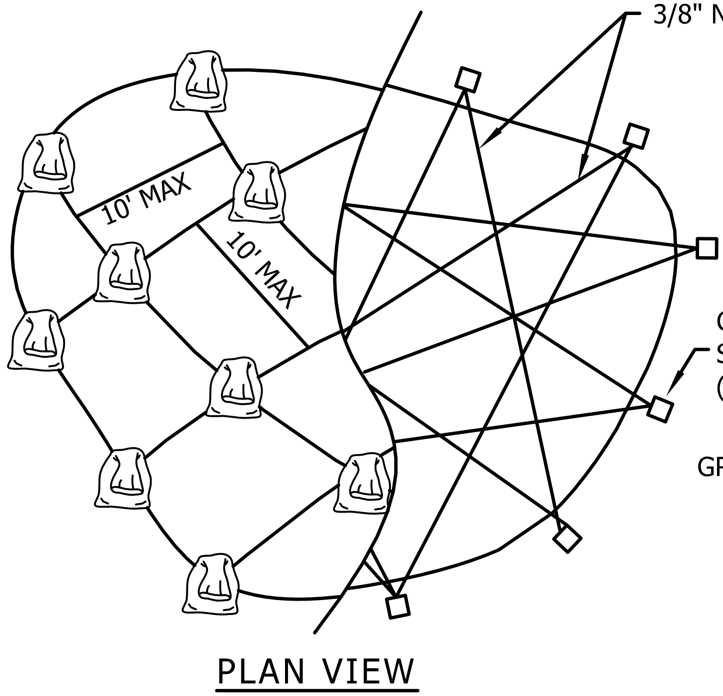
1. SEE BEST MANAGEMENT PRACTICES AND PROCEDURES IN SECTION 2.0.
2. SPRAY FROM MULTIPLE DIRECTIONS TO AVOID SHADOWING.
3. FOLLOW MANUFACTURERS MIXING AND APPLICATION GUIDES.
4. ENSURE THE PRODUCT IS APPLIED WITH ADEQUATE TIME TO CURE.
5. IF SOIL BINDERS ARE USED IN ON-SITE WATER TRUCKS OR TRAILERS, MAKE SURE TO CLEAN ALL BINDER RESIDUE FROM EQUIPMENT AFTER SPRAYING.

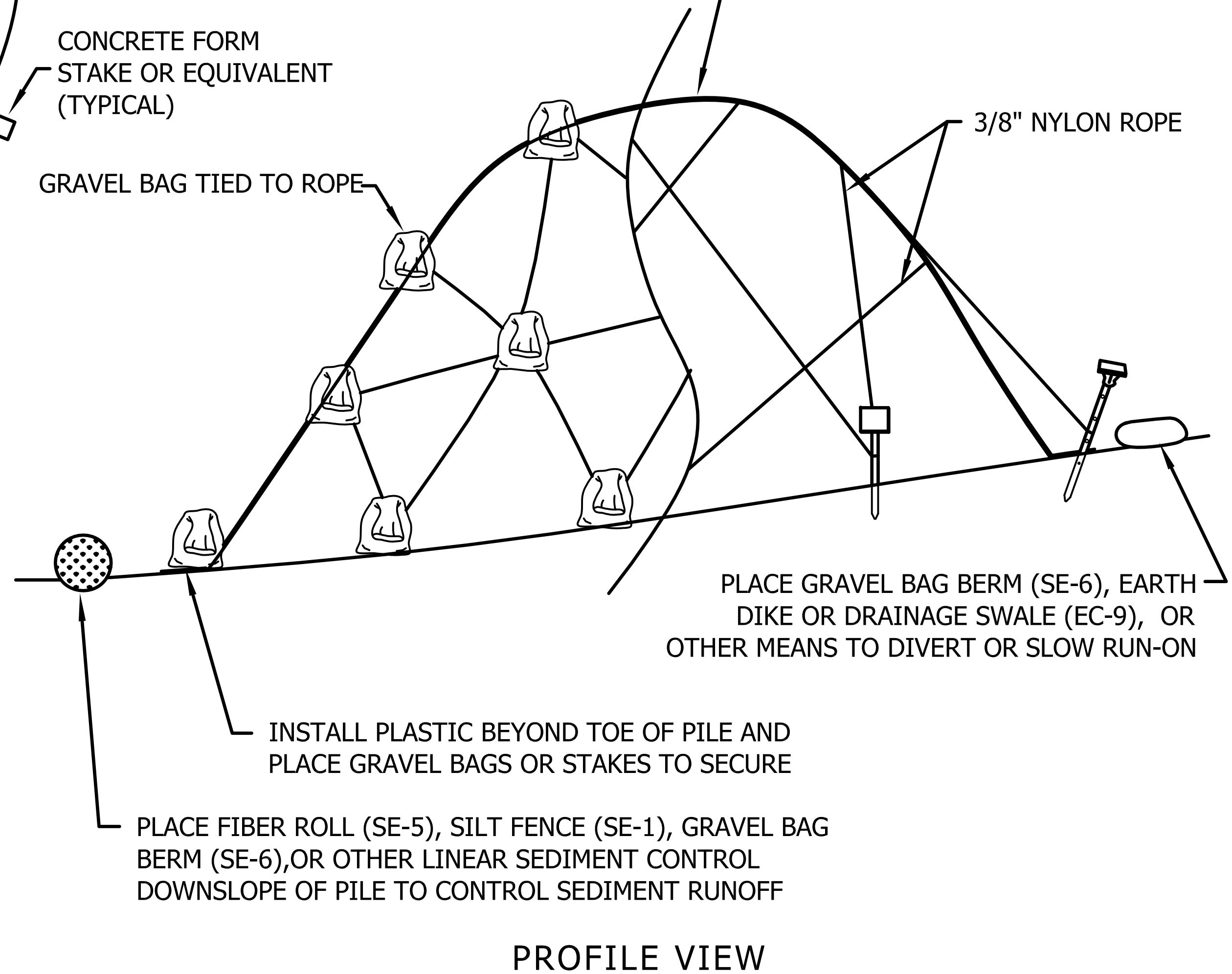
PG&E Pacific Gas and Electric Company

HYDRAULIC STABILIZATION

SOIL BINDER OR HYDROMULCH
A-ESCP - STOCKPILE MANAGEMENT

SP-02





NOTES

SEE BEST MANAGEMENT PRACTICES AND PROCEDURES IN SECTION 2.0

PLACE BAGS AT 10' ON CENTER BOTH WAYS

NOT TO SCALE

Pacific Gas and Electric Company

PLASTIC OR FABRIC COVER

GRAVEL BAG OR CONCRETE FOR STAKES AND ROPE
A-ESCP - STOCKPILE MANAGEMENT

SP-03

Appendix C

Upper Blue Lake Dam Seismic Retrofit Project Water Quality Monitoring Plan

UPPER BLUE LAKE DAM
SEISMIC RETROFIT PROJECT

WATER QUALITY MONITORING PLAN

FERC Project No. 137

***Prepared By*:**
Rohit Salve
Pacific Gas and Electric Company™

October 2018

1.0 INTRODUCTION

Upper Blue Lake Dam is a homogeneous earth-filled embankment, located on Middle Creek, a tributary to the North Fork of the Mokelumne River, approximately 10 miles southwest of Markleeville in Alpine County, California. The original embankment was constructed between 1872 and 1881, and subsequently raised about 10 feet to its current geometry between 1899 and 1900. There are no hydroelectric facilities directly related to Upper Blue Lake Dam which is operated primarily for seasonal storage and regulation of water for power generation farther downstream.

The Upper Blue Lake Seismic Retrofit Project (Project) has been proposed to improve the seismic stability of the upstream slope of the dam near the low-level outlet (LLO). Project related activities are likely to affect reservoir and in-stream surface water quality. Based on the work scope, the water quality parameter of concern is turbidity. If turbidity is found to exceed acceptable bounds, as indicated in the Basin Plan (CRWQCBCVR, 2018), project related activities will be stopped until the water quality is restored.

This monitoring plan has been developed to track changes in turbidity during all in-water work related to the Project.

2.0 PROPOSED ACTIVITIES

The proposed seismic upgrade is a 50-foot wide rock fill buttress in the natural valley at the approach channel of the low-level intake. The buttress will resist expected deformations resulting from liquefaction of the embankment along the tallest section of the dam. The addition of a buttress will require an upstream extension of the twin low-level outlet pipes by approximately 50 feet and reconfiguration of the head works for the intake structure and trash rack.

The following is the proposed sequencing of events for the construction of the Project that are related to water quality:

1. Construction will begin with draw down of the reservoir through the LLO to an elevation that can be moderated with a small cofferdam. At the lowered elevation, it is estimated that there will be enough storage to allow minimum instream flows down Middle Creek through June of 2020, while maintaining the lake level above the LLO.

2. A pumping system will be used during construction to release minimum instream flows (~2-5 cfs) from the lake to the section of Middle Creek that is below the dam (Figure 1). The pumping system will include a screened floating suction hose placed in the lake to intake clean lake water, trailer mounted pumps with generators and spill containment, and discharge piping. The pumps are expected to run 24 hours a day, seven days a week during the construction project. The discharge piping will divert water around the work site and up over the dam to a discharge point in Middle Creek downstream of the valve house. The dam embankment will be protected with plastic sheeting in the location of the discharge pipe crossing to prevent erosion of the embankment in the case of an accidental break in the pipe.

3. A silt curtain will be installed to contain work area water releases from the main the reservoir (Turbidity Curtain-1, in Figure 1).

4. A temporary cofferdam will be installed at the neck of the LLO approach channel upstream of the work area. It is expected the cofferdam will be a water filled bladder that is buttressed on the downstream side with rock fill material. Additional plastic sheeting and sand bags may be placed on the upstream side of the cofferdam to reduce leakage.

5. The water between the cofferdam and the intake will be drained through the LLO down to the invert of the pipes. Remaining standing water would be pumped back over the cofferdam into the sump discharge area within the reservoir that is contained by Turbidity Curtain-1.

6. Sump pumps will be installed on the upstream end of the work area to collect and discharge any surface flows or seepage entering the work area during construction. Water around the sump pumps will remain unperturbed to allow sediment to settle before it is discharged into the reservoir upstream of the cofferdam. If ground disturbances or precipitation cause water in the area around the sump to become turbid, turbidity will be reduced with filter socks installed on the discharge pipes, and by installing a second turbidity curtain immediately upstream of the coffer dam (Turbidity Curtain-2, in Figure 1). Water from the work area will be then discharged to the secondary sump discharge area.

7. In response to unforeseen major thunderstorms or other events that could inundate the work area, standing water will be drained through the LLO. Additional turbidity mitigation measures (such as filter socks, turbidity curtains [Turbidity Curtain-3, in Figure 1], etc.) will be installed as necessary between the LLO and the bypass discharge.

8. Following all construction activities, the turbidity monitoring system will be removed.

3.0 LOCATION OF MONITORING SITE

There are two locations within the project area where there is the potential for increased turbidity. The first is in the main reservoir if water is released into the secondary sump discharge area (Figure 1). The second is in Middle Creek, downstream of the dam. As such compliance turbidity monitoring stations will be located near the floating intakes for minimum instream flow releases (Compliance Monitoring-1, in Figure 1), and at a convenient location along Middle Creek downstream of the minimum instream flow release point (Compliance Monitoring-2, in Figure 1). There will be one monitoring station located within the reservoir upstream of the area impacted by Project activities, to provide baseline information (Figure 1). The exact location of the three stations will be determined by accessibility, safety and suitability to meet overall monitoring objectives.

4.0 METHODS

Turbidity will be continuously monitored during all in-water work. Visual observations will be made periodically to check for any plumes that might prompt a delay in construction until the turbidity subsides. In the event of any unforeseen major thunderstorms or other events that inundate the work area, standing water will be drained through the LLO. Additional turbidity mitigation measures (such as filter socks, turbidity curtains, etc.) will be installed as necessary between the LLO and bypass discharge.

PG&E will install a turbidity sensor system programmed to continuously monitor turbidity and water temperature at 15minute intervals at the baseline and compliance stations.

Baseline Data: At least 24-hours prior to any in-water work turbidity data will be recorded at the monitoring station and used to establish a beginning baseline daily average. These data can be supplemented with measurements taken during periods where no in-water work is occurring. The baseline turbidity will determine the compliance criteria as indicated in the Basin Plan for the turbidity levels at the compliance station. The most recent baseline turbidity will be referenced when assessing water quality at the compliance station.

Compliance data: To assure the project remains in compliance, turbidity levels will be measured and recorded at the compliance station. A 24-hour averaging period will be used to assess turbidity compliance.

Each turbidity data measurement will be entered into a pre-arranged spreadsheet to facilitate the calculation of the 24-hour averaging value. If the forecasted 24-hour turbidity value is approaching the compliance threshold, PG&E will alert the on-site inspector to prepare for implementation of Best Management Practice (BMP) measures. As a BMP, if the 24-hour average of turbidity is above the level of compliance then in-water work will be temporally stopped until turbidities reach a level of compliance. Work will also be stopped in the case of visible plumes of either turbidity or petroleum products immediately outside the perimeter of the turbidity curtain. Unanticipated modifications to monitoring procedures or analysis methods will be documented and reported.

5.0 QUALITY ASSURANCE/QUALITY CONTROL

The study methodology proposed for this monitoring plan is consistent with the generally accepted practice in the scientific community and is consistent with methods used to collect data for turbidity monitoring. In addition, the methods and quality assurance protocols for all turbidity data collection procedures are consistent with PG&E's quality control standard practices outlined in PG&Es QAPP (PG&E 2007).

6.0 SCHEDULE

The project is proposed to begin in the summer of 2019 and continue for a few months. Sediment removal will only occur during daylight hours so that visual observation of any turbidity plumes can be assessed and addressed during active work periods.

7.0 REFERENCES

Pacific Gas and Electric Company. 2007. Quality Assurance Program Plan for Module 4 Service Agreement Projects Requiring Water Quality and/or Water Temperature Monitoring. Report No. 026.11.06.12 Version 4, Revision Date April 18, 2007.

California Regional Water Quality Control Board Central Valley Region. 2018. The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region (Fifth Edition).

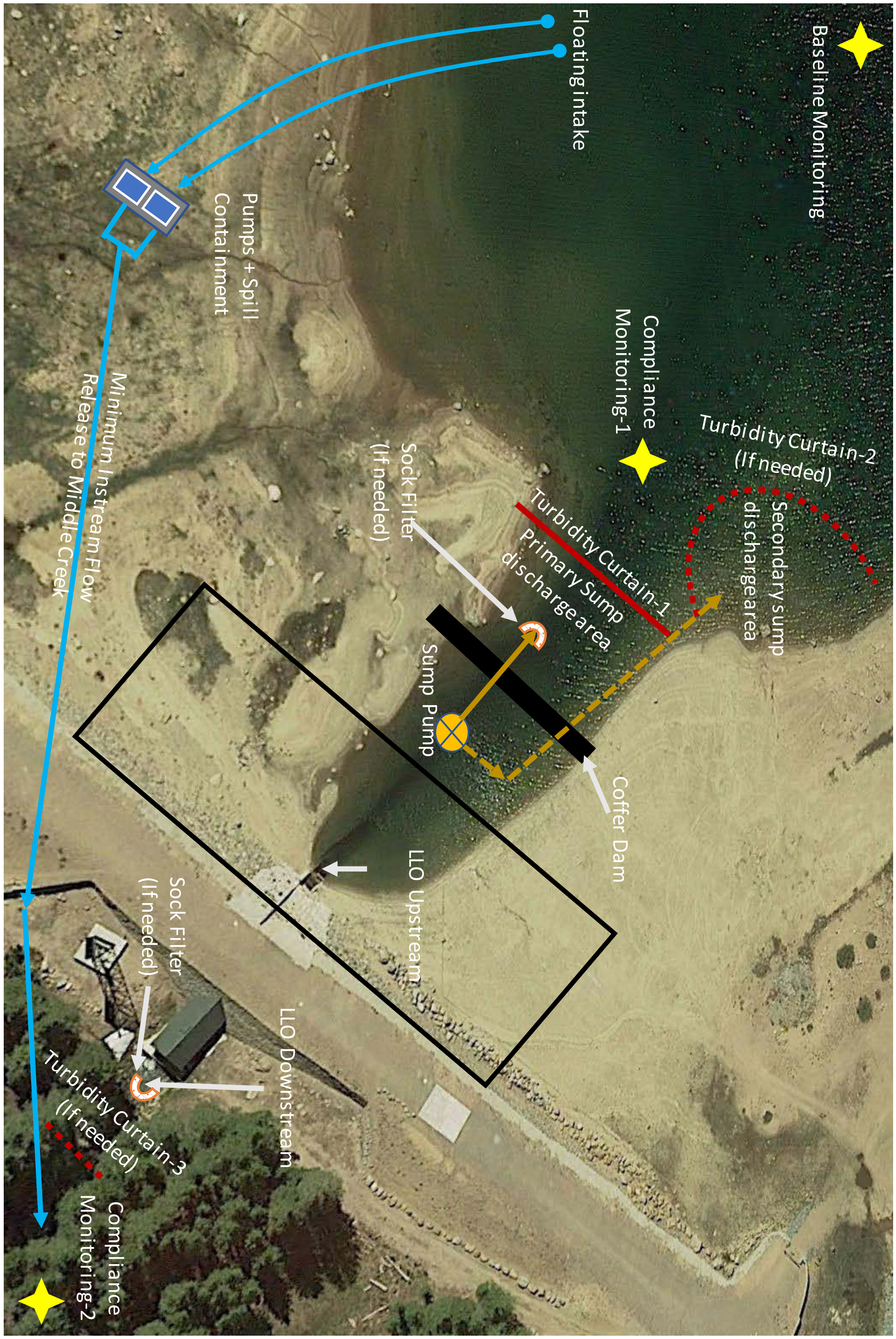


Figure 1. Layout of the work area (within black box), turbidity curtains (red lines), plumbing for Minimum Instream Flow Releases (blue Lines) and discharge of water from work area (brown lines). Dashed lines indicate the use of additional turbidity curtains and a secondary discharge system if needed.

Appendix D
Species Lists

Appendix D-1

USFWS List of Threatened or Endangered Species, Sacramento Office

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: October 02, 2018
Consultation Code: 08ESMF00-2018-SLI-2632
Event Code: 08ESMF00-2019-E-00031
Project Name: Upper Blue Lake Dam Seismic Retrofit Project

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

This project's location is within the jurisdiction of multiple offices. Expect additional species list documents from the following office, and expect that the species and critical habitats in each document reflect only those that fall in the office's jurisdiction:

Reno Fish And Wildlife Office
1340 Financial Boulevard, Suite 234
Reno, NV 89502-7147
(775) 861-6300

Project Summary

Consultation Code: 08ESMF00-2018-SLI-2632

Event Code: 08ESMF00-2019-E-00031

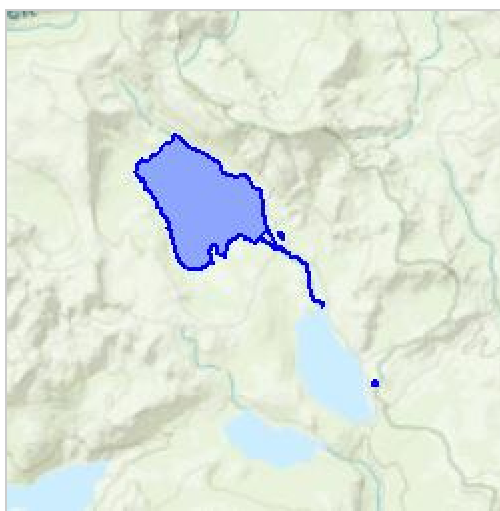
Project Name: Upper Blue Lake Dam Seismic Retrofit Project

Project Type: DAM

Project Description: The proposed action consists of three parts: the interim operational elevation restriction that has been in place since 2016, test pit excavations that are necessary for providing information for the dam improvements (completed in August 2018), and the seismic stability improvements to Upper Blue Lake dam that would be completed in 2019.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/38.629929389612954N119.9466872017943W



Counties: Alpine, CA

Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Amphibians

NAME	STATUS
Sierra Nevada Yellow-legged Frog *Rana sierrae* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9529	Endangered
Yosemite Toad *Anaxyrus canorus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7255	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened
Lahontan Cutthroat Trout *Oncorhynchus clarkii henshawi* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3964	Threatened

Critical habitats

There are 2 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Sierra Nevada Yellow-legged Frog *Rana sierrae* https://ecos.fws.gov/ecp/species/9529#crithab	Final
Yosemite Toad *Anaxyrus canorus* https://ecos.fws.gov/ecp/species/7255#crithab	Final

Appendix D-2

USFWS List of Threatened or Endangered Species, Reno Office

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Reno Fish And Wildlife Office
1340 Financial Boulevard, Suite 234
Reno, NV 89502-7147
Phone: (775) 861-6300 Fax: (775) 861-6301
http://www.fws.gov/nevada/

In Reply Refer To: October 02, 2018
Consultation Code: 08ENVD00-2018-SLI-0676
Event Code: 08ENVD00-2019-E-00005
Project Name: Upper Blue Lake Dam Seismic Retrofit Project

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The attached species list indicates threatened, endangered, proposed, and candidate species and designated or proposed critical habitat that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act of 1973, as amended (ESA, 16 U.S.C. 1531 *et seq*.), for projects that are authorized, funded, or carried out by a Federal agency. Candidate species have no protection under the ESA but are included for consideration because they could be listed prior to the completion of your project. Consideration of these species during project planning may assist species conservation efforts and may prevent the need for future listing actions. For additional information regarding species that may be found in the proposed project area, visit http://www.fws.gov/nevada/es/ipac.html.

The purpose of the ESA is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the ESA and its implementing regulations (50 CFR 402 *et seq*.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Guidelines for preparing a Biological Assessment can be found at: http://www.fws.gov/midwest/endangered/section7/ba_guide.html.

If a Federal action agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species, and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this species list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally listed, proposed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the ESA, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally, as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation, for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the attached list.

The Nevada Fish and Wildlife Office (NFWO) no longer provides species of concern lists. Most of these species for which we have concern are also on the Animal and Plant At-Risk Tracking List for Nevada (At-Risk list) maintained by the State of Nevada's Natural Heritage Program (Heritage). Instead of maintaining our own list, we adopted Heritage's At-Risk list and are partnering with them to provide distribution data and information on the conservation needs for at-risk species to agencies or project proponents. The mission of Heritage is to continually evaluate the conservation priorities of native plants, animals, and their habitats, particularly those most vulnerable to extinction or in serious decline. In addition, in order to avoid future conflicts, we ask that you consider these at-risk species early in your project planning and explore management alternatives that provide for their long-term conservation.

For a list of at-risk species by county, visit Heritage's website (http://heritage.nv.gov). For a specific list of at-risk species that may occur in the project area, you can obtain a data request form from the website (http://heritage.nv.gov/get_data) or by contacting the Administrator of Heritage at 901 South Stewart Street, Suite 5002, Carson City, Nevada 89701-5245, (775) 684-2900. Please indicate on the form that your request is being obtained as part of your coordination with the Service under the ESA. During your project analysis, if you obtain new information or data for any Nevada sensitive species, we request that you provide the information to Heritage at the above address.

Furthermore, certain species of fish and wildlife are classified as protected by the State of Nevada (http://www.leg.state.nv.us/NAC/NAC-503.html). You must first obtain the appropriate license, permit, or written authorization from the Nevada Department of Wildlife (NDOW) to take, or possess any parts of protected fish and wildlife species. Please visit http://www.ndow.org or contact NDOW in northern Nevada (775) 688-1500, in southern Nevada (702) 486-5127, or in eastern Nevada (775) 777-2300.

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq*.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the Service's wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

The Service's Pacific Southwest Region developed the *Interim Guidelines for the Development of a Project Specific Avian and Bat Protection Plan for Wind Energy Facilities* (Interim Guidelines). This document provides energy facility developers with a tool for assessing the risk of potential impacts to wildlife resources and delineates how best to design and operate a bird- and bat-friendly wind facility. These Interim Guidelines are available upon request from the NFWO. The intent of a Bird and Bat Conservation Strategy is to conserve wildlife resources while supporting project developers through: (1) establishing project development in an adaptive management framework; (2) identifying proper siting and project design strategies; (3) designing and implementing pre-construction surveys; (4) implementing appropriate conservation measures for each development phase; (5) designing and implementing appropriate post-construction monitoring strategies; (6) using post-construction studies to better understand the dynamics of mortality reduction (*e.g.*, changes in blade cut-in speed, assessments of blade "feathering" success, and studies on the effects of visual and acoustic deterrents) including efforts tied into Before-After/Control-Impact analysis; and (7) conducting a thorough risk assessment and validation leading to adjustments in management and mitigation actions.

The template and recommendations set forth in the Interim Guidelines were based upon the Avian Powerline Interaction Committee's Avian Protection Plan template (http://www.aplic.org/) developed for electric utilities and modified accordingly to address the unique concerns of wind energy facilities. These recommendations are also consistent with the Service's wind energy guidelines. We recommend contacting us as early as possible in the planning process to discuss the need and process for developing a site-specific Bird and Bat Conservation Strategy.

The Service has also developed guidance regarding wind power development in relation to prairie grouse leks (sage-grouse are included in this). This document can be found at: http://www.fws.gov/southwest/es/Oklahoma/documents/te_species/wind%20power/prairie%20grouse%20lek%205%20mile%20public.pdf.

Migratory Birds are a Service Trust Resource. Based on the Service's conservation responsibilities and management authority for migratory birds under the Migratory Bird Treaty Act of 1918, as amended (MBTA; 16 U.S.C. 703 *et seq*.), we recommend that any land clearing or other surface disturbance associated with proposed actions within the project area be timed to avoid potential destruction of bird nests or young, or birds that breed in the area. Such destruction may be in violation of the MBTA. Under the MBTA, nests with eggs or young of migratory birds may not be harmed, nor may migratory birds be killed. Therefore, we recommend land clearing be conducted outside the avian breeding season. If this is not feasible, we recommend a qualified biologist survey the area prior to land clearing. If nests are located, or if other evidence of nesting (*i.e.*, mated pairs, territorial defense, carrying nesting material, transporting food) is observed, a protective buffer (the size depending on the habitat requirements of the species) should be delineated and the entire area avoided to prevent destruction or disturbance to nests until they are no longer active.

Guidance for minimizing impacts to migratory birds for projects involving communications towers (*e.g.*, cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

If wetlands, springs, or streams are are known to occur in the project area or are present in the vicinity of the project area, we ask that you be aware of potential impacts project activities may have on these habitats. Discharge of fill material into wetlands or waters of the United States is regulated by the U.S. Army Corps of Engineers (ACOE) pursuant to section 404 of the Clean Water Act of 1972, as amended. We recommend you contact the ACOE's Regulatory Section regarding the possible need for a permit. For projects located in northern Nevada (Carson City, Churchill, Douglas, Elko, Esmeralda, Eureka, Humboldt, Lander, Lyon, Mineral, Pershing, Storey, and Washoe Counties) contact the Reno Regulatory Office at 300 Booth Street, Room 3060, Reno, Nevada 89509, (775) 784-5304; in southern Nevada (Clark, Lincoln, Nye, and White Pine Counties) contact the St. George Regulatory Office at 321 North Mall Drive, Suite L-101, St. George, Utah 84790-7314, (435) 986-3979; or in California along the eastern Sierra contact the Sacramento Regulatory Office at 650 Capitol Mall, Suite 5-200, Sacramento, California 95814, (916) 557-5250.

We appreciate your concern for threatened and endangered species. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

The table below outlines lead FWS field offices by county and land ownership/project type. Please refer to this table when you are ready to coordinate (including requests for section 7 consultation) with the field office corresponding to your project, and send any documentation regarding your project to that corresponding office. Therefore, the lead FWS field office may not be the office listed above in the letterhead.

Lead FWS offices by County and Ownership/Program

County	Ownership/Program	Species	Office Lead*

Alameda	Tidal wetlands/marsh adjacent to Bays	Salt marsh species, delta smelt	BDFWO
Alameda	All ownerships but tidal/estuarine	All	SFWO
Alpine	Humboldt Toiyabe National Forest	All	RFWO
Alpine	Lake Tahoe Basin Management Unit	All	RFWO
Alpine	Stanislaus National Forest	All	SFWO
Alpine	El Dorado National Forest	All	SFWO
Colusa	Mendocino National Forest	All	AFWO
Colusa	Other	All	By jurisdiction (see map)
Contra Costa	Legal Delta (Excluding ECCHCP)	All	BDFWO
Contra Costa	Antioch Dunes NWR	All	BDFWO
Contra Costa	Tidal wetlands/marsh adjacent to Bays	Salt marsh species, delta smelt	BDFWO
Contra Costa	All ownerships but tidal/estuarine	All	SFWO
Del Norte	All	All	AFWO
El Dorado	El Dorado National Forest	All	SFWO
El Dorado	LakeTahoe Basin Management Unit		RFWO
Glenn	Mendocino National Forest	All	AFWO
Glenn	Other	All	By jurisdiction (see map)
Humboldt	All except Shasta Trinity National Forest	All	AFWO

Humboldt	Shasta Trinity National Forest	All	YFWO
Lake	Mendocino National Forest	All	AFWO
Lake	Other	All	By jurisdiction (see map)
Lassen	Modoc National Forest	All	KFWO
Lassen	Lassen National Forest	All	SFWO
Lassen	Toiyabe National Forest	All	RFWO
Lassen	BLM Surprise and Eagle Lake Resource Areas	All	RFWO
Lassen	BLM Alturas Resource Area	All	KFWO
Lassen	Lassen Volcanic National Park	All (includes Eagle Lake trout on all ownerships)	SFWO
Lassen	All other ownerships	All	By jurisdiction (see map)
Marin	Tidal wetlands/marsh adjacent to Bays	Salt marsh species, delta smelt	BDFWO
Marin	All ownerships but tidal/estuarine	All	SFWO
Mendocino	Russian River watershed	All	SFWO
Mendocino	All except Russian River watershed	All	AFWO
Modoc	Modoc National Forest	All	KFWO
Modoc	BLM Alturas Resource Area	All	KFWO
Modoc	Klamath Basin National Wildlife Refuge Complex	All	KFWO
Modoc	BLM Surprise and Eagle Lake Resource Areas	All	RFWO

Modoc	All other ownerships	All	By jurisdiction (See map)
Mono	Inyo National Forest	All	RFWO
Mono	Humboldt Toiyabe National Forest	All	RFWO
Napa	All ownerships but tidal/estuarine	All	SFWO
Napa	Tidal wetlands/marsh adjacent to San Pablo Bay	Salt marsh species, delta smelt	BDFWO
Nevada	Humboldt Toiyabe National Forest	All	RFWO
Nevada	All other ownerships	All	By jurisdiction (See map)
Placer	Lake Tahoe Basin Management Unit	All	RFWO
Placer	All other ownerships	All	SFWO
Sacramento	Legal Delta	Delta Smelt	BDFWO
Sacramento	Other	All	By jurisdiction (see map)
San Francisco	Tidal wetlands/marsh adjacent to San Francisco Bay	Salt marsh species, delta smelt	BDFWO
San Francisco	All ownerships but tidal/estuarine	All	SFWO
San Mateo	Tidal wetlands/marsh adjacent to San Francisco Bay	Salt marsh species, delta smelt	BDFWO
San Mateo	All ownerships but tidal/estuarine	All	SFWO
San Joaquin	Legal Delta excluding San Joaquin HCP	All	BDFWO

San Joaquin	Other	All	SFWO
Santa Clara	Tidal wetlands/marsh adjacent to San Francisco Bay	Salt marsh species, delta smelt	BDFWO
Santa Clara	All ownerships but tidal/estuarine	All	SFWO
Shasta	Shasta Trinity National Forest except Hat Creek Ranger District (administered by Lassen National Forest)	All	YFWO
Shasta	Hat Creek Ranger District	All	SFWO
Shasta	Bureau of Reclamation (Central Valley Project)	All	BDFWO
Shasta	Whiskeytown National Recreation Area	All	YFWO
Shasta	BLM Alturas Resource Area	All	KFWO
Shasta	Caltrans	By jurisdiction	SFWO/AFWO
Shasta	Ahjumawi Lava Springs State Park	Shasta crayfish	SFWO
Shasta	All other ownerships	All	By jurisdiction (see map)
Shasta	Natural Resource Damage Assessment, all lands	All	SFWO/BDFWO
Sierra	Humboldt Toiyabe National Forest	All	RFWO
Sierra	All other ownerships	All	SFWO
Siskiyou	Klamath National Forest (except Ukonom District)	All	YFWO
Siskiyou	Six Rivers National Forest and Ukonom District	All	AFWO
Siskiyou	Shasta Trinity National Forest	All	YFWO

Siskiyou	Lassen National Forest	All	SFWO
Siskiyou	Modoc National Forest	All	KFWO
Siskiyou	Lava Beds National Volcanic Monument	All	KFWO
Siskiyou	BLM Alturas Resource Area	All	KFWO
Siskiyou	Klamath Basin National Wildlife Refuge Complex	All	KFWO
Siskiyou	All other ownerships	All	By jurisdiction (see map)
Solano	Suisun Marsh	All	BDFWO
Solano	Tidal wetlands/marsh adjacent to San Pablo Bay	Salt marsh species, delta smelt	BDFWO
Solano	All ownerships but tidal/estuarine	All	SFWO
Solano	Other	All	By jurisdiction (see map)
Sonoma	Tidal wetlands/marsh adjacent to San Pablo Bay	Salt marsh species, delta smelt	BDFWO
Sonoma	All ownerships but tidal/estuarine	All	SFWO
Tehama	Mendocino National Forest	All	AFWO
Tehama	Shasta Trinity National Forest except Hat Creek Ranger District (administered by Lassen National Forest)	All	YFWO
Tehama	All other ownerships	All	By jurisdiction (see map)
Trinity	BLM	All	AFWO
Trinity	Six Rivers National Forest	All	AFWO
Trinity	Shasta Trinity National Forest	All	YFWO

Trinity	Mendocino National Forest	All	AFWO
Trinity	BIA (Tribal Trust Lands)	All	AFWO
Trinity	County Government	All	AFWO
Trinity	All other ownerships	All	By jurisdiction (See map)
Yolo	Yolo Bypass	All	BDFWO
Yolo	Other	All	By jurisdiction (see map)
All	FERC-ESA	All	By jurisdiction (see map)
All	FERC-ESA	Shasta crayfish	SFWO
All	FERC-Relicensing (non-ESA)	All	BDFWO

***Office Leads:**

AFWO=Arcata Fish and Wildlife Office

BDFWO=Bay Delta Fish and Wildlife Office

KFWO=Klamath Falls Fish and Wildlife Office

RFWO=Reno Fish and Wildlife Office

YFWO=Yreka Fish and Wildlife Office

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Reno Fish And Wildlife Office
1340 Financial Boulevard, Suite 234
Reno, NV 89502-7147
(775) 861-6300

This project's location is within the jurisdiction of multiple offices. Expect additional species list documents from the following office, and expect that the species and critical habitats in each document reflect only those that fall in the office's jurisdiction:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Consultation Code: 08ENVD00-2018-SLI-0676

Event Code: 08ENVD00-2019-E-00005

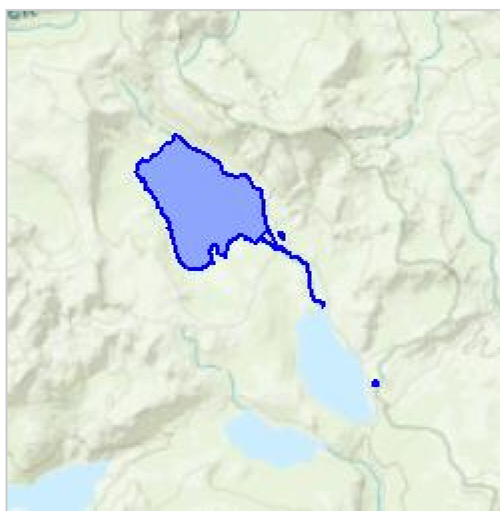
Project Name: Upper Blue Lake Dam Seismic Retrofit Project

Project Type: DAM

Project Description: The proposed action consists of three parts: the interim operational elevation restriction that has been in place since 2016, test pit excavations that are necessary for providing information for the dam improvements (completed in August 2018), and the seismic stability improvements to Upper Blue Lake dam that would be completed in 2019.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/38.629929389612954N119.9466872017943W



Counties: Alpine, CA

Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
North American Wolverine *Gulo gulo luscus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5123	Proposed Threatened

Amphibians

NAME	STATUS
Sierra Nevada Yellow-legged Frog *Rana sierrae* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9529	Endangered
Yosemite Toad *Anaxyrus canorus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7255	Threatened

Fishes

NAME	STATUS
Lahontan Cutthroat Trout *Oncorhynchus clarkii henshawi* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3964 Species survey guidelines: https://ecos.fws.gov/ipac/guideline/survey/population/233/office/14320.pdf	Threatened

Critical habitats

There are 2 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Sierra Nevada Yellow-legged Frog *Rana sierrae* https://ecos.fws.gov/ecp/species/9529#crithab	Final
Yosemite Toad *Anaxyrus canorus* https://ecos.fws.gov/ecp/species/7255#crithab	Final

USFWS National Wildlife Refuge Lands And Fish Hatcheries

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

REFUGE INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

Migratory Birds

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

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

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

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

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

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31
Cassin's Finch *Carpodacus cassinii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9462	Breeds May 15 to Jul 15

NAME	BREEDING SEASON
Olive-sided Flycatcher *Contopus cooperi* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Rufous Hummingbird *selasphorus rufus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8002	Breeds elsewhere
Williamson's Sapsucker *Sphyrapicus thyroideus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8832	Breeds May 1 to Jul 31
Willow Flycatcher *Empidonax traillii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/3482	Breeds May 20 to Aug 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (■)

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

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

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum

probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

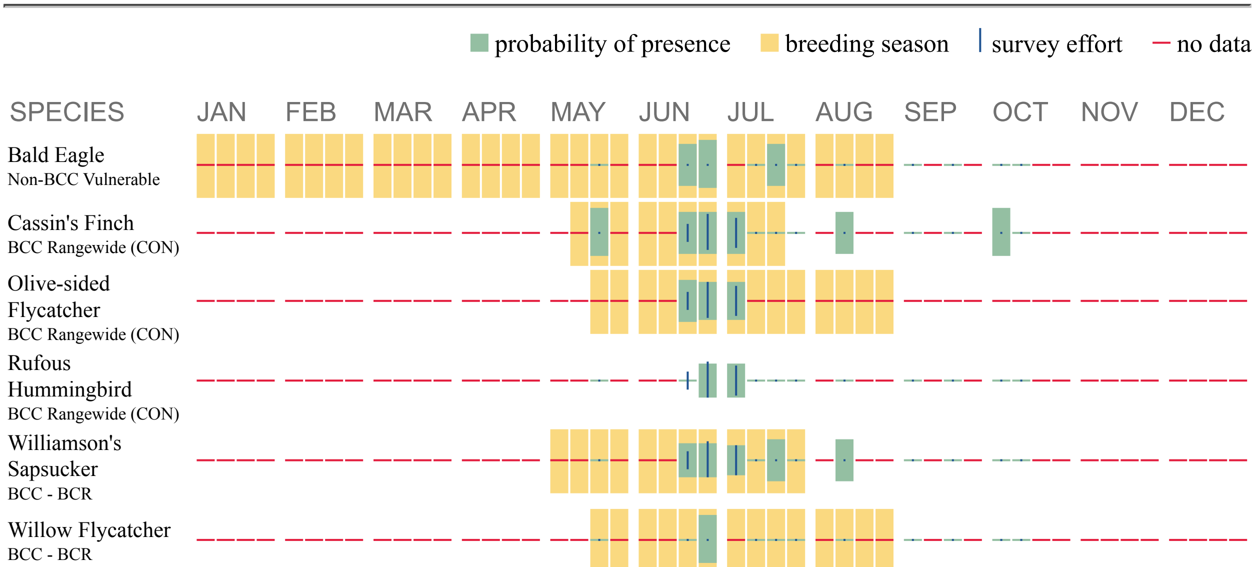
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

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

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

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

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



Additional information can be found using the following links:

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

Migratory Birds FAQ

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

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

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

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

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

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

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

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

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

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

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

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

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

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical

Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

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

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

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

Wetlands

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

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

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

THERE ARE NO WETLANDS WITHIN YOUR PROJECT AREA.

Appendix D-3

CNDDB Records Search for Plants and Natural Communities

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Carson Pass (3811968) OR Caples Lake (3812061) OR Mokelumne Peak (3812051) OR Pacific Valley (3811958) OR Ebbetts Pass (3811957) OR Markleeville (3811967))
 AND Taxonomic Group IS (Dune OR Scrub OR Herbaceous OR Marsh OR Riparian OR Woodland OR Forest OR Alpine OR Inland Waters OR Marine OR Estuarine OR Riverine OR Palustrine OR Ferns OR Gymnosperms OR Monocots OR Dicots OR Lichens OR Bryophytes)

Upper Blue Lake Dam Seismic Retrofit Project

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Agrostis humilis mountain bent grass	PMPOA040P0	None	None	G4Q	S2	2B.3
Allium tribracteatum three-bracted onion	PMLIL022D0	None	None	G2	S2	1B.2
Botrychium ascendens upswept moonwort	PPOPH010S0	None	None	G3G4	S2	2B.3
Botrychium minganense Mingan moonwort	PPOPH010R0	None	None	G4G5	S3	2B.2
Carex davyi Davy's sedge	PMCYP033H0	None	None	G3	S3	1B.3
Carex hystericina porcupine sedge	PMCYP036D0	None	None	G5	S2	2B.1
Carex scirpoidea ssp. pseudoscirpoidea western single-spiked sedge	PMCYP03C85	None	None	G5T4	S2	2B.2
Chaenactis douglasii var. alpina alpine dusty maidens	PDAST20065	None	None	G5T5	S2	2B.3
Claytonia megarhiza fell-fields claytonia	PDPOR030A0	None	None	G5	S2	2B.3
Crepis runcinata fiddleleaf hawksbeard	PDAST2R0K0	None	None	G5	S3	2B.2
Cryptantha crymophila subalpine cryptantha	PDBOR0A0R0	None	None	G3	S3	1B.3
Draba asterophora var. asterophora Tahoe draba	PDBRA110D1	None	None	G2T2?	S2?	1B.2
Elymus scribneri Scribner's wheat grass	PMPOA2H170	None	None	G5	S3	2B.3
Epilobium howellii subalpine fireweed	PDONA06180	None	None	G4	S4	4.3
Potamogeton robbinsii Robbins' pondweed	PMPOT030Z0	None	None	G5	S3	2B.3
Viola purpurea ssp. aurea golden violet	PDVIO04420	None	None	G5T2	S2	2B.2

Record Count: 16

Appendix D-4

CNDDB Records Search for Wildlife

Selected Elements by Common Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Carson Pass (3811968) OR Caples Lake (3812061) OR Mokelumne Peak (3812051) OR Pacific Valley (3811958) OR Ebbetts Pass (3811957) OR Markleeville (3811967))
 AND Taxonomic Group IS (Fish OR Amphibians OR Reptiles OR Birds OR Mammals OR Mollusks OR Arachnids OR Crustaceans OR Insects)

Upper Blue Lake Dam Seismic Retrofit Project

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
American badger *Taxidea taxus*	AMAJF04010	None	None	G5	S3	SSC
black-backed woodpecker *Picoides arcticus*	ABNYF07090	None	None	G5	S2	
California wolverine *Gulo gulo*	AMAJF03010	Proposed Threatened	Threatened	G4	S1	FP
fisher - West Coast DPS *Pekania pennanti*	AMAJF01021	None	Threatened	G5T2T3Q	S2S3	SSC
fringed myotis *Myotis thysanodes*	AMACC01090	None	None	G4	S3	
gray-headed pika *Ochotona princeps schisticeps*	AMAEA0102H	None	None	G5T2T4	S2S4	
great gray owl *Strix nebulosa*	ABNSB12040	None	Endangered	G5	S1	
Lahontan cutthroat trout *Oncorhynchus clarkii henshawi*	AFCHA02081	Threatened	None	G4T3	S2	
long-legged myotis *Myotis volans*	AMACC01110	None	None	G5	S3	
Mono checkerspot butterfly *Euphydryas editha monoensis*	IILEPK405G	None	None	G5T2T3	S1S2	
Morrison bumble bee *Bombus morrisoni*	IIHYM24460	None	None	G4G5	S1S2	
North American porcupine *Erethizon dorsatum*	AMAFJ01010	None	None	G5	S3	
Sierra marten *Martes caurina sierrae*	AMAJF01014	None	None	G5T3	S3	
Sierra Nevada mountain beaver *Aplodontia rufa californica*	AMAFA01013	None	None	G5T3T4	S2S3	SSC
Sierra Nevada red fox *Vulpes vulpes necator*	AMAJA03012	Candidate	Threatened	G5T1T2	S1	
Sierra Nevada yellow-legged frog *Rana sierrae*	AAABH01340	Endangered	Threatened	G1	S1	WL
silver-haired bat *Lasionycteris noctivagans*	AMACC02010	None	None	G5	S3S4	
southern long-toed salamander *Ambystoma macrodactylum sigillatum*	AAAAA01085	None	None	G5T4	S3	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
western bumble bee *Bombus occidentalis*	IIHYM24250	None	None	G2G3	S1	
western white-tailed jackrabbit *Lepus townsendii townsendii*	AMAEB03041	None	None	G5T5	S3?	SSC
willow flycatcher *Empidonax traillii*	ABPAE33040	None	Endangered	G5	S1S2	
Yosemite toad *Anaxyrus canorus*	AAABB01040	Threatened	None	G2G3	S2S3	SSC

Record Count: 22

Appendix D-5

CNPS Inventory of Rare and Endangered Plants Records Search

CNPS California Native Plant Society

Plant List

Inventory of Rare and Endangered Plants

21 matches found. *Click on scientific name for details*

Search Criteria

Found in Quads 3812061, 3811968, 3811967, 3812051 3811958 and 3811957;

Modify Search Criteria Export to Excel Modify Columns Modify Sort Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Agrostis humilis	mountain bent grass	Poaceae	perennial herb	Jul-Sep	2B.3	S2	G4Q
Astragalus whitneyi var. lenophyllus	woolly-leaved milk-vetch	Fabaceae	perennial herb	Jul-Aug	4.3	S4	G5T4
Boechera microphylla	small-leaved rockcress	Brassicaceae	perennial herb	Jul	3	S3	G4Q
Botrychium ascendens	upswept moonwort	Ophioglossaceae	perennial rhizomatous herb	(Jun)Jul-Aug	2B.3	S2	G3G4
Botrychium minganense	Mingan moonwort	Ophioglossaceae	perennial rhizomatous herb	Jul-Sep	2B.2	S3	G4G5
Carex davyi	Davy's sedge	Cyperaceae	perennial herb	May-Aug	1B.3	S3	G3
Carex scirpoidea ssp. pseudoscirpoidea	western single-spiked sedge	Cyperaceae	perennial rhizomatous herb	Jul,Sep	2B.2	S2	G5T4
Chaenactis douglasii var. alpina	alpine dusty maidens	Asteraceae	perennial herb	Jul-Sep	2B.3	S2	G5T5
Claytonia megarhiza	fell-fields claytonia	Montiaceae	perennial herb	Jul-Sep	2B.3	S2	G5
Crepis runcinata	fiddleleaf hawksbeard	Asteraceae	perennial herb	May-Aug	2B.2	S3	G5
Cryptantha crymophila	subalpine cryptantha	Boraginaceae	perennial herb	Jul-Aug	1B.3	S3	G3
Cryptantha glomeriflora	clustered-flower cryptantha	Boraginaceae	annual herb	Jun-Sep	4.3	S4	G4Q
Draba asterophora var. asterophora	Tahoe draba	Brassicaceae	perennial herb	Jul-Aug (Sep)	1B.2	S2?	G2T2?
Elymus scribneri	Scribner's wheat grass	Poaceae	perennial herb	Jul-Aug	2B.3	S3	G5
Epilobium howellii	subalpine fireweed	Onagraceae	perennial stoloniferous herb	Jul-Aug	4.3	S4	G4
Lewisia kelloggii ssp. hutchisonii	Hutchison's lewisia	Montiaceae	perennial herb	(Apr)May-Aug	3.2	S3	G3G4T3Q
Lewisia kelloggii ssp. kelloggii	Kellogg's lewisia	Montiaceae	perennial herb	(Apr)May-Aug	3.2	S2S3	G3G4T2T3Q
Meesia triquetra		Meesiaceae	moss	Jul	4.2	S4	G5

	three-ranked hump moss						
Polystichum lonchitis	northern holly fern	Dryopteridaceae	perennial rhizomatous herb	Jun-Sep	3	S3	G5
Potamogeton robbinsii	Robbins' pondweed	Potamogetonaceae	perennial rhizomatous herb (aquatic)	Jul-Aug	2B.3	S3	G5
Viola purpurea ssp. aurea	golden violet	Violaceae	perennial herb	Apr-Jun	2B.2	S2	G5T2

Suggested Citation

California Native Plant Society, Rare Plant Program. 2018. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 08 November 2018].

Appendix E

Lists of Plants and Animals Observed in the Upper Blue Lake Dam Seismic Retrofit Project Area

Appendix E

Lists of Plants and Animals Observed in the Upper Blue Lake Dam Seismic Retrofit Project Area

Table 1. Plants Observed in the Upper Blue Lake Seismic Retrofit Project Area

Scientific Name	Common name	Lake Shoreline	Middle Creek	Temporary Spoils Site	Spoils Site 1	Spoils Sites 2a and 2b
Abies magnifica var. *magnifica*	California red fir	X	X			
Agrostis variabilis	Mountain redtop	X	X	X		
Artemisia arbuscula	Low sagebrush				X	X
Artemisia ludoviciana var. *candicans*	Gray mugwort				*	
Bromus carinatus	California brome				X	
Calyptridium monospermum	One-seeded pussypaws					
Carex angusta	Narrow-leaved sedge	X	X			
Carex athrostachya	Slender beak sedge	*				
Carex vesicaria	Blister sedge	X				
Cirsium vulgare†	Bull thistle	X				
Collomia tinctoria	Yellow staining tinctoria	X				
Deschampsia danthonioides	Annual hairgrass	*		X		
Elymus elymoides var. *californicus*	Squirrel tail grass	X			X	
Ericameria bloomeri	Bloomer's goldenbush				*	*
Eriogonum nudum var. *deductum*	Naked buckwheat	X	X	X		X
Eriophyllum lanatum var. *integrifolium*	Oregon sunshine				X	X
Gayophytum diffusum ssp. *parviflorum*	Small flowered groundsmoke	*				
Gnaphalium palustre	Lowland cudweed	X				
Juncus bufonius var. *occidentalis*	Western toad rush	X				
Juncus mertensianus	Mertens' rush	X				
Juncus mexicanus	Mexican rush	X				

Scientific Name	Common name	Lake Shoreline	Middle Creek	Temporary Spoils Site	Spoils Site 1	Spoils Sites 2a and 2b
Lepidium virginicum	Wild peppergrass					
Ligusticum grayi	Gray's lovage				*	*
Lupinus breweri var. *breweri*	Brewer's lupine	*				
Lupinus sp.	Lupine			X		
Luzula subcongesta	Donner woodrush					
Monardella odoratissima ssp. *glauca*	Follett's monardella				X	*
Penstemon heterodoxus var. *heterodoxus*	Sierra beardtongue	X				
Penstemon parvulus	Short stalk penstemon	X				
Penstemon procerus var. *formosus*	Pincushion beardtongue	X				
Phacelia hastata var. *compacta*	Timberline phacelia	X				
Pinus contorta ssp. murrayana	Lodgepole pine		*		X	
Pinus monticola	Little sugar pine					
Pseudognaphalium thermale	Small headed cudweed					
Ranunculus flammula	Creeping buttercup	X				
Ribes lasianthum	Alpine gooseberry		X		X	
Rorippa curvisiliqua	Curvepod yellowcress	X				
Rumex conglomeratus	California dock					
Salix lemmonii	Lemmon's willow	*	X	X		
Salix orestera	Sierra gray willow				*	
Senecio triangularis	Groundsel	X				
Sidalcea glaucescens	Glaucous checker mallow	X	X			
Spergularia rubra	Red sand spurry	X		X		
Symphyotrichum spathulatum var. *spathulatum*	Western mountain aster	X				
Tsuga mertensiana	Mountain hemlock		X			
Viola macloskeyi	Small white violet	X				

x = species present

* = dominant species

† = invasive species

Table 2. Animals Observed in or Near the Upper Blue Lake Seismic Retrofit Project Area

Common Name	Scientific Name
Lahontan redside	*Richardsonius egregius*
brook trout	*Salvelinus fontinalis*
Lahontan cutthroat trout	*Oncorhynchus clarkii henshawi*
Canada goose (scat)	*Branta canadensis*
Common merganser	*Mergus merganser*
Bald eagle	*Haliaeetus leucocephalus*
Steller's jay	*Cyanocitta stelleri*
Common raven	*Corvus corax*
Mountain chickadee	*Poecile gambeli*
Red-breasted nuthatch	*Sitta canadensis*
Mountain pocket gopher (sign)	*Thomomys monticola*
Golden-mantled ground squirrel	*Callospermophilus lateralis*

Appendix F

Air Quality and Greenhouse Gas Supporting Documentation

Appendix F

Air Quality and Greenhouse Gas Supporting Documentation

Appendix F-1

Proposed Project Construction

Appendix F-1A

Construction Schedule

Phase	Code	Start Date (d/mm/yyyy)	End Date (d/mm/yyyy)	Working Days	Days/Week	2019
0. Helicopter	0-H	6/7/2019	6/9/2019	3	7	3
1. Materials Delivery	1-MD	6/10/2019	9/10/2019	92	7	92
2. Reservoir Drawdown	2-RD	6/15/2019	7/14/2019	30	7	30
3. Mobilization Start	3-MS	7/15/2019	7/20/2019	6	7	6
4. Dewatering	4-D	7/21/2019	7/23/2019	3	7	3
5. Access Installation	5-AI	7/24/2019	7/24/2019	1	7	1
6. Excavation	6-E	7/25/2019	8/13/2019	20	7	20
7. LLO Extenstion	7-LE	8/7/2019	8/22/2019	16	7	16
8. Construct Intake Structure	8-CIS	8/23/2019	9/17/2019	26	7	26
9. Place Buttress Rock	9-PBR	8/14/2019	9/18/2019	36	7	36
10. Demobilization / Finish - Site Restoration	10-SR	9/18/2019	9/25/2019	7	7	7
1. Materials Delivery - Rock Material Delivery 1	1-MD-RM1	6/10/2019	6/19/2019	10	7	10
1. Materials Delivery - Misc. Material Delivery	1-MD-MM	6/10/2019	6/16/2019	7	7	7
1. Materials Delivery - Rock Material Delivery 2	1-MD-RM2	6/10/2019	6/16/2019	7	7	7
1. Materials Delivery - Concrete Material Delivery	1-MD-CM	6/10/2019	6/14/2019	5	7	5
10. Demobilization - Disposal	10-D-D	9/18/2019	9/23/2019	4	7	4
11. Employee Commute	11-EC	6/10/2019	9/25/2019	108	7	108
4. Bypass Pump Generator	4-BPG	7/21/2019	9/17/2019	58	7	58
4. Office Generator	4-OG	7/21/2019	9/17/2019	58	7	58
4. Dewatering Pump Generator	4-DPG	7/25/2019	9/17/2019	54	7	54
0. Helicopter Intermittent	0-HI	6/15/2019	6/15/2019	1	7	1
					2019	108

Appendix F-1B

Unmitigated Construction Emissions Calculations

Offroad Calculations Onsite

Code	Days	Equip	#/day	hrs/day	HP Bin	LF	g/hp-hr (CalEEMod)									Pounds per day						Metric tons per day			
							ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2e
2-RD	30	Drawdown Pump Generator	1	24	175	0.74	0.3	2.7	2.9	0.1	0.1	0.0	568.3	0.0	0.0	1.8	16.7	18.3	0.7	0.7	0.0	1.6	0.0	0.0	1.6
4-D	3	Excavators	1	10	175	0.382	0.2	2.5	3.1	0.1	0.1	0.0	482.7	0.2	0.0	0.3	3.2	3.9	0.2	0.1	0.0	0.3	0.0	0.0	0.3
4-D	3	Tractors/Loaders/Backhoes	1	10	175	0.369	0.3	2.8	3.1	0.1	0.1	0.0	477.9	0.2	0.0	0.3	3.4	3.8	0.2	0.2	0.0	0.3	0.0	0.0	0.3
5-AI	1	Bulldozers	1	10	250	0.429	0.4	5.0	1.6	0.2	0.2	0.0	483.4	0.2	0.0	0.9	11.8	3.8	0.4	0.4	0.0	0.5	0.0	0.0	0.5
5-AI	1	Tractors/Loaders/Backhoes	1	10	175	0.369	0.3	2.8	3.1	0.1	0.1	0.0	477.9	0.2	0.0	0.3	3.4	3.8	0.2	0.2	0.0	0.3	0.0	0.0	0.3
5-AI	1	Graders	1	5	175	0.409	0.6	6.0	3.7	0.3	0.3	0.0	489.0	0.2	0.0	0.4	4.1	2.5	0.2	0.2	0.0	0.1	0.0	0.0	0.2
5-AI	1	Excavators	2	10	175	0.382	0.2	2.5	3.1	0.1	0.1	0.0	482.7	0.2	0.0	0.6	6.4	7.8	0.3	0.3	0.0	0.6	0.0	0.0	0.6
6-E	20	Excavators	2	10	175	0.382	0.2	2.5	3.1	0.1	0.1	0.0	482.7	0.2	0.0	0.6	6.4	7.8	0.3	0.3	0.0	0.6	0.0	0.0	0.6
6-E	20	Tractors/Loaders/Backhoes	1	10	175	0.369	0.3	2.8	3.1	0.1	0.1	0.0	477.9	0.2	0.0	0.3	3.4	3.8	0.2	0.2	0.0	0.3	0.0	0.0	0.3
7-LE	16	Excavators	1	5	175	0.382	0.2	2.5	3.1	0.1	0.1	0.0	482.7	0.2	0.0	0.2	1.6	1.9	0.1	0.1	0.0	0.1	0.0	0.0	0.1
7-LE	6	Tools Generator	1	4	15	0.74	0.7	4.6	3.6	0.2	0.2	0.0	568.3	0.1	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8-CIS	26	Excavators	1	10	175	0.382	0.2	2.5	3.1	0.1	0.1	0.0	482.7	0.2	0.0	0.3	3.2	3.9	0.2	0.1	0.0	0.3	0.0	0.0	0.3
8-CIS	26	Tractors/Loaders/Backhoes	1	10	175	0.369	0.3	2.8	3.1	0.1	0.1	0.0	477.9	0.2	0.0	0.3	3.4	3.8	0.2	0.2	0.0	0.3	0.0	0.0	0.3
8-CIS	26	Bulldozers	1	10	120	0.429	0.8	6.4	4.1	0.5	0.5	0.0	487.0	0.2	0.0	0.7	6.0	3.9	0.5	0.5	0.0	0.2	0.0	0.0	0.2
8-CIS	8	Tools Generator	1	4	15	0.74	0.7	4.6	3.6	0.2	0.2	0.0	568.3	0.1	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9-PBR	36	Excavators	2	10	175	0.382	0.2	2.5	3.1	0.1	0.1	0.0	482.7	0.2	0.0	0.6	6.4	7.8	0.3	0.3	0.0	0.6	0.0	0.0	0.6
9-PBR	36	Tractors/Loaders/Backhoes	1	10	175	0.369	0.3	2.8	3.1	0.1	0.1	0.0	477.9	0.2	0.0	0.3	3.4	3.8	0.2	0.2	0.0	0.3	0.0	0.0	0.3
9-PBR	36	Bulldozers	1	10	120	0.429	0.8	6.4	4.1	0.5	0.5	0.0	487.0	0.2	0.0	0.7	6.0	3.9	0.5	0.5	0.0	0.2	0.0	0.0	0.2
10-SR	7	Excavators	1	10	175	0.382	0.2	2.5	3.1	0.1	0.1	0.0	482.7	0.2	0.0	0.3	3.2	3.9	0.2	0.1	0.0	0.3	0.0	0.0	0.3
10-SR	7	Tractors/Loaders/Backhoes	1	10	175	0.369	0.3	2.8	3.1	0.1	0.1	0.0	477.9	0.2	0.0	0.3	3.4	3.8	0.2	0.2	0.0	0.3	0.0	0.0	0.3
4-BPG	58	Bypass Pump Generator	1	24	50	0.74	0.8	4.2	4.1	0.2	0.2	0.0	568.3	0.1	0.0	2.3	12.2	11.8	0.6	0.6	0.0	0.7	0.0	0.0	0.8
4-OG	58	Office Generator	1	12	25	0.74	0.7	4.6	2.5	0.2	0.2	0.0	568.3	0.1	0.0	0.5	3.1	1.7	0.1	0.1	0.0	0.2	0.0	0.0	0.2
4-DPG	54	Dewatering Pump Generator	1	24	15	0.74	0.7	4.6	3.6	0.2	0.2	0.0	568.3	0.1	0.0	0.5	3.6	2.8	0.2	0.2	0.0	0.2	0.0	0.0	0.2

Onsite Onroad Calculations

Code	Vehicle	Days	Veh/ Trip	RT Mi/ Veh	Pounds per day								Metric tons per day			
					ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e
1-MD	Dump Truck	92	1	40	0.3	1.8	0.5	0.0	0.0	1.2	0.1	0.0	0	0.0	0.0	0
1-MD	Water Truck	92	1	30	0.0	0.3	0.0	0.0	0.0	0.9	0.1	0.0	0	0.0	0.0	0
4-D	Boom Truck	3	1	40	0.0	0.4	0.1	0.0	0.0	1.2	0.1	0.0	0	0.0	0.0	0
4-D	Water Truck	3	1	30	0.0	0.3	0.0	0.0	0.0	0.9	0.1	0.0	0	0.0	0.0	0
5-AI	Water Truck	1	1	30	0.0	0.3	0.0	0.0	0.0	0.9	0.1	0.0	0	0.0	0.0	0
6-E	Water Truck	20	1	30	0.0	0.3	0.0	0.0	0.0	0.9	0.1	0.0	0	0.0	0.0	0
7-LE	Boom Truck	16	1	25	0.0	0.3	0.0	0.0	0.0	0.7	0.1	0.0	0	0.0	0.0	0
7-LE	Water Truck	16	1	30	0.0	0.3	0.0	0.0	0.0	0.9	0.1	0.0	0	0.0	0.0	0
7-LE	Welding Truck	16	1	50	0.1	0.2	0.4	0.0	0.0	1.5	0.1	0.0	0	0.0	0.0	0
8-CIS	Boom Truck	26	1	50	0.0	0.5	0.1	0.0	0.0	1.5	0.1	0.0	0	0.0	0.0	0
8-CIS	Vac Truck	26	1	50	0.0	0.5	0.1	0.0	0.0	1.5	0.1	0.0	0	0.0	0.0	0
8-CIS	Concrete Truck	26	1	30	0.0	0.3	0.0	0.0	0.0	0.9	0.1	0.0	0	0.0	0.0	0
9-PBR	Water Truck	36	1	30	0.0	0.3	0.0	0.0	0.0	0.9	0.1	0.0	0	0.0	0.0	0
10-SR	Welding Truck	7	1	50	0.1	0.2	0.4	0.0	0.0	1.5	0.1	0.0	0	0.0	0.0	0

Offsite Onroad Calculations

Code	Vehicle	Days	Trip/Day	RT Mi/Trip	Pounds per day								Metric tons per day			
					ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e
1-MD-RM1	Long-Distance Haul Truck	10	21	70	2.6	29.9	6.0	0.7	0.7	3.0	0.8	0.1	3	0.0	0.0	3
1-MD-MM	Long-Distance Haul Truck	7	2	132	0.5	5.3	1.1	0.1	0.1	0.5	0.1	0.0	1	0.0	0.0	1
1-MD-RM2	Long-Distance Haul Truck	7	15	70	1.8	21.3	4.3	0.5	0.5	2.1	0.5	0.0	2	0.0	0.0	2
1-MD-CM	Concrete Truck	5	2	70	0.0	0.3	0.0	0.0	0.0	0.3	0.1	0.0	0	0.0	0.0	0
10-D-D	Long-Distance Haul Truck	4	2	132	0.5	5.3	1.1	0.1	0.1	0.5	0.1	0.0	1	0.0	0.0	1

Employee Onroad Calculations

Code	Vehicle	Days	Trips/Day	One-Way Mi/Trip	Pounds per day								Metric tons per day				Gal per day
					ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e	Fuel
11-EC	Employee Auto	108	26	17	0.1	0.1	1.3	0.0	0.0	0.8	0.2	0.0	0	0.0	0.0	0	15

Helicopter Calculations

Code	Days	Hours/Day	Helicopter Type	Helicopter Name	Pounds per day						Metric tons per day			
					ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2e
0-H	3	5	Heavy Lift	Typical T58-GE-5	19.2	57.8	67.5	8.2	7.3	7.2	11.6	0.0	0.0	11.7
0-HI	1	2	Heavy Lift	Typical T58-GE-5	7.7	23.1	27.0	3.3	2.9	2.9	4.6	0.0	0.0	4.7

Earth Moving Calculations Onsite

Code	Days	Grading (acres/day)	Cut/fill (cy/day)	Dozing (hour/day)	Emission Factor						Pounds per day	
					PM10 G (lb/acre)	PM2.5 G (lb/acre)	PM10 C/F (lb/ton)	PM2.5 C/F (lb/ton)	PM10 Doz (lb/hr)	PM2.5 Doz (lb/hr)	PM10 D	PM2.5 D
3-MS	6	0.00	44	0	1.1	0.115	0.000	0.000	0.8	0.4	0.0	0.0
4-D	3	0.00	44	0	1.1	0.115	0.000	0.000	0.8	0.4	0.0	0.0
5-AI	1	0.00	44	10	1.1	0.115	0.000	0.000	0.8	0.4	7.5	4.1
6-E	20	0.00	44	0	1.1	0.115	0.000	0.000	0.8	0.4	0.0	0.0
7-LE	16	0.00	44	0	1.1	0.115	0.000	0.000	0.8	0.4	0.0	0.0
8-CIS	26	0.00	44	10	1.1	0.115	0.000	0.000	0.8	0.4	7.5	4.1
9-PBR	36	0.00	44	10	1.1	0.115	0.000	0.000	0.8	0.4	7.5	4.1
10-SR	7	0.11	0	0	1.1	0.115	0.000	0.000	0.8	0.4	0.1	0.0

Paving Calculations Location Onsite

Code	Year	Days	Paved (sf/day)	Emission Factor	Pounds
				ROG (lbs per acre)	ROG
10-SR	2019	7	14	2.6	0.0

Appendix F-2

Worst-case Scenario Construction

Appendix F-2A

Construction Schedule

Phase	Code	Start Date (d/mm/yyyy)	End Date (d/mm/yyyy)	Working Days	Days/Week	2019
0. Helicopter	0-H	6/7/2019	6/9/2019	3	7	3
1. Materials Delivery	1-MD	6/10/2019	9/10/2019	92	7	92
2. Reservoir Drawdown	2-RD	6/15/2019	7/14/2019	30	7	30
3. Mobilization Start	3-MS	7/15/2019	7/20/2019	6	7	6
4. Dewatering	4-D	7/21/2019	7/23/2019	3	7	3
5. Access Installation	5-AI	7/24/2019	7/24/2019	1	7	1
6. Excavation	6-E	7/25/2019	8/13/2019	20	7	20
7. LLO Extenstion	7-LE	8/7/2019	8/22/2019	16	7	16
8. Construct Intake Structure	8-CIS	8/14/2019	9/7/2019	25	7	25
9. Place Buttress Rock	9-PBR	8/14/2019	9/8/2019	26	7	26
10. Demobilization / Finish - Site Restoration	10-SR	9/18/2019	9/25/2019	7	7	7
1. Materials Delivery - Rock Material Delivery 1	1-MD-RM1	6/10/2019	6/19/2019	10	7	10
1. Materials Delivery - Misc. Material Delivery	1-MD-MM	6/10/2019	6/16/2019	7	7	7
1. Materials Delivery - Rock Material Delivery 2	1-MD-RM2	6/10/2019	6/16/2019	7	7	7
1. Materials Delivery - Concrete Material Delivery	1-MD-CM	6/10/2019	6/14/2019	5	7	5
10. Demobilization - Disposal	10-D-D	9/18/2019	9/23/2019	4	7	4
11. Employee Commute	11-EC	6/10/2019	9/25/2019	108	7	108
4. Bypass Pump Generator	4-BPG	7/21/2019	9/17/2019	58	7	58
4. Office Generator	4-OG	7/21/2019	9/17/2019	58	7	58
4. Dewatering Pump Generator	4-DPG	7/25/2019	9/17/2019	54	7	54
0. Helicopter Intermittent	0-HI	6/15/2019	6/15/2019	1	7	1

Appendix F-2B

Unmitigated Construction Emissions Calculations

Offroad Calculations Onsite

Code	Days	Equip	#/day	hrs/day	HP Bin	LF	g/hp-hr (CalEEMod)									Pounds per day						Metric tons per day			
							ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2e
2-RD	30	Drawdown Pump Generator	1	24.0	175	0.74	0.3	2.7	2.9	0.1	0.1	0.0	568.3	0.0	0.0	1.8	16.7	18.3	0.7	0.7	0.0	1.6	0.0	0.0	1.6
4-D	3	Excavators	1	10.0	175	0.382	0.2	2.5	3.1	0.1	0.1	0.0	482.7	0.2	0.0	0.3	3.2	3.9	0.2	0.1	0.0	0.3	0.0	0.0	0.3
4-D	3	Tractors/Loaders/Backhoes	1	10.0	175	0.369	0.3	2.8	3.1	0.1	0.1	0.0	477.9	0.2	0.0	0.3	3.4	3.8	0.2	0.2	0.0	0.3	0.0	0.0	0.3
4-D	3	Office Generator	1	12.0	25	0.74	0.7	4.6	2.5	0.2	0.2	0.0	568.3	0.1	0.0	0.5	3.1	1.7	0.1	0.1	0.0	0.2	0.0	0.0	0.2
5-AI	1	Bulldozers	1	10.0	250	0.429	0.4	5.0	1.6	0.2	0.2	0.0	483.4	0.2	0.0	0.9	11.8	3.8	0.4	0.4	0.0	0.5	0.0	0.0	0.5
5-AI	1	Tractors/Loaders/Backhoes	1	10.0	175	0.369	0.3	2.8	3.1	0.1	0.1	0.0	477.9	0.2	0.0	0.3	3.4	3.8	0.2	0.2	0.0	0.3	0.0	0.0	0.3
5-AI	1	Graders	1	5.0	175	0.409	0.6	6.0	3.7	0.3	0.3	0.0	489.0	0.2	0.0	0.4	4.1	2.5	0.2	0.2	0.0	0.1	0.0	0.0	0.2
5-AI	1	Excavators	2	10.0	175	0.382	0.2	2.5	3.1	0.1	0.1	0.0	482.7	0.2	0.0	0.6	6.4	7.8	0.3	0.3	0.0	0.6	0.0	0.0	0.6
6-E	20	Excavators	2	10.0	175	0.382	0.2	2.5	3.1	0.1	0.1	0.0	482.7	0.2	0.0	0.6	6.4	7.8	0.3	0.3	0.0	0.6	0.0	0.0	0.6
6-E	20	Tractors/Loaders/Backhoes	1	10.0	175	0.369	0.3	2.8	3.1	0.1	0.1	0.0	477.9	0.2	0.0	0.3	3.4	3.8	0.2	0.2	0.0	0.3	0.0	0.0	0.3
6-E	20	Bypass Pump Generator	1	24.0	50	0.74	0.8	4.2	4.1	0.2	0.2	0.0	568.3	0.1	0.0	2.3	12.2	11.8	0.6	0.6	0.0	0.7	0.0	0.0	0.8
7-LE	16	Excavators	1	5.0	175	0.382	0.2	2.5	3.1	0.1	0.1	0.0	482.7	0.2	0.0	0.2	1.6	1.9	0.1	0.1	0.0	0.1	0.0	0.0	0.1
7-LE	6	Tools Generator	1	4.0	15	0.74	0.7	4.6	3.6	0.2	0.2	0.0	568.3	0.1	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8-CIS	25	Excavators	1	10.4	175	0.382	0.2	2.5	3.1	0.1	0.1	0.0	482.7	0.2	0.0	0.3	3.3	4.0	0.2	0.1	0.0	0.3	0.0	0.0	0.3
8-CIS	25	Tractors/Loaders/Backhoes	1	10.4	175	0.369	0.3	2.8	3.1	0.1	0.1	0.0	477.9	0.2	0.0	0.3	3.5	4.0	0.2	0.2	0.0	0.3	0.0	0.0	0.3
8-CIS	25	Bulldozers	1	10.4	120	0.429	0.8	6.4	4.1	0.5	0.5	0.0	487.0	0.2	0.0	0.7	6.3	4.0	0.5	0.5	0.0	0.2	0.0	0.0	0.2
8-CIS	8	Tools Generator	1	4.2	15	0.74	0.7	4.6	3.6	0.2	0.2	0.0	568.3	0.1	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9-PBR	26	Excavators	2	10.0	175	0.382	0.2	2.5	3.1	0.1	0.1	0.0	482.7	0.2	0.0	0.6	6.4	7.8	0.3	0.3	0.0	0.6	0.0	0.0	0.6
9-PBR	26	Excavators	1	7.7	175	0.382	0.2	2.5	3.1	0.1	0.1	0.0	482.7	0.2	0.0	0.2	2.5	3.0	0.1	0.1	0.0	0.2	0.0	0.0	0.2
9-PBR	26	Tractors/Loaders/Backhoes	1	10.0	175	0.369	0.3	2.8	3.1	0.1	0.1	0.0	477.9	0.2	0.0	0.3	3.4	3.8	0.2	0.2	0.0	0.3	0.0	0.0	0.3
9-PBR	26	Tractors/Loaders/Backhoes	1	3.9	175	0.369	0.3	2.8	3.1	0.1	0.1	0.0	477.9	0.2	0.0	0.1	1.3	1.5	0.1	0.1	0.0	0.1	0.0	0.0	0.1
9-PBR	26	Bulldozers	1	10.0	120	0.429	0.8	6.4	4.1	0.5	0.5	0.0	487.0	0.2	0.0	0.7	6.0	3.9	0.5	0.5	0.0	0.2	0.0	0.0	0.2
9-PBR	26	Bulldozers	1	3.9	120	0.429	0.8	6.4	4.1	0.5	0.5	0.0	487.0	0.2	0.0	0.3	2.4	1.5	0.2	0.2	0.0	0.1	0.0	0.0	0.1
10-SR	7	Excavators	1	10.0	175	0.382	0.2	2.5	3.1	0.1	0.1	0.0	482.7	0.2	0.0	0.3	3.2	3.9	0.2	0.1	0.0	0.3	0.0	0.0	0.3
10-SR	7	Tractors/Loaders/Backhoes	1	10.0	175	0.369	0.3	2.8	3.1	0.1	0.1	0.0	477.9	0.2	0.0	0.3	3.4	3.8	0.2	0.2	0.0	0.3	0.0	0.0	0.3
4-BPG	58	Bypass Pump Generator	1	24	50	0.74	0.8	4.2	4.1	0.2	0.2	0.0	568.3	0.1	0.0	2.3	12.2	11.8	0.6	0.6	0.0	0.7	0.0	0.0	0.8
4-OG	58	Office Generator	1	12	25	0.74	0.7	4.6	2.5	0.2	0.2	0.0	568.3	0.1	0.0	0.5	3.1	1.7	0.1	0.1	0.0	0.2	0.0	0.0	0.2
4-DPG	54	Dewatering Pump Generator	1	24	15	0.74	0.7	4.6	3.6	0.2	0.2	0.0	568.3	0.1	0.0	0.5	3.6	2.8	0.2	0.2	0.0	0.2	0.0	0.0	0.2

Onsite Onroad Calculations

Code	Vehicle	Days	Veh/ Trip	RT Mi/ Veh	Pounds per day								Metric tons per day				Gal per day
					ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e	Fuel
1-MD	Dump Truck	92	1	40	0.3	1.8	0.5	0.0	0.0	1.2	0.1	0.0	0	0.0	0.0	0	14
1-MD	Water Truck	92	1	30	0.0	0.3	0.0	0.0	0.0	0.9	0.1	0.0	0	0.0	0.0	0	7
4-D	Boom Truck	3	1	40	0.0	0.4	0.1	0.0	0.0	1.2	0.1	0.0	0	0.0	0.0	0	9
4-D	Water Truck	3	1	30	0.0	0.3	0.0	0.0	0.0	0.9	0.1	0.0	0	0.0	0.0	0	7
5-AI	Water Truck	1	1	30	0.0	0.3	0.0	0.0	0.0	0.9	0.1	0.0	0	0.0	0.0	0	7
6-E	Water Truck	20	1	30	0.0	0.3	0.0	0.0	0.0	0.9	0.1	0.0	0	0.0	0.0	0	7
7-LE	Boom Truck	16	1	25	0.0	0.3	0.0	0.0	0.0	0.7	0.1	0.0	0	0.0	0.0	0	5
7-LE	Water Truck	16	1	30	0.0	0.3	0.0	0.0	0.0	0.9	0.1	0.0	0	0.0	0.0	0	7
7-LE	Welding Truck	16	1	50	0.1	0.2	0.4	0.0	0.0	1.5	0.1	0.0	0	0.0	0.0	0	8
8-CIS	Boom Truck	25	1	51	0.0	0.5	0.1	0.0	0.0	1.5	0.2	0.0	0	0.0	0.0	0	11
8-CIS	Vac Truck	25	1	51	0.0	0.5	0.1	0.0	0.0	1.5	0.2	0.0	0	0.0	0.0	0	11
8-CIS	Concrete Truck	25	1	32	0.0	0.3	0.0	0.0	0.0	0.9	0.1	0.0	0	0.0	0.0	0	7
9-PBR	Water Truck	26	1	30	0.0	0.3	0.0	0.0	0.0	0.9	0.1	0.0	0	0.0	0.0	0	7
10-SR	Welding Truck	7	1	50	0.1	0.2	0.4	0.0	0.0	1.5	0.1	0.0	0	0.0	0.0	0	8

Offsite Onroad Calculations

Code	Vehicle	Days	Trip/Day	RT Mi/Trip	Pounds per day								Metric tons per day				Gal per day
					ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e	Fuel
1-MD-RM1	Long-Distance Haul Truck	10	21	70	2.6	29.9	6.0	0.7	0.7	3.0	0.8	0.1	3	0.0	0.0	3	277
1-MD-MM	Long-Distance Haul Truck	7	2	132	0.5	5.3	1.1	0.1	0.1	0.5	0.1	0.0	1	0.0	0.0	1	50
1-MD-RM2	Long-Distance Haul Truck	7	15	70	1.8	21.3	4.3	0.5	0.5	2.1	0.5	0.0	2	0.0	0.0	2	198
1-MD-CM	Concrete Truck	5	2	70	0.0	0.3	0.0	0.0	0.0	0.3	0.1	0.0	0	0.0	0.0	0	13
10-D-D	Long-Distance Haul Truck	4	2	132	0.5	5.3	1.1	0.1	0.1	0.5	0.1	0.0	1	0.0	0.0	1	50

Employee Onroad Calculations

Code	Vehicle	Days	Trips/Day	One-Way Mi/Trip	Pounds per day								Metric tons per day				Gal per day
					ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e	Fuel
11-EC	Employee Auto	108	26	17	0.1	0.1	1.3	0.0	0.0	0.8	0.2	0.0	0	0.0	0.0	0	15

Helicopter Calculations

Code	Days	Hours/Day	Helicopter Type	Helicopter Name	Pounds per day								Metric tons per day			
					ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e
0-H	3	5	Heavy Lift	Typical T58-GE-5	19.2	57.8	67.5	8.2	7.3	0.0	0.0	7.2	11.6	0.0	0.0	11.7
0-HI	1	2	Heavy Lift	Typical T58-GE-5	7.7	23.1	27.0	3.3	2.9	0.0	0.0	2.9	4.6	0.0	0.0	4.7

Earth Moving Calculations Onsite

Code	Days	Grading (acres/day)	Cut/fill (cy/day)	Dozing (hour/day)	Emission Factor						Pounds per day	
					PM10 G (lb/acre)	PM2.5 G (lb/acre)	PM10 C/F (lb/ton)	PM2.5 C/F (lb/ton)	PM10 Doz (lb/hr)	PM2.5 Doz (lb/hr)	PM10 D	PM2.5 D
3-MS	6	0.00	49	0.0	1.1	0.115	0.000	0.000	0.8	0.4	0.0	0.0
4-D	3	0.00	49	0.0	1.1	0.115	0.000	0.000	0.8	0.4	0.0	0.0
5-AI	1	0.00	49	10.0	1.1	0.115	0.000	0.000	0.8	0.4	7.5	4.1
6-E	20	0.00	49	0.0	1.1	0.115	0.000	0.000	0.8	0.4	0.0	0.0
7-LE	16	0.00	49	0.0	1.1	0.115	0.000	0.000	0.8	0.4	0.0	0.0
8-CIS	25	0.00	49	10.4	1.1	0.115	0.000	0.000	0.8	0.4	7.8	4.3
9-PBR	26	0.00	49	13.9	1.1	0.115	0.000	0.000	0.8	0.4	10.5	5.8
10-SR	7	0.11	0	0.0	1.1	0.115	0.000	0.000	0.8	0.4	0.1	0.0

Paving Calculations Location Onsite

Code	Year	Days	Paved (sf/day)	Emission Factor	Pounds
				ROG (lbs per acre)	ROG
10-SR	2019	7	14	2.6	0.0