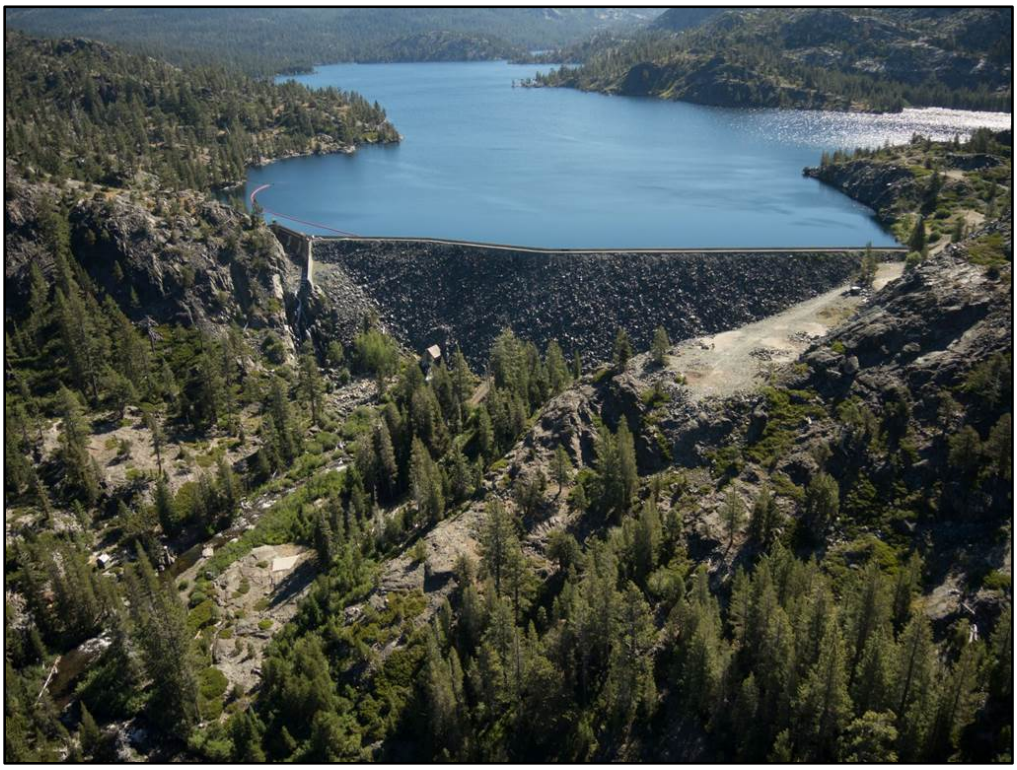
INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

LAKE FORDYCE DAM
SEEPAGE MITIGATION PROJECT



STATE WATER RESOURCES CONTROL BOARD

CALIFORNIA
Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

September 2020

Contents

Page

1 Introduction 1-1

1.1 Intent and Scope of this Document 1-1

1.2 Public Involvement Process 1-1

1.3 Organization of this Document 1-2

1.4 Impact Terminology 1-3

2 Project Description 2-1

2.1 Introduction 2-1

2.1.1 Project Location 2-1

2.1.2 Existing Dam and Reservoir Design Characteristics 2-4

2.1.3 Current Reservoir Operations 2-4

2.1.4 Project Background and Planning 2-5

2.2 Proposed Project 2-6

2.2.1 Schedule 2-6

2.2.2 Proposed Project Components Overview 2-8

2.2.3 Access Road Improvements 2-8

2.2.4 Cofferdam and Outlet Diversion 2-15

2.2.5 Lake Fordyce Dam Seepage Repair Actions 2-21

2.2.6 Construction Equipment 2-25

2.2.7 Equipment and Material Deliveries 2-25

2.2.8 Power and Water Sources during Construction 2-29

2.2.9 Staging, Stockpile, and Disposal Areas 2-29

2.3 Geotechnical Investigations 2-30

2.3.1 Upstream Concrete Face Exploration 2-30

2.3.2 Test Pits/Trenches for Seepage Berm, Concrete Plinth, and Debris-Laden Fill 2-30

2.3.3 Packer Tests 2-31

Contents

2.3.4 Soil Borings and Test Pits at Abandoned LLO 2-31
2.4 Demobilization and Site Restoration 2-32
2.4.1 Seasonal Demobilization Activities 2-32
2.4.2 End of Construction Demobilization 2-32
2.5 Reservoir Drawdown and Work Area Dewatering 2-33
2.5.1 Initial Lake Fordyce Drawdown 2-33
2.5.2 Work Area Dewatering 2-33
2.5.3 Subsequent Construction Seasons 2-33
2.5.4 Reservoir Refilling 2-34
2.5.5 Maintenance of Instream Flow Release During Construction 2-35
2.6 Water Quality Control Practices 2-35
2.6.1 Management Actions to Control the Release of Turbidity to Fordyce Creek 2-35
2.6.2 Management Actions to Control the pH during Grouting Operations 2-39
2.7 Other Construction Details 2-41
2.7.1 Construction Hours 2-41
2.7.2 Public Access during Construction 2-41
2.8 Permits and Approvals 2-42
3 Environmental Evaluation 3-1
3.1 Environmental Factors Potentially Affected 3-1
3.2 Aesthetics 3-3
3.2.1 Environmental Setting 3-3
3.2.2 Discussion 3-5
3.3 Agricultural and Forestry Resources 3-8
3.3.1 Environmental Setting 3-9
3.3.2 Discussion 3-11
3.4 Air Quality 3-13
3.4.1 Environmental Setting 3-13

3.4.2 Discussion 3-17
3.5 Biological Resources 3-27
3.5.1 Environmental Setting 3-28
3.5.2 Discussion 3-30
3.6 Cultural Resources 3-61
3.6.1 Environmental Setting 3-62
3.6.2 Discussion 3-71
3.7 Energy 3-77
3.7.1 Environmental Setting 3-77
3.7.2 Discussion 3-77
3.8 Geology and Soils 3-80
3.8.1 Environmental Setting 3-81
3.8.2 Discussion 3-83
3.9 Greenhouse Gas Emissions 3-87
3.9.1 Environmental Setting 3-87
3.9.2 Discussion 3-89
3.10 Hazards and Hazardous Materials 3-94
3.10.1 Environmental Setting 3-95
3.10.2 Discussion 3-96
3.11 Hydrology and Water Quality 3-102
3.11.1 Environmental Setting 3-103
3.11.2 Discussion 3-106
3.12 Land Use Planning 3-124
3.12.1 Environmental Setting 3-124
3.12.2 Discussion 3-125
3.13 Mineral Resources 3-127
3.13.1 Environmental Setting 3-127
3.13.2 Discussion 3-128
3.14 Noise 3-130

Contents

3.14.1 Environmental Setting 3-130
3.14.2 Discussion 3-132
3.15 Population and Housing 3-136
3.15.1 Environmental Setting 3-136
3.15.2 Discussion 3-136
3.16 Public Services 3-138
3.16.1 Environmental Setting 3-138
3.16.2 Discussion 3-139
3.17 Recreation 3-141
3.17.1 Environmental Setting 3-141
3.17.2 Discussion 3-142
3.18 Transportation 3-145
3.18.1 Environmental Setting 3-145
3.18.2 Discussion 3-146
3.19 Tribal Cultural Resources 3-150
3.19.1 Environmental Setting 3-151
3.19.2 Discussion 3-154
3.20 Utilities and Service Systems 3-155
3.20.1 Environmental Setting 3-156
3.20.2 Discussion 3-157
3.21 Wildfire 3-161
3.21.1 Environmental Setting 3-162
3.21.2 Discussion 3-164
3.22 Mandatory Findings of Significance 3-168
4 References 4-1
5 List of Preparers 5-1

List of Tables

Table 2-1 Proposed Project Improvements and Activities 2-11
Table 2-2 Approximate Excavation and Fill Quantities for Seepage Repair 2-26
Table 2-3 Turbidity Control Measures for Construction 2-36
Table 2-4 Potential Permits and Approvals 2-43
Table 3.4-1 NSAQMD and PCAPCD Thresholds of Significance 3-15
Table 3.4-2 Maximum Daily Construction-Related Emissions 3-20
Table 3.5-1 Field Surveys to Identify Protected Biological Resources 3-29
Table 3.5-2 Special-Status Plants with the Potential to Occur in the Project Area 3-31
Table 3.5-3 Special-Status Wildlife with the Potential to Occur in the Project Area 3-35
Table 3.5-4 Potential Additional Spill at Lake Spaulding 3-49
Table 3.6-1 Cultural Resources in the Study Area 3-65
Table 3.9-1 Maximum Daily Construction-Related Emissions 3-90
Table 3.9-2 Potential Water Spillage 3-91
Table 3.9-3 Potential GHG Emissions Increase 3-92
Table 3.11-1 Summary of Numeric Basin Plan Water Quality Objectives to Protect Beneficial Uses 3-108
Table 3.11-2 Summary of Narrative Basin Plan Water Quality Objectives to Protect Beneficial Uses 3-110
Table 3.11-3 Construction Activities that May Impact Water Quality Objectives 3-112
Table 3.11-4 Severity of Ill-Effects for Impacts on Fish and Physical Habitat in Freshwater Systems 3-117
Table 3.14.1 Representative Vibration Source Levels for Construction Equipment 3-134
Table 3.20-1 Water Deliveries from Fordyce Reservoir 2010-2019 3-158

List of Figures

Figure 2-1 Project Location 2-2
Figure 2-2 Project Area and Land Ownership Boundaries 2-3
Figure 2-3 Dam Work Area Components 2-9
Figure 2-4 Access Road 2-12
Figure 2-5 Cofferdam Details 2-19
Figure 2-6 Cross Section of Excavation 2-22

Figure 2-7 Seepage Repair Cross Section 2-24
Figure 2-8 Potential Helicopter Landing Zone and Materials Staging 2-28
Figure 2-9 Water Quality Control during Cofferdam Construction 2-38
Figure 2-10 Downstream pH Control Configuration 2-40
Figure 3.5-1 Theoretical Lake Fordyce Drawdown for Below Normal Water Year 3-45
Figure 3.5-2 Theoretical Lake Fordyce Drawdown for an Above Normal Water Year 3-45
Figure 3.5-3 Flow in the South Yuba River at Lang's Crossing – 2009 to 2019 (USGS 11414250) 3-50
Figure 3.21-1 Fire Hazard Severity Zones in the Project Area 3-163

List of Appendices

Appendix A 90% Access Road Design Drawings
Appendix B Mitigation, Monitoring, and Reporting Plan (to be included in Final)
Appendix C Technical Memorandum – Hydrology and Water Quality
Appendix D Technical Memorandum – Estimation of Turbidity During Dewatering

Acronyms and Abbreviations

AADT	Annual Average Daily Traffic
AB 32	Assembly Bill 32
AB 52	Assembly Bill 52
AF	acre-foot (acre-feet)
AMM	avoidance and minimization measure
AP-42	EPA Compilation of Air Pollutant Factors
ARB	California Air Resources Board
BCR	Browning Cultural Resources
BMP	best management practice
B.P.	Before Present
BSA	Boy Scouts of America
CAAQS	California Ambient Air Quality Standards
Cal4Wheel	California Four Wheel Drive Association
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
C.F.R.	Code of Federal Regulations
cfs	cubic feet per second
CH_4	methane
CNDDB	California Natural Diversity Database
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2-equivalents
CRHR	California Register of Historic Resources
dBA	A-weighted sound level
dbh	diameter at breast height
DOC	California Department of Conservation
DSOD	California Department of Water Resources, Division of Safety of Dams
DTSC	California Department of Toxic Substances Control
EAP	Energy Action Plan
EOP	Emergency Operations Plan
EPA	U.S. Environmental Protection Agency
°F	degrees Fahrenheit

Acronyms and Abbreviations

FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FRA	Federal Responsibility Area
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
HDPE	high-density polyethylene
I-80	Interstate 80
IFR	instream flow requirement
IS/MND	Initial Study/Mitigated Negative Declaration
L_{dn}	day/night average sound level
L_{eq}	equivalent noise level
LLO	low-level outlet
MCAB	Mountain Counties Air Basin
µg/L	microgram per liter
mg/L	milligrams per liter
ml	milliliter
MT	metric tons
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Grave Protection and Repatriation Act
NAHC	California Native American Heritage Commission
NCIC	North Central Information Center
NID	Nevada Irrigation District
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSAQMD	Northern Sierra Air Quality Management District
NTU	nephelometric turbidity units
OA	Operational Area
OEHHA	California Office of Environmental Health Hazard Assessment
OHV	off-highway vehicle
Ozone Plan	Ozone Attainment Plan for Western Nevada County
PAC	Protected Activity Center
PCAPCD	Placer County Air Pollution Control District
PCTPA	Placer County Transportation Planning Agency

PCWA	Placer County Water Agency
PFC	perfluorocarbon
PG&E	Pacific Gas and Electric Company
PCSP	Placer County Sustainability Plan
PM	particulate matter
PM_{10}	PM equal to or less than 10 micrometers in diameter
$PM_{2.5}$	PM equal to or less than 2.5 micrometers in diameter
Proposed Project	Lake Fordyce Dam Seepage Mitigation Project
ROG	reactive organic gases
RSA	Records Search Area
SB 32	Senate Bill 32
SEV	“severity-of-ill-effect” scores
SEV Model	SEV ranking model
SF_6	sulfur hexafluoride
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMARA	Surface Mining and Reclamation Act of 1975
SO_2	sulfur dioxide
SPI	Sierra Pacific Industries
SRA	State Responsibility Area
SWPPP	storm water pollution prevention plan
TAC	toxic air contaminants
TCR	tribal cultural resource
TMDL	total maximum daily load
UAIC	United Auburn Indian Community of the Auburn Rancheria
USDOT	U.S. Department of Transportation
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VMT	vehicle miles traveled

This page intentionally left blank.

1 INTRODUCTION

The State Water Resources Control Board (State Water Board) has prepared this Initial Study/Mitigated Negative Declaration (IS/MND) to provide the public, responsible agencies, and trustee agencies with information about the potential environmental effects of Pacific Gas and Electric Company's (PG&E), Lake Fordyce Dam Seepage Mitigation Project (Proposed Project). Lake Fordyce Dam is located in Nevada County approximately 17 miles west of Truckee, California. The Proposed Project is described in detail in Chapter 2, "Project Description." This document has been prepared in accordance with the requirements of the California Environmental Quality Act (CEQA) of 1970 (Pub. Resources Code, § 21000 et seq.) and the CEQA Guidelines (Cal. Code Regs., tit. 14, § 15000 et seq.). This IS/MND relies on expert opinion, technical studies, and other evidence to substantiate its findings.

1.1 Intent and Scope of this Document

This IS/MND reflects an evaluation at a project level (Cal. Code Regs., tit. 14, § 15378). The State Water Board, as the CEQA Lead Agency, will consider the Proposed Project's potential environmental impacts when determining whether to approve it. The intent of this IS/MND is to provide the public and decision-making agencies with information about the environmental impacts that could result from Proposed Project implementation.

This IS/MND describes the Proposed Project and its environmental setting, including existing conditions; identifies the Proposed Project's potential environmental impacts and presents mitigation measures that will be implemented to avoid, reduce, or mitigate potentially significant impacts.

1.2 Public Involvement Process

Public involvement is an integral part of the CEQA environmental review process. CEQA requires the disclosure of information about the Proposed Project to the public and agency decision-makers, and seeks to foster public participation and informed decision making.

The CEQA Guidelines (Cal. Code Regs., tit. 14, §§ 15073, 15105, subd. (b)) require that the lead agency designate a period during the IS/MND process when the public and other agencies can provide comments on a potential project's impacts. Accordingly, the State Water Board is circulating this document for a **30-day public and agency review period**.

All comments received by the date identified for closure of the public comment period in the Notice of Intent will be considered by the State Water Board during development of the Final IS/MND. Comments can be submitted electronically or by mail to:

Email: WR401Program@waterboards.ca.gov

or

State Water Resources Control Board
Division of Water Rights – Water Quality Certification Program
Attn: Mr. Jordan Smith
P.O. Box 2000
Sacramento, CA 95812-2000

1.3 Organization of this Document

This IS/MND contains the following components:

- **Chapter 1 – Introduction:** Provides a brief description of the intent and scope of this IS/MND, the public involvement process under CEQA, and the organization of and terminology used in this IS/MND.
- **Chapter 2 – Project Description:** Summarizes the Proposed Project, including existing and proposed facilities; project components; construction approach and planned activities; and relevant required permits and approvals.
- **Chapter 3 – Environmental Evaluation:** Includes an environmental setting description for each resource topic and identifies the Proposed Project's anticipated environmental impacts, as well as any mitigation measures that would be required to reduce potentially significant impacts to a less than-significant level. This Chapter also includesenvironmental checklist used to assess the Proposed Project's potential environmental effects, which is based on the model provided in Appendix G of the CEQA Guidelines.
- **Chapter 4 – References:** Provides a bibliography of printed references, websites, and personal communications used in preparing this IS/MND.
- **Chapter 5 – List of Preparers:** Provides a list of the individuals involved in preparing the IS/MND as well as their responsibilities.

1.4 Impact Terminology

This IS/MND uses the following terms to describe the environmental effects of the Proposed Project:

- **No Impact**: This finding is made when the analysis concludes that the Proposed Project would not affect a particular environmental resource or issue.
- **Less than Significant**: This finding is made when the analysis concludes that the Proposed Project would have no substantial adverse environmental impact and no mitigation is needed.
- **Less than Significant with Mitigation Incorporated**: This finding is made when the analysis shows that the Proposed Project would have no substantial adverse environmental impact with inclusion of the mitigation measure described, thereby reducing an otherwise potentially significant impact to less than significant.
- **Potentially Significant**: This finding is made when the analysis concludes that the Proposed Project could have a substantial adverse effect on the environment. This finding is appropriate when mitigation does not reduce the severity of the effect to less than significant.
- **Mitigation**: Mitigation refers to specific measures or activities to avoid or reduce the severity of potentially significant impacts, or compensate for potentially significant impacts associated with implementation of the Proposed Project.
- **Cumulative Impact**: Cumulative impacts are impacts that potentially could result when a change in the environment results from the incremental impact of a Proposed Project when added to other related past, present, or reasonably foreseeable future projects. Significant cumulative impacts may result from individually minor but collectively significant projects.

This page intentionally left blank.

2 PROJECT DESCRIPTION

2.1 Introduction

Lake Fordyce Dam is a 156-foot-high, 1,220-foot-long soil and rock-fill dam with a concrete liner on the upstream face, impounding Fordyce Creek to form Lake Fordyce. Lake Fordyce is operated at a maximum reservoir elevation of 6,341 feet.[1] The reservoir has a water storage capacity of 49,903 acre-feet (AF).[2] Inflow to Lake Fordyce is fed by Meadow Lake, Sterling Lake, and White Rock Lake (often referred to as the "upper lakes" or reservoirs), as well as unregulated inflow from rain and snowmelt within its watershed. The drainage area feeding Lake Fordyce encompasses approximately 31.7 square miles, inclusive of the three upstream reservoirs.

The dam and reservoir are part of PG&E's Drum-Spaulding Hydroelectric Project, under the jurisdiction of the Federal Energy Regulatory Commission (FERC), Project Number 2310. Lake Fordyce Dam does not have hydropower production, but does provide seasonal water storage and regulates flow for uses downstream, including but not limited to power production, irrigation, municipal and domestic consumption. No water conveyance system is associated directly with Lake Fordyce Dam. Water released from Lake Fordyce flows into Fordyce Creek, which then drains to PG&E's Lake Spaulding.

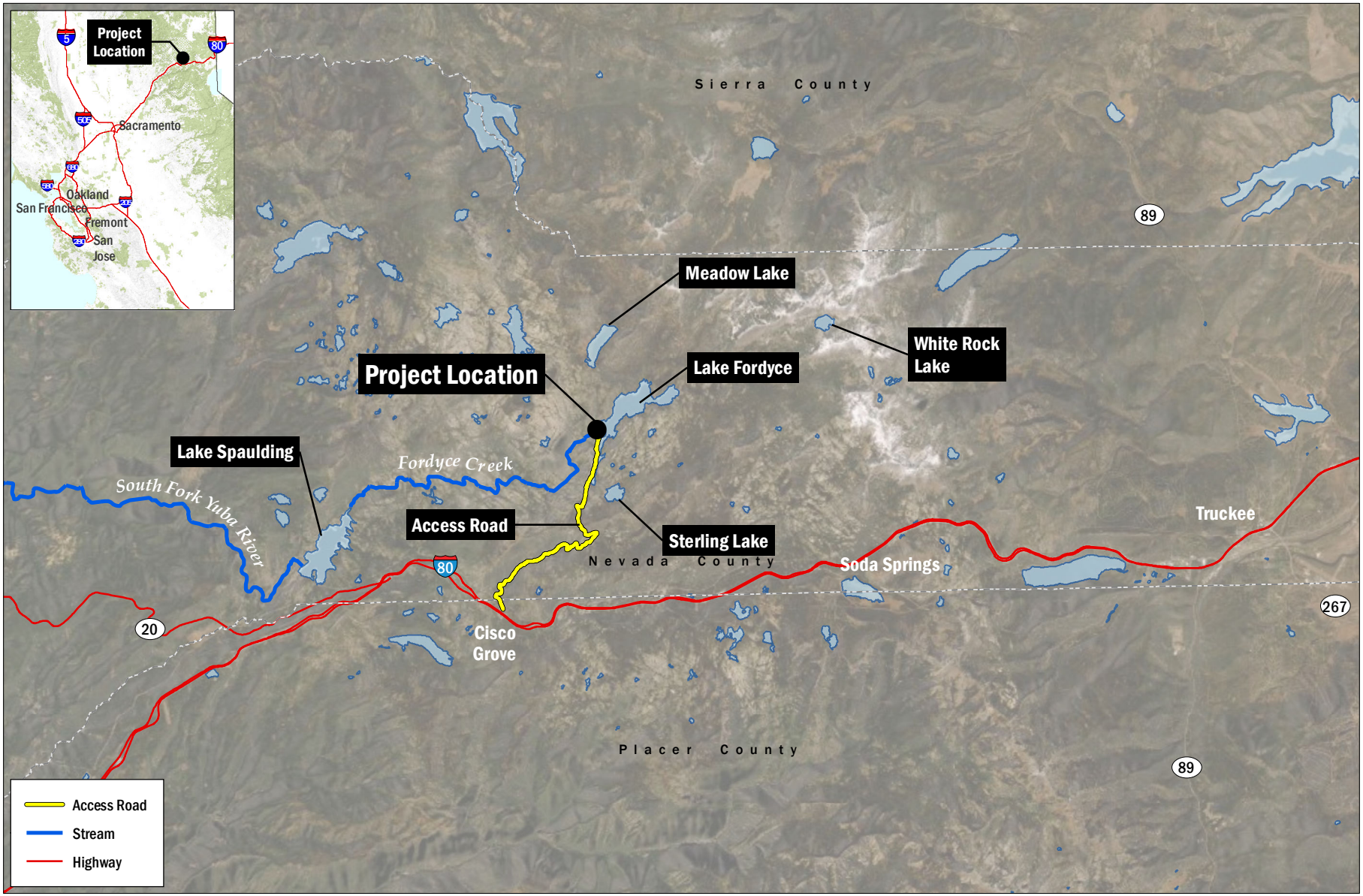
2.1.1 Project Location

Lake Fordyce Dam is located on Fordyce Creek, a tributary of the South Fork of the Yuba River, in Nevada County. The dam is about 7 miles northwest of Soda Springs, California, and about 17 miles west-northwest of Truckee, California (see Figure 2-1). The project area, where construction-related activities would occur, includes the construction limits surrounding Lake Fordyce Dam and reservoir and the access route from Interstate 80 (I-80). The dam is approximately 8 miles from the Cisco Grove exit off of I-80. The project area includes lands owned by PG&E (the dam and area surrounding Lake Fordyce), the United States Forest Service (USFS), and other private owners along the access road, including Sierra Pacific Industries (SPI) (Figure 2-2).

---

[1] Elevation data on project plans are shown using PG&E Datum. PG&E Datum = National Geodetic Vertical Datum of 1929 (Sea Level Datum of 1929) – 64.1 feet.

[2] An acre-foot is a sheet of water 1 acre in area and 1 foot in depth, with a volume of 43,560 cubic feet.



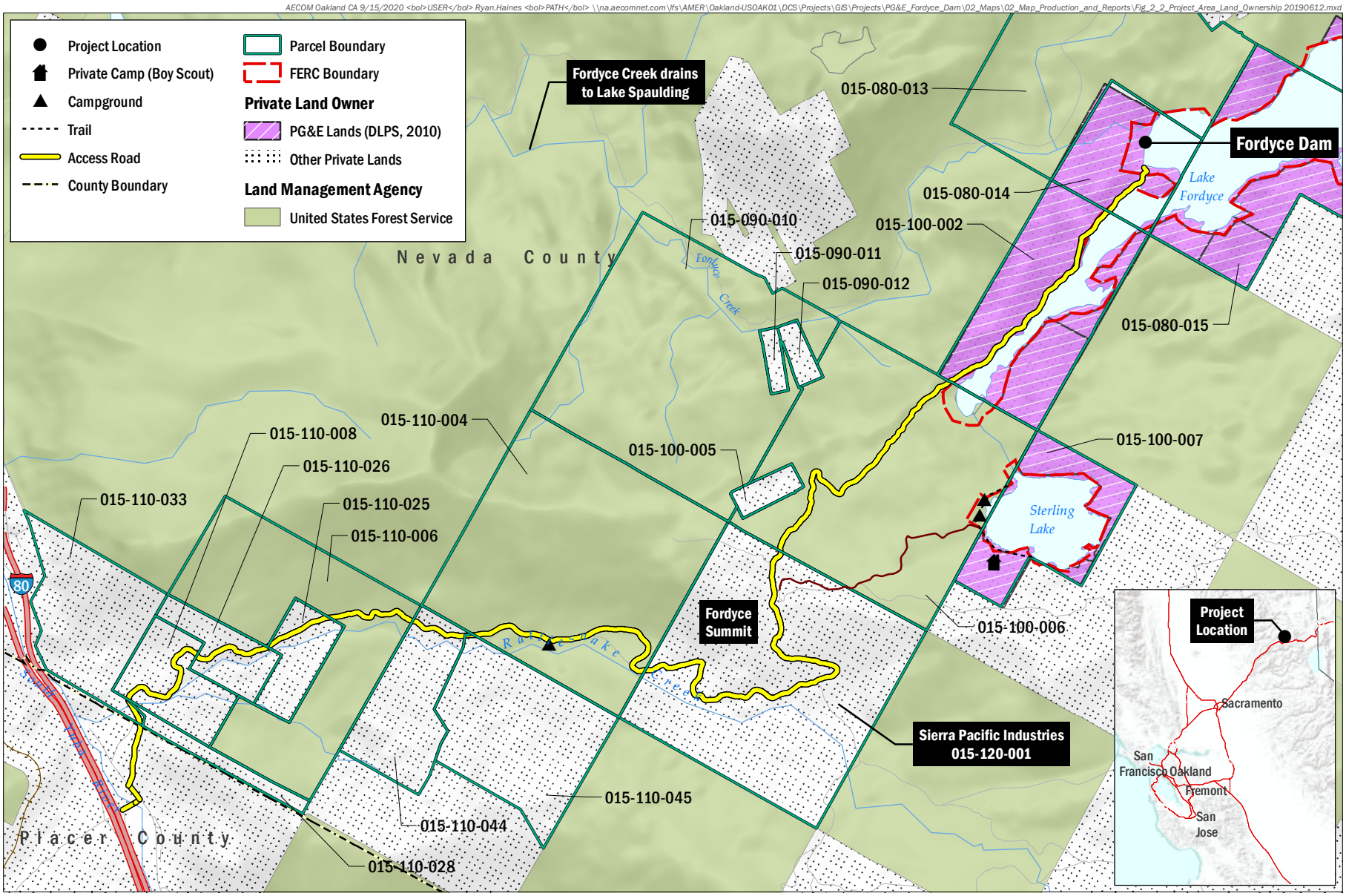
Imagery Source: Esri, 2019

AECOM

Lake Fordyce Dam Seepage Mitigation Project

FIGURE 2-1

Project Location



AECOM

Lake Fordyce Dam Seepage Mitigation Project

FIGURE 2-2

Project Area and Land Ownership Boundaries

The dam site would be accessed via an approximately 8-mile-long existing unimproved road that begins at Hampshire Rocks Road, off I-80 in Placer County. Although a portion of this access road (approximately 1,400 feet) is in Placer County, the only Proposed Project activity that would occur in Placer County is driving on existing roads to Lake Fordyce Dam. All other Proposed Project activities would occur in Nevada County. Therefore, the analyses of environmental factors in this document focus on Nevada County and extend to Placer County only where environmental factors in Placer County could be impacted.

2.1.2 Existing Dam and Reservoir Design Characteristics

Lake Fordyce Dam was initially constructed between 1873 and 1882, from locally sourced soil and rock material to an approximate height of 96 feet. Lake Fordyce Dam was subsequently raised with additional rock fill between 1924 and 1925, bringing the dam to its current dimensions of 156 feet in height and crest length of 1,220 feet. The reservoir discharges through a low-level outlet (LLO) at the base of the right abutment of the dam. The LLO is a steel pipe with an inside diameter of 47 inches and a manually operated needle valve on the downstream side. The LLO is used continuously throughout the year to satisfy downstream water supply requirements and maintain the minimum instream flow requirement (IFR) as specified in the Drum-Spaulding Hydroelectric Project, FERC license No. 2310. The LLO has been reported to have a maximum design discharge capacity of 590 cubic feet per second (cfs); however, because of the age of the LLO and recently observed outflow data, the LLO is assumed to have a maximum discharge capacity of 490 cfs.

Lake Fordyce Dam includes a 120-foot-long by 28-foot-wide side channel spillway at the right abutment (on the right side of the dam looking downstream). The spillway section of Lake Fordyce Dam has a spill crest elevation of 6,332 feet and is controlled with two 15-foot-high by 14-foot-wide radial gates at the head of the spillway. During the spring and summer months, up to 9 feet of flashboards are typically installed in the spillway to provide additional water storage, raising the maximum reservoir storage elevation to approximately 6,341 feet. The spillway can discharge a maximum of 20,630 cfs.

2.1.3 Current Reservoir Operations

Annual reservoir operations at Lake Fordyce are controlled by license requirements of the Drum-Spaulding Hydroelectric Project, FERC Project No. 2310. Per the Drum-Spaulding Hydroelectric Project license, the IFR in Fordyce Creek below Lake Fordyce

Dam must be maintained at a minimum of 5 cfs at all times. Furthermore, a minimum of 3,000 AF of water storage must be kept in the reservoir.

Water storage in Lake Fordyce typically peaks around May or June due to snowmelt runoff. According to PG&E records, the reservoir has spilled in 29 of the past 32 years (1989–2020). Mean daily flows during spills have peaked at approximately 7,400 cfs. Reservoir drawdown of Lake Fordyce is typically started after risk of spill at Lake Spaulding has subsided and continues until minimum pool is reached. Past drawdowns have started as early as April or as late as July. During drawdown, water releases to Fordyce Creek are usually between 200 and 400 cfs but can be as high as 490 cfs.

2.1.4 Project Background and Planning

Lake Fordyce Dam has a long history of seepage.[3] At full reservoir capacity, the dam currently seeps at a rate between 23 to 60 cfs and varies with reservoir level. The following key dam design attributes are believed to contribute to the known seepage pathways that the Proposed Project is intended to address:

- the historic Fordyce Creek thalweg[4] near the left groin[5] (on the left side of the dam looking downstream);
- the original LLO, which was abandoned in 1911 (discussed further below); and
- the upstream face/concrete liner of the dam.

According to PG&E operating records, the downstream toe[6] of the left groin has experienced seepage discharge since the dam was constructed. This seepage is believed to originate primarily from the upstream toe of the dam, where it intersects with the historic thalweg of Fordyce Creek. The upstream toe of the dam originally was constructed of erodible material in the thalweg of Fordyce Creek. To address seepage associated with the upstream toe, a “cutoff wall” was constructed along the upstream toe of the dam in 1911. The cutoff wall was constructed in difficult conditions and does not

[3] Seepage is defined as “the slow escape of a liquid or gas through porous material or small holes.”

[4] The thalweg is the lowest point along the course of a river or creek

[5] The groin is the area along the contact, or intersection, of the face of a dam with the ground surface along the sides of the dam.

[6] The downstream toe is the junction of the downstream face of a dam with the natural ground surface.

tie into bedrock at several locations along its foundation. Areas where the cutoff wall does not connect to bedrock are believed to continue to enable pathways for seepage.

Construction of the 1911 cutoff wall required abandoning the original LLO, which was situated near the thalweg of Fordyce Creek. A new LLO was constructed on the right side of the dam, and abandonment of the original LLO included plugging the outlet with concrete grout. In addition to the seepage paths along the cutoff wall, seepage paths are believed to have subsequently formed through and around the long-abandoned original LLO.

The upstream concrete face of the dam has been repaired several times over the dam's lifetime. Previous repairs, including patching the concrete facing joints, have resulted in temporary reductions in measured seepage rates. However, such repairs have not provided a permanent reduction in seepage rates.

Lake Fordyce Dam and reservoir are under the jurisdiction of the California Department of Water Resources, Division of Safety of Dams (DSOD). In 2005, DSOD instituted a seepage threshold of 30 cfs for Lake Fordyce Dam. DSOD indicated to PG&E that if the threshold was exceeded in the future, PG&E would need to revisit the seepage issue and consider potential mitigation. Seepage at Lake Fordyce Dam exceeded the threshold in November 2011. Accordingly, in 2012 DSOD required PG&E to submit a plan and schedule to mitigate the seepage. The Proposed Project, described in detail in the following sections, is the result of multiple years of planning and engineering analysis by PG&E.

2.2 Proposed Project

The purpose of the Proposed Project is to improve the safety of Lake Fordyce Dam by providing a permanent dam repair to reduce seepage in accordance with DSOD requirements. The following sections present details about the Proposed Project components and activities.

2.2.1 Schedule

Work at Lake Fordyce Dam is expected to occur over an approximately 12-week window, between mid-July and mid-October of each construction year. Specific seasonal duration of each construction year would be informed by weather conditions and annual water year type (e.g., snowpack). If conditions allow, work may begin earlier in the season if the access road is passable and reservoir drawdown is complete before July. Outside of the

annual construction window, the dam would function and perform in its normal and safe capacity, where PG&E under normal operating conditions draws the reservoir down to it permitted minimum pool elevation. Likely year-by-year construction sequences would include the following activities:

Construction Year One (once reservoir drawdown is complete):

- access road improvements;
- mobilization and establishment of staging/laydown areas;
- cofferdam construction and in-stream flow bypass system installation;
- dewatering of the work area;
- geotechnical exploration and testing;
- investigation of abandoned LLO;
- initial plinth and grout curtain construction;
- grading of a portion of the seepage berm and placement of granular fill pad material; and
- rewatering of the work area.

Construction Year Two (once reservoir drawdown is complete):

- lowering Lake Fordyce to minimum pool;
- maintenance of road improvements and in-stream flow bypass system;
- dewatering of the work area;
- completion of the plinth and grout curtain construction;
- completion of the seepage berm and placement of granular fill pad material;
- installation of anchorage for the impermeable liner;
- installation of a portion of the impermeable liner; and
- rewatering of the work area.

Construction Year Three (once reservoir drawdown is complete):

- maintenance of road improvements and in-stream flow bypass system;
- dewatering of the work area;
- performance of selected grouting to the abandoned LLO;
- completion of the liner installation;
- completion of site restoration;
- rewatering of the work area.
- Removal of cofferdam bin-walls

At the end of the last construction season, all equipment and construction-related buildings and materials would be removed from the work area and staging areas, the temporary gaging and data collection and water treatment facilities downstream from the dam would be removed, and the cofferdam bin-walls would be removed. PG&E would leave the cofferdam rock materials in the reservoir following completion of construction.

Cofferdam bin-wall removal may not be possible at the end of the third construction year if weather conditions, such as early snowfall, do not provide adequate time to remove the bin-walls. If necessary, this would occur during a fourth year following the annual reservoir drawdown. This possible fourth year of activity would include maintenance of road improvements, as necessary, for equipment access.

2.2.2 Proposed Project Components Overview

An overview of the Proposed Project components is shown in Table 2-1 (on the third page following). The Proposed Project would consist of access road improvements, construction of a cofferdam and setting up work area components for dewatering and staging, a geotechnical investigation, and the seepage repair. These components are described in more detail in the following sections. The work area components surrounding the dam are shown in Figure 2-3. All construction would occur while the reservoir is maintained at or below its license-required minimum pool elevation of 6,245 feet (approximately 3,000 AF of water). PG&E will pursue a FERC license variance for all Proposed Project items that require deviation from the FERC license conditions.

2.2.3 Access Road Improvements

The dam and reservoir are accessed by exiting I-80 at Cisco Grove, then following Cisco Road to Hampshire Rocks Road (a Placer County road). From Hampshire Rocks Road, the work area is accessed via Rattlesnake Road, also known as USFS Road 85, which transitions to USFS Road 85-02 and then to USFS Road 85-02-01 at Fordyce Summit. Together, USFS Roads 85-02 and 85-02-01 are known as Lake Fordyce Road (Figure 2-4 on the fourth page following). Rattlesnake Road and Lake Fordyce Road (generally referred to as the access road in this document) cross private property and lands administered by USFS. Magonigal Road intersects with Lake Fordyce Road south of Fordyce Summit, and Sterling Lake Road intersects with Lake Fordyce Road near Fordyce Summit. Magonigal Road would be used intermittently to access staging areas and Sterling Lake Road would be used intermittently to obtain water from Sterling Lake for dust control.

AECOM Seattle WA 6/12/2019 USER: a.cambell PATH: J:\DCS Resources\GIR\Projects\60597564 Furnace Dam\60597564_04.indd

N

100' 0 100' 200'

1"=100'

CONSTRUCTION ZONE LIMITS, A = 50.0 ACRES

6310

6285

6260

LAKE FORDYCE SURFACE AREA LIMITS AT WSEL 6245.4

18" DIA SDR 32.5 HDPE TEMP IFR PIPELINE, PROVIDE ANCHORS AT 100-FT INTERVALS PER DWG C-7

REMOVE DOWNSTREAM 150-FT OF PIPING AND REPLACE EACH SEASON

TEMP BARGE-MOUNTED IFR PUMP STATION WITH REDUNDANT PERMEABLE TURBIDITY CURTAINS

EXIST SPILLWAY

FOR PERMANENT DAM IMPROVEMENTS, SEE NOTE 1

COFFERDAM

GROUTED RIPRAP SPILL APRON

DEWATERED WORK SPACE

NOTE: FOR ILLUSTRATIVE PURPOSES ONLY. SEE CIVIL DRAWINGS FOR DETAILS AND DIMENSIONS OF PROPOSED TEMPORARY CONSTRUCTION PROVISIONS.

EXIST YB-200 FLOW GAGING STATION

IMPROVED ACCESS TRAIL

BYPASS/CONTROL VALVE STATION

BYPASS PIPE SYSTEM

IMPERMEABLE MEMBRANE WITH BALLAST

LAKE FORDYCE SURFACE AREA LIMITS AT WSEL 6245.4

INSTALL 48" HDPE PIPE FOR WATER QUALITY MANAGEMENT DURING GROUTING OPERATIONS

FORDYCE CREEK

EXIST 42" LLO DISCHARGE VALVE

FORDYCE DAM

6285

IMPROVED ACCESS ROUTES SURFACED WITH AGG BASE, 25% MAX SLOPE

CONNECT TO EXIST LLO INLET

6260

6335

EXIST HELI-PAD / LANDING ZONE

TEMP WATER QUALITY MANAGEMENT BASIN

ELEC CONDUCTORS TO TEMP PUMP STATION

SETTLING AREA FOR DEWATERING DISCHARGE WITH REDUNDANT PERMEABLE TURBIDITY CURTAINS

6260

STAGING AREA A = 1.13 ACRES

6285

6260

DIESEL-POWERED GENERATORS AND FUEL STORAGE

STAGING AREA A = 1.25 ACRES

6310

PROPOSED HELI-PAD / LANDING ZONE

CONSTRUCTION ZONE LIMITS, A = 50.0 ACRES

6335

CONSTRUCTION ZONE LIMITS, A = 50.0 ACRES

FORDYCE LAKE RD

6260

STERLING CREEK

FORDYCE DAM SEEPAGE MITIGATION ACCESS ROAD IMPROVEMENTS

NOTES:

1. REFER TO "IMPROVEMENT PLANS/SPECIFICATIONS FOR SEEPAGE MITIGATION LOCATED AT LAKE FORDYCE DAM - 95% SUBMITTAL," PREPARED BY SAGE ENGINEERS, INC., DATED OCTOBER 2018 FOR DEFINITION OF PRESCRIPTIVE SEEPAGE IMPROVEMENTS AND CONSTRUCTION REQUIREMENTS.
2. TOPOGRAPHIC MAPPING USED IS PER DEVINE TARBELL & ASSOCIATES, INC. TITLED "FULL RESERVOIR BATHYMETRIC SURVEY," DATED 2009. 5-FT CONTOUR INTERVALS.
3. CONSTRUCTION ZONE LOCATED ENTIRELY WITHIN PG&E OWNED PARCEL AND FERC BOUNDARY. USFS ROAD NOT INCLUDED, REFER TO USFS SPECIAL USE PERMIT FOR ROAD IMPROVEMENTS AND MAINTENANCE.
4. ALL ELEVATIONS IN TOPO MAPPING ARE CONVERTED FROM NGVD 29 VERTICAL DATUM TO PG&E LOCAL DATUM.
5. REFER TO DWG G-2 AND G-3 FOR SYMBOLS, ABBREVIATIONS, GENERAL PROJECT NOTES AND INFORMATION.

BLACK & VEATCH Building a world of difference Black & Veatch Corporation Sacramento, California

SYBLON REID General Engineering Contractors Providing Solutions to Difficult Projects

AECOM

Lake Fordyce Dam Seepage Mitigation Project

FIGURE 2-3

Work Area Components

This page intentionally left blank.

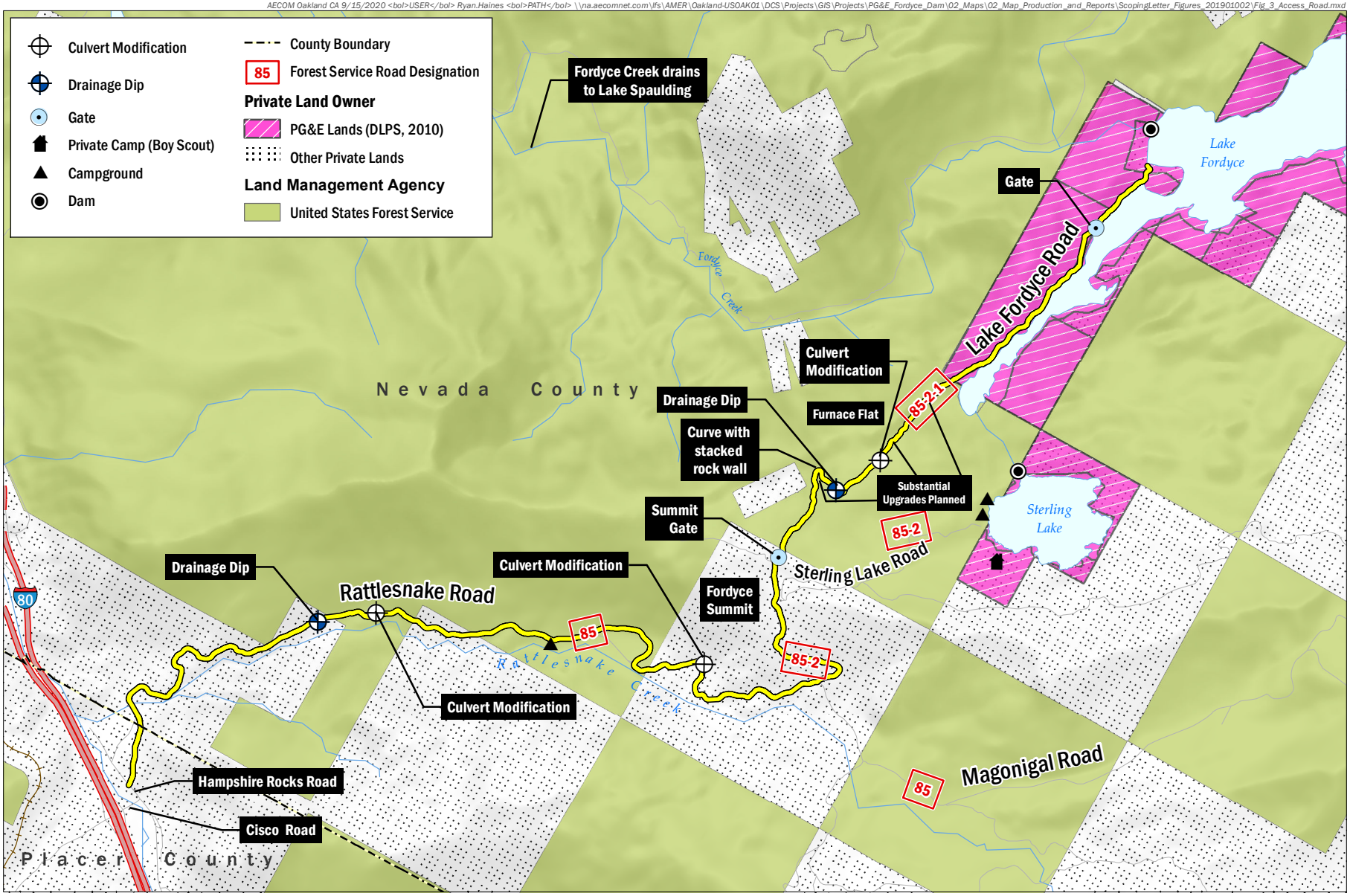
Table 2-1 Proposed Project Improvements and Activities

Component	Summary of Work
Access Road Improvements	• Smooth roadway segments by grading and adding aggregate rock. • Widen isolated areas of roadway. • Recondition existing roadway and road turnouts. • Alter turn radii to allow passage by trucks hauling equipment or materials. • Create a truck turnaround area at the end of the roadway near the dam.
Cofferdam and Outlet Diversion	• Install the cofferdam in sections across the reservoir, to enable access to the upstream toe of the dam (i.e., the work area). • Fill the bin-wall cofferdam with aggregate material. • Install a 60-inch-diameter diversion pipe. • Dewater the work area.
Geotechnical Investigations	• Explore the upstream concrete face. • Excavate test pits and trenches for the seepage berm, concrete plinth, and debris-laden fill. • Conduct Packer tests. • Perform soil borings at the abandoned LLO. • Excavate test pits for the abandoned LLO.
Main Dam Repairs	• Excavate debris-laden fill and prepare the bedrock surface. • Plug and grout the original LLO. • Lay formwork for the concrete plinth. • Construct the concrete plinth. • Construct the grout curtain. • Install an impermeable liner on the upstream face of the dam.

Note: Terms in this table are described in later sections of text

LLO = low-level outlet

AECOM Oakland CA 9/15/2020 <bol>USER</bol> Ryan.Haines <bol>PATH</bol> \\na.aecomnet.com\fs\AMER\Oakland-USOAK01\DCS\Projects\GIS\Projects\PG&E_Fordyce_Dam\02_Maps\02_Map_Production_and_Reports\ScopingLetter_Figures_201901002\Fig_3_Access_Road.mxd



Data Sources: CPAD, 2018a; DLPS, 2010; Nevada County Open Data Portal, 2018; PG&E, 2018; Esri, 2019; AECOM, 2018.

AECOM

Lake Fordyce Dam Seepage Mitigation Project

FIGURE 2-4

Access Road

Several segments of the access road would be improved to allow construction vehicle access to the work area. Improvements to Magonigal and Sterling Lake roads would not be necessary. Road modifications would follow USFS specifications and would include smoothing segments of the roadway surface through grading and addition of aggregate rock; widening selected areas of the road; reconditioning existing road turnouts; altering the turn radius at a number of turns to allow semi-trucks with trailers to safely navigate the access route during construction; and creating a turnaround area at the end of the roadway near the dam. Weekly maintenance of the roadway would be completed during the construction period at the dam, as needed. Details of the access road improvements are shown in the 90 percent road design plan drawings, provided in Appendix A.

The following activities would occur during the first year of construction:

Roadway Surface Improvements: The roadway would be graded and capped with 1.5-inch angular aggregate rock and established with a minimum width of 14 feet. Approximately 7,500 tons of certified weed-free aggregate would be imported from a licensed source for use. The thickness of the aggregate rock cap would be between 6 and 12 inches, depending on what is necessary to smooth the roadway surface.

Turn Radii Improvements: Turn radii improvements would be made and could include a combination of tree and vegetation removal, removal or shaving of rock outcrops, and culvert modifications to allow a wider area for improved truck turns. Rock riprap and rock aggregate would be used as backfill material, and to create the proper roadway surface angle for each turn. These improvements are shown in Appendix A.

The alignment of the roadway turn at Station 303+00 (see Appendix A) would be permanently modified. This modified turn would be created on top of and adjacent to an existing small radius (sharp) roadway turn, supported by a stacked rock wall (see Figure 2-4). Suitable fill would be installed adjacent to and on top of the existing roadway and one of the stacked rock walls, to allow an adequate and safe turning radius and roadway surface angle for construction vehicles. Tree removal, consisting of 12 trees larger than 10 inches diameter at breast height (dbh) and up to 68 smaller trees and saplings, would be necessary to create the turn alignment. A geotextile fabric would be placed on the roadway and stacked rock wall to protect these components.

A vehicle turnaround would be constructed adjacent to the dam at the end of the roadway. The turnaround would involve creating a flatter, graded area and restoring an existing turnout to improve construction vehicle movements. A short retaining wall would be

installed in one portion of the turnaround. Ten trees larger than 10 inches dbh would be removed.

Water Crossings: Up to three culverts would be modified by adding 7 to 15-foot extensions as part of improving existing turn radii at three turns (see Figure 2-4 and Appendix A for locations). Pipe couplings would be used to attach the culvert extensions to the existing culverts, and the extensions would have the same capacity as the existing culverts. Two of the culverts would be extended at the outfalls, which would include rock energy dissipators, and one culvert would be extended on the upstream side. The extended culvert sections would be installed with rock armoring to protect the integrity of the new culvert sections.

A drainage dip would be constructed across the road at Station 305+00 to accommodate the proposed modified turn. This modified turn would be created on top of and adjacent to an existing small radius (sharp) roadway turn, supported by a stacked rock wall. A new drainage dip or rock apron would also be installed at the termini of an existing roadside ditch at Station 309+00 (see Figure 2-4 and Appendix A). The apron would divert water in the ditch to flow away from the roadway and reduce erosion of the roadway surface. The apron would be designed to comply with USFS requirements.

Vegetation Removal: Vegetation and tree removal would take place at road locations where access would inhibit construction vehicle movements or where other roadway improvements would occur (e.g., turnouts, turn radius improvements). One hundred forty-three (143) trees larger than 10 inches dbh and up to 150 smaller trees and saplings would be removed. Tree removal methods would follow standard forestry practices, and rootballs would be left in place, if possible. Trimmed and removed vegetation would be removed from the site, chipped, or lopped and scattered on site. Treatment of vegetation would be completed based on the location, site-specific conditions, and the specific requirements and requests of the individual landowners.

Turnouts: Existing turnouts would be reconditioned, as necessary, following a similar grading and aggregate rock fill method to that described above for the roadway surface.

Rock Removal: Rock outcrops would be removed or reduced adjacent to the roadway, where the rock prohibits safe movement of construction vehicles. Rock removal and road design would comply with USFS requirements. Rock removal could include a single protrusion of rock extending into the roadway bed, rock that is in the roadbed, or long, narrow segments of cut rock immediately adjacent to the road. Rock removal techniques

would include drilling, splitting, and grinding, and may include blasting. Locations where rock removal may occur are shown in the 90% road design plans (Appendix A)

The following activities would occur each subsequent year to maintain the access road:

After the initial construction year, roadway maintenance would begin with debris and snow removal, as necessary, along Rattlesnake and Lake Fordyce roads. Snow removal is expected to be minimal and mainly address remnant patches of snow from the previous winter.

Water trucks would be used to keep the unpaved access road damp, reducing dust generated from hauling operations and helping to bind the roadway rock aggregate material together to reduce unraveling and rutting. Water for these trucks would be obtained from Lake Fordyce, Sterling Lake, and a private well at a corporation yard at Cisco Grove. A skip loader and motor grader would remain on site to periodically repair any areas of unraveling or rutting of the rock aggregate roadway cap. A stockpile of material for roadway maintenance would be maintained at a staging area near the intersection of Lake Fordyce and Magonigal roads.

Post-construction activities would be as follows:

When construction is completed and all equipment is fully demobilized from the dam site, the improvements to the unpaved roads would be left in place but would revert to their previous scale of maintenance. All new culvert extensions would remain in place. Final treatment of the road on USFS property would be subject to Special Use Conditions and determined through consultation with USFS.

2.2.4 Cofferdam and Outlet Diversion

A cofferdam and flow bypass would be installed to allow dewatering of the work area on the upstream side of Lake Fordyce Dam and provide a “dry” workspace, while maintaining the IFR. The location of the cofferdam would be at a natural constriction in the reservoir bathymetry, approximately 700 feet upstream from Lake Fordyce Dam (see Figure 2-3). Before installation of the cofferdam, Lake Fordyce would be drained to the minimum level allowed (about 3,000 AF at a water surface elevation of 6,245.4 feet).

Bin-Wall Cofferdam Construction

To provide a stable base for the cofferdam, up to 500 cubic yards of surficial mud would be removed from lake floor beneath the cofferdam, using a diver operated suction dredge. Pumps for the dredging would be contained on up to two suction dredge barges (roughly 30-foot by 40-foot) with winches and rigging systems. The dredged material (sediment water slurry) would be pumped to two approximately 25-foot wide by 50-foot long geotubes (geotextile filter bags to separate sediment from water), located at the staging area west of the dam (see Figure 2-3). The geotubes would be placed on a PVC membrane with a perimeter berm to collect decant water. A biodegradable biopolymer flocculant (e.g., Chitosan) would be added to the dredged slurry when discharging into the geotubes, to bond particles and promote coagulation/flocculation of the sediment. The geotubes would retain the sediment and release filtered water, that would be collected and discharged back to Lake Fordyce through a pipe.

The material collected in the geotubes would be given time to consolidate and dry out for eventual disposal. After drying, the sediment in the geotubes would be loaded into haul trucks for off-site disposal at a permitted landfill. The cofferdam would be constructed using steel interlocking slide rail segments (also known as bin-walls), as shown in the photograph above. This system would consist of steel walls with bracing between them. Granular fill material would be placed in the space between the bin-walls to form the cofferdam. The fill material would conform to the bottom of the reservoir. This system can be constructed “in-the-wet” (with water remaining in the reservoir); therefore, the reservoir would not have to be lowered below the minimum pool elevation for install the cofferdam. The cofferdam would be approximately 25 feet wide, spanning an

approximate length of about 450 feet across the reservoir. The height of the cofferdam would vary, based on profile of reservoir (Figure 2-5, on the second page following), and is expected to be a maximum of 23 feet tall. To control seepage under the cofferdam, an impermeable membrane would be placed along the upstream face of the cofferdam and would extend about 100 feet upstream from the cofferdam. The membrane would be sealed to the surface of the lake bed, using a weighted ballast material to hold it in place.

The cofferdam would include a flow bypass system to pass water from the upstream side of the cofferdam to the dam's LLO. The main bypass would consist of an approximately 60-inch-diameter pipeline from the cofferdam to the point of connection at the current LLO inlet (approximately 700 feet). Downstream from the cofferdam, a reduced-diameter bypass pipe with a control valve and flow meter would be installed near a main bypass isolation valve. Minimum IFR would be made with flows through the reduced-diameter bypass pipe, with the 60-inch bypass isolation valve closed. The 60-inch-diameter bypass pipe and isolation valve would be used to manage higher flows—for example, if stormflows are expected and more water must be released.

After being constructed, the cofferdam would be left in place throughout the construction phase. In preparation for the winter season, the area between the cofferdam and Lake Fordyce Dam would be rewatered and equalized with the water level in the lake. The LLO would be left open during the winter to maintain the minimum IFR and minimize storage in the reservoir. The cofferdam would remain submerged until the next construction season, when reservoir dewatering would be conducted in preparation for the construction season.

The construction approach would be as follows: After the reservoir is drawn down to its minimum pool elevation and shoreline access to the cofferdam location is established, earthen transition abutments would be placed between the shore and the ends of the cofferdam to transition to the first bin-wall section.

The cofferdam would be constructed starting from the left bank, beginning with the earthen abutment, and then the first bin-wall segment would be placed to form a rectangular box. This box would be filled with clean rockfill material and capped with coarse rock to provide armoring protection and allow equipment to move along the cofferdam to place the next segments (as shown in the photograph inset on the previous page). Additional bin-wall segments would be set sequentially in a similar fashion across the reservoir to form the cofferdam. Divers would work ahead of the placement of the bin-wall segments to confirm the cofferdam perimeters, remove logs with rootballs, and

saw-cut stumps closer to the lakebed bottom that may impede the functionality of the cofferdam. This debris would be towed to shore, where it would be collected for removal from the site. Clean rockfill material and geotextile fabric would be placed on the reservoir bottom for the bin-wall to be placed on, after the divers have removed any debris.

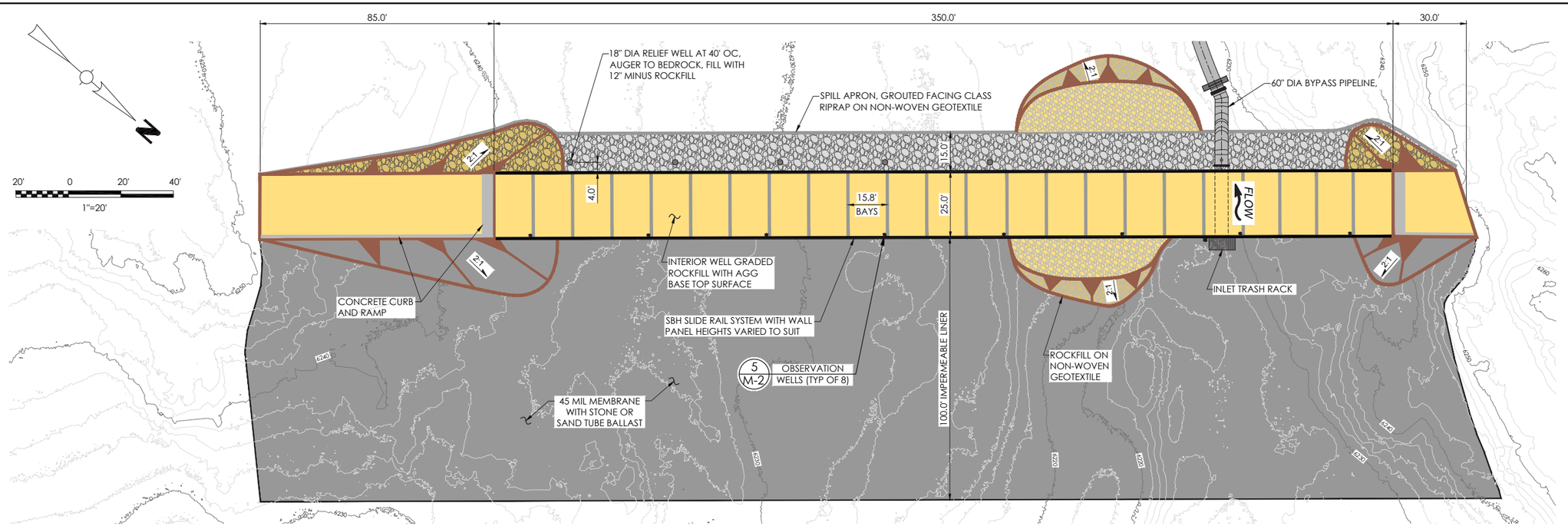
After the cofferdam is constructed and the work area is dewatered, an approximately 700-foot-long section of 60-inch-diameter bypass pipe would be installed between the cofferdam and Lake Fordyce Dam LLO in the dry workspace. To maintain the required minimum instream flow release to Fordyce Creek (5 cfs) while the LLO is closed, a temporary bypass pumping system would be employed as needed. This system would use barge-mounted pumps upstream from the cofferdam to pump water through temporary pipes to the spillway to maintain flow in the creek when the Fordyce LLO is closed for installation of the bypass pipeline. After the 60-inch-diameter bypass pipe is connected, the LLO would be opened to allow release of flows through the bypass pipe and the barge mounted pump station would be shut down.

After dewatering of the work area between the cofferdam and the main dam (see Section 2.5, Reservoir Dewatering, for details), riprap would be placed along the downstream toe of the cofferdam. A V-ditch would be constructed along the downstream edge of the revetment to collect any residual seepage under the cofferdam.

Because of the limited construction window, construction of the cofferdam would take place using double work shifts. Cofferdam construction would start in August of the first year of construction, after the reservoir water elevation is lowered.

After construction, the flow bypass pipe between the cofferdam and Lake Fordyce Dam would be removed. However, the cofferdam materials would be left in place in the reservoir, including the clean rockfill material within the bin-walls and the geotextile fabric that is buried under the rockfill on the reservoir bottom. The bin-wall elements would be removed for salvage. Removal of the bin-walls would take place at the end of the normal water season, when PG&E has drawn the lake down to its minimum pool level during routine operations. Removal of the bin-walls would begin at one of the banks and the steel elements of the bin-wall system would be removed progressively to the extent possible, leaving the rock material on the bottom.

AECOM Seattle WA 6/12/2019 USER: a.cambell PATH: J:\DCS Resources\GIR\Projects\60587564 Furnace Dam\60587564_04.indd



BLACK & VEATCH
Building a world of difference
Black & Veatch Corporation
Sacramento, California

SYBLON REID
General Engineering Contractors
Providing Solutions to Difficult Projects

AECOM

Lake Fordyce Dam Seepage Mitigation Project

FIGURE 2-5

Cofferdam Details

This page intentionally left blank.

2.2.5 Lake Fordyce Dam Seepage Repair Actions

The primary action to reduce the existing seepage would consist of placing an impermeable membrane liner on the dam's upstream face. The membrane would be anchored to the concrete face of the dam and to a new concrete plinth that would be constructed along the upstream toe of the dam. A grout curtain would be constructed below the concrete plinth to control seepage through the foundation. This membrane and plinth system would extend the impermeable face of the dam down to bedrock to cut off seepage through the embankment.

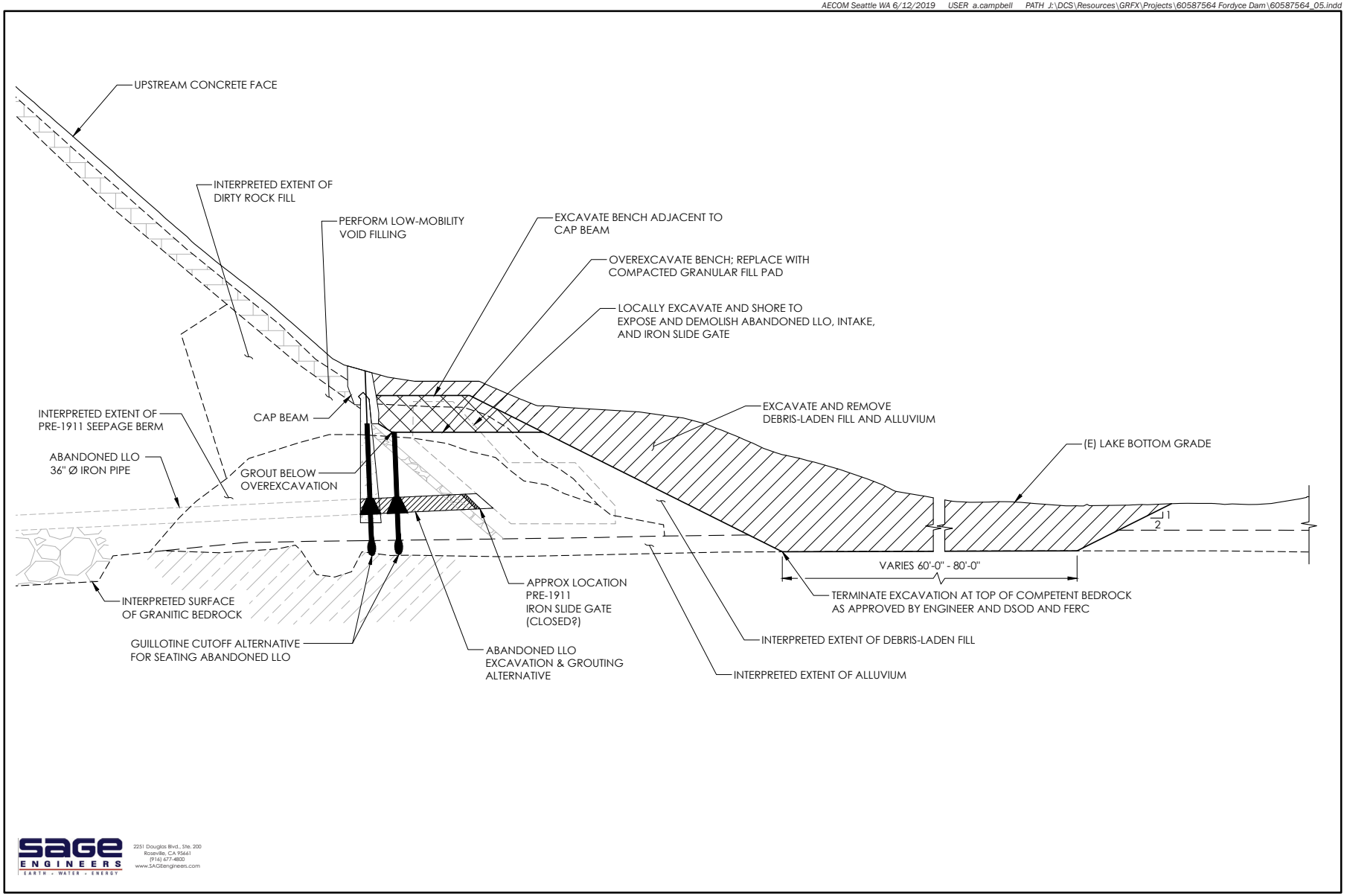
This repair action would require removing existing, potentially incompetent fill at the base of the dam, down to bedrock. In addition, the original LLO (circa 1870s) would be plugged; the area surrounding the current LLO would be sealed with grout because the voids around the outlet are believed to be another potential pathway for seepage.

The construction approach would be as follows:

Demolition and Excavation: Demolition work to prepare for the grouting and plinth construction would include excavation down to bedrock of the fill at the upstream toe of the dam. This fill is thought to potentially have debris from construction of the dam and material that has been transported downstream over the years and is known as the "debris-laden fill." This fill may contain materials such as tree trunks, timbers, rebar, metal, concrete, shotcrete, or pipe. Figure 2-6 shows a cross-section of the excavation area and location of this fill at the toe of the dam. During excavation of the debris-laden fill, debris would be set aside for disposal at a permitted off-site disposal facility. Debris-free nonhazardous[7] soil from the excavation would be relocated and spread in the reservoir bed in the work area, outside other construction workspace. The material would be graded to match existing contours. To provide access to the excavation area, two ramps would be created in the reservoir. After excavation is complete, the ramps would be removed. This work would be performed using a double shift (20 to 24 hours), 7 days per week, for approximately 17 days.

[7] As discussed in section 3.10.2, excavated soil would be tested for hazardous material prior to relocation or reuse and all hazardous materials would be handled and disposed of in accordance with federal and state law.

AECOM Seattle WA 6/12/2019 USER a.campbell PATH J:\DCS\Resources\GRFX\Projects\60587564 Fordyce Dam\60587564_05.indd



SAGE ENGINEERS
EARTH • WATER • ENERGY
2251 Douglas Blvd., Ste. 200
Roseville, CA 95661
(916) 677-4800
www.SAGEengineers.com

AECOM

Lake Fordyce Dam Seepage Mitigation Project

FIGURE 2-6

Cross Section of Excavation

Plinth Construction: Before construction of the plinth, the subgrade surface within the plinth footprint would be pressure-washed to remove loose or unsuitable material. DSOD would perform an inspection of the prepared bedrock surface. After the inspection is completed, dental concrete would be placed to provide a level surface for installation of the plinth. The cast-in-place, reinforced concrete plinth would then be constructed along the upstream toe of the dam. The plinth would be approximately 8 feet wide and span approximately 900 feet along the toe.

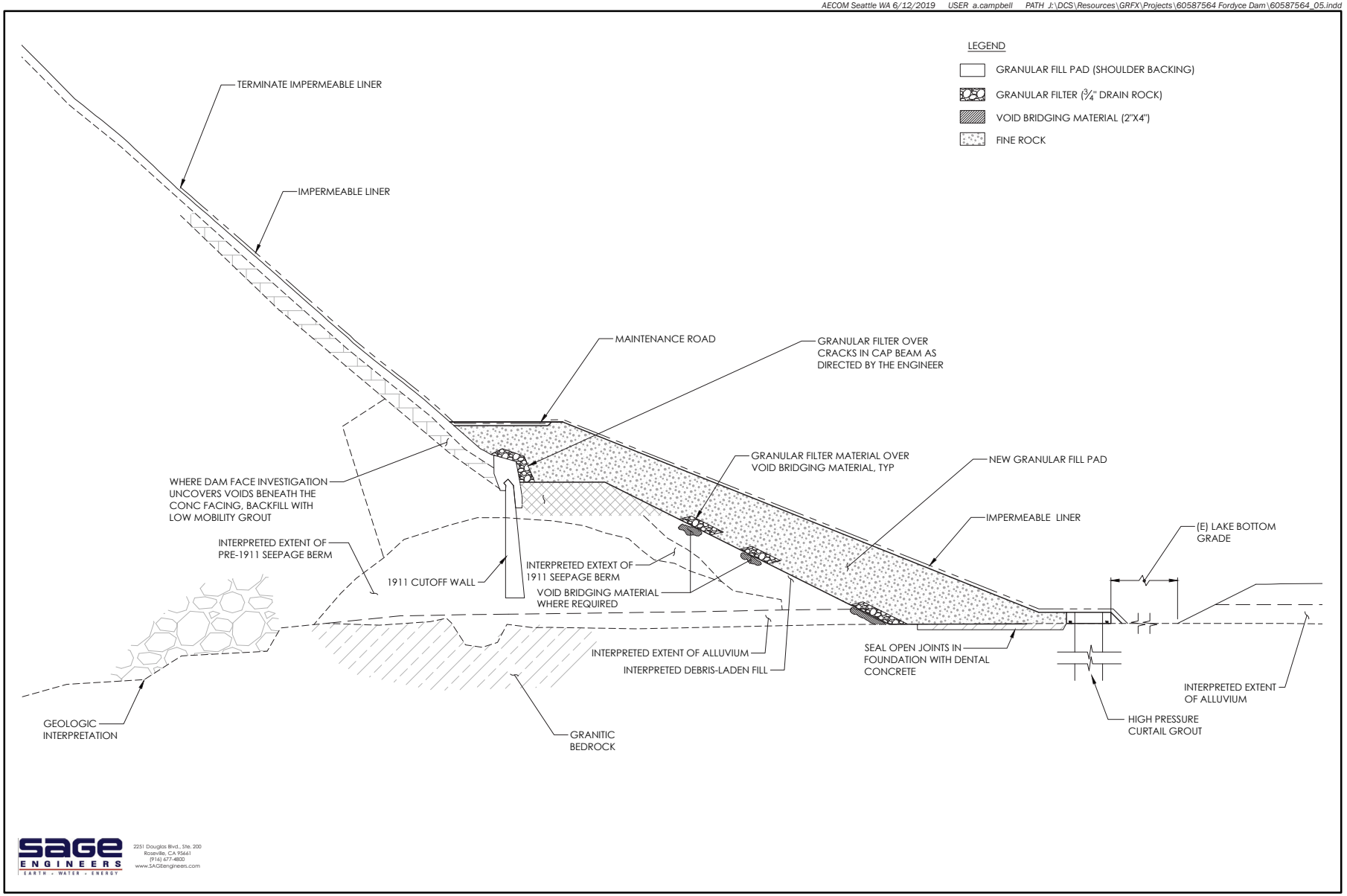
The final alignment of the plinth would be determined as the excavation is nearing completion and would be based on the results of the geotechnical exploration work scheduled in construction year one. Concrete for the plinth would be brought to the site from an off-site commercial batch plant. The plinth would be secured to the granite surface using short rock anchors to prevent vertical and lateral movement and would serve as the anchor for the impermeable membrane.

Grout Curtain and other Grouting Operations: A grout curtain, consisting of a mixture of cement and bentonite clay, would be installed beneath the plinth to reduce seepage under the plinth (Figure 2-7). A grout mixing station, consisting of a colloidal mixer, agitation tanks, and bentonite storage tanks, and a silo for cement, would be set up on site in one of the staging areas. Cement would be delivered to the site in supersacks wrapped in protective plastic, placed on pallets, and stored under tarps to prevent weather damage or possible release to the environment.

Holes between 10 and 40 feet deep would be drilled through the plinth into the bedrock beneath. A relatively low-viscosity grout slurry would be pumped under pressure, filling cracks and voids (potential seepage pathways) in the substrate. Additional grouting to seal potential seepage pathways would be conducted in the area downstream from the 1911 cutoff wall, in the existing seepage berm, and around the original dam outlet. Holes would be drilled at regular intervals in these areas, and grout would be injected under pressure. Holes would be drilled into the original LLO pipe, and the pipe would be filled with low-mobility grout to create a cutoff, or, alternatively, an excavation would be made to the LLO, which would be sealed with grout, and the fill would be replaced (see Figure 2-7). Areas around and beneath the original LLO pipe also would be grouted.

During grouting operations, water quality controls and other environmental protection measures would be implemented to ensure that grout-laden water (with potentially high pH) does not seep through the dam and enter Fordyce Creek downstream from the dam. These measures are detailed in Section 3.11.

AECOM Seattle WA 6/12/2019 USER a.campbell PATH J:\DCS\Resources\GRFX\Projects\60587564 Fordyce Dam\60587564_05.indd



SAGE ENGINEERS
EARTH • WATER • ENERGY
2251 Douglas Blvd., Ste. 200
Roseville, CA 95661
(916) 677-4800
www.SAGEengineers.com

AECOM

Lake Fordyce Dam Seepage Mitigation Project

FIGURE 2-7

Seepage Repair Cross Section

Impermeable Liner: After plinth construction and grouting operations, a granular fill pad would be placed from the downstream side of the plinth and up the dam face to elevation 6,253 feet, where a 20-foot-wide bench would be created (Figure 2-7). The bench would be used as a maintenance road along the upstream face of the dam, providing access to the LLO.

The lower portion of the upstream face of the dam, from elevation 6,295 feet down to the plinth, would be lined with an impermeable geomembrane liner (Figure 2-7). The liner would be installed by workers from a swing-stage scaffold system that could be raised and lowered from the top of the dam. Liner anchors would be installed on the concrete surface of the dam, the granular fill pad, and on the plinth. Rolls of the liner membrane would be suspended and rolled out vertically from the top of the dam. Liner sections would be bonded together using a hot weld process, melting a portion the liner surfaces together. The liner sections would be secured to the liner anchors. Ballast material would be placed over the liner on the bench to accommodate vehicular traffic when the bench is accessible during low-water levels.

Cut and Fill Volumes: During the repair, soils would be excavated and materials would be temporarily and permanently placed in the project area. Approximate quantities of Proposed Project excavation and fill are summarized in Table 2-2 (on the following page). Excess materials would include soil excavated from the upstream toe of the dam. Approximately 16,000 cubic yards of soils from the upstream toe of the dam would be permanently relocated in the reservoir. As noted above, any unsuitable material would be hauled offsite for disposal at an appropriate disposal facility.

2.2.6 Construction Equipment

The Proposed Project would require the use of heavy equipment including long-reach excavators, cranes, bulldozers, dump trucks, loaders, backhoes, generators, compressors, water trucks, and fuel tanks.

2.2.7 Equipment and Material Deliveries

Equipment Mobilization

Initial mobilization during the first construction season would involve equipment and materials for access road improvements. Equipment would include excavators, dozers, loaders, rollers, and compressors. This initial mobilization would require approximately 50 haul trips over 5 days to bring in heavy equipment. During access road improvement work, approximately 20 material delivery trips per day would be needed to deliver roadway materials.

Table 2-2 Approximate Excavation and Fill Quantities for Seepage Repair

Component	Excavation Volume (cubic yards)	Excavation Area (square feet)	Fill Volume (cubic yards)	Fill Area (square feet)	Fill Material Source
Site preparation (including access road improvements)	N/A	N/A	7,000	100,000	Teichert Cool Cave quarry
Access ramps	N/A	N/A	1,000	12,000	Teichert Cool Cave quarry
Cofferdam	N/A	N/A	9,200	20,000	Teichert Cool Cave quarry
Debris-laden fill	18,000	65,000	16,000	100,000	Upstream toe of dam
Plinth	1,000	6,880	1,000	6,880	TNT concrete materials
Granular fill pad	N/A	N/A	15,000	30,000	Hansen Grass Valley quarry

Notes:

Excavation in the area of the granular fill pad is captured in the excavation volume of the debris-laden fill.

N/A = not applicable

After the access road improvements are completed, equipment and materials would be mobilized to the dam and reservoir work area. During the first 2 weeks of each construction season approximately 10 trips per day would be needed to mobilize heavy equipment to the site.

Imported Materials

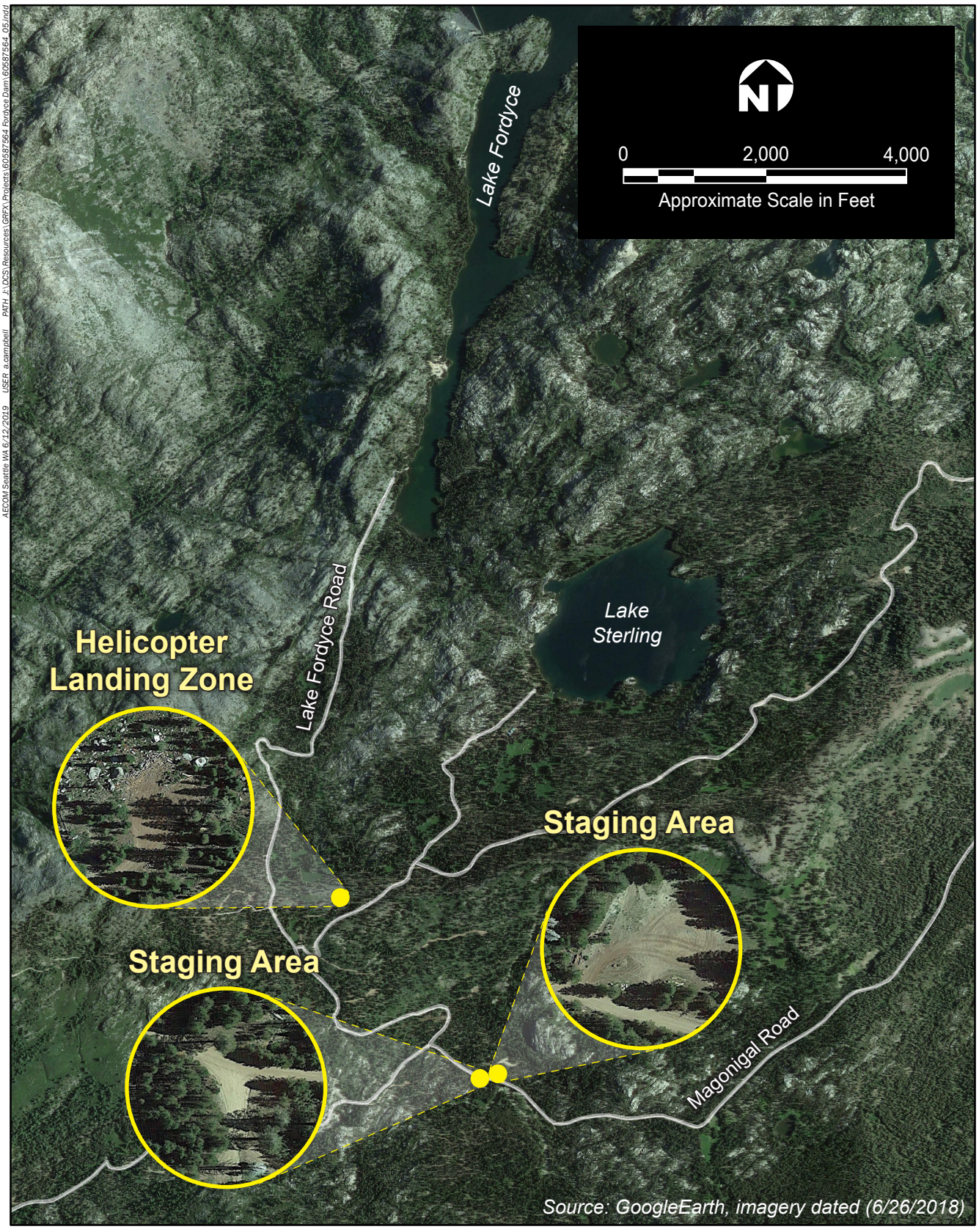
Materials to construct the road improvements, concrete for the plinth, and granular fill pad material would be imported. All imported materials would be obtained from existing commercial sources and would include cofferdam bin-wall structures; clean rock and granular fill material; road base; concrete; formwork for concrete, cement, aggregate, additives, and rebar needed for concrete structures; and impermeable liner.

An average of approximately 100 material delivery trips would occur per week and would vary by season. Much of the granular fill pad material (approximately 75 percent) would be brought to the site during the first construction season and stored on-site for use primarily in construction season two, allowing trucking of the material to take place Monday through Friday and limiting construction traffic on weekends. This would also reduce fill hauling operations that would coincide with concrete deliveries for plinth construction and grouting during seasons two and three. Fill pad material would require approximately 650 truck trips. During plinth construction and grouting activities, concrete deliveries would average approximately 200 trips over 25 days. Other routine material deliveries would average 10 per day.

Helicopter Operations

The Proposed Project would involve use of helicopters for mobilization and demobilization of equipment and delivery of equipment and materials to inaccessible portions of the work area, such as the downstream toe of Lake Fordyce Dam where no vehicular access is possible. Helicopter use is expected to occur during the first portion of the July work window (or first portion of the first month of each season), and then again in the middle of October of each construction season. Each period of use is expected to be 2 to 4 days in duration, for approximately 3 to 5 hours each day.

Helicopters would be used for the delivery and removal of the bypass pipe, water treatment system equipment for use below the dam, and other materials. Materials and equipment would be transported via truck on the improved access road to a designated landing zone on SPI property near the intersection of Lake Fordyce and Lake Sterling roads (Figure 2-8) where loads would be picked up by helicopter using a sling and transported to the dam. An established equipment yard off Hampshire Rocks Road also may be used as a location to stage equipment or materials for transport by helicopter to the dam site. All helicopter operations would follow strict safety guidelines, comply with Federal Aviation Administration regulations, and follow the PG&E practices for nesting bird management discussed in Section 3.5.



AECOM Seattle WA 6/12/2019 USER: a.campbell PATH: J:\DCS\Resources\GRFX\Projects\60587564 Fordyce Dam\60587564_05.indd

AECOM

Lake Fordyce Dam Seepage Mitigation Project

FIGURE 2-8

Helicopter Landing Zone and Access Road Staging

2.2.8 Power and Water Sources during Construction

During construction, power would be provided by portable generators. Water used for construction, including dust control and wetting of stockpiled materials, would be obtained from Lake Fordyce, Sterling Lake, and a private well at an existing corporation yard at Cisco Grove. To avoid entrainment of fish or amphibians, screens would be placed on the intake hoses where water is taken from lake locations.

2.2.9 Staging, Stockpile, and Disposal Areas

Two staging areas have been identified in the work area for use during construction. One site of approximately 1.25 acres on the downstream side of the dam, adjacent to the left abutment, would be used for construction offices, parking, and material storage. The second area (approximately 1.13 acres) would be on the upstream side of the dam near the left abutment. This site would be below the spillway elevation of the reservoir and would be inundated during the winter between construction seasons. This second site would be used for stockpiling clean fill material and for temporary material storage but would not be used to store hazardous material (e.g., hydraulic fluids or fuels). The staging areas are shown in Figure 2-3.

The proposed staging/stockpile areas are former quarry sites that currently have large angular rock left from previous quarry operations. Site preparation would include minimal clearing and grubbing, moving the existing rock material aside or using the material as fill elsewhere for the Proposed Project, and stabilizing the faces of the former quarries by removing any loose materials. The upstream staging area would be used for stockpiling only clean, washed rock and clean, washed granular fill, much of which would be brought to the site in the first construction season. Imported stockpiled material would be placed on fabric to separate it from the existing site grade.

In addition to the work area, staging also would occur at an established equipment yard off Hampshire Rocks Road and on SPI-owned land south of Lake Fordyce, within several open spaces that are used as log landings (see Figure 2-8). One of these sites near the intersection of Lake Fordyce and Lake Sterling roads would be used as a helicopter landing zone, and the other sites would serve as locations to transfer materials from highway trucks to vehicles more suitable for negotiating tighter turns that still would be present even after access road improvements are completed. Because of the limited space in the work area, these locations may also be used for construction worker parking.

Non-hazardous soil from the debris-laden fill excavation would be disposed by spreading in a portion of the work area (reservoir bottom) between the cofferdam and Lake Fordyce Dam. All debris that may be in this fill (e.g., tree parts, rebar, concrete) would be separated from the soil and hauled off-site for disposal at an appropriate, permitted facility.

2.3 Geotechnical Investigations

A detailed geotechnical and geologic investigation would be conducted during the first construction year, subsequent to the access road improvements, installation of the cofferdam, and dewatering of the work area at the dam. The investigation would include:

- upstream concrete face exploration;
- test pits/trenches for seepage berm, concrete plinth, and debris-laden fill;
- packer tests; and
- soil borings and test pits at the abandoned original LLO.

2.3.1 Upstream Concrete Face Exploration

Core holes would be drilled and inspected in the upstream concrete face at 24 locations to check for the presence of voids beneath the upstream facing and evaluate whether the existing concrete liner is supported by the underlying rockfill. At core hole locations determined to require further investigation, 18-inch-square panels would be cut through the concrete/gunite face and rock would be removed. After the investigation work is completed, rock or grout would be placed in the sections where the 18-inch panels were removed, and grout would be placed in the remaining core holes.

2.3.2 Test Pits/Trenches for Seepage Berm, Concrete Plinth, and Debris-Laden Fill

Test pits and trenches would be dug to visually explore the area around the seepage berm, debris-laden fill, and base and top of the proposed concrete plinth. This activity first would begin with performing any access improvements down to the upstream toe of the dam that were not done to support installation of the cofferdam and bypass. This access would be created by removing debris-laden fill and placing road rock or similar material to reach the designated areas for investigation. All of these access improvements would be in the dewatered reservoir bed.

The test pits would be approximately 30 feet long by 4 feet wide, and range in depth up to 15 feet. Trenches at and upstream from the concrete plinth would be up to 100 feet

long; these trenches potentially could be replaced with a large dozer trench (mass excavation between the planned trench excavations). The excavations likely would be to bedrock. Test pits along the alignment of the proposed upper plinth would be excavated to expose the toe of the dam's existing upstream concrete facing and evaluate bedrock conditions. The test pits would be 5 feet deep or less.

Water encountered in the excavated areas from infiltration or from conducting the investigation (e.g., cleaning the exposed bedrock with a pressure washer) would be collected and pumped up either to settling ponds or into Baker-style sediment tanks. When the investigation is completed, the pits or trenches would be backfilled. The test pits along the alignment of the proposed upper plinth would be backfilled with dental concrete to reduce the potential for seepage paths to develop in the dam abutments before placing the impermeable liner. The other areas of excavation would be backfilled with either screened and aerated soils from the excavations or an imported material, if necessary.

2.3.3 Packer Tests

After the investigation of the test pits/test trenches is completed, a drill rig would be mobilized to the site to perform packer tests along the concrete plinth alignment. Holes would be drilled to approximately 40 feet in depth and would be used to perform multi-pressure packer testing. This test would be performed by pumping clear water under pressure into the borehole to evaluate the permeability of the bedrock along the plinth line and provide information for the grouting operation.

Soil cuttings and drilling fluids would be collected and hauled off-site. After the boring information has been collected, the boreholes would be filled with grout.

2.3.4 Soil Borings and Test Pits at Abandoned LLO

To plan for grouting operations, two 50-foot-deep borings would be drilled at designated locations near the original, now abandoned LLO. This would be accomplished using a 4-inch-diameter rotary sonic-type machine without air or water-assisted return. The use of drilling fluids to fill the bore holes would not be required at this location. Soil cuttings would be collected and hauled off-site. After completion, the boreholes would be filled with grout.

Two test pits around the abandoned LLO would be excavated to allow visual inspection of the area, to refine the design of the grouting and backfilling of the abandoned LLO

structure and outlet pipe. The pits would be up to 8 feet square and up to 15 feet deep. After the test pit work is completed, the pits would be filled and compacted with granular fill material.

2.4 Demobilization and Site Restoration

2.4.1 Seasonal Demobilization Activities

At the end of each construction season, the work area would be prepared for overwintering. All construction equipment, vehicles, office trailers, connex storage vans, dewatering systems, tools, trash bins, sanitary facilities, and other temporary facilities would be removed from the site. All other consumable materials (e.g., concrete sacks, lubricants) also would be removed. Stockpiled washed, clean rock and washed, clean granular fill for use in future construction seasons would be left on site between construction seasons. Material would be arranged to prevent erosion and sloughing into the reservoir. After transitioning to the pumped IFR bypass system to temporarily maintain minimum flows in Fordyce Creek, a portion of the 60-inch-diameter pipe connecting the cofferdam to the Lake Fordyce Dam LLO would be removed, and the trash racks would be re-installed on the LLO. The portion of pipe extending through the cofferdam and containing a 60-inch butterfly valve would remain. The work area upstream of Lake Fordyce Dam would be rewatered to equalize the water levels upstream and downstream from the cofferdam in preparation for winter and spring inflows. After the required instream flow release is met through the LLO, the temporary bypass pumping system would be shut down and removed from the site.

2.4.2 End of Construction Demobilization

At the end of the seepage repair construction activities, all equipment and facilities would be removed, including the flow bypass system at the cofferdam and the racks would be reinstalled on the LLO. Any remaining stockpiled rock or granular fill material also would be removed from the site, along with the filter fabric underlying this material. The work area would be re-watered to equalize the water levels upstream and downstream from the cofferdam and the cofferdam bin-walls would be removed. Rock materials used to construct the cofferdam would be left in place on the lake bed. Removal of the cofferdam bin-walls would occur at the end of the third construction season or during the following year if weather, such as early season snowfall, prohibits removal of the bin-walls at the end of the third construction season. Bin-wall removal would occur when the reservoir is drawn down.

Access road improvements and all culvert extensions would remain in place and the road surface would degrade over time to its existing unimproved state. Final treatment of roadways on USFS property would be subject to Special Use Conditions and determined through consultation with USFS.

2.5 Reservoir Drawdown and Work Area Dewatering

As described above, the seepage repair work would occur at the upstream toe of Lake Fordyce Dam, and must be conducted "in-the-dry"; therefore, the reservoir in the work area would need to be fully drained.

2.5.1 Initial Lake Fordyce Drawdown

Initial drawdown of Lake Fordyce during the first construction season would begin around April by releasing water through Lake Fordyce Dam's 48-inch LLO at a rate of 400 to 500 cfs. Drawing down the reservoir to the minimum pool elevation would take 2-3 months, depending on the storage in Lake Fordyce at the time.

2.5.2 Work Area Dewatering

In the first construction season, cofferdam construction would begin when the reservoir is drawn down to the minimum pool elevation (about 3,000 AF), which is expected to be by July. After the cofferdam construction is completed, the work area between the cofferdam and Lake Fordyce Dam would be dewatered. Dewatering initially would rely on use of the LLO before coupling with the bypass pipe. When water quality conditions require, or after the LLO no longer is usable, the work space would continue to be drained using dewatering pumps. After the work area is drained, the bypass pipe from the cofferdam would be coupled with the LLO to allow water to flow from the reservoir upstream of the cofferdam into Fordyce Creek. IFR flows would be managed through the pumped bypass system (described in Section 2.5.3) at times when water cannot be delivered though the LLO. Figure 2-3 shows the dewatered work area and the pool remaining upstream from the cofferdam, as well as the location of the pumped bypass system.

2.5.3 Subsequent Construction Seasons

Operation of Lake Fordyce preceding construction seasons two and three would be such that water storage above minimum pool would be reduced to minimize the subsequent reservoir drawdown time. The minimum IFR of 5 cfs would be maintained at the LLO valve to ensure compliance with the IFR. To minimize storage behind the dam during the

winter and spring, the radial gates at the spillway would be opened to reduce maximum storage capacity to approximately 39,000 AF. The LLO valve would be adjusted once the first significant storm is forecasted each winter, to release approximately 150 cfs throughout the winter. It is expected that inflow from storm events and spring snowmelt may, at times, exceed the capacity of the LLO setting, in which case the reservoir would reach higher levels of storage, but leaving the valve open would help limit the amount of water impounded by the dam and reduce drawdown duration in the spring to maximize the potential summer construction season. The amount that Lake Fordyce would fill between the construction seasons depends on the amount of precipitation over the winter. During a wet winter, Lake Fordyce may fill prior to the next construction season, while during a dry year, the lake may remain near the minimum pool elevation. Once the LLO valve house becomes accessible in the spring, (anytime between April and June) the valve would be opened to draw down the reservoir at a rate of 400 to 500 cfs until the minimum pool elevating is reached. These flows are within the typical flow ranges for Fordyce Creek.

Reservoir drawdown in subsequent construction seasons would occur as described above, except that the cofferdam already would be in place. As the reservoir is drawn down to the level of the cofferdam, which may occur as early as June in a dry year or as late as August in a wet year, the slide gate on the bypass pipe inlet would be closed, and dewatering of the area between the cofferdam and Lake Fordyce Dam would occur as described above.

2.5.4 Reservoir Refilling

At the end of each construction season, the work area would be rewatered (after removal of all construction equipment and materials). A pumped bypass system would be used to maintain downstream creek flow. After flow is established with the pumped system, the bypass inlet slide gate at the cofferdam would be closed. A section of the bypass pipe would be removed at the LLO, and the trash rack on the Fordyce LLO would be re-installed. With the Fordyce LLO still closed, the inlet slide gate at the cofferdam would be opened gradually to allow water to flow into the work area. When the water levels on both sides of the cofferdam are equalized, releases would resume from the Fordyce LLO and overwinter operations between construction seasons would occur as described above.

2.5.5 Maintenance of Instream Flow Release During Construction

Minimum instream flow releases of 5 cfs would be maintained with the cofferdam bypass flow system. Flows through the reduced-diameter bypass pipe would occur with the main bypass valve closed. The reduced-diameter bypass line would be equipped with a control valve and flowmeter, to verify that a minimum 5 cfs release is maintained.

A barge-mounted, pumped bypass system would be used when connecting and disconnecting the lower portion of the flow bypass pipe to the Fordyce LLO at the beginning and end of each construction season. At these times, the valves at the cofferdam would be closed and the temporary pumping system upstream from the cofferdam would be used to pump flows to the spillway. To ensure that instream flows are never interrupted, the system would employ a backup pump and generators with automatic transfer switches to start immediately if any failure were to occur in the primary pumping system. The temporary pumped bypass system would be redeployed at the end of the construction season to allow removal of the last section of 60-inch-diameter pipe and reinstallation of the trash rack at the LLO structure. Flow meters would be installed on the temporary discharge lines to ensure that the minimum flow is maintained.

2.6 Water Quality Control Practices

A number of methods would be employed to protect the quality of water flowing down Fordyce Creek during construction.

2.6.1 Management Actions to Control the Release of Turbidity to Fordyce Creek

To reduce impacts to turbidity, PG&E has included turbidity control measures and incorporated them into the Proposed Project. Table 2-3 summarizes the turbidity control measures that would be implemented during construction to reduce turbidity in the Fordyce Creek.

Diver assisted dredging. To provide a stable base for the cofferdam, up to 500 cubic yards of surficial mud would be removed from lake floor beneath the cofferdam, using a diver operated suction dredge. Use of small diameter suction dredge hoses would allow visual contact with the surface during sediment removal and would minimize agitation and disruption of lake sediments.

Table 2-3 Turbidity Control Measures for Construction

Turbidity Control Measure	Construction Element	Location
Diver assisted dredging – Maintain visual contact with the surface during sediment removal and minimize agitation and disruption of lake sediments.	• Suction dredging	Reservoir (at cofferdam)
Geotubes (geotextile fabric sock)	• Material handling	Staging area near dam
Turbidity curtains	• Installation of the cofferdam • Removal of the cofferdam bin-wall elements	Reservoir (at cofferdam)
Flow ramping – Monitor and adjust flow as needed to control turbidity	• Initial dewatering of the work area behind the dam	Work area behind dam
Upstream location for work area discharge -Pump seepage water from the work area to a discharge location upstream of the cofferdam, isolated by a turbidity curtain	• Dewatering of the remaining low-water residual in the work area behind the dam • Seepage management in work area	Work area between Lake Fordyce Dam and cofferdam
Use turbid water for dust control	• All construction	Access road, staging areas
Allow equalization and time for initial settling before discharge	• Re-watering of the work area	Work area between Lake Fordyce Dam and cofferdam

Handling of slurry materials. As discussed in Section 2.2.3, the pumps for the dredging would be contained on up to two suction dredge barges (roughly 30-foot by 40-foot) with winches and rigging systems. The dredged material (sediment water slurry) would be pumped to two approximately 25-foot-wide by 50-foot-long geotubes (geotextile filter bags used to separate sediment from water) located at the staging area west of the dam. The geotubes would be placed on a PVC membrane with a perimeter berm to collect decant

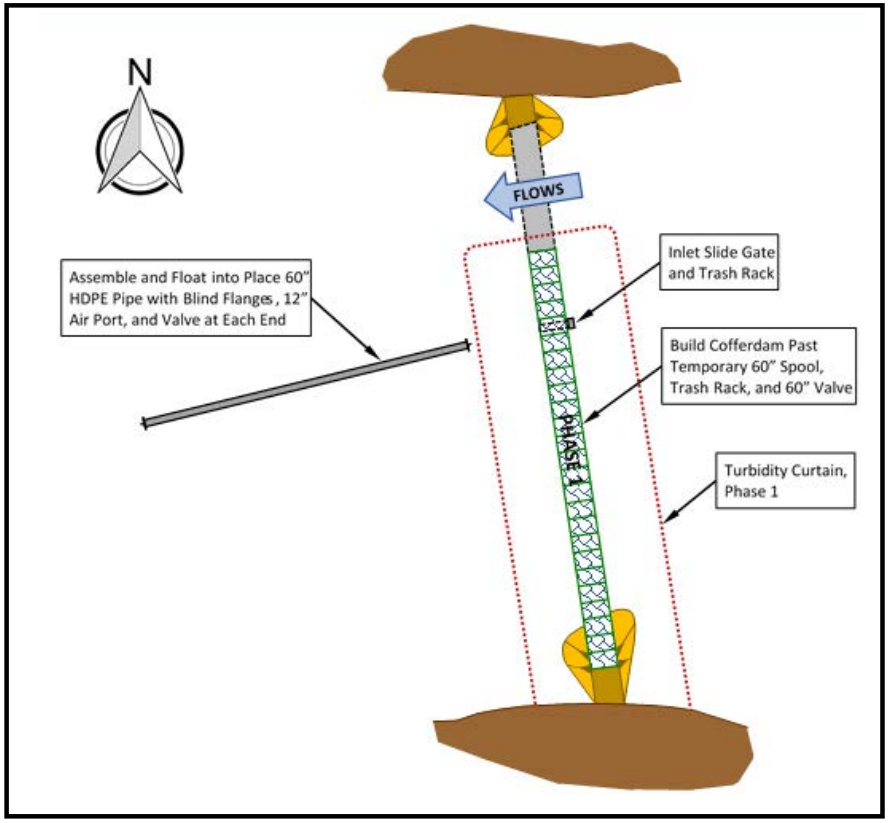
water. A biodegradable biopolymer flocculant would be added to the slurry to bond particles and promote coagulation/flocculation of the sediment within the geotubes. The geotubes would retain the sediment and release filtered water, which would be collected and discharged back to Lake Fordyce. The use of flocculant is not expected impair water quality; geotubes have been found to retain approximately 99 percent of the soil-flocculent mixture and any residual that is not retained in the geotube is biodegradable.

Turbidity Curtains. A turbidity curtain (or curtains) would be used during construction of the bin-wall cofferdam, to contain the suspended sediment that would result from disturbance of the reservoir bottom. The turbidity curtain would be deployed in two phases. Phase 1 would consist of installing the curtain around the first two-thirds of the cofferdam footprint. The remaining area not surrounded by the curtain would be left open to allow flows to continue freely toward the low-level outlet of the dam for release downstream. In Phase 2, the turbidity curtain would be relocated to its subsequent position around the area of the remaining, yet-to-be-constructed portion of the cofferdam. During Phase 2 construction, water would be able to pass through the cofferdam through the 60-inch-diameter pipe installed during Phase 1. Figure 2-9 shows the construction sequence for the cofferdam and turbidity curtain installation.

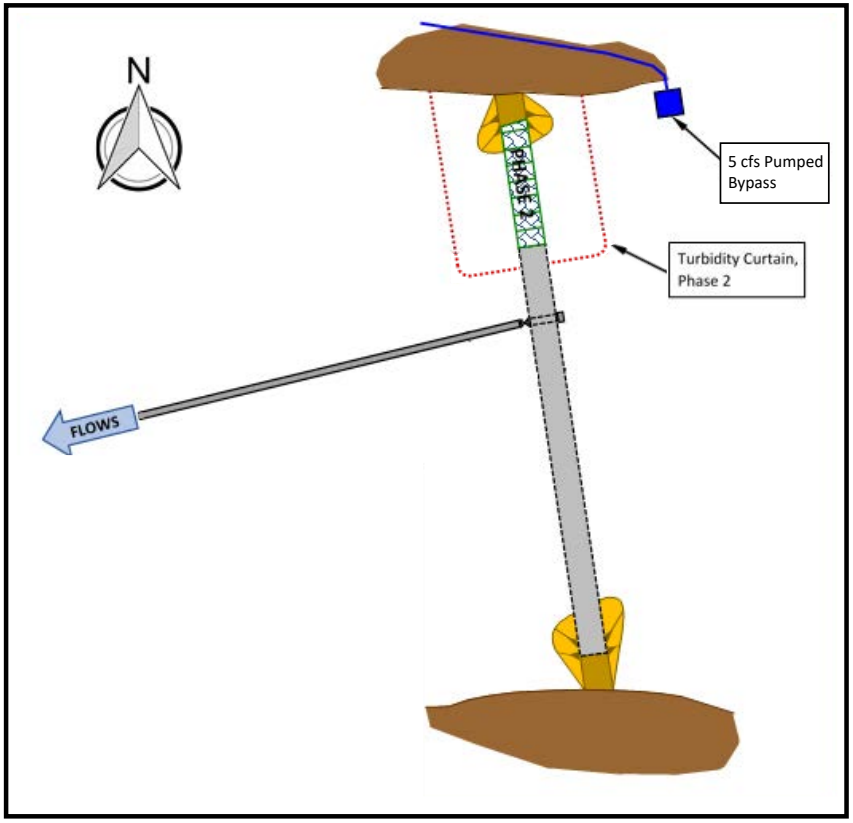
Turbidity curtains also would be used during cofferdam deconstruction, to prevent excess turbidity from being released. After the cofferdam bin-walls are removed, initial settling would occur before large flows are discharged. The IFR would be maintained with the pumped bypass system drawing water from upstream of the cofferdam.

Flow ramping (monitor and adjust flow as needed to control turbidity). The work area between the cofferdam and the dam would be dewatered using the low-level outlet. Because turbidity is expected to increase in the shallow water remaining in the work area as dewatering nears completion, turbidity would be monitored during dewatering, and the discharge rate would be adjusted or halted to control turbidity to be protective of beneficial uses. For example, the Draft *Dewatering/Removal of Water Plan* for the Proposed Project (Black & Veatch, 2020) includes multi-phase sequencing for the removal of the 200-acre feet of water that would be remaining in the work area after reservoir drawdown: the first 9 feet of water would be removed using the LLO at flow rates that range between 100 and 25 cfs; the next 16 feet of water would be removed using 8-inch trailer mounted pumps at flow rates that range between 25 and 20 cfs; and the last 8 feet of water would be removed using 3-inch submersible pumps at flow rates ranging between 5 and 1 cfs. Use of lower flow rates when the work area is shallow minimizes entrainment of turbidity in the pumped water.

Phase 1



Phase 2



AECOM

Lake Fordyce Dam Seepage Mitigation Project

FIGURE 2-9

Water Quality Control During Cofferdam Construction

Upstream location for work area discharge. An area would be designated in Lake Fordyce, upstream of the cofferdam, as a discharge location for water from the work area. A turbidity curtain would be installed near the shore to isolate a portion of the lake as the discharge area (see Figure 2-3 for location).

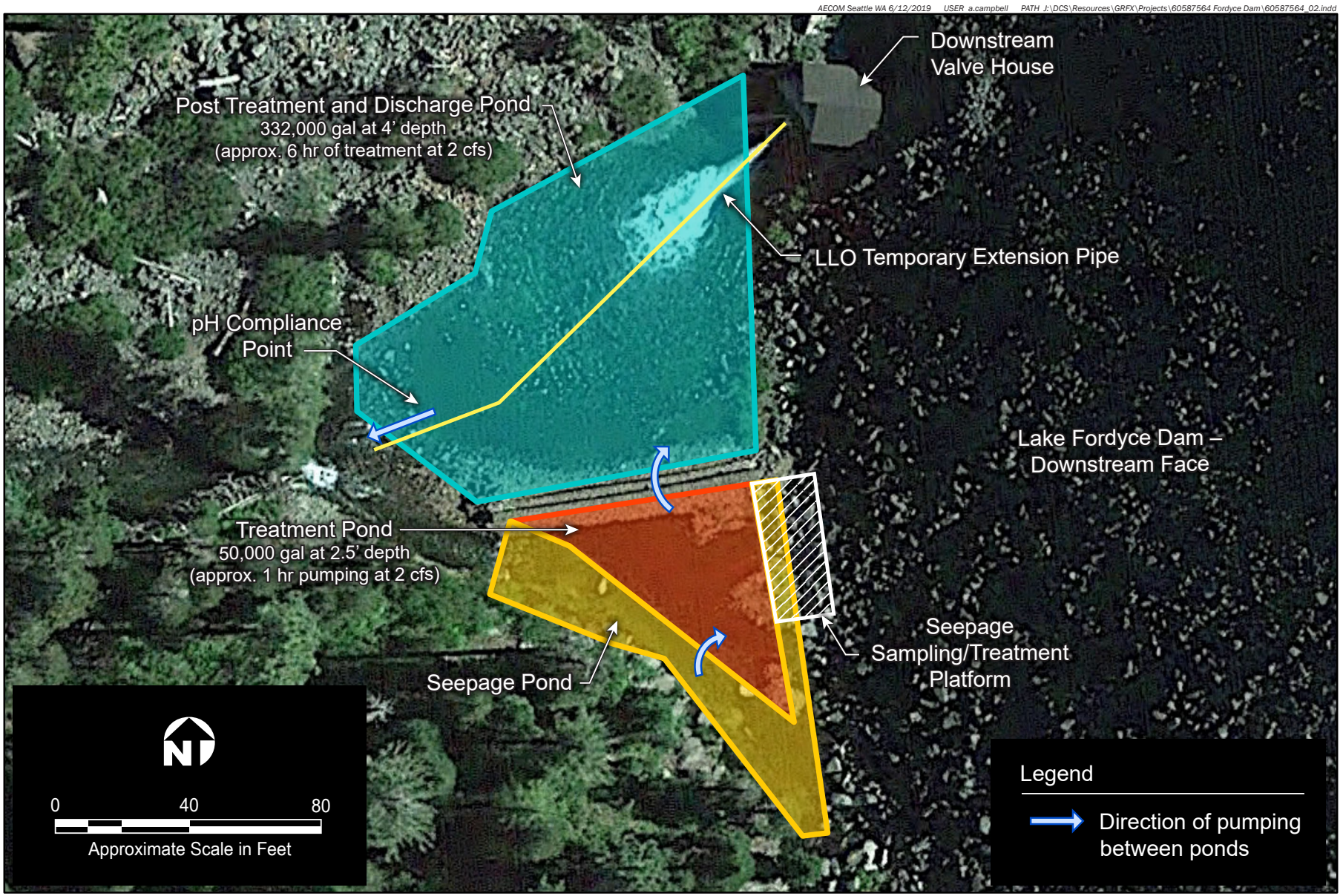
The shallow, residual water that remains in the work area after dewatering through the LLO, would potentially be turbid and would be pumped to the area in Lake Fordyce isolated by the turbidity curtain. Similarly, seepage beneath the cofferdam that flows to the V-ditch constructed downstream of the cofferdam in the dewatered work area would be collected and pumped back into the area isolated by the turbidity curtain. Excavations for geotechnical investigations and other ground-disturbing activities that produce turbid water, and wash water generated during the excavation for the concrete plinth, would be handled in a similar manner.

Turbid water for dust control. To reduce the amount of potentially turbid water flowing to the isolated discharge area of the lake, as much water as practical would be used for dust control on the access road and staging areas.

Equalization and settling when rewatering. At the end of each construction season, the work area would be rewatered after removal of all construction equipment and materials. When the water levels on both sides of the cofferdam are equalized, time would be allowed for initial settling before normal winter operations resume. The IFR would be maintained during this period with the pumped bypass system.

2.6.2 Management Actions to Control the pH during Grouting Operations

A temporary monitoring and treatment system would be installed below the dam to prevent high-pH water from entering the creek during grouting operations. The release point for the IFR outlet would be extended temporarily, approximately 180 feet downstream beyond its natural pool below the dam, using 42-inch-diameter piping. Extending the outlet's release point would provide an area for construction of for three temporary ponds below the dam (Figure 2-10). The ponds would be created using supersacks (large sandbags filled with clean pea gravel) to divide natural pools below the dam. Although placement of the supersacks may cause a short-term transient increase in turbidity, turbidity monitoring and protocols for adaptive management would be in place prior to construction of the ponds (Mitigation Measure HYD-1).



AECOM

Lake Fordyce Dam Seepage Mitigation Project

FIGURE 2-10

Downstream pH Control Configuration

The initial seepage pond would be used for collecting and sampling the dam seepage water. This pond would be monitored, and if the pH meets water quality standards, the seepage would be allowed to spill over to the creek. If high-pH is present in the seepage pond, the water would be pumped to the treatment pond using a pump and a multi-bag filter, to remove any grout particles. The treatment pond would be lined with 30-mil[8] pond liner material, to protect the substrate. CO_2 treatment would be administered to the water in this pond to neutralize the high pH. The third pond would serve as the post-treatment and discharge pond, where mixing and additional testing would be conducted before the water is released downstream.

2.7 Other Construction Details

2.7.1 Construction Hours

Because of the limited construction window, construction activities would occur 5 to 7 days per week between 6 a.m. and 6 p.m., with some activities scheduled for double shifts 24 hours per day. Cofferdam construction during year one would occur 24 hours per day. The number of workers on site would vary, based on the construction phase, up to an approximate maximum of 50 workers over the course of construction.

2.7.2 Public Access during Construction

To maintain public safety, public access on Lake Fordyce Road would be restricted during the three construction seasons by a temporary gate that would be installed at Fordyce Summit, just north of Sterling Lake Road (see Figure 2-4). This location has a turnaround just before the site for the proposed gate. During periods when this gate would be open for construction traffic but closed to the public, a flagger would be stationed at the gate to prevent public access. Public access beyond the summit gate to a parking area/informal campground south of the dam tender's house (at the start of what is known locally as the Committee Trail) may be allowed on certain Sundays and holidays, if work is not occurring, or other periods agreed on with recreational groups (e.g., potential access for the Sierra Trek event, discussed in Section 3.17, Recreation).

Lake Fordyce Road would be closed to general public access between the Committee Trail and the dam site for the full duration of project construction. Access to the dam site would be restricted by an existing gate just south of the dam tender's house (see Figure 2-4). A flagger would be stationed at the gate during active construction when the

[8] A 30-mil liner is 0.0300 inch thick.

gate is open to prevent public access to the construction site at the dam. This gate would remain locked when active construction is not occurring.

Public access along roadways south of the proposed gate at Fordyce Summit—including Rattlesnake Road, Sterling Lake Road, and Magonigal Road—would be allowed when safe, but would be restricted during times of heavy construction traffic. Heavy use of the roadways could include times when road improvements and vegetation removal are occurring on Rattlesnake Road and times when large amounts of construction materials—such as aggregate or concrete—are being delivered, or when construction equipment is being mobilized or demobilized. General public access to the southern portion of the road is likely to be restricted for much of the first construction season because of the road improvements being performed, project mobilization, and granular fill hauling. Although the road would be closed to the general public during much of the construction period, PG&E would work individually with local land owners to provide access to their properties.

Safety and informational signage related to the Proposed Project and construction vehicle access would be installed along Rattlesnake and Lake Fordyce roads. This would include warning signs regarding use of the roadways by construction vehicles, construction speed limits, safety flagger locations, notifications of public access restrictions, and responsible party contact information.

Lake Fordyce Road is under the jurisdiction of the USFS on both USFS land and privately held parcels. PG&E would obtain a Special Use Permit for commercial use of the roadways, and coordinate with USFS and other legal users of the roadways on details of road closures and use restrictions.

2.8 Permits and Approvals

As defined by CEQA, a lead agency is the public agency with the principal responsibility for carrying out or approving a proposed project. The State Water Resources Control Board is the state lead agency responsible for approving the Proposed Project. In addition to the CEQA review, FERC (as the primary federal agency with approval authority) would evaluate potential impacts of the Proposed Project under the National Environmental Policy Act (42 U.S.C. § 4321 et seq.). Table 2-4 presents an overview of the various permits or approvals that may be required for the Proposed Project.

Table 2-4 Potential Permits and Approvals

Agency	Permit or Approval	Proposed Project Action Associated with Permit/Approval
Federal Energy Regulatory Commission (FERC), San Francisco Regional Office	Approval of plans and specifications	The Proposed Project would repair or alter a FERC-regulated dam or reservoir.
FERC, Division of Hydropower Administration and Compliance	Temporary Variance to License Article 39	The Proposed Project may require the reservoir be temporarily drawn down below the 3,000-acre-foot minimum.
U.S. Army Corps of Engineers	Clean Water Act section 404 individual permit	Proposed Project activities could place fill in waters of the United States.
U.S. Fish and Wildlife Service	Biological opinion under section 7 of the Endangered Species Act	Excavation activities could affect threatened or endangered terrestrial or freshwater species in the project area.
U.S. Forest Service	Special Use Permit under 36 Code of Federal Regulations part 251	The Proposed Project would entail use of and construction activities on national forest lands, including alterations and closures of forest roads and felling and removal of trees.
California Department of Water Resources, Division of Safety of Dams	Approval of plans and specifications	The Proposed Project would repair or alter a regulated dam or reservoir.

Agency	Permit or Approval	Proposed Project Action Associated with Permit/Approval
California Department of Fish and Wildlife	Section 1602 Lake and Streambed Alteration Agreement	The access road improvements also would involve work in the beds and banks of seasonal drainages.
State Water Resources Control Board	Clean Water Act section 401 Water Quality Certification	The Proposed Project would place fill in waters of the state and involves a FERC licensed facility.
Central Valley Regional Water Quality Control Board	Coverage under the Statewide Construction General Permit	The Proposed Project would disturb more than one acre of land.
Nevada County	Drilling permit	Geotechnical investigation may require permits for certain drilling operations.
Sierra Pacific Industries	Permission to use and alter private property	The Proposed Project would entail use of and construction activities on private property, including alterations of roadways and potentially felling and removing trees.
Other private landowners	Permission to use and alter private property	The Proposed Project would entail use of and construction activities on private property, including alterations of roadways and potentially felling and removing trees.

3 ENVIRONMENTAL EVALUATION

3.1 Environmental Factors Potentially Affected

The environmental factors checked below potentially would be affected by the Proposed Project, involving at least one impact that is a "Potentially Significant Impact," as indicated by the checklist on the following pages.

☒ Aesthetics	☐ Greenhouse Gas Emissions	☐ Population and Housing
☐ Agriculture and Forestry Resources	☐ Hazards and Hazardous Materials	☐ Public Services
☒ Air Quality	☒ Hydrology and Water Quality	☐ Recreation
☒ Biological Resources	☐ Land Use and Planning	☐ Transportation
☒ Cultural Resources	☐ Mineral Resources	☒ Tribal Cultural Resources
☐ Energy	☐ Noise	☐ Utilities and Service Systems
☒ Geology and Soils		☒ Wildfire

This chapter describes the potential impacts of all Proposed Project activities. The Proposed Project is primarily located within Nevada County.[9] As described in Chapter 2, "Project Description," following Proposed Project construction activities, Lake Fordyce Dam would revert to its current baseline operating conditions, as regulated by PG&E's FERC hydropower license. The Proposed Project would not result in any long-term changes to the existing level of intensity of activity or cycling of water at Lake Fordyce Dam and reservoir. Therefore, operations after the seepage repair would not result in any changes to the environmental factors covered by Appendix G of the CEQA Guidelines. Thus, the analyses in this chapter focus solely on potential construction impacts.

[9] Approximately 1,400 feet of the southern portion of the access road (described in Section 2.1.1) is within Placer County. No construction would occur on this portion of the access road.

ENVIRONMENTAL DETERMINATION

On the basis of this Initial Study, the State Water Resources Control Board finds:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the proposed project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect: 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed on the proposed project, nothing further is required.

_____ _____

Signature Date

State Water Board

_____

Title

_____

Printed Name

3.2 Aesthetics

I. AESTHETICS **Except as provided in Public Resources Code Section 21099, would the project:**	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less-than-Significant Impact**	**No Impact**
a) Have a substantial adverse effect on a scenic vista?			X	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?			X	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?		X		

3.2.1 Environmental Setting

Project Area Visual Character

The visual characteristics of the surrounding area include expansive mountain ranges and woodlands containing wildlife habitat, vegetation diversity (e.g., coniferous trees,

shrubs), water resources (e.g., creeks, lakes), scenic views from mountain peaks, and recreational facilities (e.g., campsites and hiking trails). The work area includes Lake Fordyce, which is surrounded by mountain peaks and ridgelines. Portions of the area have been altered from their natural state by forest roads, trails, logging, clearing of brush, thinning of overgrown forests and dam and reservoir operations. Roads that run through the project area include Rattlesnake, Sterling, and Lake Fordyce roads. The area around the dam and Lake Fordyce contains several lakes, including Sterling Lake to the south; Meadow Lake to the north; and French Lake to the northeast.

No permanent residences are near the dam. Big Bend, Troy, and Kingvale—the nearest communities—are located approximately 5 to 7 miles to the south of Lake Fordyce Dam. These communities are at lower elevations than the project area, with no views of the dam or reservoir. Woodchuck Campground is near Rattlesnake Creek off the Lake Fordyce access road, approximately 3 miles from Cisco Grove. Sterling Lake Campground and Robert E. Cole Campground are adjacent to Sterling Lake, approximately 2 miles to the south. The dam is not visible from any of these campgrounds. Lake Fordyce Road terminates near the dam and is used by recreational vehicles.

Scenic Vistas

Although the project area is not an officially designated scenic vista, it is in the Tahoe National Forest, which is considered to be a scenic resource. The surrounding area has high visual quality, because it generally remains unaltered by human activities. Viewers of the project area include motorists using 4-wheel drive vehicles and off-highway vehicles (OHVs) along Rattlesnake and Lake Fordyce roads; whitewater boaters; hikers; and campers. The project area is visible from forest roads and a hiking trail that runs adjacent to Lake Fordyce Road. Panoramic views of the project area are possible from Signal Peak, Black Buttes, and Old Man Mountain.

Scenic Highways

I-80 has an exit at Cisco Road in Placer County near the southern end of the access route to the dam. I-80 is an eligible state scenic highway throughout Nevada County, and portions of Placer County, but has not been officially designated a state scenic highway (Nevada County Transportation Commission 2018; Caltrans 2020). According to the California Department of Transportation (Caltrans), I-80 is eligible for listing as a state scenic highway in Nevada County and Placer County from Emigrant Gap to the Nevada state line. In addition, I-80 is designated as a scenic corridor in the Nevada County

General Plan (Nevada County 1995). I-80 is approximately 5 miles south of the work area at the dam, but at a much lower elevation than the dam, with a mountain crest between the highway and the work area. Lake Fordyce Dam and reservoir are not visible from I-80, nor is the entrance to the Proposed Project access road (Rattlesnake Road).

Light and Glare

Aside from dispersed camping and rural developments, no nighttime lighting or daytime glare occur in the project area.

3.2.2 Discussion

a. Scenic Vista Effects – Less-than-Significant Impact

Construction activities would temporarily affect public views of the project area along the access road and possibly areas of higher elevations. As discussed above, the dam and reservoir can potentially be seen from Signal Peak, Black Buttes, Old Man Mountain, and other nearby mountain peaks and ridgelines. Construction activities would include improvements to the access road, seasonal draining of a portion of the reservoir, and construction at the dam.

Road improvements would consist of the addition of aggregate base rock to the existing unpaved road. Certain curves along the roadway would be widened slightly to accommodate trucks hauling heavy equipment, and certain trees immediately adjacent to the roadway would be removed. Rock outcroppings along portions of the roadway would be excavated in places to widen the road slightly to accommodate trucks. During the construction season, the cofferdam and dewatered work area at the toe of the dam would be visible, along with construction equipment and staging areas with stockpiled materials (see Figure 2-3). Construction at the dam is expected to occur over an approximately three-month window, between mid-July and mid-October in each of the three construction years, with specific durations determined by weather conditions and annual water year type.

Improvements to the access road would not alter the broad visual character of the road. The road would remain unpaved through forested land. Although the dam work site may be visible from areas of higher elevation, the Proposed Project would not affect scenic vistas because of the distance from the Proposed Project to viewing points and the temporary nature of the construction work.

After construction is completed, staging areas or other altered landscapes would be graded to more natural contours. The Proposed Project would not introduce any new structures that could affect existing scenic vistas. The only part of the dam repair that would be visible is the portion of neutrally colored liner (the color is similar to concrete) on the upstream face above the water line; all other repairs would be below the waterline. Mountainous topography and forested land would remain prominent features from viewpoints. Therefore, the impact would be **less than significant.** No mitigation is required.

b. Scenic Resource Damage within a State Scenic Highway (i.e., trees, rock outcroppings, and historic buildings) – No Impact

The project area is not within the viewshed of any state-designated scenic highways. As discussed above, I-80 is an eligible state scenic highway throughout Nevada County and portions of Placer County, but is not officially designated as such. Motorists traveling east and west on I-80 would not have any views of the project area. Construction traffic would use I-80 to access the project area; however, I-80 is currently used by both trucks and passenger vehicles. During the Proposed Project, no scenic resources would be damaged along a state scenic highway, because the project area is not within the vicinity of a state scenic highway. Furthermore, the Proposed Project would not be visible from I-80. Therefore, **no impact** would occur.

c. Visual Character Degradation – Less-than-Significant Impact

The existing visual environment of the project area would be temporarily altered to accommodate the Proposed Project. The visual character of the project area would reflect short-term changes because some construction activities would be visible to recreationists from adjacent land. Equipment, materials, and stockpiles would be stored onsite in staging areas. One site has been identified adjacent to Lake Fordyce and Lake Sterling roads as a potential helicopter landing zone for delivery of certain materials (see Figure 2-8). Equipment used for loading delivered materials onto trucks for delivery to the project area would be stored on-site. During periods of heavy trucking activity, Lake Fordyce Road would be closed near its intersection with Lake Sterling Road; therefore, public views of the construction site would not be available from these roads. Tree removal and tree trimming would be necessary at certain locations to create adequate roadway width and overhead clearance for construction vehicles. Approximately 143 trees larger than 10 inches dbh and up to 150 smaller trees and saplings adjacent to the roadway would be removed. Tree removal would occur mostly in the 2.7 miles of road

from Fordyce Summit to Lake Fordyce (Appendix A). Although this would be a change in the surrounding environment, considering that the project area is located in the Tahoe National Forest, the change would not substantially alter the existing visual character of the project area or the roadway because the tree removal would involve individual trees and clusters spread out along the roadway, mostly at turnout locations.

Although construction-related structures and activities would create a temporary change to the visual character of the project area, these changes would extend only for the duration of the construction activities, approximately three to four months during each of the three construction seasons. Impacts on aesthetics would generally be site-specific and localized. Furthermore, construction staging and laydown areas would be in areas that, where feasible, have already been disturbed. After construction is complete, only the three small culvert extensions along the access road would be left in place. Over time, improvements to the road bed would degrade to near current conditions. Therefore, the impact would be **less than significant**. No mitigation is required.

d. New Light or Glare – Less-than-Significant Impact with Mitigation Incorporated

The project area is uninhabited, and no structures exist that would constitute a significant source of light or glare during the nighttime. The majority of Proposed Project construction would take place during daylight hours, although nighttime construction would be required for certain activities, such as construction of the cofferdam during the first season or large concrete pours that may be time-sensitive. Nighttime construction could result in light scatter; however, there are no sensitive receptors near the work site. Users in the vicinity that would be most sensitive to night lighting would be wilderness campers. The nearest campground, located at Lake Sterling, does not have any direct views of the project area but may have views of the sky above the site, and night lighting may produce a detectable glow. The impact would be **potentially significant**.

Mitigation Measure AES-1: Minimize Nighttime Lighting Effects.

Night-lighting during project construction will be shielded and directed downward, toward the work area, to minimize light trespass to adjacent areas.

Implementation of Mitigation Measure AES-1 would reduce the effects of nighttime lighting during construction. The impact would be **less than significant with mitigation incorporated**.

3.3 Agricultural and Forestry Resources

II. AGRICULTURAL AND FORESTRY RESOURCES 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, the Forest Legacy Assessment Project, and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less-than-Significant Impact**	**No Impact**
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?				X

II. AGRICULTURAL AND FORESTRY RESOURCES	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less-than-Significant Impact**	**No Impact**
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
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 Protection (as defined by Government Code section 51104(g)?			X	
d) Result in the loss of forest land or conversion of forest land to non-forest use?			X	
e) Involve other changes in the existing environment which, 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?				X

3.3.1 Environmental Setting

Agricultural Resources

The California Department of Conservation's (DOC) Important Farmland classifications—Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance—recognize the land's suitability for agricultural production by considering the physical and chemical characteristics of the soil, such as soil temperature range, depth of the groundwater table, flooding potential, rock fragment content, and

rooting depth. The project area is in a region not mapped by the DOC's Important Farmland Finder Map and does not include Important Farmland classifications.

According to the U.S. Department of Agriculture's Natural Resources Conservation Service Soil Survey, the project area is not identified as Prime Farmland (DOC 2019).

Additionally, the project area does not contain any parcels subject to a Williamson Act contract for agricultural preservation (Nevada County 2016; Placer County 2020).

Forestry Resources

USFS defines "Forest Land" as being at least one acre in size and at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for non-forest use. "Timberland" is defined in Public Resources Code section 4526 as land owned by the federal government and designated by the California Department of Forestry and Fire Protection as experimental forest land, which is available for, and capable of growing a crop of trees of a commercial species used to produce lumber and other forest products, including Christmas trees. Government Code sections 51112 and 51113, subdivision (h) defines a "Timberland Production Zone" as land used for growing and harvesting timber and compatible uses.

The most extensive timberlands in the project area are in the Tahoe National Forest, which contains approximately 200,000 acres of timberlands that are considered suitable for timberland production (Nevada County 1995). An existing Road Maintenance Agreement between PG&E and Tahoe National Forest allows for the maintenance of roadside vegetation, including removal of brush or tree growth that obstructs visibility. As part of this maintenance agreement, brush and trees that encroach on the road can be removed by PG&E when they constitute a hazard (such as hindering safe sight distances on the roadway). Tree removal by PG&E in the Tahoe National Forest that is outside of the conditions of this maintenance agreement would require a permit from the USFS.

Portions of the project area are on designated forest lands in the Tahoe National Forest (see Figure 2-2). Lake Fordyce Dam is on PG&E land, surrounded by Tahoe National Forest lands. The majority of the project area is in forest-designated areas, with smaller portions in Timberland Production Zone-designated areas.

3.3.2 Discussion

a. Farmland Conversion – No Impact

No construction would occur in areas containing designated Prime Farmland, Unique Farmland, or Farmland of Statewide Important as a result of the Proposed Project. Operation of the dam and reservoir after construction would remain the same as current operations; therefore, the Proposed Project would not convert designated farmland to non-agricultural use. **No impact** would occur.

b. Agricultural Zoning or Williamson Act Conflicts – No Impact

The project area is not on Williamson Act land or on land with existing agricultural zoning. In addition, the Proposed Project would not change the zoning status of the project area. Therefore, the Proposed Project would not conflict with existing zoning for agricultural use or with a Williamson Act contract. **No impact** would occur.

c. Forest Land or Timberland Zoning Conflicts – Less-than-Significant Impact

The majority of the project area is in a national forest and Timberland Production Zone. Removal of approximately 290 trees, including up to 150 trees that would be non-merchantable with diameters less than 10 inches dbh, would occur primarily to construct improvements along the access road. Tree removal would be necessary to create adequate roadway width and overhead clearance for construction vehicles in Nevada County. As noted in section L-II 4.3.15 of the Nevada County Code, tree removal may be allowed where necessary to provide site access for public utilities (Nevada County 2019). Tree removal would be included in the Special Use Permit that PG&E would obtain from the USFS. Vegetation removal could include mature trees and seedlings, as well as brush cover, that would impede use of the access road in the project area.

Tree removal would be intermittent along the approximately eight-mile access road and would not alter existing uses or zoning in the project area. Therefore, Proposed Project activities would not cause rezoning of forest land or timberland. The impact would be **less than significant**. No mitigation is required.

d. Loss or Conversion of Forest Land – Less-than-Significant Impact

As discussed above, the Proposed Project would require the removal of about 290 trees, many less than 10 inches dbh, to construct improvements along the access road in Nevada County. Tree removal is necessary to create adequate roadway width and

overhead clearance for construction vehicles. However, the project area would remain heavily forested during and following implementation of the Proposed Project, and no loss or conversion of forest land would occur. Tree removal would not negatively affect timberland production in the project area because tree removal would primarily occur immediately adjacent to the access road, and tree removal would affect sightlines only at widened curves or where the road would need to be widened marginally to provide access. One hundred forty-three (143) of the trees to be removed would be larger than 10 inches dbh and would be considered merchantable trees by USFS. Up to 150 smaller trees and saplings would be removed that are not considered to be merchantable trees by USFS. Thus, tree removal would be minimal relative to the surrounding forest land, many of the trees to be removed would not be merchantable, and no changes would occur following the limited duration of the Proposed Project. Therefore, the impact would be **less than significant**. No mitigation is required.

e. Other Farmland or Forest Land Conversion – No Impact

The Proposed Project would improve dam safety by providing permanent repairs to reduce seepage and also would improve the access road. Thus, the Proposed Project implementation would not discourage the continued use of the surrounding land for forestry purposes, result in the conversion of Farmland to non-agricultural use, or convert forest land to non-forest use. **No impact** would occur.

3.4 Air Quality

III. AIR QUALITY: Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied on to make the following determinations. Would the project:	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less-than-Significant Impact**	**No Impact**
a) Conflict with or obstruct implementation of applicable air quality plans?			X	
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?		X		
c) Expose sensitive receptors to substantial pollutant concentrations?			X	
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?			X	

3.4.1 Environmental Setting

Air quality is defined by the concentration of pollutants in relation to their impact on human health. Concentrations of air pollutants are determined by the rate and location of pollutant emissions released by pollution sources, and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, and sunlight. Therefore, ambient air quality conditions within the local air basin are influenced by natural factors, such as topography, meteorology, and

climate, in addition to the amount of air pollutant emissions released by existing air pollutant sources.

The project area is in Nevada County and the central part of Placer County. Nevada County and the central part of Placer County are within the Mountain Counties Air Basin (MCAB). Portions of the Proposed Project in Nevada County are under the jurisdiction of the Northern Sierra Air Quality Management District (NSAQMD), while portions of the Proposed Project in Placer County (approximately 1,400 feet of access road) are under the jurisdiction of the Placer County Air Pollution Control District (PCAPCD).

Air Pollutants of Concern

Individual air pollutants at certain concentrations may adversely affect human or animal health, reduce visibility, damage property, and reduce the productivity or vigor of crops and natural vegetation. Six air pollutants have been identified by the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (ARB) as being of concern, both on a nationwide and statewide level: ozone; carbon monoxide (CO); nitrogen dioxide (NO_2); sulfur dioxide (SO_2); lead; and particulate matter (PM), which is subdivided into two classes based on particle size: PM equal to or less than 10 micrometers in diameter (PM_{10}) and PM equal to or less than 2.5 micrometers in diameter ($PM_{2.5}$). Because the air quality standards for these air pollutants are regulated using human health and environmentally based criteria, they commonly are referred to as "criteria air pollutants."

Attainment of Federal and State Air Quality Standards

Areas are classified under the Federal Clean Air Act and California Clean Air Act as attainment, non-attainment, or maintenance (previously non-attainment and currently attainment) for each criteria pollutant based on whether the federal and state air quality standards have been achieved. With respect to the National Ambient Air Quality Standards (NAAQS), the PCAPCD and NSAQMDs are designated as a nonattainment area for ozone (all of Placer County and only Western Nevada County) and as an attainment or unclassified area for all other pollutants (EPA 2020). With respect to the California Ambient Air Quality Standards (CAAQS), the PCAPCD and NSAQMDs are designated as a nonattainment area for ozone and PM_{10}, and as an attainment or unclassified area for all other pollutants (ARB 2018a). Ozone exceedances in Nevada and Placer Counties occur primarily due to ozone transported from the Broader

Sacramento Area[10] and the San Francisco Bay Area (NSAQMD 2009, PCAPCD 2020). Ozone is not directly emitted into the air but is formed through complex chemical reactions between precursor emissions of reactive organic gases (ROG) and oxides of nitrogen (NO_X) in the presence of sunlight. Major contributors to PM are woodstoves and fireplaces, residential open burning, dust emissions from construction and earth-moving equipment, forestry management burns, transport from agricultural burns, vehicle traffic and windblown dust (NSAQMD 2009).

As part of its efforts to attain and maintain CAAQS and NAAQS, the NSAQMD and PCAPCD have established recommended thresholds of significance for evaluating proposed projects. As shown in Table 3.4-1 and discussed next, the NSAQMD's recommended significance criteria include a mix of emission level tiers and different levels of mitigation, which are required depending on which tier is exceeded. Table 3.4-1 also presents PCAPCD's significance thresholds adopted for the construction phase of projects.

Table 3.4-1 NSAQMD and PCAPCD Thresholds of Significance

District	Level	ROG (lb/day)	NO_X (lb/day)	PM_{10} (lb/day)
NSAQMD	Level A	<24	<24	<79
NSAQMD	Level B	<24-136	<24-136	<79-136
NSAQMD	Level C	>136	>136	>136
PCAPCD	NA	82	82	82

Notes:

lb/day = pounds per day; NO_X = nitrogen oxides; PM_{10} = particulate matter less than 10 microns in diameter; ROG = reactive organic gases

Source: NSAQMD 2009

Under the Level A thresholds, the NSAQMD considers emissions of ROG and NO_X that exceed 24 pounds per day and emissions of PM_{10} that exceed 79 pounds per day to be significant, if basic emission reduction measures are not implemented (i.e., alternatives

[10] Defined in Title 17 of the California Code of Regulations, section 70500, subdivision (b)(3).

to open burning of vegetation, using grid power instead of diesel generators to power equipment) (NSAQMD 2009). Level B thresholds for the NSAQMD are those that generate between 24 and 136 pounds per day of ROG and NO_X and between 79 and 136 pounds of PM_{10} per day. Under the Level B thresholds, emissions would be significant if additional reduction measures are not implemented (i.e., temporary traffic control during all phases of construction, scheduling of traffic flow to off-peak hours) (NSAQMD 2009). For classification Level C thresholds, all reduction measures under Levels A and B must be implemented in addition to dust control practices and higher engine tier technology. If emissions cannot be mitigated down to Level B, then a determination of a significant air quality impact must be made.

The NSAQMD and PCAPCD have not established recommended mass emission thresholds for $PM_{2.5}$; however, $PM_{2.5}$ emissions are presented herein for informational purposes. The NSAQMD also recommends for CO emissions to be estimated to inform the public, although no threshold has been established.

Toxic Air Contaminants

In addition to criteria air pollutants, EPA and ARB regulate hazardous air pollutants, also known as toxic air contaminants (TAC). TAC collectively refer to a diverse group of air pollutants that are capable of causing chronic (i.e., long-duration) and acute (i.e., severe but short-term) adverse effects on human health, including carcinogenic effects. TACs can be separated into carcinogens and noncarcinogens, based on the nature of the effects associated with exposure to the pollutant. For regulatory purposes, carcinogens are assumed to have no safe threshold below which health impacts would not occur. Any exposure to a carcinogen poses some risk of contracting cancer. Noncarcinogens differ in that a safe level of exposure generally is assumed to exist, below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis.

Sensitive Receptors

Sensitive receptors are facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Hospitals, schools, convalescent facilities, daycare facilities, and residences are examples of sensitive receptors. There are no sensitive receptors in the vicinity of the dam; the project area is undeveloped and largely uninhabited. The informal campground nearest to Lake Fordyce would be closed, and other recreational opportunities would be limited for the duration of construction. In addition, recreational visitors at Lake Sterling, including

informal camping spots and temporary summer camp programs near the access road, would consist of temporary recreational users and would not be exposed to construction-related emissions for an extended period.

3.4.2 Discussion

a. Air Quality Plan Conflicts – Less-than-Significant Impact

Air quality plans describe air pollution control strategies to be implemented by a city, county, or regional air district. The primary purpose of an air quality plan is to bring an area that does not attain NAAQS and CAAQS into compliance with those standards, pursuant to the requirements of the federal Clean Air Act and California Clean Air Act. The applicable air quality plan for the project area is the Ozone Attainment Plan for Western Nevada County (Ozone Plan), released on October 12, 2018 (ARB 2018b). In addition, approximately 1,400 feet of access road lies within Placer County, which is included in the Sacramento Federal Ozone Non-Attainment Area; thus, the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan is also an applicable air quality plan for the project area. The attainment plans (supplemented by the ARB 2018 Updates to the California State Implementation Plan) were adopted as a part of the 2018 State Implementation Plan Update on October 25, 2018.

The Ozone Plan includes attainment, reasonably available control measure, and reasonable further progress demonstrations, and contingency measures for progress and attainment. The Ozone Plan also identifies strategies and control measures needed to achieve attainment of the ozone standard, including the ARB Control Program and District Control Program, which include the Reasonably Available Control Technology and the NSAQMD's Rule 428 (New and Modified Stationary Source Review).

Proposed Project construction would involve the use of off-road equipment, haul trucks, and worker commute trips. Assumptions for off-road equipment emissions in the State Implementation Plan were developed based on hours of activity and equipment population reported to ARB for rule compliance. The Proposed Project would not increase the assumptions for off-road equipment use in the Ozone Plan. Furthermore, the Proposed Project would not involve off-road equipment use within Placer County and would not conflict with the assumptions in the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan. In addition, the applicable statewide Airborne Toxic Control Measures for Construction, Grading, and Diesel, which reduces emissions of NO_X and ROG (ozone precursors) would also be implemented.

Furthermore, the emissions inventories used to develop a region's air quality attainment plans are based primarily on projected growth in population, employment, and associated vehicle miles traveled (VMT) for the region that are determined, in part, based on the planned growth identified in local and regional planning documents. Therefore, projects that would result in increases in population or employment growth beyond that projected in regional or local plans could result in increases in VMT above that planned in the attainment plan, further resulting in mobile-source emissions that could conflict with a region's air quality planning efforts. The Proposed Project would not involve any uses that would increase population beyond that considered in the General Plan or the State Implementation Plan. Thus, the Proposed Project would not change the amount of development projected in the MCAB and would be consistent with the projected growth in population, employment, and VMT used in air quality planning efforts by the NSAQMD. Furthermore, the Proposed Project would not result in any new stationary sources of emissions or any new land use development. Thus, implementation of the Proposed Project would not conflict with or obstruct implementation of any air quality planning efforts. The impact would be **less than significant.** No mitigation is required.

b. Cumulative Criteria Pollutant Increases – Less-than-Significant Impact with Mitigation Incorporated

The Proposed Project would not result in an increase in long-term operational emissions because its purpose would be to improve the dam safety by providing a permanent repair to reduce the seepage, in accordance with DSOD requirements. Thus, the permanent repair of the dam would not introduce any new emissions sources to the MCAB or an increase in vehicle activity. However, emissions would be generated during construction.

Construction emissions would be short term or temporary but have the potential to result in a significant impact on air quality. Proposed Project construction would generate temporary emissions of precursors to ozone (ROG and NO_X), CO, PM_{10}, and $PM_{2.5}$. ROG, NO_X, and CO emissions are associated primarily with mobile equipment exhaust, including off-road construction equipment and on-road motor vehicles. Exhaust emissions from diesel equipment, haul truck trips, delivery truck trips, and worker commute trips also would generate PM_{10} and $PM_{2.5}$ emissions. Fugitive PM dust emissions would be associated primarily with site preparation and travel on roads, and would vary as a function of parameters such as soil silt content, soil moisture, wind speed, acreage of disturbance area, and miles traveled by construction vehicles.

Generally, Proposed Project construction would consist of access road improvements, construction of a cofferdam, and seepage repair. Construction activities would occur over an approximately 3-month window, between mid-July and mid-October each year, for 3 years and limited duration during a fourth year to remove the cofferdam bin-walls, if necessary. Because of the limited construction window, some construction activities would occur 5 to 7 days per week, with some activities scheduled for double shifts at 24 hours per day. In addition to off-road equipment, worker commutes, and material export and deliveries, the Proposed Project would also involve the limited use of a helicopter for mobilization and demobilization of equipment or material to inaccessible parts of the work area. Furthermore, during access road improvements, some blasting may be required for certain rock removal activities.

Emissions were estimated using emission factors from the ARB OFFROAD and EMFAC 2017 inventory models. Construction emissions from the operation of diesel-fueled off-road equipment were estimated by multiplying estimated daily use (in hours) by equipment-specific emissions factors, based on engine tiers and horsepower provided by the contractor.[11] Emissions from on-road motor vehicles were estimated using vehicle trips, VMT, and EMFAC 2017 mobile source emission factors. The emission factors represent the fleet-wide average and vehicle-specific emission factors in Nevada County. Fugitive dust emissions were estimated using the EPA Compilation of Air Pollutant Factors (AP-42) and are based on material loading, VMT, blasting approach, and earthwork quantities.

Table 3.4-2 summarizes the maximum daily emissions of criteria air pollutants and precursors associated with project construction for comparison with the NSAQMD's thresholds of significance. As described previously, approximately 1,400 feet of access road are located within the PCAPCD jurisdiction. The emissions that occur on the access road and within the jurisdiction of the PCAPCD are limited to on-road construction vehicle trips. Therefore, Table 3.4-2 takes a conservative approach and also shows the total daily on-road emissions for comparison to the PCAPCD thresholds.

[11] Based on the equipment types and counts provided by the contractor, the analysis assumed approximately 69 percent of the equipment fleet would have Tier 4 engines, approximately 27 percent would have Tier 3 engines, and the remaining 4 percent would be split evenly between Tier 2 and Tier 1 engines.

Table 3.4-2 Maximum Daily Construction-Related Emissions

	ROG (lb/day)	NO_X (lb/day)	CO (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)[2]
Maximum Daily Emissions [1]	11.77	103.71	218.05	101.53	13.12
NSAQMD Level A Thresholds	24	24	N/A	79	N/A
Exceeds Level A Threshold?	No	**Yes**	—	**Yes**	—
NSAQMD Level B Thresholds	136	136	N/A	136	N/A
Exceeds Level B Threshold?	**No**	**No**	**—**	**No**	**—**
Maximum On-Road Emissions[3]	**0.43**	**17.92**	**10.00**	**0.67**	**0.32**
PCAPCD Threshold	**82**	**82**	**N/A**	**82**	**N/A**
Exceeds PCAPCD Threshold?	**No**	**No**	**—**	**No**	**—**

Notes:

1. Maximum daily emissions are assumed to occur during cofferdam construction (Season one) based on information provided by the contractor. In addition, it was assumed rock blasting would occur during access road improvements; as such, blasting activities are not anticipated to occur during this worst-case analysis. Similarly, helicopter activity is anticipated to occur during mobilization and demobilization activities. As such, helicopter usage is not anticipated to overlap with the maximum daily scenario.
2. NSAQMD does not have a threshold for CO and $PM_{2.5}$ emissions; maximum daily emissions shown for informational purposes.
3. Maximum on-road emissions conservatively include total daily emissions associated with on-road vehicle travel for comparison to the PCAPCD thresholds due to the portion of the access road (approximately 1,400 feet) located within the PCAPCD jurisdiction.

CO = carbon monoxide; lb/day = pounds per day; NO_X = nitrogen oxides; PCAPCD= Placer County Air Pollution Control District ; PM_{10} = particulate matter less than 10 microns in diameter; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; ROG = reactive organic gases

Source: NSAQMD 2009

As shown in Table 3.4-2, construction-related emissions would be within the NSAQMD's Level B range. According to the NSAQMD Guidelines, a project's emissions within the Level B range would be potentially significant and subject to NSAQMD's Mitigation for Use During Design and Construction Phases for Classifications as Level B Threshold (NSAQMD 2009). Accordingly, implementation of the following NSAQMD-recommended mitigation measures for projects with emissions within the Level B range are considered adequate to reduce air quality impacts to a less-than-significant level:

NSAQMD-Recommended Mitigation for Use During Design and Construction Phases for Classifications as Level B Threshold

a) Alternatives to open burning of vegetative material will be used unless otherwise deemed infeasible by the District. Among suitable alternatives are chipping, mulching, or conversion to biomass fuel.

b) Grid power shall be used (as opposed to diesel generators) for job site power needs where feasible during construction

c) Temporary traffic control shall be provided during all phases of the construction to improve traffic flow as deemed appropriate by local transportation agencies and/or Caltrans.

d) Construction activities shall be scheduled to direct traffic flow to off-peak hours as much as practicable.

e) There shall be a limit of one wood-burning appliance per residence, and it shall be an EPA Phase II certified appliance. Also, each residence shall be equipped with a non-woodburning source of heat.

However, due to remote location and nature of the project, the recommended NSAQMD mitigation measures have been revised. For example, because the project area does not have access to grid power, using grid power as opposed to diesel generators (described as measure [b] above) would not be feasible. Similarly, the Project does not involve residences; thus measure (e) above would not be applicable. Implementation of Mitigation Measure AQ-1 would minimize emissions associated with open burning as well as reduce emissions of NO_X, ROG, and PM associated with idling vehicles. Therefore, consistent with NSAQMD Guidelines, with implementation of Mitigation Measure AQ-1, the Project's construction emissions (which are within the Level B range), would be less than significant.

Mitigation Measure AQ-1: Mitigations for Use during Project Design and Construction.

i. Alternatives to open burning of vegetative material will be used unless otherwise deemed infeasible by the District. Among suitable alternatives are chipping, mulching, or conversion to biomass fuel.

ii. Temporary traffic control shall be provided during all phases of the construction to improve traffic flow as deemed appropriate by local transportation agencies and/or Caltrans.

iii. Construction activities shall be scheduled to direct traffic flow to off-peak hours as much as practicable.

In addition, pursuant to NSAQMD Rule 226 (Dust Control), PCAPCD Rule 228 (Fugitive Dust), and consistent with the Guidelines for Assessing and Mitigating Air Quality Impacts of Land Use Projects (NSAQMD 2009), PG&E and its contractors would submit and implement a Dust Control Plan for implementation during construction activities, reducing fugitive PM_{10} emissions (a criteria pollutant for which the MCAB is in nonattainment under the CAAQS). Since the following conditions are basic requirements for compliance with NSAQMD Rules and Regulations and are typically included in the General Notes and/or the Grading Plan for projects, the emission estimates shown in Table 3.4-2 include implementation of the recommended dust control plan conditions (ii) and (iv) below, which reduce fugitive dust emissions by approximately 55 to 57 percent. To ensure compliance with NSAQMD Rule 226 and PCAPCD Rule 228, the recommended dust control plan conditions have been included as an additional mitigation measure to minimize fugitive dust generation during Project construction activities.

Mitigation Measure AQ-2: Recommended Dust Control Plan Conditions.

i. The applicant would be responsible for ensuring that all adequate dust control measures are implemented in a timely manner during all phases of project development and construction.

ii. All material excavated, stockpiled, or graded would be sufficiently watered, treated, or covered to prevent fugitive dust from leaving the property boundaries and causing a public nuisance or a violation of an ambient air standard. Watering should occur at least twice daily, with complete site coverage.

iii. All areas with vehicle traffic would be watered or have dust palliative applied as necessary for regular stabilization of dust emissions.

iv. All on-site vehicle traffic would be limited to a speed of 15 mph on unpaved roads.

v. All land clearing, grading, earth moving, or excavation activities on a project would be suspended as necessary to prevent excessive windblown dust when winds are expected to exceed 20 mph.

vi. All inactive portions of the development site would be covered, seeded, or watered until a suitable cover is established. Alternatively, the applicant may apply County-approved nontoxic soil stabilizers (according to manufacturers' specifications) to all inactive construction areas (previously graded areas which remain inactive for 96 hours) in accordance with the local grading ordinance.

vii. All material transported off-site would be either sufficiently watered or securely covered to prevent public nuisance, and there must be a minimum of 6 inches of freeboard in the bed of the transport vehicle.

viii. Paved streets adjacent to the project would be swept or washed at the end of each day, or more frequently if necessary, to remove excessive or visibly raised accumulations of dirt and/or mud which may have resulted from proposed project activities.

ix. Prior to the completion of construction activities, the applicant would re-establish ground cover on the site through seeding and watering in accordance with the local grading ordinance.

With implementation of Mitigation Measures AQ-1 and AQ-2, the emissions of criteria air pollutants and precursors generated by construction would not result in the cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard. The impact would be **less than significant with mitigation incorporated**.

c. Sensitive Receptor Exposure – Less-than-Significant Impact

Criteria Pollutants

As shown in Table 3.4-2, construction-related activities would result in emissions of criteria air pollutants, but at levels that would not exceed the thresholds of significance for Level B adopted by the NSAQMD. Projects that exceed Level A require basic mitigations and may be considered a less-than-significant impact to air quality. The thresholds of significance were designed to identify those projects that would result in significant levels of air pollution, and to assist the region in attaining the applicable state and federal ambient air quality standards, which were established using health-based criteria to protect the public with a margin of safety from adverse health impacts from exposure to air pollution. Therefore, projects that would not exceed the thresholds of significance would not impede attainment and maintenance of the standards, which can inform the project's impacts to regional air quality and health risks associated from criteria pollutants under CEQA.

In addition, the health effects of NO_X, which is a precursor to ozone, are discussed in the amicus brief filed by the South Coast Air Quality Management District (SCAQMD) in the *Sierra Club v. County of Fresno* (2014) 26 Cal.App.4th 704. The brief states that it "takes a large amount of additional precursor emissions to cause a modeled increase in ambient ozone levels" (SCAQMD 2015). The SCAQMD explained that it may be technically infeasible to accurately quantify ozone-related health impacts caused by NO_x or ROG emissions from relatively small projects, due to photochemistry and regional model limitations (SCAQMD 2015). Furthermore, the SCAQMD brief stated that a project emitting only 10 tons per year of NO_x or VOC/[ROG] is small enough that its regional impact on ambient ozone levels may not be detected in the regional air quality models used to determine ozone levels" (SCAQMD 2015). Therefore, in this case, it would not be feasible to directly correlate project emissions of NO_x (annual emissions of NO_X are estimated to be less than three tons per year) with specific health impacts from ozone. The SCAQMD explains that this is in part because ozone formation is not linearly related to emissions; ozone impacts vary depending on the location of the emissions, the location of other precursor emissions, meteorology, and seasonal impacts (SCAQMD 2015). Thus, because the criteria air pollutant emissions are within the Level B range, and the level of emissions are relatively low, construction of the Proposed Project would not expose sensitive receptors to substantial pollutant concentrations.

Toxic Air Contaminants

The greatest potential for TAC emissions would be related to diesel PM emissions, associated with use of heavy-duty construction equipment. The California Office of Environmental Health Hazard Assessment (OEHHA) has developed a Guidance Manual for the Preparation of Health Risk Assessments (OEHHA 2015). According to OEHHA methodology, health effects from carcinogenic TACs usually are described in terms of individual cancer risk, which is based on a 30-year lifetime exposure to TACs.

As discussed above, there are no sensitive receptors near the work area; the project area is undeveloped and largely uninhabited. The informal campground nearest to Lake Fordyce would be closed, and other recreational opportunities, such as off-road vehicle access to Fordyce Trail from Lake Fordyce Road, would be limited for the duration of construction and would not result in extended exposure. Furthermore, recreational visitors at informal campgrounds or for summer camp programs would be transient users and would not be exposed to construction-related emissions for an extended period. Construction would occur only over an approximately 3-month-long construction season each year, for 3 years and a limited duration during a fourth year, if necessary. Thus, trucks and off-road equipment would not operate in the immediate vicinity of any sensitive receptor for an extended period. Therefore, considering the lack of sensitive receptors in the project area and limited construction duration, construction-related activities would not expose sensitive receptors to substantial pollutant concentrations.

The Proposed Project would not result in an increase in long-term operational emissions because its purpose would be to improve the dam safety by providing a permanent repair to reduce the seepage, in accordance with DSOD requirements. Thus, the permanent repair of the dam would not introduce any new emissions sources or expose sensitive receptors to substantial pollutant concentrations. The impact would be **less than significant**. No mitigation is required.

d. Odor – Less-than-Significant Impact

The occurrence and severity of odor impacts depend on numerous factors: the nature, frequency, and intensity of the source; wind speed and direction; and the presence of sensitive receptors. Although offensive odors rarely cause any physical harm, they still can be very unpleasant, and they can generate citizen complaints to local governments and regulatory agencies.

Typical odor sources of concern include wastewater treatment plants, sanitary landfills, transfer stations, composting facilities, petroleum refineries, asphalt batch plants, chemical manufacturing facilities, fiberglass manufacturing facilities, auto body shops, rendering plants, and coffee roasting facilities. The Proposed Project would not include these types of facilities or operations and would not result in a new source of substantial odors.

Potential construction-related sources of odors would include diesel equipment that would emit exhaust. However, because of the temporary nature of these emissions, the highly diffusive properties of diesel exhaust, and lack of nearby receptors, the potential impact would be minimal. Furthermore, the odors would be typical of most construction sites. Therefore, the Proposed Project would not result in other emissions (such as those leading to odors), adversely affecting a substantial number of people. The impact would be **less than significant.** No mitigation is required.

3.5 Biological Resources

IV. BIOLOGICAL RESOURCES: Would the project:	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less-than-Significant Impact**	**No Impact**
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 Wildlife or U.S. Fish and Wildlife Service?		X		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife and U.S. Fish and Wildlife Service?				X
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?		X		
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?			X	

IV. BIOLOGICAL RESOURCES: Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
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?				X

3.5.1 Environmental Setting

Data Collection and Review

A review of publicly available aerial imagery and mapping was conducted to evaluate potential biological resources in the project area. The aerial images were combined with a review of online databases to identify locations where special-status species, wetlands and waters of the U.S., and other sensitive biological resources would have the potential to occur. Queries of the California Natural Diversity Database (CNDDB) (CDFW 2020) and the U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Conservation online tool (USFWS 2020), as well as the California Native Plant Society's Inventory of Rare and Endangered Plants of California (CNPS 2019a) were conducted to identify special-status species that have potential to occur in the project area as well as the surrounding area. The CNDDB list and an official species list were obtained from the USFWS Information for Planning and Conservation online tool website (CDFW 2020; USFWS 2020). A query of observations in eBird (an online data source provided by the National Audubon Society) was reviewed to obtain a list of bird species that may occur in the project area (eBird 2020).

Field Surveys

Field surveys were conducted to assess the potential for the Proposed Project to affect protected biological resources. Table 3.5-1 lists the surveys that were conducted.

Table 3.5-1 Field Surveys to Identify Protected Biological Resources

Date	Survey Type	Survey Area(s)
October 2 and 3, 2018	Wetland delineation (PG&E 2019a)	Proposed Project footprint, with the exception of access road
October 3 through 5, 2018	Sierra Nevada yellow-legged frog habitat assessment	The section of Fordyce Creek downstream from Lake Fordyce Dam Multiple perennial sections of Fordyce Creek and permanent adjacent ponds along and near the mid-section of Fordyce Creek, east of Eagle Lakes The section of Fordyce Creek just upstream from Lake Spaulding A ponded area west of and adjacent to Lake Fordyce Road Several tributaries along Lake Fordyce
July 29 through 31, 2019	Botanical inventory and special-status plant surveys (Stillwater Sciences 2019) Additional surveys to support the wetland delineation and an aquatic habitat evaluation (Stillwater Sciences 2020b)	Proposed Project footprint, with the exception of access road
October 10, 2019	Follow up surveys to collect wetland delineation data along the access road	Proposed Project access roadways

Project Setting and Regional Context

The project area is in the Tahoe National Forest on the western slope of the north-central portion of the Sierra Nevada. It falls within the Sierra Nevada section of the Sierran Steppe-Mixed Coniferous Forest Province. Elevations in the project area range between 5,700 feet to the south to 7,000 feet around Lake Sterling. The project area is dominated by conifer forest, which includes incense cedar, red fir, white fir, and Jeffrey pine. Lodgepole pines are located in moist soils in meadows and along shorelines. Quaking aspen and mountain alder are common deciduous trees and may form a subcanopy beneath the conifer overstory. Some areas are barren, devoid of vegetation because of rocky and steep terrain with little to no soil layer. Although absent within the project area, there are marshes and meadows in the project vicinity.

3.5.2 Discussion

a. Sensitive Species – Less-than-Significant Impact with Mitigation Incorporated

Sensitive Plant Species: Special-status plant species that were identified during the desktop review as having a potential to occur in the project area are shown in Table 3.5-2. As shown in the table, field surveys for special-status plant species were conducted on July 29–31, 2019. These field surveys were comprehensive for vascular plants, meaning that "every plant taxon that occurs on site [was] identified to the taxonomic level necessary to determine rarity and listing status" (Stillwater Sciences 2019). Of the 37 special-status plant species identified during the desktop review, none were observed during the field surveys.

The entire project area was surveyed, with the exception of the access road, because access road improvements would primarily occur within the road prism (Stillwater Sciences 2019). Access road improvements may result in impacts on areas adjacent to the road prism at seven locations, including three culvert extensions and four drainage dips/rock aprons. Prior to the commencement of road improvements, these seven locations would be surveyed for special-status plant species during the appropriate phenotypic period; however, special-status plant species are not expected to be found. Nonetheless, in the unlikely event that special-status plant species are observed during these surveys, the impact would be **potentially significant**. Therefore, Mitigation Measure BIO-1 would be required.

Table 3.5-2 Special-Status Plants with the Potential to Occur in the Project Area

Scientific Name	Common Name	Status (USFWS/ State/CRPR/ USFS)	Present/ Absent during Field Surveys
Arabis rigidissima var. *demota*	Galena Creek rockcress	– / – / 1B.2 / FSS	Absent
Artemisia tripartita subsp. *tripartite*	threetip sagebrush	– / – / 2B.3 / –	Absent
Astragalus lemmonii	Lemmon's milk-vetch	– / – / 1B.2 / FSS	Absent
Botrychium ascendens	upswept moonwort	– / – / 2B.3 / FSS	Absent
Botrychium crenulatum	scalloped moonwort	– / – / 2B.2 / FSS	Absent
Botrychium lunaria	common moonwort	– / – / 2B.3 / FSS	Absent
Botrychium minganense	Mingan moonwort	– / – / 2B.2 / FSS	Absent
Botrychium montanum	western goblin	– / – / 2B.1 / FSS	Absent
Brasenia schreberi	watershield	– / – / 2B.3 / –	Absent
Carex davyi	Davy's sedge	– / – / 1B.3 / –	Absent
Carex lasiocarpa	woolly-fruited sedge	– / – / 2B.3 / –	Absent
Carex limosa	mud sedge	– / – / 2B.2 / –	Absent
Drosera anglica	English sundew	– / – / 2B.3 / –	Absent
Erigeron miser	starved daisy	– / – / 1B.3 / FSS	Absent
Eriogonum umbellatum var. *torreyanum*	Donner Pass buckwheat	– / – / 1B.2 / FSS	Absent
Ivesia aperta var. *aperta*	Sierra Valley ivesia	– / – / 1B.2 / FSS	Absent
Ivesia aperta var. *canina*	Dog Valley ivesia	– / – / 1B.1 / FSS	Absent
Ivesia sericoleuca	Plumas ivesia	– / – / 1B.2 / FSS	Absent
Ivesia webberi	Webber's ivesia	FT / – / 1B.1 / FSS	Absent
Juncus luciensis	Santa Lucia dwarf rush	– / – / 1B.2 / FSS	Absent
Mertensia oblongifolia var. *oblongifolia*	sagebrush bluebells	– / – / 2B.2 / –	Absent

Scientific Name	Common Name	Status (USFWS/ State/CRPR/ USFS)	Present/ Absent during Field Surveys
Monardella follettii	Follett's monardella	– / – / 1B.2 / FSS	Absent
Oreostemma elatum	tall alpine-aster	– / – / 1B.2 / –	Absent
Packera indecora	rayless mountain ragwort	– / – / 2B.2 / –	Absent
Penstemon personatus	closed-throated beardtongue	– / – / 1B.2 / FSS	Absent
Phacelia stebbinsii	Stebbins' phacelia	– / – / 1B.2 / FSS	Absent
Potamogeton praelongus	white-stemmed pondweed	– / – / 2B.3 / –	Absent
Potamogeton robbinsii	Robbins' pondweed	– / – / 2B.3 / –	Absent
Pyrrocoma lucida	sticky pyrrocoma	– / – / 1B.2 / FSS	Absent
Rhamnus alnifolia	alder buckthorn	– / – / 2B.2 / –	Absent
Rhynchospora alba	white beaked-rush	– / – / 2B.2 / –	Absent
Schoenoplectus subterminalis	water bulrush	– / – / 2B.3 / –	Absent
Tauschia howellii	Howell's tauschia	– / – / 1B.3 / FSS	Absent
Helodium blandowii	Blandow's bog moss	– / – / 2B.3 / FSS	Absent
Meesia longiseta	long seta hump moss	– / – / 2B.3 / –	Absent
Meesia uliginosa	broad-nerved hump moss	– / – / 2B.2 / FSS	Absent
Nardia hiroshii	Hiroshi's flapwort	– / – / 2B.3 / –	Absent

Source: Stillwater 2019. Botanical Surveys for the Lake Fordyce Dam Repair Project

Notes:

USFWS = U.S. Fish and Wildlife Service

USFS = U.S. Forest Service

Status

FT = federally listed threatened

FSS = Forest Service sensitive

– = None

California Rare Plant Rank (CRPR)

1B Plants rare, threatened, or endangered in California and elsewhere
2B Plants rare, threatened, or endangered in California, but more common elsewhere
3 More information needed about this plant, a review list
4 Plants of limited distribution, a watch list
0.1 Seriously threatened in California (high degree/immediacy of threat)
0.2 Moderately threatened in California (moderate degree/immediacy of threat)
0.3 Not very threatened in California (low degree/immediacy of threats or no current threats known)

Mitigation Measure BIO-1: Avoid Impacts on Special-Status Plants.

A qualified botanist will conduct focused botanical surveys in the areas at seven locations, including three culvert extensions and four drainage dips that were not covered by 2019 surveys during the appropriate phenotypic period. If any special-status plant species are identified during these surveys, the following measures will be implemented:

a) If ground disturbance is planned to occur in areas documented as containing populations of special-status species, the top 6 inches of soil in these areas will be stockpiled during construction and replaced following construction.

b) If it is not feasible to retain the top 6 inches of soil in areas where sensitive plant species will be affected, then qualified biologists will collect seeds of the applicable sensitive species during the appropriate blooming season, for reseeding temporarily affected areas as part of site restoration.

c) If feasible, work activities in habitats occupied by special-status plants will occur before germination or following special-status plant species seed production, to allow maximum seed set and avoidance of direct mortality. Work in habitats occupied by special-status plants will not occur from germination through seed set, based on the special-status species present in the project area.

d) In the event that construction cannot avoid populations of special-status plant species during the growing/blooming season, special-status plant populations will be flagged before construction. The timing of the flagging efforts will correspond with the blooming period when the species is most conspicuous and easily recognizable.

Implementation of Mitigation Measure BIO-1 would reduce the impact on special-status plant species to a less-than-significant level. Thus, the impact would be **less than significant with mitigation incorporated**.

Special-Status Wildlife Species: Special-status wildlife species that were identified during the desktop review as having a potential to occur in the project area are shown in Table 3.5-3. Of the 21 special-status wildlife species initially identified, seven were determined to be absent from the project area and six were determined unlikely to occur in the project area (Table 3.5-3). Six species were determined to have a potential to occur, and two species were confirmed to be in the project area (Table 3.5-3).

The following discussions present detailed impact analyses for those special-status wildlife species determined to be present or have a potential to occur in the project area. In addition, although western pond turtle and foothill yellow-legged frog were determined to be unlikely to occur and absent from the project area respectively, it was determined that the modified flow regime required to construct the Proposed Project could result in potential effects to these species within the South Yuba River, below Spaulding Reservoir. As such, impact analyses for these two species are also provided.

Bald eagle. Bald eagles are sensitive to noise generation and can abandon active nests due to high noise levels, such as those from helicopters and blasting, occurring more than 0.5 mile away. They may abandon active nests due to other construction-generated noise up to 0.5 mile away. In addition, disruption of foraging behavior could result from noise-generating activities. Nest destruction would occur if a tree is felled that contains an active nest. Helicopter travel within 0.25 mile above an active nest would also result in potential nest abandonment. Without the implementation of mitigation measures to avoid nest abandonment, potential direct effects on the bald eagle would include nest destruction and nest abandonment as a result of noise-generating construction, blasting, and helicopter activities if there is an active bald eagle nest or if bald eagles are present in the vicinity of those activities.

Table 3.5-3 Special-Status Wildlife with the Potential to Occur in the Project Area

Common Name ***Scientific Name***	**Status**[a]	**Distribution in California**	**Habitat Association**	**Likelihood to Occur in the Project Area**
Bald eagle *Haliaeetus leucocephalus*	SE, FSS, BGEPA	Permanent resident and uncommon winter migrant, found nesting primarily in Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Trinity counties	Large bodies of water or rivers with abundant fish, uses snags or other perches; nests in advanced-successional conifer forest near open water	Present: individuals (adults and juveniles) have been observed in the project area; an active nest was documented on Lake Fordyce in 2002
Northern goshawk *Accipter gentilis*	SSC, FSS	Nests in North Coast Ranges through Sierra Nevada, Klamath, Cascade, and Warner Mountains, in Mount Pinos and San Jacinto, San Bernardino, and White Mountains; winters along north coast, throughout foothills, and in northern deserts	Mature and old-growth stands of coniferous forest, middle and higher elevations; nests in dense part of stands near an opening	Present: The project area contains suitable habitat and is within the species' range; Lake Fordyce has a Protected Activity Center (PAC)

Common Name *Scientific Name*	Status[a]	Distribution in California	Habitat Association	Likelihood to Occur in the Project Area
Sierra Nevada yellow-legged frog *Rana sierrae*	FE, ST, FSS	From Plumas County, south through the Sierra Nevada, to Inyo County	Lakes, ponds, and streams in montane riparian, lodgepole pine, subalpine conifer, and wet meadow habitats	Potential to Occur: Suitable habitat is present in the vicinity of the project area at Rattlesnake Creek and the project area is within its range of the species, but no CNDDB sightings have been recorded in the project area or during relicensing surveys
Southern long-toed salamander *Ambystoma macrodactylum sigillatum*	SSC	Occurs along the northern Sierra Nevada range south to Garner Meadows and Spicer Reservoir, and in Trinity and Siskiyou Counties near the Trinity Alps	Inhabits alpine meadows, high mountain ponds and lakes. Adults spend much of their lives underground, often using the tunnels of burrowing mammals such as moles and ground squirrels	Potential to Occur: The project area contains suitable habitat and is within its range. 31 CNDDB sightings have been reported within 5 miles of the project area, eight of which occur within 1 mile
Western bumble bee *Bombus occidentalis*	SCE, FSS	Throughout California and adjacent states	Uses flowering plants in meadows and forested openings; abandoned rodent burrows are used for nest and hibernation sites for queens	Potential to Occur: The project area contains suitable habitat conditions and is within its range; six collection records in Tahoe National Forest prior to 2000; 2003 and 2016 sightings in Tahoe National Forest

Common Name ***Scientific Name***	**Status**[a]	**Distribution in California**	**Habitat Association**	**Likelihood to Occur in the Project Area**
California spotted owl *Strix occidentalis occidentalis*	SSC, FSS	From the southern Cascade Range of northern California, south along the west slope of the Sierra Nevada, and in mountains of central and southern California nearly to the Mexican border	Typically in older forested habitats; nests in complex stands dominated by conifers, especially coastal redwood, with hardwood understories; some open areas are important for foraging	Potential to Occur: The project area contains suitable habitat and is within the species' range; no CNDDB sightings or PACs within the project area
Townsend's western big-eared bat *Corynorhinus townsendii*	SSC, FSS	Throughout California, found in all but subalpine and alpine habitats, details of distribution not well known	Most abundant in mesic habitats, also found in oak woodlands, desert, vegetated drainages, caves/cave-like structures (including basal hollows in large trees, mines, tunnels, and buildings)	Potential to Occur: Action Area contains suitable roosting and foraging habitat, though no sightings or signs of activity in Action Area during PG&E relicensing surveys
Pallid bat *Antrozous pallidus*	SSC, FSS	Throughout California except for elevations greater than 3,000 m in the Sierra Nevada	Roosts in rock crevices, tree hollows, mines, caves, and a variety of vacant and occupied buildings; feeds in a variety of open woodland habitats	Potential to Occur: Action Area contains suitable roosting and foraging habitat, though no sightings or signs of activity in Action Area during PG&E relicensing surveys.

Common Name ***Scientific Name***	**Status[a]**	**Distribution in California**	**Habitat Association**	**Likelihood to Occur in the Project Area**
Western pond turtle *Actinemys marmorata*	SSC, FSS	From the Oregon border along the coast ranges to the Mexican border, and west of the crest of the Cascades and Sierras; sea level to approximately 6,000 ft in elevation	Permanent, slow-moving fresh or brackish water with available basking sites and adjacent open habitats or forest for nesting	Unlikely to Occur: Nearest occurrence is approximately 25 miles west of the project area, and the project is at the extreme elevational range for this species
Greater sandhill crane *Grus canadensis tabida*	ST, FP, FSS	Winter visitor and migrant; scattered locations in the Central Valley; breeds in extreme northeastern California	Forages in freshwater marshes and grasslands as well as harvested rice fields, corn stubble, barley, and newly planted grain fields	Unlikely to Occur: The project area lacks suitable habitat; CNDDB sightings in Tahoe National Forest are outside the project area
Great gray owl *Strix nebulosa*	SE, FSS	In the Sierra Nevada from the vicinity of Quincy, Plumas County south to around Yosemite	Dense, coniferous forest, usually near a meadow for foraging; nests in large, broken-topped snags	Unlikely to Occur: no CNDDB sightings in the project area; project area lacks adequate foraging and nesting habitat

Common Name ***Scientific Name***	**Status**[a]	**Distribution in California**	**Habitat Association**	**Likelihood to Occur in the Project Area**
Willow flycatcher *Empidonax traillii*	SE, FSS	In the Sierra Nevada and Cascade ranges; nests as far south as San Diego County; confirmed breeding along the Eel River, and in mesic clear-cuts in northern Humboldt County	Dense brushy thickets within riparian woodland often dominated by willows and/or alder, near permanent standing water; uses brushy, early-succession forests (e.g., clear-cuts) in the Pacific Northwest	Unlikely to Occur: limited suitable habitat in the project area; no known occurrences in or near the project area
Sierra Nevada mountain beaver *Aplodontia rufa californica*	SSC	Found throughout the Cascade, Klamath, and Sierra Nevada ranges	Mountain beavers occur in dense riparian-deciduous and open, brushy stages of most forest types. Typical habitat in the Sierra Nevada is montane riparian	Unlikely to Occur: anecdotal sightings have been reported in the Tahoe National Forest but none in recent years or in the project area; unconfirmed CNDDB sighting in 2010 more than 3.14 miles from the project area
California wolverine *Gulo gulo*	ST, FPT, FSS	Scarce resident of North Coast mountains and Sierra Nevada; high elevations, between 1,300 and 3,400 meters (4,300 and 10,800 feet)	Dense mixed-conifer forest; uses caves, hollows, logs, rock outcrops, and burrows for cover.	Unlikely to Occur: anecdotal sightings have been reported in Tahoe National Forest but none in recent years or within the project area; 1969 unconfirmed CNDDB sighting over 1.5 mi from project area

Common Name *Scientific Name*	Status[a]	Distribution in California	Habitat Association	Likelihood to Occur in the Project Area
Lahontan Lake tui chub *Gila bicolor pectinifer*	SSC, FSS	Lake Tahoe; possibly Stampede, Boca, and Prosser reservoirs on the Truckee and Little Truckee rivers	Large, deep lakes and reservoirs; can tolerate a wide range of physiochemical water conditions; algal beds in shallow, inshore areas appear to be necessary for successful spawning and larval survival	Absent: only confirmed occurrence is in Lake Tahoe, which is outside the project area
Hardhead *Mylopharadon conocephalus*	SSC, FSS	Low- to mid-elevation streams in the Sacramento-San Joaquin and Russian river drainages	Clear, deep pools with sand-gravel-boulder bottoms and slow water velocity	Absent: The project area is outside the species' known range
Delta smelt *Hypomesus transpacificus*	FT, SE	Sacramento-San Joaquin Delta and upper reaches of San Francisco Bay	Generally found in brackish water below 25°C; shallow, fresh or slightly brackish backwater sloughs and edgewaters are used for spawning; adequate flow and suitable water quality is required for adult access to spawning habitat and transport of juveniles to Bay rearing habitat	Absent: The project area lacks suitable brackish water habitat and is outside the species' known range

Common Name ***Scientific Name***	**Status**[a]	**Distribution in California**	**Habitat Association**	**Likelihood to Occur in the Project Area**
Lahontan cutthroat trout *Oncorhynchus clarkii henshawi*	FT	Lahontan Basin (Carson, Walker, Truckee, and Susan River watersheds)	Well-vegetated cold water streams with abundant cover and large lakes	Absent: The project area is outside the species' known range; species was stocked in nearby Meadow Lake last in 2013 but currently is not believed to occur there, because it would not persist without continued stocking
Foothill yellow-legged frog *Rana boylii*	SCT, SSC, FSS	From the Oregon border along the coast to the Transverse Ranges, and south along the western side of the Sierra Nevada Mountains to Kern County; a possible isolated population in Baja California	Shallow tributaries and mainstems of perennial streams and rivers, typically associated with cobble or boulder substrate	Absent: The project area is outside the species' elevational range but may occur downstream of Spaulding Reservoir
Sierra Nevada red fox *Vulpes vulpes necator*	ST, FSS, FC	Southern Cascade, Sierra Nevada, and Klamath mountain ranges	High elevation alpine and barren areas, subalpine/red fir/lodgepole pine/mixed conifer forests, and meadows	Absent: currently restricted to only two populations: one near Lassen Peak and a second near Sonora Pass

Common Name *Scientific Name*	Status[a]	Distribution in California	Habitat Association	Likelihood to Occur in the Project Area
Fisher, West Coast DPS *Pekania pennanti*	ST, SSC, FSS	Northern California and southern Sierra Nevada mountains	Dense, mature coniferous or mixed forests with large diameter trees and snags, downed wood, and multiple canopy layers	Absent: The project area is outside what is currently considered this species' range; 1973 CNDDB sighting greater than 1.5 mi from project area

Source: Stillwater 2020a

Notes:

a. Status codes:

CDFW = California Department of Fish and Wildlife
FE = Listed as endangered under the federal Endangered Species Act
FT = Listed as threatened under the federal Endangered Species Act
FPT = Federally Proposed Threatened
FC = Federal Candidate: Development of a proposed listing regulation is precluded by other higher priority listing activities.
SE = Listed as endangered under the California Endangered Species Act
ST = Listed as threatened under the California Endangered Species Act
SCE = State Candidate Endangered
SCT = State Candidate Threatened
SSC = CDFW Species of Special Concern
FP = CDFW Fully Protected Species
BGEPA = Federally protected under Bald and Golden Eagle Protection Act
FSS = Forest Service Sensitive species

The presence of humans and equipment also may cause a visual distraction. If there are no active nests within 1 mile of these activities, these effects are likely to be negligible, because construction associated with the Proposed Project would be concentrated in a relatively small area as compared to the remainder of Lake Fordyce, Fordyce Creek, and surrounding lakes, which would offer an abundance of foraging habitat away from potential disturbances. Bald eagles may be affected indirectly if turbidity, hazardous spills, or leaks from equipment during seepage repair activities reduce aquatic habitat quality for prey fish species.

Northern goshawk. As with bald eagles, the northern goshawk is sensitive to noise generation. The northern goshawk can abandon active nests due to high noise levels, such as those from helicopters and blasting, occurring more than 0.25 mile away. They may abandon active nests from other construction-generated noise up to 0.25 mile away. Without the implementation of mitigation measures to avoid nest abandonment, potential direct effects on northern goshawk would include disruption of nesting and foraging due to noise-generating construction, blasting, and helicopter activities. Nesting disruption may result in nest abandonment and, nest failure. Removal of trees along the access road would be unlikely to affect nesting because the northern goshawk typically nests in stands with large trees and high canopy cover, which is uncharacteristic of the area along the access road. The northern goshawk could be indirectly affected by noise and disturbance associated with access road improvements, specifically removal of woody debris and trees along the access road and in staging areas that may support prey species, such as birds and small mammals.

Sierra Nevada yellow-legged frog. Lake Fordyce does not provide suitable breeding habitat for the Sierra Nevada yellow-legged frog because of its steep and rocky shoreline and the prevalence of predatory fish (NID and PG&E 2010). Based on October 2018 and July 2019 field survey data, Fordyce Creek does not appear to support the Sierra Nevada yellow legged frog. However, suitable habitat for Sierra Nevada yellow-legged frog occurs in the vicinity of the project area within Rattlesnake Creek and in small ponds (Mossy Pond) located east of Fordyce Lake. There have been several occurrences of Sierra Nevada yellow-legged frogs along Rattlesnake Creek east of the project area (near Magonigal Road) as well as in Rattlesnake Creek along the lower portion of the access road (CDFW 2020). Therefore, impacts to the Sierra Nevada yellow-legged frog would be limited to Proposed Project activities occurring in the vicinity of Rattlesnake Creek, such as road improvement activities or staging.

Proposed Project activities within or adjacent to suitable aquatic features would have the potential to affect the Sierra Nevada yellow-legged frog or critical habitat. If the Sierra Nevada yellow-legged frog is present during construction of the Proposed Project, individual frogs could be disturbed, injured, or killed by project-related activities. Potential short-term, direct effects on the Sierra Nevada yellow-legged frog may include disruption of behavior and movement due to visual disturbance, noise, and/or vibration from nearby equipment, vehicles, or the general presence of humans. Direct effects could also include injury or mortality of individual frogs resulting from collisions with construction vehicles or equipment. However, the potential for the species to be using roads and adjacent habitat would be low, because Sierra Nevada yellow-legged frog is highly aquatic and known to use uplands only temporarily for migration and dispersal. Because the species is highly aquatic, it would typically avoid humans/workers and stay in the stream or on the streambank. Construction workers would pose little direct risk to tadpoles or egg masses because they would not enter suitable aquatic breeding habitat.

Reservoir drawdown and construction activities would affect flows in Fordyce Creek below the dam. Examples of projected flow below Fordyce Dam from the project as compared to actual flow data are shown in Figure 3.5-1 for a below normal water year, and Figure 3.5-2 for an above normal water year. These projections show that peak outflows (labeled as outflow) during the project construction years would be muted in Fordyce Creek, but within the normal range of actual flows recorded during 2017-2018 (below normal water year) and 2015-2016 (above normal water year) and those typically experienced in Fordyce Creek. Although the Sierra Nevada yellow-legged frog has not been detected in Fordyce Creek in the past, if any were present during the Proposed Project, they would subject to flows within the normal range of flows typically experienced in Fordyce Creek and unlikely to be affected by the temporary changes in flows during construction.

Water may be drawn from Lake Sterling to fill water trucks. Because Lake Sterling is managed as a put-and-grow, catchable rainbow trout fishery, no suitable habitat for the Sierra Nevada yellow-legged frog would be present. Lake Sterling was surveyed for the Sierra Nevada yellow-legged frog by CDFG in 2001, with no detections.

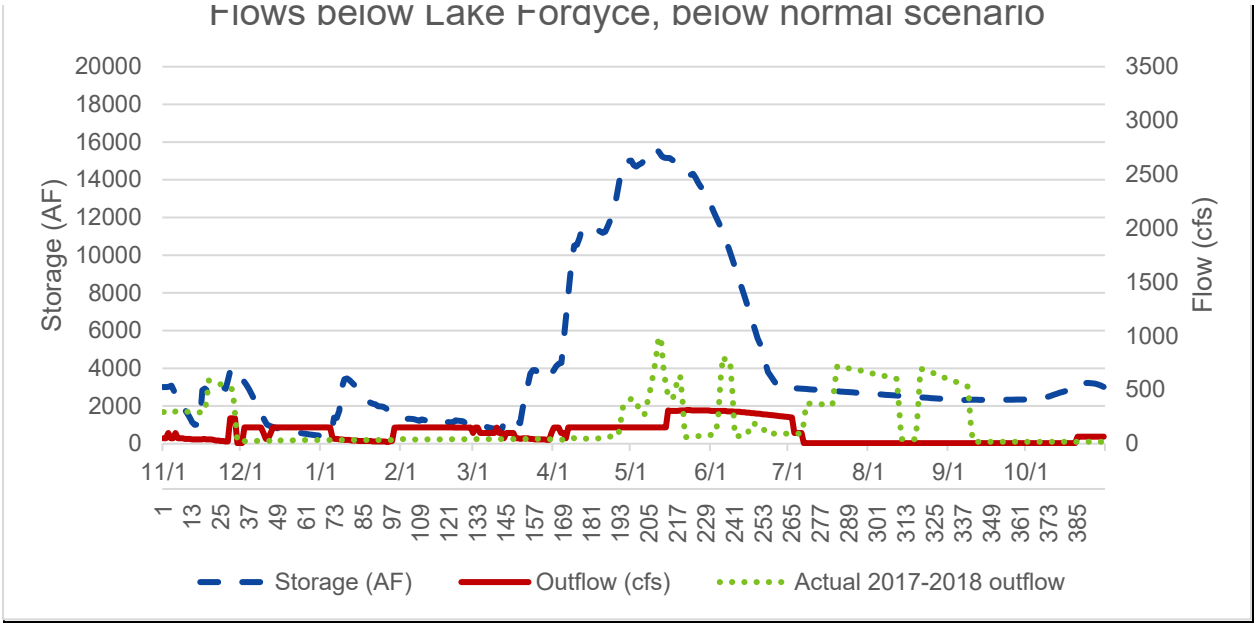


Figure 3.5-1 Theoretical Lake Fordyce Drawdown for Below Normal Water Year

Source: PG&E 2019b – Draft Reservoir Management Plan

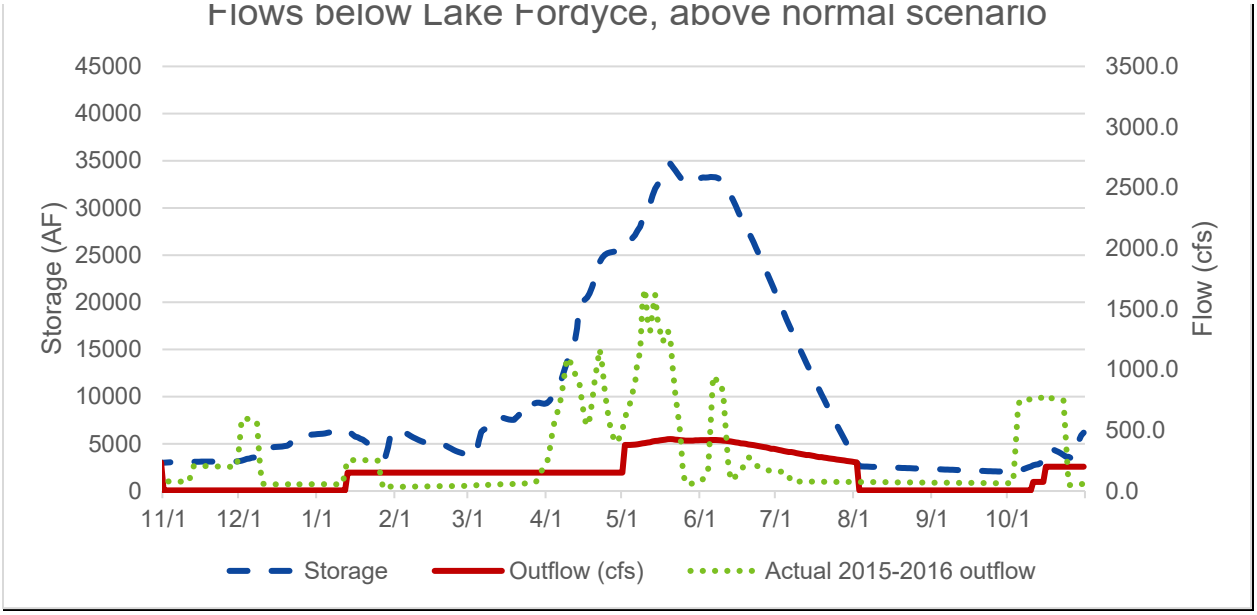


Figure 3.5-2 Theoretical Lake Fordyce Drawdown for an Above Normal Water Year

Source: PG&E 2019b – Draft Reservoir Management Plan

Section 2.6.2, Management Actions to Control the pH during Grouting Operations, discusses the creation of temporary ponds immediately downstream of Lake Fordyce Dam to control pH during grouting operations and prevent high-pH water from entering Fordyce Creek. The ponds would be created using supersacks (large sandbags filled with clean pea gravel) to divide natural pools below the dam. The sacks would be placed by hand with workers maneuvering the bags into place as they are lowered via helicopter. It is unlikely that the Sierra Nevada yellow-legged frog would be present at this location, however hand placement of the sacks would allow amphibians to be avoided, and the presence of workers could cause individual frogs and other amphibians to avoid the area. The sacks would result in temporary fill in Fordyce Creek of 0.031 acre or about 1,300 square feet. Temporary impact to habitat would also apply to the amphibians discussed below (southern long-toed salamander and western pond turtle).

Southern long-toed salamander. Potential impacts to the southern long-toed salamander would be similar to those described for the Sierra Nevada yellow-legged frog. Proposed Project activities within or adjacent to suitable aquatic features would have the potential to affect the southern long-toed salamander. If the species is present during Proposed Project activities, individual salamanders could be disturbed, injured, or killed. Potential short-term direct effects on the southern long-toed salamander may include disruption of behavior and movement from visual disturbance, noise, and/or vibration from nearby equipment or vehicles, or the general presence of humans. Direct effects also could include injury or mortality of individual frogs, resulting from collisions with construction vehicles or equipment.

Western bumble bee. Direct effects on the western bumble bee may occur from noise or vibrations from construction equipment during access road improvement activities if the clearing/grubbing of staging areas disturbs burrows containing nests or hibernation sites, or if such burrows are inadvertently filled. Direct effects also may occur if individual bees are killed or injured from collisions with vehicles or equipment. The western bumble bee could be indirectly affected if flowering plants are damaged or killed during road improvement activities, such as when widening the road, constructing turnouts, or grading, and during the clearing/grubbing of staging areas. However, indirect effects are likely to be negligible because these activities would be confined to small areas with few flowering plants. Thus, the Proposed Project would result in only minimal and temporary effects on the western bumble bee, and would not make a considerable contribution to any overall adverse cumulative effects from past, present, or reasonably foreseeable future actions in the vicinity of the project area.

California spotted owl. Similar to bald eagles and northern goshawk, California spotted owls are sensitive to noise generation and can abandon active nests due to high noise levels, such as those from helicopters and blasting. Owls may abandon active nests from other construction-generated noise up to 0.25 mile away and potentially at greater distances for helicopter operations or blasting. No nesting habitat is present in the project area; therefore, nest destruction of California spotted owl from tree felling activities would not occur. Helicopter travel within 0.25 mile above an active nest could also result in potential nest abandonment. In addition, direct effects could include the disruption of foraging behavior from noise-generating construction and helicopter activities. Without the implementation of mitigation measures to avoid nest abandonment, potential direct effects on California spotted owl would include nest abandonment as a result of noise-generating construction, blasting, and helicopter activities if there is an active nest or if breeding pairs are present in the vicinity of those activities.

The presence of humans and equipment also may cause a visual disturbance. However, because owls are mostly nocturnal foragers and most Proposed Project construction activities (including helicopter work) would occur during the day, foraging owls would be unlikely to be affected. Furthermore, while construction double-shifts (20 to 24 hours) are planned at times, these activities would not be taking place in suitable foraging habitat. Indirect effects would include disturbance to prey species and modification of habitat from tree and woody debris removal during access road improvements and the clearing/grubbing of staging areas. Indirect effects would be negligible when compared with the large amount of foraging habitat in the surrounding forest, and the areas associated with construction would provide little suitable foraging habitat.

Townsend's big-eared bat. Townsend's big-eared bats may use rock outcrops along the project access road if such features provide or are adjacent to cavernous features. If present, blasting rock outcrops could permanently remove roosting habitat. Additionally, sudden, loud noises can potentially disturb bats and cause abandonment of roosts. Noise generation and overpressure from blasting have the potential to cause roost abandonment and, if a maternity roost, potential to cause abandoning of young. Because blasts are short, intermittent noise events, the degree to which blasting would impact bats depends on the frequency of blast events, which are expected to be infrequent, and the distance to roosting habitat. Tree removal would not affect Townsend's big-eared bat maternity colonies, as Townsend's big-eared bat are not known to use trees for maternity roosts (they require warm and stable temperatures, such as in caves, rock crevices, or bridges).

Pallid Bat. Pallid bats may use rock outcrops along the project access road if such features provide suitable rock crevices for roosting. If present, blasting rock outcrops could permanently remove roosting habitat. Additionally, sudden, loud noises can potentially disturb bats and cause abandonment of roosts. Noise generation and overpressure from blasting have the potential to cause roost abandonment and, if a maternity roost, potential to cause abandoning of young. Because blasts are short, intermittent noise events, the degree to which blasting would impact bats depends on the frequency of blast events, which are expected to be infrequent, and the distance to roosting habitat. Tree removal would not affect pallid bat maternity colonies, as pallid bats are not known to use trees for maternity roosts (they require warm and stable temperatures, such as in caves, rock crevices, or bridges).

Western pond turtle. This species is not expected to occur in the project area, as it generally only occurs below approximately 4,700 feet, and only rarely occurs up to 6,700 feet elevation (Jennings and Hayes 1994); whereas the project is located at approximately 6,300 to 7,100 feet elevation. In addition, the nearest CNDDB occurrence of this species is approximately 25 miles west of Lake Fordyce Dam. As such, potential impacts to the western pond turtle would be limited to the potential for the Proposed Project to increase flows in Fordyce Creek and in the South Yuba River. Western pond turtles have been recorded in the South Yuba River.

During the Proposed Project, storage in Lake Fordyce would be maintained at a lower level over the winter by operating the LLO to release 150 cfs throughout the winter, and in spring increasing the flow to up to 500 cfs (depending on the water year) in preparation for the upcoming construction season. The proposed reservoir operations (described in Section 2.5.1) are projected to potentially cause an increase in the volumes of water that spill at Lake Spaulding, downstream of Lake Fordyce Dam, due to the timing and volumes of release from Lake Fordyce. PG&E developed theoretical drawdown curves for Lake Fordyce project planning purposes (PG&E 2019b). Estimations of potential additional spill at Spaulding Dam were made for dry, below normal, above normal, and wet runoff season scenarios using measured inflow data from 2014, 2018, 2016, and 2017, respectively (PG&E 2019b). Table 3.5-4 shows estimated spill rates at Spaulding Dam for the various water year scenarios with flows below Spaulding Dam at Lang's Crossing. Actual rates could vary based on a number of factors including the timing of runoff and snowmelt in any given year.

Table 3.5-4 Potential Additional Spill at Lake Spaulding

Water Year Scenario	Water Year Used for Scenario Development	Actual Maximum Average Daily Spill at Spaulding Dam (cfs)	Projected Additional Spill at Spalding Dam with Proposed Project (cfs)	Total Maximum Daily Projected Flow in South Yuba Below Spaulding Dam with Proposed Project (cfs)
Dry	2014	417	240	657
Below Normal	2018	6,444*	260**	6,704
Above Normal	2016	2,771	430	3,201
Wet	2017	2,812	1,075***	3,887

Source: PG&E 2019b

*- Below normal scenario due to a high peak day on April 7. Flows on other days during 2018 were between approximately 500 and 1,000 cfs.

*-assumes LLO is open before 5/1. If opened after 5/1 in this scenario flow would be lower (150 cfs)

**- Under the wet scenario, Lake Fordyce would spill regardless of the project. The number shown includes the spill at Fordyce in addition to the approximately 500 cfs added by the project due to project reservoir operations.

Flows in the South Yuba River at Lang's Crossing range beyond those shown in Table 3.5-1, from below 30 cfs to in excess of 20,000 cfs, with winter and spring flows often between 2,500 and 5,000 cfs (Figure 3.5-3) and varying widely from day to day depending on runoff from snowmelt. Flows in the South Yuba River during spill events could be higher than corresponding flows without extra spill rates due to drawdown of Lake Fordyce; however, while the project may contribute to increased flows in the South Yuba River below Lake Spaulding during certain portions of the year, the potential flows would not be outside the normal range of winter and spring flows experienced by western pond turtles in the river. In addition, the LLO at Lake Fordyce Dam would operate at 150 cfs or 500 cfs (see Section 2.5.1) so the Proposed Project would not contribute to wide fluctuations in daily flow rates. As such, no significant impacts to the western pond turtle from increased flows in the South Yuba River are expected to occur.

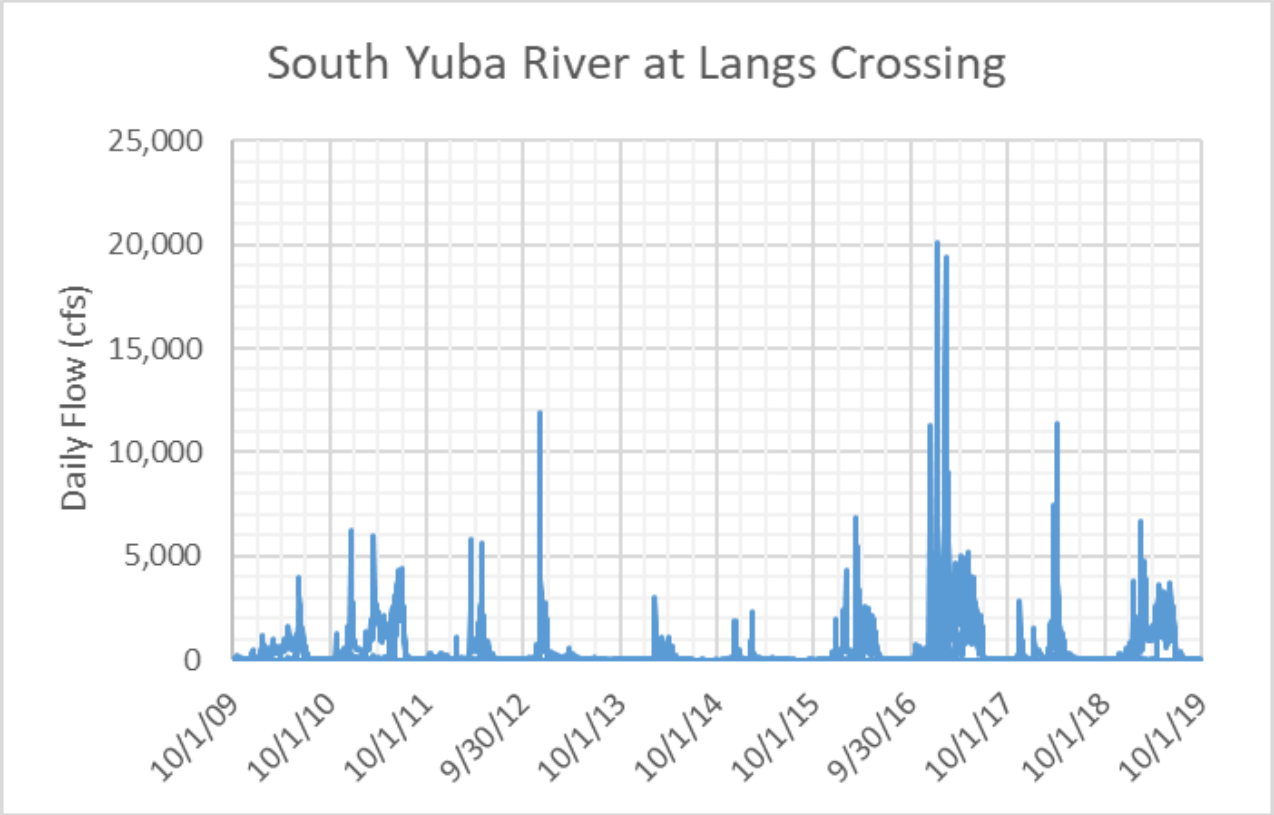


Figure 3.5-3 Flow in the South Yuba River at Lang's Crossing – 2009 to 2019 (USGS 11414250)

Foothill yellow-legged frog. Similar to western pond turtle, this species is not expected to occur in the project area, as the project is outside of its known range, and the nearest CNDDB occurrence of this species is approximately 11 miles west of the project area. Therefore, potential impacts to the foothill yellow-legged frog would be limited to the potential for the Proposed Project to result in increased flows below Lake Spaulding in the South Yuba River, where foothill yellow-legged frogs have been recorded. However, as described in the previous section for western pond turtle, increases in flows would not be outside the normal range of flows experienced by foothill yellow-legged frog, and no significant impacts to the foothill yellow-legged frog are expected from increased flows in the Yuba River as a result of the Proposed Project.

The impact on any of these species would be **potentially significant**. Therefore, Mitigation Measures BIO-2 through BIO-5, as well as Mitigation Measure HYD-1 will be implemented.

Mitigation Measure BIO-2: Implement Standard Best Management Practices.

The following standard Best Management Practices (BMPs) will be implemented:

a) All heavy equipment, vehicles, and construction activities will be confined to existing roads, road shoulders, and disturbed/developed or designated work areas. Work areas will be limited to what is absolutely necessary for construction.

b) Vehicular speeds will be limited to 15 miles per hour on unpaved roads.

c) Control measures for erosion, excessive sedimentation, and sources of turbidity will be implemented and in place prior to the commencement of, during, and after any ground clearing activities, excavation, or any other Project activities that could result in erosion or sediment discharges to surface water.

d) Caution will be used when handling and or storing chemicals (e.g., fuel, hydraulic fluid) near waterways. The Proposed Project will comply with any and all applicable laws and regulations related to the handling and storage of chemicals. Appropriate materials will be on site to prevent and manage spills.

e) When not in use, equipment will be stored in upland areas outside the boundaries of waterways.

f) All construction equipment will be inspected for leaks before being brought on site. All equipment will be well maintained and inspected daily while on site to prevent leaks of fuels, lubricants, or other fluids into waters of the United States or waters of the state. Stationary equipment (e.g., generators) within 100 feet of aquatic habitat will be parked over secondary containment.

g) Service and refueling procedures will be conducted in a designated area, where no potential exists for fuel spills to seep or wash into waterways.

h) Stockpiles will be located outside of riparian habitat and protected with appropriate stock pile management BMPs. If more than 0.25 inch of rain is forecasted during construction, all spoil piles will be covered with plastic and surrounded with sediment control technologies or berms to prevent sediment run-off.

i) No pets, hunting, open fires (such as barbecues), or firearms will be permitted in the work area.

j) During Proposed Project construction, all trash that may attract predators will be properly contained in covered garbage receptacles and removed from the project area daily. After construction, all trash and construction debris will be removed from the project area.

Mitigation Measure BIO-3: Implement Standard Avoidance and Minimization Measures for Wildlife.

The following avoidance and minimization measures (AMMs) will be implemented:

a) A qualified biologist will develop an environmental training program and present this training to all construction workers before they begin work on the Proposed Project. The training will include a description of special-species with potential to occur, life history and habitat associations, general measures that are being implemented to conserve the species as they relate to the Proposed Project; the terms and conditions of project permits, approvals, and certifications; penalties for non-compliance; and the boundaries of the work area and project area. A handout will be provided to all participants, and at least one copy of this information will be kept on site, in the job packet, during construction activities. Upon completion of the training, attendees will sign a form stating that they have participated in the training and understand the AMMs.

b) All construction workers will check visually for wildlife beneath vehicles and construction equipment before moving or operating them.

c) If animals are observed in the work area or the immediate vicinity, work will stop until the animal leaves the area of its own volition. The animal will not be harried or harassed into leaving the area. If the animal does not leave of its own accord, the PG&E biologist will be contacted, who in turn will report such observations to the appropriate agency. If this involves a listed or sensitive species, PG&E, in consultation with the appropriate agencies, will develop a plan to relocate that animal.

d) Grading and vegetation removal along roads and construction work areas will be minimized to the extent feasible. PG&E will trim, clear, or remove vegetation only as necessary to establish the access routes and allow equipment use.

e) Only tightly woven netting or similar material will be used for all geosynthetic erosion control materials, such as coir rolls and geotextiles. No plastic monofilament matting will be used.

Mitigation Measure BIO-4: Implement Specific Avoidance and Minimization Measures for the Sierra Nevada Yellow-legged Frog.

The following modifications will be implemented within suitable habitat for the Sierra Nevada yellow-legged frog specifically to avoid or minimize potential effects on the Sierra Nevada yellow-legged frog:

a) A qualified biologist shall conduct preconstruction surveys at work sites that contain suitable aquatic habitat for the frog (e.g., staging areas or road work within or adjacent to streams). Surveys shall be conducted within 24 hours prior to the start of work at that location. If work will occur at a location over multiple years, the work site shall be resurveyed each year prior to resuming construction.

b) A USFWS-approved monitor shall be present during roadwork activities (i.e., culvert modifications or construction of low water crossings) with suitable frog habitat when water is present in the work site.

c) Staging areas along Magonigal Road will not be used for helicopter operations. Measures will be designated in the Stormwater Pollution Prevention Plan (SWPPP) at these areas to limit sediment of construction materials from cascading downslope to protect known occurrences of the frog in Rattlesnake Creek.

d) If a frog is encountered, the general procedure is to leave the animal alone. If a frog is encountered in an active area of the Proposed Project, the first priority is to stop all activities in the surrounding area that may have the potential to result in take (e.g., harassment, injury, or death) of the frog. A photograph will be taken (without handling the frog), and the project biologist shall be contacted. If the project biologist determines that it is a Sierra Nevada yellow-legged frog, it shall be permitted to leave the project area on its own. If it does not leave, work will be delayed until the frog leaves the area or until a relocation plan can be developed in consultation with USFWS and/or California Department of Fish and Wildlife (CDFW). PG&E shall contact USFWS, CDFW, and USFS within 48 hours for guidance on how to proceed.

e) At the end of the day, all steep-sided excavations more than 2 feet deep will be provided with one or more ramps, installed at an angle of no more than 45 degrees to allow egress. The ramps will be constructed of earthen material or plywood (or similar material) and be a minimum width of 6 inches.

f) All excavations will be inspected before being backfilled or graded, to ensure that no listed species are trapped within them.

g) All open ends of pipes will be covered at the end of each work day. If this is not possible, all ends of pipes will be elevated to a minimum of 3 feet above the ground.

Mitigation Measure BIO-5: Implement Specific Measures for Nesting Birds.

A qualified biologist will implement a nesting bird management plan to ensure that construction, including blasting and helicopter use will not result in significant impacts to nesting birds or nest abandonment by sensitive or special status bird species. The nesting bird management plan will include the following components:

a) Complete preconstruction surveys for active nests within a timeframe prior to construction that is suitable for detection of recently established nests and no more than 14 days prior to activity commencement within pre-determined buffer zones. The surveys will determine nesting bird presence and identify the need to implement or adjust construction buffers. Where suitable nesting habitat is present, the buffer to survey for bald eagle will be at least ½ mile for project activities, including blasting locations and helicopter landing zones or zones where helicopter operations will be below 1,000 feet above the tree canopy. Where nesting suitable habitat is present, the buffer to survey for active nests of California spotted owl and northern goshawk will be at least 0.25 mile for project activities, including blasting locations and helicopter landing zones or zones where helicopter operations will be below 1,000 feet above the tree. The surveys will:

- Document habitat types present at the site that are suitable for nesting birds.

- Document nesting birds that are present on or adjacent to the site. Nesting pairs or nests will be recorded using a GPS unit to record the location of the observed nest, the species, and the estimated distance

from the planned activities. All nesting birds encountered during the surveys will be recorded.

- Assign and document the appropriate buffers distance based on activity types.
- Provide recommendations and guidelines for nesting avoidance and minimization measures or nesting deterrence. Recommendations may include alterations to helicopter flight paths based on observed raptors, the use of other rock removal activities during roadway improvements if nests are found to be within the appropriate buffers of planned blasting areas, the need for additional nest surveys to discover any nests established during the construction season, and a biological monitor to monitor nesting behaviors if active nests are found within the planned buffer areas.
- Buffer distances will be provided to the PG&E Environmental Lead and communicated to the foreman.

b) PG&E will apply buffers and other applicable nesting bird avoidance and minimization measures around active nests based on the biologist's recommendations to avoid and minimize impacts to birds that nest or may nest in the vicinity of project activities. If the buffer will constrain a planned construction activity, the biologist will consider the following to determine whether a "reduced buffer" is appropriate:

- Activity disturbance type
- Existing conditions
- Nest concealment
- The natural history, behavior, and nest chronology of the species
- Habituation
- Environmental conditions

c) The biologist will ensure an appropriate buffer for high intensity activities before such activities occur. High intensity activities include blasting and helicopter

operations. The appropriate buffer for these activities will be developed by the biologist on a case-by-case basis.

d) The biologist will determine if a biological monitor is necessary for activities with "reduced buffers." The biological monitor will implement the established buffer, monitor adjacent construction activity, and document active nest status. The biological monitor will observe nesting behavior to determine whether reduced buffers need to be increased. The potential effects of disturbance will be considered by the biological monitor and the biologist, and buffers will be adjusted as necessary. The biological monitor will be responsible for determining when a nest is no longer active based on nest observations. Monitoring will commence with activity onset and if no behavioral response to the activity is observed (agitation, extended non-attendance) then periodic monitoring may be performed.

Mitigation Measure BIO-6: Implement Specific Avoidance and Minimization Measures for Special-status Bat Species

1. If feasible, work should be scheduled between September 1 and April 30 to avoid the bat maternity season.

2. If work is conducted during the bat maternity season (May 1 to August 31), a pre-construction survey for special-status bat (i.e., Townsend's big-eared bat, pallid bat, and fringed myotis) habitat shall be conducted by a qualified biologist (e.g., who is experienced in the identification of special-status bat habitat) in advance of any rock or tree removal, to identify signs of potential bat use (e.g., large cavities or crevices in rocks or trees, basal hollows in large trees or snags, spaces under loose/exfoliating tree bark, or deep bark fissures).

3. Should potential roosting habitat or active bat roosts be found in trees to be removed, the following measures shall be implemented:

    a. Tree removal shall occur when bats are active (approximately April 1 to November 1) and outside of months of winter torpor (approximately October 31 to March 31), to the extent feasible.

    b. A qualified biologist shall be present during tree removal if it has been determined during the pre-construction survey that bat roosts or habitat are present. Trees shall be disturbed only when no rain is occurring or is not

forecast to occur for 3 days and when daytime temperatures are at least 50 degrees Fahrenheit (°F).

4. Removal of trees containing or suspected to contain roost sites shall be done under supervision of a qualified biologist.

Potential effects on the Sierra Nevada yellow-legged frog and its habitat would be avoided or minimized by implementing Mitigation Measures BIO-2, BIO-3, and BIO-4. Conducting Proposed Project activities that require in-water work in areas with potentially suitable habitat (e.g., Fordyce Creek) only during the species' active season would avoid potential harm to overwintering frogs, which may be unable to move away from potentially harmful activities while dormant. Conducting in-water activities during the species' active season is also expected to increase the ability of qualified biologists to detect frogs present during surveys occurring before the start of construction, as well as increase the ability of frogs to move away from potentially harmful activities.

In particular, implementation of Mitigation Measure BIO-4(b) would require that a qualified biologist be on site to conduct a visual survey for amphibians in the project area before work begins. This survey would be conducted within 24 hours before the start of work. Thus, direct impacts on this species are not anticipated. Furthermore, with the implementation of Mitigation Measure BIO-2, potential indirect effects would be avoided or minimized, including the reduction of aquatic habitat quality in Fordyce Creek from turbidity, hazardous spills, or equipment leaks during repair activities. Therefore, the impact on Sierra Nevada yellow-legged frog would be reduced to **less than significant with mitigation incorporated**.

With implementation of general BMPs (Mitigation Measure BIO-1), standard PG&E AMMs (Mitigation Measure BIO-3) for wildlife, and measures discussed previously to protect the Sierra Nevada yellow-legged frog and other amphibians (Mitigation Measure BIO-4), the potential for impacts related to the Proposed Project is expected to be avoided or minimized. Therefore, the impact on southern long-toed salamander would be reduced to **less than significant with mitigation incorporated**.

Because increases in flows within the south Yuba River downstream of Lake Spaulding as a result of the Proposed Project would not be outside the normal range of flows experienced by western pond turtle and foothill yellow-legged frog, the impact to the western pond turtle and foothill yellow legged frog would be **less than significant.**

Implementation of general BMPs (Mitigation Measure BIO-2) and standard PG&E measures (Mitigation Measure BIO-3) for wildlife would reduce the impact on western bumble bee to **less than significant with mitigation incorporated**. Implementation of general BMPs (Mitigation Measure BIO-2), standard PG&E measures (Mitigation Measure BIO-3) for wildlife, and specific measures (Mitigation Measure BIO-5) for nesting birds would reduce the impact on bald eagle, California spotted owl, and northern goshawk to **less than significant with mitigation incorporated**. Indirect effects on aquatic habitat would be minimized because the proposed action would incorporate additional measures to protect water quality, such as Mitigation Measure HYD-1 to monitor and manage turbidity in Fordyce Creek and the use of turbidity curtains for in-water work in the reservoir.

By implementing general BMPs (Mitigation Measure BIO-2), standard PG&E AMMs for wildlife (Mitigation Measure BIO-3), and modifications to the Project to avoid or minimize project-related effects on sensitive species including bats (Mitigation Measure BIO-6), impacts to Townsend's big-eared bat and pallid bat would be reduced to **less than significant with mitigation incorporated**.

b. Riparian Habitat or Sensitive Natural Communities – No Impact

During the 2019 botanical surveys, mapping of vegetation alliances was performed to the extent necessary to document any sensitive natural communities. All potentially sensitive natural communities were keyed using vegetation composition data and the online Manual of California Vegetation (CNPS 2019b). No sensitive natural communities were documented within or adjacent to the project area during the 2019 botanical surveys. Therefore, **no impact** would occur.

c. State or Federally Protected Wetlands – Less-than-Significant Impact with Mitigation Incorporated

No federally protected wetlands occur within the project area. Thus, no direct impacts on federally protected wetlands are anticipated due to project construction. Impacts on water resources would be limited to the bed and bank of Lake Fordyce, Fordyce Creek immediately downstream from Lake Fordyce Dam, and intermittent drainages that cross the Proposed Project access road. Although no direct impacts on federally protected wetlands are anticipated, federally protected wetlands do occur in the immediate vicinity of the project area. During the wetland delineation, seasonally flooded palustrine emergent wetlands were identified within 10 feet of the access road in three locations. These wetlands occur on both sides of the access road at Station 265+00, on the west

side of the access road at Station 290+00, and on the south side of the road at Station 310+00 (see Appendix A for station locations). Because of the proximity of these wetlands to the access road, construction could potentially result in degradation of these wetlands from sedimentation and/or pollution of these features through runoff from the Proposed Project. Sedimentation may occur if soil-laden stormwater from the project area flows into these wetlands, and introduction of pollutants to these features could occur if an accidental spill of a petroleum product or other substance enters these features. The impact would be **potentially significant**.

To ensure that no soil-laden waters or pollutants would enter these protected wetlands, PG&E would implement standard best management practices, particularly Mitigation Measures BIO-2(a) through BIO-2(h). These measures would include ensuring that all equipment and vehicles would remain in designated work areas, erosion control materials would be employed where needed, spill management materials would be available on site, all equipment would be monitored for leaks, and stockpile management would be employed. With the implementation of Mitigation Measure BIO-2, impacts to state or federally protected wetlands would be reduced to **less than significant with mitigation incorporated**.

d. Native Wildlife Movement – Less than Significant

Terrestrial animals may make diurnal and seasonal movements throughout the project area, travelling between upland and aquatic habitat, and to breeding habitats. Because the Proposed Project would repair of an existing dam and would not construct any new permanent roads, it would not result in new permanent barriers within wildlife movement corridors. Because of the nature of the work that would be conducted at contained and discreet work areas, construction activities would not result in substantial obstruction of wildlife movement. No construction activities or work areas would be located in such a way as to block or significantly restrict movements through connective migratory corridors between larger areas of habitat.

Cofferdam installation and reservoir draw down each construction season would result in a portion of Lake Fordyce becoming unavailable to aquatic species. However, no special-status or anadromous fish species are present in the project area. No impacts to the movement of common fish species are anticipated, as no changes to the existing fish passage is planned from the project. Therefore, the impact would be **less than significant**. No mitigation is required.

e. Conflict with Local Policies or Ordinances Protecting Biological Resources – No Impact

The Proposed Project would include tree removal in Nevada County and Placer County along the access road to allow for truck transport of construction materials. The Nevada County General Plan includes measures to protect trees; however, these measures are intended to discourage "intrusion and encroachment by incompatible land uses in significant and sensitive habitat" (Directive Policy 13.2). Road improvements for the Proposed Project would not constitute the intrusion or encroachment of incompatible land uses, and the trees planned for removal are not in sensitive habitat. In addition, Nevada County policies indicate that "tree removal may be allowed where necessary to comply with public right-of-way development or dedication, or development of required site access and public utilities" (Nevada County General Plan Action Policy 13.2).

The Proposed Project does not conflict with Placer County Code section 12.16.030 regarding tree removal, as the project would not be removing trees in a riparian zone, does not involve commercial firewood cutting, and does not include the removal of more than 50 percent of trees in the project area. The Proposed Project does not include the removal of any landmark or protected trees, as defined by the Placer County Code section 12.16.020. Thus, **no impact** would occur.

f. Conflict with an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other – No Impact

The project area is not within the boundaries of any adopted Habitat Conservation Plan or Natural Communities Conservation Plan. Thus, **no impact** would occur.

3.6 Cultural Resources

V. CULTURAL RESOURCES: Would the project:	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less-than-Significant Impact**	**No Impact**
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?			X	
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?		X		
c) Disturb any human remains, including those interred outside of dedicated cemeteries?		X		

The information presented in this section is based on the Cultural Resources Inventory/National Register of Historic Places (NRHP) and California Register of Historic Resources (CRHR) evaluations, prepared for PG&E by Browning Cultural Resources (BCR 2019).

The project area is in the Tahoe National Forest on the western slope of the north-central portion of the Sierra Nevada. It falls within the Sierra Nevada Section of the Sierran Steppe-Mixed Coniferous Forest Province (Stuart and Sawyer 2001, as cited in BCR 2019). Elevations in the project area range from 5,700 feet in the south to 7,000 feet around Lake Sterling. The study area considered in this section includes all areas of direct and indirect impacts associated with the Proposed Project and encompasses all project construction sites, the helicopter landing zone, and all access and staging areas. The study area encompasses approximately 121 acres.

3.6.1 Environmental Setting

Prehistoric Context

No archaeological sites dating to the Late Pleistocene (15,000 to 10,000 Before Present [B.P.]) are in the Lake Tahoe region, though a recent re-evaluation of High Sierra land use suggests that land-use strategies in the Lake Tahoe vicinity were substantially more intensive and multidimensional by the early Holocene (10,000 to 8,000 B.P.) than previously thought (BCR 2019). The Middle Holocene (circa 8,000 to 5,000 B.P.) is poorly represented archaeologically throughout California, because of drought and possible changes in sedimentation rates obscuring or removing evidence of sites.

The beginning of the Late Holocene (5,000 to 2,000 B.P.) is marked by a shift toward a more temperate climate and the first well documented archaeological cultures in central and northern California. In the Truckee vicinity, sites are marked by typological affiliations with the Great Basin and a preference for locally abundant basalt, and is further represented by artifact types such as Martis and Elko projectile points, the mano and metate, large crudely shaped projectile points, atlatl weights, the bowl mortar, and the cylindrical pestle (BCR 2019). Available archaeological information demonstrates that by the Middle Archaic, the Sierran people showed clear influences from both the Great Basin and Central California.

By the Late Holocene (2,000 to 200 B.P.), the bow appeared as the preeminent weapon—marked archaeologically by an abrupt reduction in projectile point size—and important subsistence changes took place when the acorn emerged as a clearly important staple, a process marked by a proliferation of the use of bedrock mortars. Societies during this period are associated with the ethnographic Washoe and Nisenan.

Ethnographic Context

The study area falls within lands claimed ethnographically by the Washoe and Nisenan peoples of California and Nevada. The high ranges of the Sierra were useable only during the summer months, and ethnographic accounts reflect this. The high country was used by both Nisenan and Washoe (BCR 2019). Washoe sources state that trading parties and those gathering and collecting regularly crossed the Sierra crest and ranged westward, possibly as far as Auburn (BCR 2019).

Historic Context

The vicinity of the study area has had a long history of water appropriations, dating from 1855 when an agent for the Snow Mountain Water Company recorded a possession for the location. In 1873, South Yuba Water Canal Company (the successor to Snow Mountain) began actual construction of a dam at the Fordyce site. With financial opportunity as its incentive, the company went forward with the massive undertaking of constructing a large rockfill dam to fill the narrow gorge. Work crews quarried granite near the site and built a narrow gauge rail system to carry it to the dam. This first dam leaked badly and was repeatedly and laboriously infilled with dirt from the surrounding hills and meadows (BCR 2019). Even in its incomplete and leaky condition, Lake Fordyce was key to the South Yuba Water Company operation. The next significant modifications were made in 1878, with the addition of 78-foot-tall timber plank facing on the upstream slope. This planking installation was completed in 1879, increasing the dam to 80 feet (BCR 2019).

PG&E made major improvements to Lake Fordyce Dam beginning in 1911. Lake Fordyce was the largest storage reservoir on its system, and the improvement was critical to future development of the Drum-Spaulding Project, the first major hydroelectric project for PG&E (BCR 2019). Improvements were designed primarily to diminish leakage, which included installing a concrete cut-off wall along the toe of the dam and reinforcing the crest. In addition, the spillway was closed off and a new outlet tunnel was excavated. In 1923, Lake Fordyce Dam was chosen as the place to increase water storage, to help increase power generation. In 1923, crews began working to raise the dam 47 feet, creating the reservoir from 20,000 to 47,000 AF (BCR 2019). Lake Fordyce Dam continued to have maintenance problems through the twentieth century. Leakage through the concrete facing of the upstream slope was addressed in 1931 and 1935. Continued leakage in 1937 led engineers to believe that one of the old quarries in the bottom of the reservoir was allowing water to enter the granite bedrock structure and leak water under the dam (BCR 2019). In 1945, the same problem led to gunite patching (BCR 2019). Inspections in 1962 and 1971 again pointed out the increasing leakage of the concrete face (BCR 2019).

To increase hydroelectric generation capacity on the Drum-Spaulding System in 1979, the storage capacity of Lake Fordyce was improved by raising the dam using flashboards and a 4-foot-high parapet wall along the crest. As part of the same project, PG&E resealed the lower two-thirds of the upstream concrete face with gunite, to reduce leakage. Other than general maintenance and inspections, no further significant modifications to the dam have occurred. Today, its design as completed in 1927 still generally is intact (BCR 2019).

Records Search

The Proposed Project's Records Search Area (RSA) includes the study area plus a 0.25-mile buffer. Records searched included previously conducted study reports and site records within the RSA. GIS data was obtained by PG&E from the North Central Information Center (NCIC) and Tahoe National Forest. Additional research consisted of reviewing reports and relevant information; reviewing General Land Office survey plat maps, which provide early and accurate cartographic data about the Western United States; reviewing patents for federal lands; and examining PG&E's MapGuide database. This effort also included research on historic mines in the area.

The majority of data was collected from a comprehensive study, conducted as part of the Drum-Spaulding Hydroelectric Project, under the jurisdiction of FERC (Project Number 2310), and a subsequent smaller project (BCR 2019).

Survey and Excavation Methodology

BCR performed a cultural resource survey of areas within the study area not previously adequately surveyed or inundated by Lake Fordyce in October 2018. The field inventory consisted of a pedestrian survey, resource identification, and documentation. An intensive survey was conducted in all areas of the study area that were not surveyed previously, with adequate coverage for use by the Proposed Project. This consisted of conducting survey transects no more than 15 to 20 meters apart, based on environmental conditions. Most of the area above the high-water mark of Lake Fordyce is characterized as having a bedrock surface, with little possibility for subsurface deposition. In addition to a cultural resource inventory, NRHP and CRHR evaluations were performed on those resources within the study area that cannot be avoided during project construction. To obtain subsurface data at these sites, the focus was aimed at artifact concentrations and features that had a possibility of deposition.

Known Cultural Resources

Several cultural resource studies have been conducted within the current study area, as well as within the RSA in the last 40 years, though only three studies adequately meet current standards. Previous adequate coverage encompasses approximately 74 percent of the study area. Previous cultural resources studies identified 34 cultural resources within the RSA. Eight historic-era archaeological resources and five historic-era built environment resources are within the study area. Table 3.6-1 summarizes each cultural resource.

Table 3.6-1 Cultural Resources in the Study Area

Primary/ Temporary No.	Resource Type	Description	Current NRHP/CRHR Status	Recommended NRHP/CRHR Status
FLDR-4	Archaeological Resource	Two Prospecting Pits	Unevaluated[b]	Ineligible
P-29-000690	Archaeological Resource	Furnace Flat Mining Site	Unevaluated	Unevaluated
P-29-002959	Archaeological Resource	Lake Fordyce Dam Quarry 1	Ineligible	Ineligible
P-29-004025	Archaeological Resource	Lake Fordyce Dam Quarry 2	Ineligible	Ineligible
P-29-004024	Archaeological Resource	Lake Fordyce Dam Construction Camp	Unevaluated	Ineligible
P-29-004033	Archaeological Resource	Cisco-Fordyce 60 kV Line	Ineligible	Ineligible
P-29-004042	Archaeological Resource	Abandoned Road Grade, Mining Features, and Refuse	Unevaluated	Unevaluated
P-29-004046[a]	Archaeological Resource	Lake Fordyce Dam Tender's Camp	Unevaluated	Ineligible
P-29-004046[a]	Built Environment Historical Resource	Dam Tender's House	Ineligible	Ineligible
P-29-004046[a]	Built Environment Historical Resource	Garage/Shop	Ineligible	Ineligible
P-29-004257	Built Environment Historical Resource	Lake Fordyce Dam	Eligible as a district contributor	Contributor

Primary/ Temporary No.	Resource Type	Description	Current NRHP/CRHR Status	Recommended NRHP/CRHR Status
P-29-004258	Built Environment Historical Resource	Lake Fordyce Road	Eligible as a district contributor	Contributor
P-29-004273 P-31-005407	Built Environment Historical Resource	Drum-Spaulding Hydroelectric Historic District	Eligible	Eligible

Notes:

a. The built environment components of P-29-004046, the Dam Tender's House and Garage, have been determined ineligible for the NRHP through SHPO consensus. The Lake Fordyce Dam Tender's Camp archaeological site is unevaluated and is evaluated in this report. Confusingly, all are assigned the site designation of P-29-004046.

b. This resource was identified by Browning Cultural Resources as part of the Proposed Project (BCR 2019).

FLDR-4 (Two Prospecting Pits)

Site FLDR-4 consists of two prospecting pits, one on the northwest side of Lake Fordyce Road and one directly across the road to the southeast. The latter features a stacked rock wall on the southeast side that is 4 to 5 courses high.

Based on the evaluation completed by BCR (2019), the two prospecting pits do not appear to meet NRHP and CRHR eligibility because of lack of significance, lack of historic integrity, and lack of association with any potential prehistoric or historic person or period of significance. Therefore, the resource is recommended to be ineligible for the NRHP and CRHR and is considered to not be a unique archaeological resource pursuant to Public Resources Code section 21083.2, subdivision (g). This resource is not considered to be an archaeological resource under CEQA and is not discussed further.

P-29-000690 (Furnace Flat Mining Site)

The Furnace Flat Mining Site is on USFS property and currently is unevaluated because it is expected to be avoided during project implementation. A site record was prepared in

1982, describing the site as two stone structures in various states of condition, with a historic debris scatter (BCR 2019). H. Meals monitored the site in 1994 and reported that people had been climbing on the furnace, and thereby loosening stones. Meals also noted additional structure flats, nails, ceramics, tins, and a vertical shaft on the contour above the furnace, as well as an opium pipe bowl. During a site revisit, the shaft that was reported previously was not relocated, nor were the fence lines and board scatters as shown in a 1982 sketch map. However, the original two stone structures, rock wall, depression, and two trash scatters on the map were relocated, along with an additional pit, two benches or granite quarries adjacent to the stone structures, and another quarry with associated tailings in the western portion of the site.

The Furnace Flat Mining Site is assumed to be eligible for listing in the CRHR and NRHP for the Proposed Project and is considered to be a unique archaeological resource under CEQA.

P-29-002959 and P-29-004025 (Lake Fordyce Dam Quarry 1 and Lake Fordyce Dam Quarry 2)

Lake Fordyce Dam Quarry 1 and Lake Fordyce Dam Quarry 2 are both rock and sand quarries that were an essential part of dam construction. They were used in 1912–1913, during the initial development of the Drum-Spaulding Hydroelectric Historic District features, and likely again in the 1920s when the system was expanded and dams were enlarged. Although the quarries are associated with important events in local hydroelectric development, they were a common feature at dam sites during the construction periods.

Based on the evaluation, Lake Fordyce Dam Quarry 1 and Lake Fordyce Dam Quarry 2 do not appear to meet NRHP and CRHR eligibility because of a lack of significance and lack of historic integrity to any potential prehistoric or historic person or period of significance. Therefore, the resource is recommended to be ineligible for the NRHP and CRHR and is considered to not be a unique archaeological resource, pursuant to Public Resources Code section 21083.2, subdivision (g).This resource is not considered to be an archaeological resource under CEQA and is not discussed further.

P-29-004024 (Lake Fordyce Dam Construction Camp)

P-29-004024 consists of the remains of the Lake Fordyce Dam construction facilities that were used during several phases of construction and improvement projects. The camp was first used from 1873 to 1882, during the initial phase of construction. Subsequent

episodes of dam improvement re-used the site in 1883, 1911, and from 1923–1927. The majority of existing features relate to the largest phase of construction during the 1920s. The site extends north and south for approximately 0.3 mile on the eastern face of Lake Fordyce, and the area is dominated by igneous bedrock outcrops with a sparse Jeffrey pine, lodgepole pine, white fir, chaparral, and small grasses.

The site features reflect the industrial nature of the resource and include heavy machinery mounts, blacksmithing and foundry areas, warehouse and machine shop fountains, office areas, vehicle and railroad grades, and other structural pads and depressions that likely supported water tanks, substation sheds, shops, and privies. P-29-004024 contains the archaeological remains of the construction camp and facilities that supported the dam construction. Although the construction camp is directly associated with Lake Fordyce Dam and Lake Fordyce Road, which are both contributing elements of a historic-era district, neither are individually significant. Based on the evaluation, the resource does not appear to meet NRHP and CRHR eligibility because of lack of significance and historic integrity to any potential prehistoric or historic person or period of significance. Therefore, the resource is recommended to be ineligible for the NRHP and CRHR and is considered to not be a unique archaeological resource pursuant to Public Resources Code section 21083.2, subdivision (g). This resource is not considered to be an archaeological resource under CEQA and is not discussed further.

P-29-004033 (Cisco-Fordyce 60 kV Line)

P-29-004033 includes two isolated concentrations of transmission line insulator fragments, representing the Cisco-Fordyce 60 kV Line. Although it is associated with construction, operation, and ongoing maintenance of the Drum-Spaulding Hydroelectric Historic District, it represents a minor feature of the overall system and was not a key element of the construction or maintenance effort, nor is it associated with a significant person or period. Based on the evaluation, the Cisco-Fordyce 60 kV Line does not appear to meet NRHP and CRHR eligibility because of lack of significance and lack of historic integrity to any potential prehistoric or historic person or period of significance. Therefore, the resource is recommended to be ineligible for the NRHP and CRHR and is considered to not be a unique archaeological resource pursuant to Public Resources Code section 21083.2, subdivision (g). This resource is not considered to be an archaeological resource under CEQA and is not discussed further.

P-29-004042 (Abandoned Road Grade, Mining Features, and Refuse)

P-29-004042 consists of a segment of a nineteenth century road, extending from Lake Fordyce at the south towards Meadow Lake to the north, an associated scatter of sparse historic debris, and two small mining prospect pits, on USFS property. The site is on a south/southeast facing slope on the northeast side of Lake Fordyce. The road segment consists of a shallow trace of a depressed trail, with associated road features consisting of loosely piled rock, rock retaining walls, and battered rock outcrops. Two prospect pits and a possible collapsed rock cairn are near the northern end of the recorded segment of the resource. P-29-004042 has been unevaluated; however, it is assumed to be eligible for listing in the CRHR and NRHP for the Proposed Project and is considered to be a unique archaeological resource under CEQA.

P-29-004046 (Lake Fordyce Dam Tender's Camp)

The archaeological component of P-29-004046 consists of the archaeological remnants of the Lake Fordyce Dam tender's camp. The multi-use camp served as a maintenance station for dam operations through several phases of occupation, spanning from 1874 to the present, and had its largest occupation during the 1923–1927 dam construction phase. This site is separate from the main construction camp (P-29-004024). Dam improvements were made by PG&E in 1911 and likely used the site area. From 1923–1927, a large scale construction phase of Lake Fordyce Dam was implemented with a workforce of nearly 250 men. The camp consisted of a mess house, a cookhouse, a recreation hall, eight bunk houses, and a number of tents. The dam tender's house that was constructed during this time was destroyed by a fire and was replaced with the present structure in the 1950s. Based on the evaluation, the Lake Fordyce Dam tender's camp does not appear to meet NRHP and CRHR eligibility because of lack of significance and lack of historic integrity to any potential prehistoric or historic person or period of significance. Therefore, the resource is recommended to be ineligible for the NRHP and CRHR and is considered to not be a unique archaeological resource pursuant to Public Resources Code section 21083.2, subdivision (g).This resource is not considered to be an archaeological resource under CEQA and is not discussed further.

P-29-004046 (Lake Fordyce Dam Tender's House and Garage/Shop)

The built environment component of P-29-004046 consists of the Lake Fordyce Dam tender's house and outbuildings. The Lake Fordyce Dam tender's house is a rectangular, concrete block building, constructed by PG&E around 1953 to replace an earlier 1913-era tender's house at Lake Fordyce. The adjacent shop and shed were added at a later date.

It is not unique and is not noted in state or local history. It does not reflect the architectural detailing evident on other historic tender's houses in the PG&E system, including those at nearby Camp Spaulding, and was not associated with initial development of the system or a particular person. This house was built in the 1950s, 30 years after the end of the period of significance, to replace an original tender's house that was destroyed by fire. Based on the evaluation, the building does not appear to meet CRHR eligibility. Thus, it is not considered to be a contributing element of the Drum-Spaulding Hydroelectric Historic District and is not considered to be a historical resource under CEQA. This building is not discussed further.

P-29-004257 (Lake Fordyce Dam)

Lake Fordyce Dam originally was constructed from 1873 to 1882, with improvements made in 1911 and a major reconstruction episode from 1923 to 1927. The dam in its current configuration is nearly equivalent to its state after the completion of the 1927 project. All other work associated with the dam has been maintenance and repair projects. The dam was evaluated in 1999 and was found to be ineligible as an individual property for inclusion in the NRHP because of modifications to its original integrity, including concreting the upstream side and covering original rock walls with riprap and gunite (BCR 2019).

However, the dam is considered a contributing element in the Drum-Spaulding Hydroelectric Historic District for its involvement with the early development of California's hydroelectric infrastructure and the resulting growth of industry in the San Francisco Bay Area, as well as the growth of agricultural development in both Placer and Nevada counties, associated with the irrigation water impounded by the system. The dam retains adequate integrity to qualify as a contributing element of a larger district. Its character-defining features are its linkage with its system and functionality. Therefore, Lake Fordyce Dam is considered to be a historical resource under CEQA.

P-29-004258 (Lake Fordyce Road)

Lake Fordyce Road is a gravel road, providing access to Lake Fordyce Dam from Cisco Grove. The road was constructed in 1923, to transport heavy equipment for a major dam improvement project. Lake Fordyce Road is made up of USFS Road 85 (Rattlesnake Road), which transitions to USFS Road 85-02, and then to USFS 85-02-01 at Fordyce Summit. The road stretches approximately 8 miles, climbing northwest 5.3 miles up the southern face of Fordyce Summit, and then descending 2.7 miles to the dam. The resource is not individually eligible for the NRHP because of its common construction and

engineering design; however, it is a contributing element to the Drum-Spaulding Hydroelectric Historic District under NRHP for its role in the early development of California's hydroelectric infrastructure (BCR 2019). Its character-defining features are its linkage with its system and functionality. Therefore, the Lake Fordyce Road resource is considered to be a historical resource under CEQA.

P-29-004273 and P-31-005407 (Drum-Spalding Hydroelectric Historic District)

The Drum-Spaulding Hydroelectric Historic District is composed of 55 elements from six PG&E developments: Spaulding No. 3, Spaulding No. 1 and No. 2, Drum No. 1 and No. 2, Halsey, Wise, and Wise No. 2. Components of the district include seven reservoirs, four major water conduits, five powerhouses with associated switchyards, and associated facilities and structures, including residential and maintenance-related facilities. These features reflect the massive effort undertaken by PG&E between 1912 and 1931 (period of significance) to develop what for many years would represent the backbone of the PG&E electrical-generating department. The Drum-Spaulding Hydroelectric Historic District has received a consensus determination and is eligible for listing in the NRHP (BCR 2019). Thus, it is considered to be a historical resource under CEQA.

3.6.2 Discussion

a. Historical Resource Change – Less-than-Significant Impact

Lake Fordyce Dam (P-29-004257), Lake Fordyce Road (P-29-004258), and the Drum-Spaulding Hydroelectric Historic District (P-29-004273 and P-31-005407) are considered to be historical resources under CEQA. No other historical resources would be affected by the Proposed Project. The Drum-Spaulding Hydroelectric Historic District was determined to be eligible for listing in the NRHP through the consensus process. As part of that same process, Lake Fordyce Dam and Lake Fordyce Road were determined to be eligible for listing in the NRHP as contributors to the historic district (BCR 2019). The significance of the dam and road stems from extant operational associations within the context of the district as a whole. Their significance lies in the connectivity to the broader Drum-Spaulding Hydroelectric Historic District.

Modifications proposed at Lake Fordyce Dam would improve its functionality, because it is seeping, and the improvements would contribute to its ability to serve the system and maintain the system as a whole; therefore, no character-defining features of the dam or aspects of either the dam's or historic district's integrity would be altered. Similarly, the

significance of the road lies in its association with the historic district and its ability to function as a working part of the district. The traditional function of the road served to facilitate access and maintenance of the dam and reservoir, and thus modifications and improvements proposed to the roadway would facilitate that traditional use and better enable access. Therefore, modifications to the roadway would neither alter any character-defining features nor modify any aspect of integrity of either the road or the historic district. Because neither of the contributors would be altered in a way that would affect their ability to convey their significance, the Drum-Spaulding Hydroelectric Historic District would not be adversely affected or subject to negative impacts because of Proposed Project implementation. Because none of the Proposed Project elements would result in a substantial adverse change to built-environment historical resources, the impact would be **less than significant.** No mitigation is required.

b. Archaeological Resource Change – Less-than-Significant Impact with Mitigation Incorporated

The Furnace Flat Mining Site (P-29-000690) and Abandoned Road Grade, Mining Features, and Refuse (P-29-004042) are assumed to be eligible for listing in the CRHR and are considered to be historical resources under CEQA. Although Lake Fordyce Road runs through the boundary of the Furnace Flat Mining Site, no features or artifacts associated with this site are within or immediately adjacent to the roadway. The Abandoned Road Grade, Mining Features, and Refuse resource is at the far northern extent of the study area. The project footprint just touches the southern-most extent of the site's boundary, because this site's boundary is at the edge of the reservoir when the level of the reservoir is at the ordinary high-water mark. Because water levels would be lowered below the ordinary high water mark for the project, activities proposed in the vicinity (i.e., the addition of pipes to facilitate lake drainage down the spillway) would occur outside the footprint of the site. Therefore these historical sites would not be adversely affected by project implementation. However, previously unrecorded archaeological resources possibility remain buried and undiscovered in the project area. The impact of unanticipated discovery of an unknown archaeological resource would be potentially significant.

Mitigation Measure CUL-1: Procedures to Avoid Impacts on Archaeological Resources.

Before the start of construction, known archaeological sites in the area of potential effect/area of potential impact that are eligible for listing on the NRHP or CRHR or are

considered eligible for the purposes of this project (P-29-000690/FS # 05175500001 and P-29-004042/FS # 05175300937) will be flagged as avoidance areas during construction. These sites will be subject to archaeological spot monitoring, to ensure that no impacts occur inadvertently because of implementation of the Proposed Project.

Mitigation Measure CUL-2: Procedures for Unanticipated Discovery of Archaeological Resources.

In the event that deposits of prehistoric or historic-era archaeological resources are encountered during Proposed Project construction activities, all work within approximately 100 feet around the discovery will be stopped, and a qualified archeologist meeting federal criteria (36 Code of Federal Regulations [C.F.R.] § 61) will be contacted to assess the deposit(s) and make recommendations. This work will be conducted in accordance with 36 C.F.R. § 800.13 (Post-Review Discoveries) and CEQA Guidelines (Cal. Code Regs., tit. 14, § 15064.5). PG&E will also notify the tribes who requested consultation or to be notified of unanticipated discoveries in the event that prehistoric archaeological resources are encountered. These tribes are the Colfax-Todd Valley Consolidated Tribe, United Auburn Indian Community of the Auburn Rancheria, and Washoe Tribe of California and Nevada (see Section 3.19 for summary of tribal consultation).

During the project, it is anticipated that debris associated with former maintenance and construction projects may be encountered near the toe of the dam. Debris may include concrete rubble, scraps of metal, and other industrial items such as cables and machinery, as well as trash that has deposited from the surface of the lake. Said items will be treated as isolates and will warrant no further management consideration, given their lack of both provenience and the ability to yield data. However, in the event that features such as stacked rock platforms or intact railroads are encountered, the unanticipated discovery protocol detailed herein must be followed.

If deposits of prehistoric or historic archeological materials cannot be avoided by Proposed Project activities, PG&E will retain a qualified archaeologist to evaluate the potential historic significance of the resource(s). The resource will be determined whether it is: (1) a historical resource as defined in CEQA Guidelines ((Cal. Code Regs., tit. 14, § 15064.5) and thus eligible for listing in the California Register of Historical Resources (CRHR); (2) a unique archaeological resource as defined in the Public Resources Code (Pub. Resources Code, § 21083.2, subd. (g)); (3) a potential

tribal cultural resource (TCR) as defined in the Public Resources Code (Pub. Resources Code, § 21074, subd.(a)) and/or (4) a historic property as defined in 36 C.F.R. § 800.16, subd. (l)(1) and thus eligible for listing in the National Register of Historic Places (NRHP). Tribes will also be consulted to determine the significance of a resource.

If the deposits are determined to be non-significant by a qualified archaeologist and are determined to not be TCRs through consultation with the tribe(s), avoidance will not be necessary. If the deposits are determined to be potentially significant by the qualified archaeologist or are TCRs, the resources will be avoided if feasible. In-place preservation of the archaeological resources will be the preferred manner of mitigating potential impacts, because this will maintain the relationship between the resource and the archaeological context. In-place preservation also will reduce the potential for conflicts with the religious or cultural values of groups associated with the resource. Other mitigation options will include the full or partial removal and curation of the resource.

If avoidance is not feasible, Proposed Project impacts will be mitigated in accordance with the recommendations of the archaeologist, in coordination with PG&E and CEQA Guidelines (Cal. Code Regs., tit. 14, § 15126.4, subd. (b)(3)(C)), which requires implementation of a data recovery plan, and with the consulting tribes, as appropriate. The data recovery plan will include provisions for adequately recovering all scientifically consequential information from and about any discovered archaeological materials, and will include recommendations for the treatment of these resources.

PG&E will confirm that a qualified archeologist will be retained for preparation and implementation of the data recovery plan, which will be conducted before any additional earth-moving activities in the area of the resource. The recovery plan will be submitted to PG&E and the NCIC. After the recovery plan is reviewed and approved by PG&E and any appropriate resource recovery is completed, project construction activity in the area of the find may resume. A data recovery plan will not be required for resources that have been deemed by the NCIC as adequately recorded and recovered by studies previously completed.

Mitigation Measure CUL-3: Worker Training

Before the start of construction, all construction workers will undergo training to ensure awareness of the potential for previously undiscovered cultural resources on-site, including TCRs, and to become familiar with the laws protecting these resources and

associated penalties, as well as the procedures to follow if they discover cultural resources during project-related work.

Implementation of Mitigation Measures CUL 1, 2, and 3 would reduce the impact from unanticipated discovery of unrecorded archaeological resources during project construction activities. The impact would become **less than significant with mitigation incorporated**.

c. Human Remains Disturbance – Less-than-Significant Impact with Mitigation Incorporated

No human remains are known to exist in the work area. However, the possibility would remain that ground-disturbing activities during construction could uncover previously unknown human remains. The impact would be potentially significant.

Mitigation Measure CUL-4: Treatment of Human Remains

Discovery of human remains on federal lands will be subject to the Native American Grave Protection and Repatriation Act (NAGPRA). In accordance with the NAGPRA, if human remains are uncovered during ground-disturbing activities, all activities within 100 feet will be halted and the PG&E Cultural Resource Specialist will notify the appropriate federal agency by telephone within 24 hours, followed within 3 days by written confirmation. Human remains will not be excavated or removed unless a permit is issued under the Archaeological Resources Protection Act and after consultation with appropriate Native American representatives. The activity that resulted in the inadvertent discovery may resume 30 days after certification by the notified federal agency of receipt of the written confirmation of notification of inadvertent discovery. The activity may also resume at any time that a written, binding agreement is executed between the federal agency and the affiliated Indian tribe(s) that adopt a recovery plan for the excavation or removal of the human remains, funerary objects, sacred objects, or objects of cultural patrimony

Discovery of human remains on PG&E or private lands must comply with the Health and Safety Code (Health & Saf. Code, § 7050.5, subd. (b)) and Public Resources Code (Pub. Resources Code, § 5097.98). In accordance with these state laws, if human remains are uncovered during ground-disturbing activities, all such activities within 100 feet will be halted, and the PG&E Cultural Resource Specialist and the appropriate county Coroner will be contacted immediately. The Coroner is required to examine all discoveries of human remains within two working days of receiving

notice of a discovery on private or state lands (Health & Saf. Code, § 7050.5, subd. (b)). If the Coroner determines that the remains are of Native American origin, he or she must contact the California Native American Heritage Commission (NAHC) by phone within 24 hours of making that determination (Health & Saf. Code, § 7050, subd. (c)). The County or its appointed representative and the professional archaeologist will consult with a Most Likely Descendent, determined by the NAHC, regarding the removal or preservation and avoidance of the remains, and they will determine whether additional burials may be present in the work area.

Implementation of Mitigation Measure CUL-4 would incorporate the procedures outlined in the NAGPRA, Health and Safety Code (Health & Saf. Code, § 7050.5, subd. (b)), and Public Resources Code (Pub. Resources Code, § 5097.98) to reduce the impact. The impact would become **less than significant with mitigation incorporated**.

3.7 Energy

VI. ENERGY: Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?			X	
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?			X	

3.7.1 Environmental Setting

The dam and reservoir are part of PG&E's Drum-Spaulding Hydroelectric Project, under the jurisdiction of FERC (Project Number 2310). The dam has no directly associated powerhouse or any other utilities. Lake Fordyce (or the reservoir) provides cyclic water storage and regulates flow for uses downstream, including power production, irrigation, and domestic consumption. No water conveyance system is associated directly with Lake Fordyce Dam. Water released from Lake Fordyce flows into Fordyce Creek, which then drains to PG&E's Lake Spaulding.

3.7.2 Discussion

a. Wasteful Consumption of Energy – Less-than-Significant Impact

Project construction would include using construction vehicles. Northern Sierra Air Quality Management District standards (aimed at reducing air pollution), including minimizing idling, ensuring proper maintenance, and using the required tier level engines would minimize the wasteful consumption of energy resources during construction. Construction activities would use energy to power construction vehicles and equipment. Energy use would be temporary and limited to the approximately three months of

construction activities in each of the three construction years and potentially a short duration during the fourth year to remove the coffer dam, if required. The Proposed Project would not include unusual characteristics that would necessitate the use of construction equipment that would be considered less energy efficient than at comparable construction sites. The short-term energy consumption required during construction would allow for the long-term, continued operation of Lake Fordyce Dam to provide storage and regulate flow for uses downstream, including renewable energy produced by the Drum-Spaulding Hydroelectric Project. No additional energy use would be necessary during operation beyond that of existing operations. Therefore, energy use during construction would not result in wasteful, inefficient, or unnecessary consumption of energy resources. The impact would be **less than significant**. No mitigation is required.

b. Conflict with state or local plan – Less-than-Significant Impact

Nevada County's Energy Action Plan (EAP) was developed to assist the County in implementing and accelerating energy efficiency, water efficiency, and renewable energy efforts. The EAP identifies energy use within unincorporated county limits by the community and County-operated facilities. The goals of the EAP are to "Improve Energy Efficiency in Buildings, Facilities, and County Operations," "Expand the Utilization of Renewable Energy and Resilience Measures," and "Encourage the Efficient and Safe Transportation and Use of Water Resources" (Nevada County 2019). The EAP recommends various renewable energy, energy-efficiency, and water efficiency strategies to reduce the projected annual grid-supplied electricity use by 2035.

The Placer County Sustainability Plan (PCSP) outlines various programs and policies to reduce GHG emissions in unincorporated county limits and enhance community resiliency to long-term changes associated with climate-related hazards. The PCSP includes two main components consisting of the a GHG Emission Reduction Strategy and an Adaptation Strategy. Several goals and strategies to reduce GHG emission from various sectors are included in the PCSP (Placer County, 2020).

The Proposed Project would not conflict with or obstruct the either the Nevada County EAP or PCSP. The Proposed Project would not require construction of buildings that would need to incorporate applicable energy efficient and water efficient strategies. Furthermore, operation of the dam and reservoir after construction would remain the same as current operations. As stated above, the short-term energy consumption required during construction would allow for the long-term, continued operation of Lake Fordyce Dam, which enables renewable energy production. No additional energy use

would be necessary during operation beyond that of existing operations. The impact would be **less than significant**. No mitigation is required.

3.8 Geology and Soils

VI. GEOLOGY AND SOILS: Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) 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.				X
ii) Strong seismic ground shaking?				X
iii) Seismic-related ground failure, including liquefaction?			X	
iv) Landslides?			X	
b) Result in substantial soil erosion or the loss of topsoil?			X	
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 on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			X	

VI. GEOLOGY AND SOILS: Would the project:	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less-than-Significant Impact**	**No Impact**
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?				X
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of wastewater?				X
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		X		

3.8.1 Environmental Setting

Regional Geologic Setting

The project area lies in the Tahoe National Forest, a part of the Sierra Nevada mountain range, which is 80 miles wide and extends more than 400 miles northward from the Mojave Desert to the Cascade Range. The mountain range lies between the large Central Valley depression to the west and the Great Basin to the East. The Sierra Nevada is composed of tectonically accreted terranes of Paleozoic and Mesozoic age. Geological features include towering granite ridges and glacially serrated rock outcroppings (Bateman 1968). Drainage within the Yuba and Bear river basins is west to southwest, from the Sierra Crest to the adjacent floor of the Sacramento Valley. Rhyolitic and andesitic volcanic eruptions and Quaternary Period glacial erosion extensively influenced these basins. The modern Yuba and Bear river basins drain the northwestern Sierra Nevada via a series of deep canyons, separated by high, steep-sided ridges, and a parallel drainage network (FERC 2014).

Lake Fordyce Dam and reservoir are on Fordyce Creek in Nevada County, with a minimum elevation of 6,245 feet. The creek drains to Lake Spaulding to the southwest. The site is surrounded by lakes and reservoirs. Lake Tahoe is approximately 30 miles southeast of the work area. All construction activities that may affect geologic and soil resources would occur within Nevada County.

Seismic Hazards

The project area is in a seismically active region. However, the project area is not within an Alquist-Priolo Earthquake Fault Zone or near active faults. The nearest active fault is the Polaris fault, located approximately 14 miles to the east (USGS 2019a). Foothill fault systems are more than 30 miles west of the project area. Among the more significant faults are the Grass Valley Fault, the Melones Fault Zone, the Big Bend/Wolf Creek Fault Zone, the Giant Gap Fault, and the Camel Peak Fault Zone. However, none of these faults have been active in Quaternary time (USGS 2019a; FERC 2014). Smaller earthquakes (magnitudes of less than 4.0) have been experienced. However, earthquakes with larger magnitudes near and in the project area are rare and have not occurred in the last 10 years (Earthquake Track 2019).

According to USGS geologic hazard maps and NRCS soils maps, no unstable geologic units or soils are in the project area that potentially could result in lateral spreading, liquefaction, or collapse (USGS 2019b; NRCS 2019). Because of the distance from seismic sources and soil types, the project area has a low risk for liquefaction and lateral spreading (USGS 2019a).

Soil

The project area topography features mountain slopes that mainly are made up of sedimentary rock and rocky soil complexes. The area is underlain primarily by granite, with many locations having no overlying soil, and other areas having overlying soil of varying depth. The generally well-drained sandy loam soils are influenced by the steep slopes. Mapped soils primarily include: Rock outcrop, granitic; Rock outcrop, metamorphic-Tinker-Cryumbrepts; Rock outcrop, metamorphic-Woodseye complex; Smokey-Lorack-Cryumbrepts; and Rock outcrop, granitic-Tinker-Cryumbrepts. These soils have low to high runoff potential; low shrink-well potential; low water erodibility; and low to moderate wind erodibility. These soils are moderately to highly corrosive to steel, and slightly to moderately corrosive to concrete. The reservoir shoreline in the work area is composed of bedrock and rock fragments up to the high-water surface elevations of the reservoir and is not at risk of erosion (NRCS 2019).

Paleontological Resources

The paleontological importance of a project area can be assessed by identifying the paleontological sensitivity of geologic formations that are exposed there. A paleontologically sensitive geologic formation is one that is rated high for potential paleontological productivity (i.e., the recorded abundance and types of fossil specimens, and the number of previously recorded fossil sites) and is known to have produced unique, scientifically important fossils. The project area geologic formations include undivided Mesozoic volcanic and metavolcanic rocks (Mzv); and Mesozoic granite, quartz monzonite, granodiorite, and quartz diorite (grMz) (DOC 2018). Based on these geological formations, the paleontological sensitivity of the project area is low (SVP 2011; USBR 2014).

3.8.2 Discussion

a. Human Safety and Structural Integrity

i. Earthquake Fault Rupture – No Impact

The project area is not within a designated Alquist-Priolo Earthquake Zone. No known active or potentially active faults underlie any portion of the project area. The nearest active fault is the Polaris fault, located approximately 14 miles east of the project area (USGS 2019a). Because no known active or potentially active faults underlie the portions of the project area, there would be **no impact** related to fault rupture during construction and operation of the Proposed Project.

ii. Strong Seismic Shaking – No Impact

The project area has low to moderate seismicity, and seismic shaking intensities from nearby faults in the area are anticipated to be low (USGS 2019a; FERC 2014). The Proposed Project would not exacerbate the potential for seismic shaking; the intensity of the earthquake ground motion at the site would depend on the characteristics of the generating fault, distance to the earthquake epicenter, magnitude, and duration of the earthquake, and specific site geologic conditions. The Proposed Project would not change the exposure of people or structures to hazards resulting from seismic ground-shaking because operation of the dam and reservoir after construction would remain the same as current operations. **No impact** would occur.

iii and iv. Ground Failure, Including Liquefaction, Landslides and Lateral Spreading – Less-than-Significant Impact

Ground failure can result when liquefaction, landslides, or lateral spreading affect the stability of the ground as a consequence of shaking. Liquefaction occurs when ground vibrations or water pressure cause soil particles to spread apart and lose contact with each other, causing the soil to behave temporarily as a viscous liquid. Poorly drained, fine-grained soils (such as sandy, silty, and gravelly soils) are the most susceptible to liquefaction during the intense shaking of an earthquake. These soils types are not present at the project area, and it is not an area identified as susceptible to significant risk of liquefaction (USGS 2019b).

The project area is not in an Earthquake-Induced Landslide Zone Area where previous occurrence of landslide movement or local topographic, geological, geotechnical, and subsurface water conditions indicate a potential for permanent ground displacements (DOC 2015). However, because construction work would involve earth-moving activities in areas with steep slopes, there is a potential for debris slides or soil movement on steep slopes with shallow soils over bedrock. Standard engineering and construction BMPs would be implemented to control erosion and maintain slope stability, including: inspecting areas where landslide hazards can occur; minimizing vegetation and tree removal, and implementing rock and sediment controls. These measures would adequately reduce impacts related to slope stability during construction. The impact would be **less than significant**. No mitigation is required.

b. Soil Erosion or Topsoil Loss – Less-than-Significant Impact

Factors that influence the erosion potential of a soil include vegetative cover; soil properties such as soil texture, structure, rock fragments and depth; steepness and slope length; and climatic factors such as the amount and intensity of precipitation. Proposed Project construction would involve excavation, grading, and tree removal. During soil disturbance and earth-moving activities, the potential would exist for exposed soils to be subject to erosional forces from water and wind, especially in areas with steep slopes. Soils on steep slopes often are more erodible, especially during heavy rain events. Consequently, graded could result in soil erosion. PG&E would adhere to regulatory erosion control planning and permitting requirements, and well as would implement erosion control BMPs. Under the statewide Construction General Permit, a Stormwater Pollution Prevention Plan (SWPPP) would be prepared and implemented, which would contain BMPs to control erosion and effects on water quality. The SWPPP would be

prepared by the contactor as part of the application for coverage under the Statewide Construction General Permit and could include BMPs such as using silt fences and wattles, covering stockpiled soils and aggregate, using energy dissipaters at culvert outlets, and using a rock apron as needed at discharge locations. Water (from locations described in Section 2.2.7) would be used to keep the access road wet, which would to help bind the roadway rock aggregate material to reduce unraveling, rutting, and erosion. The Proposed Project road improvements would make the access road more stable, thereby reducing the erosion potential from road. Therefore, the impact would be **less than significant**. No mitigation is required.

c. Geologic Unit Instability – Less-than-Significant Impact

No unstable geologic units are in the project area (NRCS 2019; USGS 2019a). As discussed under impact a.iii, the project area is not in an area identified as susceptible to significant risk of liquefaction or lateral spreading. The project area generally does not contain areas of recent alluvial deposits or high ground water. Subsidence in Nevada County principally is from mining operations rather than geologic phenomena (Nevada County 2011). Therefore, there is a low potential for subsidence or lateral spreading.

Clearing and grubbing is expected to be limited to the staging/stockpile areas, which generally are devoid of vegetation under existing conditions. The proposed staging/stockpile areas at the dam are former quarry sites that currently contain angular rock, left from previous quarry operations. Site preparation would include either moving the material aside or using it as fill elsewhere in the project area. The slopes adjacent to the staging areas have near vertical faces from the former quarries, with rocks that may pose a rock fall hazard. For this reason, light scaling would be performed along these faces to remove any loose materials. The proposed staging areas/helicopter landing zone near the Fordyce summit are previously cleared areas.

Certain rock outcrops along sections of the access road would be removed or cut back adjacent to the roadway, where the rock would prohibit safe movement of construction vehicles. Locations where rock removal may occur are shown in Appendix A. Rock removal would occur at various locations from Fordyce Summit to the dam and could include a single protrusion of rock extending into the roadway prism, rock that is in the roadbed, or long narrow segments of existing cut rock immediately adjacent to the roadway. Rock removal techniques would include drilling, splitting, and grinding, and may include blasting. Rock slopes that are cut would be visually inspected by a geotechnical engineer for loose rock which may be a hazard and the rock would be removed.

Because the Proposed Project is not located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Proposed Project, the impact would be **less than significant.** No mitigation is required.

d. Expansive Soils – No Impact

Expansive soils are composed mainly of clays, which greatly increase in volume when saturated with water and shrink when dried (referred to as having shrink-swell potential). No expansive clay soils have been identified in the project area (NRCS 2019). Therefore, **no impact** would occur.

e. Septic Suitability – No Impact

No septic systems or alternative wastewater disposal systems would be associated with the Proposed Project. **No impact** would occur.

f. Paleontological Resource Destruction – Less-than-Significant with Mitigation Incorporated

Project construction would occur in areas with a low potential for paleontological resources. The project area is in undivided Mesozoic volcanic and metavolcanic rocks and Mesozoic granite, quartz monzonite, granodiorite, and quartz diorite. Areas that are not sedimentary in origin and have not been known to produce fossils in the past typically are considered to have low sensitivity. However, ground-disturbing activities would have the potential to uncover previously unknown paleontological resources within the project footprint. The impact would be potential significant. The following mitigation measure would be implemented to avoid destruction of unknown paleontological resources that could be uncovered during construction activities.

Mitigation Measure GEO-1: Discovery of Paleontological Resources

If any paleontological resources are uncovered during Proposed Project construction activities, all work within 20 feet of the discovery will be halted or diverted to other areas on the site and PG&E's Cultural Resources Specialist will be notified immediately. A qualified paleontologist will be retained to evaluate the finds and recommend appropriate measures for the unanticipated discovered paleontological resources.

Implementation of this measure would reduce the impact on paleontological resources, to **less than significant with mitigation incorporated**.

3.9 Greenhouse Gas Emissions

VIII. GREENHOUSE GAS EMISSIONS: Would the project:	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less-than-Significant Impact**	**No Impact**
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			X	

3.9.1 Environmental Setting

Greenhouse gas (GHG) emissions play a critical role in determining the Earth's surface temperature. A portion of the solar radiation that enters Earth's atmosphere is absorbed by the Earth's surface, and a smaller portion of this radiation is reflected back toward space. Infrared radiation (i.e., thermal heat) is absorbed by GHGs; therefore, infrared radiation released from the Earth that otherwise would have escaped back into space instead is "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the "greenhouse effect," is responsible for maintaining a habitable climate on the Earth.

GHGs are present in the atmosphere naturally, are released by natural sources, and are formed from secondary reactions taking place in the atmosphere. The following are GHGs that are widely recognized as the principal contributors to human-induced global climate change: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Global warming potential (GWP) is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to CO_2. The GWP of a GHG is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation

and length of time (i.e., lifetime) that the gas remains in the atmosphere ("atmospheric lifetime"). The GWP of each gas is measured relative to CO_2, the most abundant GHG. GHGs with lower emissions rates than CO_2 still may contribute to climate change because they are more effective at absorbing outgoing infrared radiation than CO_2 (i.e., high GWP). The concept of CO_2-equivalents (CO_2e) is used to account the different GWP potentials of GHGs to absorb infrared radiation.

Neither the NSAQMD nor Nevada County has established explicit numerical thresholds of significance or guidance for evaluating the significance of a project's potential GHG impacts. However, the NSAQMD Guidelines for Assessing and Mitigating Air Quality Impacts of Land Use Projects recommend that GHG emissions be quantified, although no established threshold of significance exists (NSAQMD 2009). As described previously, approximately 1,400 feet of the access road lies within Placer County, which is under the jurisdiction of the PCAPCD. The Placer County Air Pollution Control District (PCAPCD), in its 2017 CEQA guidelines, recommended a threshold of 10,000 MT CO_2e per year for the project-level construction phase (PCAPCD 2017).

To provide additional context and place the Proposed Project's emissions in perspective, this analysis reviewed guidelines and thresholds used by other public agencies and quantitatively analyzed construction-related emissions associated with the Proposed Project for informational purposes. In 2014, the Sacramento Metropolitan Air Quality Management District (SMAQMD) adopted a significance threshold for GHG emissions of 1,100 metric tons (MT) CO_2e per year that applies to construction and operational emissions (SMAQMD 2018). Although the SMAQMD recognizes that no known level of emissions determines whether a single project will substantially impact overall GHG emission levels in the atmosphere, a threshold must be set to trigger a review and assessment of the need to mitigate a project's GHG emissions. The threshold set by the SMAQMD was developed by considering the Assembly Bill 32 (AB 32) and Senate Bill 32 (SB 32) statewide GHG reduction goals.[12] The SMAQMD also recommended amortizing

[12] In September 2006, California passed AB 32, the California Global Warming Solutions Act of 2006, which required statewide GHG emissions be reduced to 1990 levels by 2020. In 2016, this goal was reinforced with the passage of SB 32, the California Global Warming Solutions Act: emissions limit, which established a statewide GHG reduction goal of 40 percent below 1990 levels by 2030. The 2030 target represents reductions needed to ensure California can achieve its longer-term 2050 target of reducing GHG emissions to 80 percent below 1990 levels per Executive Order B-30-15.

the level of short-term construction emissions over the expected (long-term) operational life of a project (SMAQMD 2018). The operational life of a project varies by project type; however, the SMAQMD recommended for agencies to use 40 years for new residential and 25 years for conventional commercial. Similarly, other air districts (e.g., South Coast Air Quality Management District) typically assume a project lifetime to be 30 years. The most conservative threshold was included in the California Air Pollution Control Officers Association (CAPCOA) report, CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, which recommends a threshold of 900 MT CO2e per year for any residential, commercial, or industrial project (CAPCOA 2008). Although the Proposed Project would not include typical land use development (i.e., residential, commercial, or industrial project), this analysis quantified the total construction-related emissions, amortized the emissions over the life of the project (assumed to be 30 years) and compared the emissions to the conservative CAPCOA threshold of 900 MT CO2e per year.

Each of the significance thresholds developed by these other agencies has been designed to establish the level of emissions for individual projects that would make a cumulatively considerable contribution to the significant cumulative impact of GHG emissions, based on the statewide framework established by AB 32, SB 32, and relevant executive orders addressing climate change effects. Adopting any of these other agencies' thresholds as emissions limits for this or other projects is not the intent of Nevada and Placer Counties or PG&E, but is intended to provide additional information to put the Proposed Project's anticipated GHG emissions in the appropriate statewide context and consider their potential impacts, pursuant to CEQA.

3.9.2 Discussion

a. Generate GHG Emissions – Less-than-Significant Impact

Heavy-duty off-road equipment, material transport (vehicles and helicopter use), blasting activities, and worker commutes during construction would result in exhaust-related GHG emissions. Construction-related GHG emissions were estimated on a seasonal basis, using the same methodology discussed in Section 3.4, Air Quality. Table 3.9-1 summarizes the total and amortized, construction-related GHG emissions associated with the Proposed Project.

Table 3.9-1 Maximum Daily Construction-Related Emissions

Description	GHG Emissions (MT CO_2e)
Season 1	1,589
Season 2	1,212
Season 3[2]	1,087
Total Emissions	3,888
Amortized Construction Emissions[1]	**130**

Notes:

MT CO_2e = metric tons carbon dioxide equivalents

1. Amortized emissions estimated assuming a 30-year lifetime of the Proposed Project (3,888 MT CO_2e divided by 30 years).

2. Year three emissions include estimates for coffer dam bin-wall removal that may go to year four.

As shown in Table 3.9-1, the amortized, construction-related CO_2e emissions associated with the Proposed Project would be substantially less than any of the GHG thresholds discussed above (i.e., CAPCOA annual threshold of 900 MT CO_2e, SMAQMD annual threshold of 1,100 MT CO_2e, or PCAPCD annual threshold of 10,000 MT CO_2e). These thresholds were developed to allow projects to demonstrate consistency with the statewide framework for reducing GHG emissions, and on this basis, the Proposed Project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

Construction would require water storage at Lake Fordyce above minimum pool to be reduced during construction years. This would be accomplished by leaving the LLO valve partially open through the winter and early spring and allowing the lake to spill if volume exceeds approximately 39,000 AF instead of the typical 49,903 AF. The reservoir would be dewatered earlier than what is typical during normal operations. This change in reservoir storage operations at Lake Fordyce during the construction period could result in the potential for additional water to spill at Lake Spaulding, causing a potential loss in hydropower generated by the Drum-Spaulding Hydroelectric Project. Based on information provided by PG&E, PG&E and its contractors would be managing the drawdown to minimize spill as much as possible. In addition, water spillage generally depends on the weather patterns for a particular year. For example, and as shown in

Table 3.9-2, in a dry year, spillage is estimated to be minimal (and there would be no potential loss in hydropower), than what could be seen in a median or wet year. The potential also would exist for the Nevada Irrigation District (NID) to increase water storage and help offset the loss in generation.

Table 3.9-2 Potential Water Spillage

Water Year Scenario	Estimated Water Spillage (AF)	Potential Generation Loss (MWh)
Dry (2014)	0	0
Below Normal (2018)	22,539	40,232
Above Normal (2016)	44,059	78,645
Wet (2017)	49,000	87,465

Notes:

AF = acre feet; MWh = megawatt-hours

Source: Percival, pers. comm., 2020

Based on information provided by PG&E, the Drum-Spaulding Hydroelectric Project would represent only approximately 7 percent of PG&E's total hydroelectric power generation (Percival, pers. comm., 2020). More than 85 percent of the electricity delivered by PG&E is a combination of renewable and GHG-free resources. As stated in PG&E's Power Source Disclosure report, the power mix delivered in 2018 included non-emitting nuclear generation (34 percent), large hydroelectric facilities (13 percent), eligible renewable resources (e.g., wind, geothermal, biomass, solar, small hydro) (39 percent), and natural gas/other (15 percent) (CEC 2019). Thus, the potential loss in hydropower shown in Table 3.9-2 is not anticipated to substantially affect the power grid mixture of energy sources. For disclosure purposes, the potential GHG emissions increase associated with the potential loss in hydropower due to water spillage was estimated for each water year scenario. As shown in Table 3.9-3, under the worst-case scenario of a wet year, the potential GHG emissions increase would be 14,371 MT CO_2, or approximately 479 MT CO_2 per year when amortizing over the life of the Proposed Project (conservatively assuming a 30-year Proposed Project lifetime). As such, the amortized emissions associated with construction-related (off-road and on-road) equipment and the potential GHG emissions increase due to water spillage would be approximately 609 MT CO_2e, which is less than any of the GHG thresholds discussed above (i.e., CAPCOA annual threshold of 900 MT CO_2e, SMAQMD annual threshold of 1,100 MT CO_2e, or PCAPCD annual threshold of 10,000 MT CO_2e).

Table 3.9-3 Potential GHG Emissions Increase

Water Year Scenario	Potential Generation Loss (MWh)	GHG Emissions Increase (MT CO_2)[1]
Dry (2014)	0	0
Below Normal (2018)	40,232	6,610
Above Normal (2016)	78,645	12,921
Wet (2017)	87,465	14,371

Notes:

[1] Potential GHG emissions increase conservatively estimated based on the average CO_2 intensity of 362 pounds per megawatt-hour for delivered electricity as reported in the PG&E 2020 Corporate Responsibility and Sustainability Report for 2010-2018.

MWh = megawatt-hours; MT CO_2 = metric tons carbon dioxide

In addition, the Proposed Project would not result in an increase in long-term operational emissions because its purpose would be to improve the dam safety by providing a permanent repair to reduce the seepage, in accordance with DSOD requirements. In contrast, permanent dam repair would allow continued long-term operation of the dam, providing water storage and regulating flow for uses downstream, including hydroelectric power production. Thus, the long-term operation of the dam would offset any potential loss in hydropower generation that would be experienced during construction.

Because the Proposed Project's GHG emissions would be below recommended thresholds and any loss of hydropower generation during construction would not result in a substantial increase in non-renewable energy production, the impact would be **less than significant**. No mitigation is required.

b. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases – Less-than-Significant Impact

In 2006, California passed the California Global Warming Solutions Act of 2006 (AB 32; Health & Saf. Code, § 38500 et seq.). AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. In December 2008, ARB adopted its Climate Change Scoping Plan (Scoping Plan), which contains the main strategies that California will implement to achieve the required GHG reductions required by AB 32 (ARB 2008).

In 2008 and 2014, ARB approved the Scoping Plan and the first update to the Scoping Plan, respectively (ARB 2008, 2014). In 2016, the California State Legislature enacted SB 32, which established a 2030 GHG emissions reduction target of 40 percent below 1990 levels. In response to SB 32 and the companion legislation of AB 197, ARB approved the 2017 Scoping Plan Update: The Strategy for Achieving California's 2030 GHG Target in November 2017 (ARB 2017). The 2017 Scoping Plan draws from the previous plans to present strategies for reaching California's 2030 GHG reduction target.

Although the Scoping Plan updates include measures that would indirectly address GHG emissions associated with construction activities, including the phasing in of cleaner technology for diesel engine fleets (including construction equipment and cleaner fuels), successful implementation of these measures predominantly depends on the development of laws and policies at the state level. Thus, none of these statewide plans or policies constitute a regulation to adopt or implementation of a regional or local plan for reduction or mitigation of GHG emissions. Therefore, any requirements or policies formulated under the mandate of AB 32 and SB 32 that presumably would be applicable to the project, either directly or indirectly, would be implemented consistent with statewide policies and laws.

Nevada County and the NSAQMD have not adopted a plan, policy, or regulation for the purpose of reducing GHG emissions. In January 2020, Placer County adopted the PCSP. The PCSP includes strategies intended to reduce GHG emissions from the energy, water and wastewater, transportation, solid waste, agriculture, and off-road equipment sectors (Placer County 2020). However, the PCSP does not contain measures that would be directly applicable to the Proposed Project. The Proposed Project would not conflict with the AB 32 Scoping Plan and 2017 Scoping Plan; or any other plans, policies, or regulations for reducing GHG emissions. As discussed in Section 3.9(a), the Proposed Project also would not generate GHG emissions that would have a significant impact on the environment.

Furthermore, the Proposed Project would allow the permanent repair of the dam and its continued long-term operation. The dam provides water storage and regulates flow for uses downstream, including hydroelectric power production, irrigation, and domestic consumption. Thus, implementation of the Proposed Project would allow the continued long-term generation of hydroelectric power production at this facility. This would be consistent with California's renewable energy targets and Scoping Plan strategies of increasing low carbon energy. Therefore, the Proposed Project would not conflict with any applicable plan, policy, or regulation for reducing GHG emissions. The impact would be **less than significant**. No mitigation is required.

3.10 Hazards and Hazardous Materials

IX: HAZARDS AND HAZARDOUS MATERIALS: Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?		X		
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?			X	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one- quarter mile of an existing or proposed school?				X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X

IX: HAZARDS AND HAZARDOUS MATERIALS: Would the project:	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less-than-Significant Impact**	**No Impact**
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?				X
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			X	
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?		X		

3.10.1 Environmental Setting

Lake Fordyce Dam is in a remote location more than 5 miles from the nearest inhabited area. No permanent residences or industrial/commercial facilities are in the project area. Searches of the State Water Board's GeoTracker (State Water Board 2019) and the California Department of Toxic Substances Control's (DTSC) EnviroStor databases showed no potentially contaminated sites in the project area. The project area is not on a list of identified hazardous material sites, pursuant to Government Code section 65962.5, and no listed sites or facilities are within a 1-mile radius (DTSC 2019). Furthermore, no leaking underground storage tank sites listed in GeoTracker are within a 1-mile radius (State Water Board 2019).

No schools or airports are near the project area. The nearest school is approximately 5 miles to the southeast, and the nearest airport is Blue Canyon–Nyack Airport,

approximately 12 miles southwest of the dam. Because of the weather conditions, vegetation, and slope steepness, part of the project area, including areas around the dam site, is located in a very high fire hazard severity zone. Several small patches around the dam site are classified as having "moderate" fire hazard severity (CAL FIRE 2007). Section 3.21, Wildfire, presents more details on wildfire hazards.

3.10.2 Discussion

a. Hazardous Material Transport, Use, or Disposal – Less-than-Significant with Mitigation

Project construction would include the routine transport, storage, use, and disposal of small quantities of hazardous materials. Products used during construction, such as gasoline, diesel, hydraulic fluid, lubricants, adhesives, and solvents, are categorized as hazardous materials and are highly regulated by federal, state, and local laws and regulations.

Under the Hazardous Materials Transportation Act of 1976, the U.S. Department of Transportation's (USDOT) Office of Hazardous Materials Safety regulates the transportation of hazardous materials and sets requirements for hazardous material packaging and transport via guidelines intended to protect human health and the environment. USDOT provides hazardous materials safety training programs and supervises hazardous materials activities.

Transportation of hazardous materials on state roadways is regulated by the California Highway Patrol and Caltrans. Use of these materials is regulated by DTSC, as outlined in Title 22 of the California Code of Regulations. The construction contractor would be required to follow all applicable local, state, and federal regulations for transport, use, and disposal of hazardous materials.

Proposed Project construction would require excavation of soils within the dewatered reservoir at the toe of the dam. As described in Section 2, once any debris has been removed, the excess soil would be disposed of by spreading it within the work area on the bottom of Lake Fordyce.

Two reservoir sediment samples were collected from borings advanced in Lake Fordyce in August 2019 as part of exploratory investigations for the Proposed Project (described in more detail in Appendix C). Analysis of the soil did not find any contaminants at levels that would be considered a federal or state hazardous waste if the soil were to be removed

from the project area or reused at the work area. RCRA establishes Toxicity Characteristic Leaching Procedure (TCLP) values for various contaminants, exceedance of which means that the material would be considered a federal hazardous waste if removed from the project area. Similarly, Title 22 of the California Code of Regulations establishes soluble threshold limit concentration (STLC) values, exceedance of which means that the material would be considered a California hazardous waste if removed from the project area. TCLP and STLC testing are leachate analysis procedures, which are typically only undertaken if total concentrations of a constituent in a sample exceed 10 times the relevant STLC value, or 20 times the relevant TCLP value.[13] Total metals and mercury concentrations for the borings were significantly less than the STLC or TCLP decision factors (see Table 1 in Appendix C); therefore, soil from these areas is not anticipated to exceed federal or state hazardous waste criteria, and would not be required to be handled, transported, and disposed of as a hazardous waste if removed from the project area.

However, if unanticipated contamination were present at levels exceeding hazardous waste thresholds, the handling, transport, and disposal of the soil on the reservoir bottom would be a potentially significant impact. Implementation of Mitigation Measure HAZ-1 would reduce potential impacts by requiring implementation of measures to identify areas of unanticipated contamination within the project area and characterize potential hazardous soils so that appropriate measures, such as offsite disposal of the soil, can be taken to reduce impacts.

Mitigation Measure HAZ-1: Unanticipated Contamination

During ground-disturbing activities throughout the project area, the contractor(s) will inspect the exposed soil and associated dewatering effluent for obvious signs of contamination from hazardous materials such as odors, stains, or other suspect materials.

Should signs of unanticipated contamination be encountered, work will be suspended, the area will be secured and the Resident Engineer and PG&E manager(s) will be notified. An investigation will be designed and performed to verify the presence and

[13] Section 1.2 of the TCLP allows for a total constituent analysis in lieu of the TCLP extraction. If a waste is 100 percent solid, as defined by the TCLP method, then the results of the total constituent analysis may be divided by 20 to convert the total results into the maximum leachable concentration. This factor is derived from the 20:1 liquid-to-solid ratio employed in the TCLP (EPA 2018).

extent of hazardous material contamination at the site, and a site-specific soil management plan will be prepared and implemented.

In addition to visual observations, composite samples will be collected from the excavated debris-laden fill and analyzed for mercury to characterize the spoils material prior to spreading on the lake bottom. Spoils characterization will be conducted by analyzing and a composite sample for every 2,000 cubic yards of soil that would be spread on the bottom. Any soils deemed hazardous would be hauled offsite for disposal at an appropriately permitted commercial facility.

Implementation of Mitigation Measure HAZ-1 would reduce impacts related to potential handling, storage, transportation and disposal of hazardous wastes, by requiring that potentially contaminated soils be investigated and adequately characterized, so that such waste can be handled, stored, transported, and disposed of in accordance with applicable state and federal regulations. These state and federal regulations include OSHA and Cal/OSHA requirements for worker safety, RCRA and USDOT regulations for transportation of hazardous materials, and RCRA and California Code of Regulations requirements for disposal of hazardous wastes at a facility permitted to accept the waste. This comprehensive framework of regulations has been developed to reduce risks associated with the handling, use, storage, transportation and disposal of hazardous waste. Proper identification of hazardous wastes, and compliance with applicable regulations will therefore reduce potential impacts associated with any hazardous waste soils or dewatering effluent to a **less-than-significant level with mitigation**.

b. Reasonably Foreseeable Upset and Accident Conditions – Less-than-Significant

Because of the use of typical construction equipment (e.g., gasoline or diesel powered machinery) and construction materials (e.g., solvents, adhesives, or paints) during Proposed Project construction, the potential would exist for accidental spills or releases of hazardous materials, thereby exposing construction workers or the public to hazardous conditions.

Hazardous materials would be collected and properly stored at the two identified staging areas near Lake Fordyce Dam. Storage of any hazardous materials would follow applicable regulations for the use of secondary containment and proper storage containers. In addition, spill prevention and cleanup kits would be kept on site during construction and would be used in case of accidental release of hazardous material. Spill prevention kits would include absorbent materials and materials to reduce the risk of any

spills from entering a waterway. Waste material would be drummed or otherwise appropriately contained and would be removed from the site and disposed at an appropriate, permitted waste disposal facility.

Project construction activities may include refueling and minor maintenance of construction equipment on site, which could lead to minor fuel and oil spills. The use and handling of hazardous materials during construction would occur in compliance with applicable federal, state, and local laws, including California Division of Occupational Safety and Health requirements. All construction activities would be subject to the National Pollutant Discharge Elimination System (NPDES) permit process that would require preparation of a SWPPP, which would be reviewed and approved by the Regional Water Quality Control Board. As discussed in Section 3.11, Hydrology and Water Quality, because the Proposed Project would disturb more than one acre of land, it would be subject to the Statewide Construction General Permit. The General Permit would require PG&E to develop and implement a SWPPP. The SWPPP prepared for the Proposed Project would incorporate measures to prevent and minimize the effects of hazardous material spills. Measures could include:

- Maintaining vehicles and equipment in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials.
- Carrying materials to absorb leaks or spills in Service/maintenance vehicles
- Cleaning up hazardous spills immediately with proper disposal of any contaminated soil at a licensed facility.
- Servicing, refueling, and staging construction equipment only at designated areas, offset from riparian or aquatic habitat and not in a location where a spill would drain directly toward aquatic habitat.
- Washing equipment washing only in designated locations where water cannot flow into drainage channels.

Measures developed for the SWPPP would be implemented as part of the Proposed Project and would minimize the potential release of hazardous materials to the environment and nearby waterways from the use, storage, or disposal of hazardous materials during construction and operation. The impact would be **less than significant**. No mitigation is required.

c. Hazardous Substances in Close Proximity to Schools – No Impact

No schools are within 0.25 mile of the project area. Therefore, the project would have **no impact** on schools related to hazardous substances.

d. Existing Hazardous Materials Sites – No Impact

As identified above, the project area is not on a list of identified hazardous material sites pursuant to Government Code section 65962.5. The area surrounding the dam is used predominately for timber harvesting and recreational purposes. Therefore, **no impact** would occur.

e. Public Airport Hazards – No Impact

No public or private airports or airport strips are within 2 miles of the project area. The area is not within an airport land use plan. The nearest airport is Blue Canyon–Nyack Airport, approximately 12.5 miles from the dam. It is a smaller airport in Placer County and has a single, short asphalt runway. The Truckee Tahoe Airport is approximately 20 miles southeast of the dam. It is a public airport 2 miles east of Truckee in Nevada and Placer counties, with by two asphalt runways. Reno-Tahoe International Airport is approximately 40 miles northeast of the dam. It is a large international airport 3 miles from downtown Reno in Washoe County. Because of the distance from the project area to the closest airports, **no impact** related to airport hazards.

f. Emergency Evacuation and Response Plan Interference – Less than Significant

Because the project area is isolated and undeveloped, no adopted emergency response plan or emergency evacuation plan exists. However, the vast majority of Proposed Project activities would occur in Nevada County which has adopted an Emergency Operations Plan (EOP) for unincorporated areas. The EOP provides guidelines for emergency response planning, preparation, training, and execution throughout Nevada County. It identifies roads such as I-80 and California State Highways 20 and 49 for large evacuations. The project area would be subject to the EOP if Nevada County acts as the Operational Area (OA) during an emergency event (Nevada County 2011a). The California Emergency Services Act defines the OA (for each county in California) as an intermediate level of state emergency management organization, consisting of the county and all political subdivisions within county boundaries.

Tahoe National Forest participates in the Local Hazard Mitigation Plan for Nevada County. The plan identifies hazards in Nevada County and provides mitigation strategies for reducing or eliminating long-term risk to people and property from natural and human-caused hazards and their effects (Nevada County 2011b). The Proposed Project would be consistent with Nevada County's EOP and Local Hazard Mitigation Plan. Increased construction vehicles on I-80 could result in increased traffic, which could affect emergency vehicle response times. However, these impacts would be temporary and are not expected to be substantial because the additional truck traffic would be minor compared to the average daily traffic on the roadway (see Section 3.18, Transportation). Thus, evacuation routes would not be impeded or disrupted during project construction or operation. PG&E and USFS share the responsibility for maintaining roads that provide access to the Drum-Spaulding Hydroelectric Project facilities, of which the project area is a part. During construction, the access road would provide improved emergency evacuation access beyond its current condition that limits access to 4-wheel-drive vehicles only. Therefore, the impact would be **less than significant**. No mitigation is required.

g. Wildland Fires – Less-than-Significant Impact with Mitigation Incorporated

Section 3.21, Wildfire, discusses hazards from wildfire in more detail.

3.11 Hydrology and Water Quality

X. HYDROLOGY/WATER QUALITY: Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?			X	
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?			X	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i) result in a substantial erosion or siltation on- or off-site;		X		
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;			X	

X. HYDROLOGY/WATER QUALITY: Would the project:	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less-than-Significant Impact**	**No Impact**
iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or			X	
iv) impede or redirect flood flows?				X
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?			X	
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?		X		

3.11.1 Environmental Setting

Lake Fordyce Dam impounds Fordyce Creek, creating Lake Fordyce (reservoir). The reservoir encompasses approximately 715 acres and has a storage capacity of 49,900 AF of water. The drainage area above the dam covers 31.7 square miles, with elevations ranging from 6,400 to 9,000 feet. This upper watershed area generally is covered by mixed coniferous forest. Tributaries to Lake Fordyce include Fordyce Creek, North Creek, and White Rock Creek. Storage also is provided by reservoirs and lakes in the upper watershed, including Meadows Lake, White Rock Lake, and Lake Sterling.

Fordyce Creek flows into the northern arm of Lake Spaulding, approximately 9 miles below the dam, and the South Yuba River flows into Lake Spaulding's southern arm. Water is diverted at Lake Spaulding for domestic use, irrigation and power generation

under PG&E's Drum-Spaulding Hydroelectric Project and is transferred to the adjacent watershed. Reservoir spills and other surface water flows from Lake Spaulding continue down the South Yuba River. The South Yuba River eventually flows into the southern arm of Englebright Reservoir, while the Yuba River feeds the northern arm. The Yuba River continues west from Englebright Reservoir and is joined by Deer Creek just above the Sacramento Valley floor. The Yuba River discharges to the Feather River, a tributary to the Lower Sacramento River.

In California, water quality standards are established in regional water quality control plans. Regional Water Quality Control Boards have primary responsibility for the formulation and adoption of water quality control plans for their respective regions, subject to State Water Board and EPA approval, as appropriate (Wat. Code, § 13240 et seq.). Water quality control plans are often referred to as basin plans because they cover specific areas defined by drainage basins. Basin plans designate the beneficial uses of water to be protected, establish the water quality objectives necessary for the reasonable protection of those beneficial uses or the prevention of nuisance, and set forth implementation programs to achieve the water quality objectives. (*Id*., § 13241, § 13050, subds. (h), (j).) Beneficial uses, together with the water quality objectives contained in basin plans and state and federal anti-degradation requirements, constitute California's water quality standards.

As provided in the Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan), tributary sources to Englebright Reservoir— including Fordyce Creek— have existing beneficial uses that include municipal and domestic supply; irrigation; stock watering; hydropower generation; contact recreation, canoeing and rafting, other noncontact water recreation; cold freshwater habitat; cold water spawning, reproduction, and/or early development for salmon or steelhead; and wildlife habitat (Central Valley Regional Water Quality Control Board, Water Quality Control Plan Sacramento River Basin and San Joaquin River Basin (2018)).

The Fordyce Creek watershed is in the western Sierra Nevada, which is dominated by granitic rock but also includes many types of igneous, sedimentary, and metamorphic rocks. Fractured bedrock formations can provide water to wells when wells intersect the fractures. However, because the water yield from the fractured rock is variable, groundwater makes up a relatively small portion of the water supply in the region.

Few domestic wells are found in the fractured granite and limestone rock near Fordyce Lake. Six wells were identified within the project vicinity: two domestic wells located southwest of Meadows Lake; one domestic well located northeast of Lake Sterling; and three production wells located southeast of Lake Sterling for the Glacial Trails Scout Ranch (DWR 1979, 1985, 1997, 2013). These wells are located in the watershed above Lake Fordyce. The production depth range from 200 to 925 feet below ground surface for these wells, which is estimated to be at or above the bottom elevation of Lake Fordyce.

Flooding is not a widespread issue near the project area. Although sections of Lake Fordyce have been identified as special flood hazard areas by the Federal Emergency Management Agency (FEMA), no FEMA-designated floodplains are adjacent to Fordyce Creek. The reservoir is designated as a floodplain area because of the inundation that occurs at the dam.

There are historic gold mines in the Fordyce Creek watershed, and historic gold mining (e.g., hydraulic and/or placer mining) has been a source of heavy metal contamination and mining debris deposits in downstream areas of the Yuba River watershed. Sediment samples were collected from borings advanced in Lake Fordyce in August 2019, which were analyzed for metals and mercury, petroleum hydrocarbons (i.e., gasoline, diesel, or motor oil), and volatile organic compounds (see Appendix C). Arsenic and mercury were found in at least one of the two samples, at concentrations greater than non-regulatory EPA regional screening levels and threshold-effect concentrations for freshwater sediments (EPA 2002, 2019), but substantially below regulatory thresholds for hazardous materials. Motor oil and toluene also were found in one of the samples, but at concentrations below screening levels.

As part of the relicensing effort for the Drum-Spaulding project, a water quality study was conducted in 2008 and 2009 that included a multi-season survey of water quality within, upstream, and downstream of regional reservoirs. Samples were analyzed for 34 general physical water quality parameters, metals, and nutrients. In general, the water quality study found that basins and sub-basins in the region have low turbidity (from 0 to about 3 nephelometric turbidity units (NTU), and generally less than 10 NTU year-round) (NID and PG&E 2010a). As part of this study, a limited number of grab samples were collected within the Fordyce Creek watershed. Turbidity was found to be less than 1 NTU in spring and up to 6.9 NTU in fall (NID and PG&E 2010b).

Water temperature, dissolved oxygen, and pH were also measured during this study. In June and July 2008, Lake Fordyce was stratified with surface temperatures at 66 and 68°F and bottom temperatures at 43 and 44° F; while in August and September, the temperature gradient was less pronounced, with surface waters in the reservoir measured at 62 and 63°F and bottom temperatures measured at 45 and 51°F. In Fordyce Creek below the dam, temperatures were measured at 47, 49, and 56°F in spring, summer, and fall respectively. Dissolved oxygen concentrations ranged from 7.3 to 8.7 milligrams per liter (mg/L) within the reservoir and from 7.3 to 7.9 mg/L within the creek below the dam during these sampling events. The pH ranged from 6.5 to 7.7 within the reservoir and from 6.4 to 7.4 within the creek below the dam (NID and PG&E 2010b).

Turbidity and stream flow were more recently monitored in Fordyce Creek in October and November 2019, approximately 1,000 feet downstream from the dam. Although a short-term increase in turbidity occurred when the flows were increased from 8 to 14 cfs at the end of October, measurements typically were found below 1 NTU, but ranged up to about 11 NTU during this low-flow period (see Appendix C).

3.11.2 Discussion

a. Water Quality Standards and Waste Discharge Requirements – Less-than-Significant Impact with Mitigation Incorporated

The Proposed Project involves the repair of an existing dam on Fordyce Creek to ensure its compliance with the requirements of the Department of Water Resources, Division of Dam Safety. To perform the necessary dam repairs, a dry workspace upstream from the dam would be required. The following activities would be necessary to create this dry work space: drawing down the reservoir to the regular minimum pool elevation; installing a cofferdam and bypass system; dewatering the work area downstream of the coffer dam and upstream of Lake Fordyce Dam at the beginning of each construction season; managing seepage through saturated soils in dewatered areas; rewatering the work area at the end of each construction season, and removing the cofferdam bin-walls after construction is completed in either year three or year four depending on the available construction window given precipitation conditions.

As described in Section 2.5, the reservoir would be drawn down at the start of each construction season, in a manner similar to its routine operations. Approximately 400 to 500 cfs would be released from the reservoir to Fordyce Creek, starting as early as April of each construction year, and the reservoir would be drawn down to its minimum pool

elevation of 6,245 feet (about 3,000 AF) over multiple months. Under routine operations, Lake Fordyce is often drawn down starting in early June, although this timing can fluctuate and start as early as April or as late as July. Daily flow in Fordyce Creek during April 2016 and 2019 reservoir releases typically ranged between 290 and 440 cfs, but some days exceeded 550 cfs (USGS, 2020). Although Lake Fordyce is typically drawn down later in the season at lower flow rates, the reservoir releases needed to facilitate construction would be within range observed under existing conditions, and therefore the earlier drawdown is not expected to impact the beneficial uses associated with water quality.

During the construction season, the Proposed Project would maintain instream flow releases as they occur under existing conditions (minimum instream flow of 5 cfs) and as described in Section 2.2.4, Cofferdam and Outlet Diversion, and Maintenance of Instream Flow Releases During Construction in Section 2.5.

As described in Section 3.11.1, beneficial uses and associated water quality objectives for Fordyce Creek and Lake Fordyce are listed in the Basin Plan. Beneficial uses include: municipal and domestic supply (MUN); irrigation; stock watering; hydropower generation; contact recreation, canoeing and rafting (REC-1); other noncontact water recreation; cold freshwater habitat (COLD); cold water spawning, reproduction, and/or early development for salmon or steelhead (SPWN); and wildlife habitat. Numeric water quality objectives associated with beneficial uses for Fordyce Creek are listed in Table 3.11-1, and narrative objectives are summarized in Table 3.11-2.

Proposed Project activities have the potential to impact beneficial uses and water quality objectives for Fordyce Creek and Lake Fordyce. Table 3.11-3 lists the activities with the greatest potential to impact water quality objectives and beneficial uses during construction and the approximate duration of these activities. The activities in Table 3.11-3 could cause exceedances of numeric water quality objectives in Fordyce Creek and Lake Fordyce. However, the significance of an exceedance depends on multiple factors, including its magnitude, duration, and adverse impacts on beneficial uses.

Table 3.11-1 Summary of Numeric Basin Plan Water Quality Objectives to Protect Beneficial Uses

Parameter	Water Quality Objective
Bacteria	Waters designated REC-1: the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 ml, nor shall more than 10 percent of the total number of samples taken during any 30-day period exceed 400/100 ml.
Chemical Constituents	Waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. For water designated for use as domestic or municipal supply (MUN), waters shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels specified in Title 22 of the California Code of Regulations. Additionally, waters shall not contain lead in excess of 0.015 mg/L.
Dissolved Oxygen	For surface water bodies outside the legal boundaries of the Delta, the monthly median of the mean daily dissolved oxygen concentration shall not fall below 85 percent of saturation in the main water mass, and the 95th percentile concentration shall not fall below 75 percent of saturation. The dissolved oxygen concentrations shall not be reduced below the following minimum levels at any time: Waters designated COLD: 7.0 mg/L minimum Waters designated SPWN: 7.0 mg/L minimum
pH	The pH shall not be depressed below 6.5 nor raised above 8.5.
Temperature	The natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated that such alteration in temperature does not adversely affect beneficial uses. At no time or place shall the temperature of COLD intrastate waters be increased more than 5 °F) above natural receiving water temperature.

Parameter	Water Quality Objective
Turbidity	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits: • Where natural turbidity is less than 1 NTU, controllable factors shall not cause downstream turbidity to exceed 2. • Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU. • Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent. • Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs. • Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent. In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

Notes:

°F = degrees Fahrenheit; mg/L = milligram per liter; ml = milliliter; NTU = nephelometric turbidity unit

Source: CVRWQCB 2018

Table 3.11-2 Summary of Narrative Basin Plan Water Quality Objectives to Protect Beneficial Uses

Parameter	Water Quality Objective
Biostimulatory Substances	Water shall not contain biostimulatory substances that promote aquatic growths in concentrations that cause nuisance or adversely affect beneficial uses.
Color	Water shall be free of discoloration that causes nuisance or adversely affects beneficial uses.
Floating Material	Water shall not contain floating material in amounts that cause nuisance or adversely affect beneficial uses.
Oil and Grease	Waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.
Pesticides	• No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses. • Discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses. • Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by the Environmental Protection Agency or the Executive Officer. • Pesticide concentrations shall not exceed those allowable by applicable antidegradation policies (see State Water Resources Control Board Resolution No. 68-16 and 40 C.F.R. Section 131.12.). • Pesticide concentrations shall not exceed the lowest levels technically and economically achievable. • Waters designated for use as domestic or municipal supply shall not contain concentrations of pesticides in excess of the Maximum Contaminant Levels set forth in California Code of Regulations, Title 22, Division 4, Chapter 15. • Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of thiobencarb in excess of 1.0 µg/L.

Parameter	Water Quality Objective
Pesticides (continued)	For the purposes of this objective, the term pesticide shall include: (1) any substance, or mixture of substances that is intended to be used for defoliating plants, regulating plant growth, or for preventing, destroying, repelling, or mitigating any pest, which may infest or be detrimental to vegetation, man, animals, or households, or be present in any agricultural or nonagricultural environment whatsoever, or (2) any spray adjuvant, or (3) any breakdown products of these materials that threaten beneficial uses. Note that discharges of "inert" ingredients included in pesticide formulations must comply with all applicable water quality objectives.
Radioactivity	Radionuclides shall not be present in concentrations that are harmful to human, plant, animal or aquatic life nor that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal or aquatic life.
Sediment	The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.
Settleable Material	Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.
Suspended Material	Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.
Taste or Odor	Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses.
Toxicity	All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.

Notes:

C.F.R. = Code of Federal Regulations; µg/L = microgram per liter

Source: CVRWQCB 2018

Table 3.11-3 Construction Activities that May Impact Water Quality Objectives

Project Element	Construction Season(s)	Approximate Duration
Cofferdam Construction		
• Suction dredging	1	7 days
• Material handling of slurry	1	30 days
• Cofferdam construction (initial section)	1	30 days
• Relocate curtain	1	2 days
• Cofferdam construction (final section)	1	8 days
• Initial dewatering/bypass install	1	14 days
Seepage and stormwater management in the work area	1 to 3	Continuous during construction
Work area dewatering (before construction season)	2 and 3	4 days per season
Work area re-watering (end of each construction season)	1 to 3	4 days per season
Cofferdam bin-wall removal	3 or 4	20 days

Temperature, dissolved oxygen, oil and grease, pH, and turbidity are discussed in further detail below because Proposed Project activities could have an impact on these water quality objectives. Sources of biostimulatory substances, bacteria, chemical constituents in excess of the maximum contaminant levels, coloration, floating materials, radioactivity, and toxicity are not associated with the Proposed Project activities. Sediment, settleable material, and suspended material are not anticipated to be adversely affected by the Proposed Project. No substances or biochemical processes that may impact taste and odor are anticipated as part the construction.

Oil and Grease: The Proposed Project has the potential to introduce oil and grease from construction machinery and pumps. Other than during cofferdam construction and removal, dewatering, and seepage and stormwater management, the work area equipment will be kept out the water, and a SWPPP would be developed to minimize any discharges and prevent hazardous material spills. As a result, impacts to oil and grease would be **less than significant**.

Temperature: As discussed in Section 3.11-1, there are limited data on water temperature in the Fordyce Creek watershed. However, based on the available data, Lake Fordyce appears to have thermal stratification in late spring and summer, with a temperature gradient that is less pronounced later in the season when the reservoir has been drawn down. Surface temperatures in Fordyce Creek immediately downstream of the dam increase in temperature from late spring to early fall, but are often cooler than surface temperatures in the reservoir during the same period. Although a small portion of Lake Fordyce would be dewatered to provide a dry work area behind the dam during the summer construction seasons, water would remain in the majority of Lake Fordyce during the summer, as per existing operations; as a result, lake water temperatures would not be impacted. During construction, the IFR would be obtained from the subsurface, at an elevation similar to that of the low level outlet. Water temperatures are expected to be similar to those found during existing conditions. As a result, impacts to water temperature would be **less than significant**. Additionally, HYD-1's monitoring and adaptive management actions will further reduce the less-than-significant impact to temperature.

Dissolved Oxygen: As discussed in Section 3.11-1, there is limited data on dissolved oxygen concentrations in the Fordyce Creek watershed. Based on the available data, dissolved oxygen concentrations ranged from 7.3 to 8.7 mg/L in the reservoir and from 7.3 to 7.9 mg/L in the creek below the dam. These values exceed the minimum dissolved oxygen objective for cold water habitat and cold water spawning. The Proposed Project would not introduce nutrients or other materials that would result in a substantial oxygen demand in the reservoir or creek. During construction, the work area behind the dam would be dewatered and excavation and material handling would occur in the dewatered area. As discussed above, IFR would be maintained throughout the summer construction season from the relatively large body of water remaining in the majority of Lake Fordyce, as per existing operations. As a result, the dissolved oxygen within the lake would not be significantly impacted and impacts to dissolved oxygen concentrations into Fordyce Creek would be **less than significant**. Additionally, HYD-1's monitoring and adaptive

management actions will further reduce the less-than-significant impact to dissolved oxygen.

pH: A grout curtain (described in Section 2.2.5, Lake Fordyce Dam Seepage Repair Actions), would be installed by injecting a mixture of cement and bentonite clay to reduce seepage beneath the plinth. Grouting also would be used to seal potential seepage pathways at the cutoff wall, seepage berm, and original dam outlet. During grouting operations, grout would have the potential to react with seepage traveling through the dam and could cause a change in the pH of the water seeping into Fordyce Creek, resulting in alkaline (high pH) discharges. The discharge of high-pH water to the creek (greater than pH 8.5) would be an exceedance of the Basin Plan's pH objective, and could result in a potentially significant impact to Fordyce Creek, but any impact would be isolated from Lake Fordyce. PG&E has included as part of its Proposed Project actions to be implemented during grouting operations that would manage the pH of the seepage discharged to Fordyce Creek and maintain pH between 6.5 and 8.5 (see Section 2.6.2, Management Actions to Control the pH during Grouting Operations). As a result, Proposed Project impacts to pH would be **less than significant**. Additionally, HYD-1's monitoring and adaptive management actions will further reduce the less-than-significant impact to pH.

Turbidity: As discussed in Section 3.1.11, measured regional turbidity levels were low and ranged from 0 to 3 NTU; data collected in Fordyce Creek in 2019 found turbidity measurements typically were below 1 NTU, but ranged up to about 11 NTU following flow changes during the low-flow period when monitoring occurred (see Appendix C). Because the Proposed Project involves dredging and in-water actions, Proposed Project activities are expected to result in an exceedance of the Basin Plan's numeric turbidity objectives.

To reduce the potential impact of turbidity exceedances, the Proposed Project includes actions to control the release of turbidity to Fordyce Creek (see Section 2.6.1, Management Actions to Control the Release of Turbidity to Fordyce Creek). These include construction management actions (such as monitoring dredging activities and using turbid water for dust control), use of geotubes and turbidity curtains to reduce the export of turbid water to Fordyce Creek, and monitoring of flows and turbidity.

To assess the effectiveness of the turbidity control measures discussed in Section 2.6.1, a sediment study was conducted that evaluated the potential for erosion of reservoir sediments during the dewatering of the work area between Lake Fordyce Dam and the

cofferdam (Appendix D). Erosion rates were estimated based on sediment characteristics found in geotechnical borings collected near the cofferdam alignment, estimated velocities near the intakes, and depth of water during dewatering. Velocities near the lake bottom were found to be less than one foot per second within a few feet of the intake pumps. Suspended sediment concentrations were then estimated based on the erosion rates and flow rates during dewatering. The study found that only 10 percent of the sediment between the dam and the cofferdam would be erodible when flow ramping measures are implemented. This is due, in part, to the assumption that the majority of the sediment between the dam and the cofferdam consists of non-cohesive sands, gravels, and silty sands, consistent with the engineering geologic cross section developed for the cofferdam alignment (see Figure 2 in Appendix C). The sediment found to be erodible was material characterized as "muck" in the engineering geologic cross section; these sediments contain approximately 60 percent fine-grained material.

Water pumped from the area between Lake Fordyce Dam and the cofferdam would be discharged to Lake Fordyce in an area isolated behind a turbidity curtain, as described in Section 2.6.1. Use of the turbidity curtain would minimize increased turbidity levels in the lake. Diffusion in the lake was assumed to occur in two dimensions, causing substantial dissipation of sediment within 600 feet of the discharge. The settling area within the lake is approximately 6,000 square feet, representing less than 0.02 percent of the lake surface area. Fish will be able to migrate from the settling area due to gaps along the shore. Due to relatively small size of the settling area the fish's ability to migrate out from the turbidity curtains, the turbidity-related impacts to the lake will be less than significant.

Although the management actions identified in 2.6.1 would reduce the amount of turbidity released during Proposed Project activities, turbidity levels may still exceed numeric Basin Plan objectives. However, the significance of an exceedance depends on multiple factors, including its magnitude, duration, and adverse impacts on beneficial uses. As explained below, elevated levels of turbidity due to Proposed Project activities are not likely to impact aquatic resources, which are included in the cold freshwater habitat and cold water spawning[14] beneficial uses.

Turbidity affects fish by impairing vision and altering feeding behavior, predator avoidance, and behavioral interaction with other fishes. Very high levels of suspended

[14] The cold water spawning beneficial use includes cold water spawning, reproduction and/or early development for salmon or steelhead.

sediment can cause physical harm to gill tissues and physiological effects that ultimately can result in injury or death. In aquatic systems, a general relationship exists between the duration of exposure, magnitude of turbidity, and severity of effects on fish and other organisms. The higher the turbidity level, the shorter the duration of a turbidity event must be to avoid adverse effects. For example, salmonids can tolerate very high spikes in turbidity (e.g., 400+ NTU), if the duration is brief, while moderate increases of turbidity over a longer period may cause shifts in aquatic species' composition (Bisson and Bilby 1982; Gregory and Levings 1996; Gregory and Levings 1998, Shaw and Richardson 2001).

To quantify the relationship between the magnitude of turbidity and exposure duration in fish, Newcombe and Jensen (1996) developed a "severity-of-ill-effect" score (SEV) ranking model (SEV Model). Newcombe (2003) modified the SEV Model so that it could be used to assess the impact of turbidity in clear, cold water systems such as the conditions of Fordyce Creek. The model evaluated a variety of fish, including but not limited to brown trout and rainbow trout. Rainbow trout are known to occur in Fordyce Creek and have been stocked in Lake Fordyce; brown trout have been stocked in Fordyce Lake as recently as 1998. This SEV Model is used widely, including by the Central Coast RWQCB to develop sediment total maximum daily loads (TMDLs) in the Pajaro River watershed (Central Coast RWQCB 2005), a coastal stream basin draining into Monterey Bay. The SEV Model incorporates magnitude and duration of turbidity events into SEV values and provides a basis for identifying turbidity thresholds that are protective of beneficial uses. Newcombe's analysis and scores apply to both juvenile and adult life phases of cold water fish.

In Newcombe (2003), the SEV value index scores were grouped into four categories, based on behavioral, physiological, and survival effects: nil effects (scores of 0 to 0.5), minor effects (scores of 0.5 to 3.5), moderate, sublethal effects (scores of 3.5 to 8.5), and severe, lethal and paralethal effects (scores of 8.5 to 14.5). Table 3.11-4 shows Newcombe's SEV scores and the relative effect on fish and habitat. An SEV score below 4 represents behavioral effects in the form of alarm or avoidance responses. An SEV score of 6 can result in short-term reduction in feeding rates or success and minor physiological stress such as increased respiration or coughing, but does not include habitat degradation or long-term effects on feeding. Moderate habitat degradation begins at an SEV of 7, and lethal effects do not occur until SEVs of about 10 or greater.

Table 3.11-4 Severity of Ill-Effects for Impacts on Fish and Physical Habitat in Freshwater Systems

SEV	Effects on Fish Behavior, Physiology, and Survival[1]	Effects on Aquatic Habitat[2]
0	***Nil effect*:** No behavioral effects	—
1	***Behavioral effects:*** Alarm reaction	—
2	Abandonment of cover	—
3	Avoidance of response	Measured change in habitat preference
4	***Sublethal effects:*** Short-term reduction in feeding rates or feeding success	—
5	Minor physiological stress: increased respiration rate	—
6	Moderate physiological stress	—
7	Moderate habitat degradation; impaired homing	Moderate habitat degradation
8	Indications of major physiological stress: long-term reduction in feeding rate or feeding success; poor condition	—
9	***Lethal and Paralethal effects:*** Reduced growth rate, delayed hatching, reduced fish density	—
10	0–20% mortality, increased predation, moderate to severe habitat degradation	Moderately severe habitat degradation
11	>20–40% mortality	—
12	>40–60% mortality	Severe habitat degradation
13	>60–80% mortality	—
14	>80–100% mortality	Catastrophic or total destruction of habitat in the receiving environment

Notes:

SEV = severity-of-ill-effect

[1] Newcombe and Jensen (1996)

[2] Anderson (1996)

To further reduce Proposed Project turbidity exceedances and protect the beneficial uses of Fordyce Creek, Mitigation Measure HYD-1 shall be implemented. Mitigation Measure HYD-1 will avoid and minimize construction-related turbidity effects to aquatic resources by requiring the Proposed Project to manage turbidity levels at or below a SEV score of 3.5 on the SEV Model. Although some construction activities (e.g., cofferdam construction) may cause short-term spikes in turbidity, these turbidity increases shall not result in a SEV greater than 3.5; therefore, the impacts to beneficial uses associated with aquatic resources would less than significant. The monitoring and adaptive management measures in Mitigation Measure HYD-1 would provide additional means to avoid turbidity increases that could have a substantial effect on aquatic resources and beneficial uses in Fordyce Creek.

Additionally, PG&E is required to obtain all necessary permits and approvals for project implementation, including a Clean Water Act section 401 Water Quality Certification from the State Water Board. This certification is issued by the state to address water quality impacts and will identify turbidity limits and other water quality conditions that must be followed. In addition to the site-specific turbidity restrictions required in Mitigation Measure HYD-1, PG&E must adhere to all conditions in the Clean Water Act section 401 Water Quality Certification.

Implementation of the project-specific turbidity control measures in Mitigation Measure HYD-1 would reduce turbidity related impacts to surface water quality to **less than significant with mitigation incorporated**.

Mitigation Measure HYD-1: Monitor and Implement Adaptive Management Strategy

A Water Quality Management Plan will be developed to protect water quality objectives and beneficial uses from impacts due to Proposed Project activities, such as increases in turbidity associated with the Proposed Project. The Water Quality Management Plan will require management of turbidity levels in Fordyce Creek at or below a “severity-of-ill-effect” (SEV) of 3.5 on the Newcombe (2003) ranking model (SEV Model). The Water Quality Management Plan shall include protocols used to monitor turbidity, dissolved oxygen, pH, and temperature. At a minimum, the Water Quality Management Plan shall include:

- monitoring locations, frequency, and duration;

- adaptive management actions to implement if turbidity begins to approach SEV 3.5;
- adaptive management actions to implement if water quality objectives are determined to be adversely impacted by the Proposed Project; and
- reporting to the State Water Board.

A minimum of three monitoring locations shall be required with stations located both above and below the Proposed Project. Monitoring shall occur via a sensor system to continuously monitor water quality at a minimum of 20-minute intervals. Each construction season, monitoring shall begin prior to dewatering the work area and use of the cofferdam bypass system, and shall continue for the duration of the construction season, and for a minimum of three days following the completion of the construction season.

b. Groundwater Depletion or Recharge – Less-than-Significant Impact

The project area is not above a groundwater basin. Although local infiltration could collect in pockets found in granite or limestone rock fractures, these soil conditions would not be suitable for retaining large amounts of groundwater in the local area. Thus, only a limited number of groundwater wells are in the local vicinity. For example, one deep well is near Lake Sterling (DWR 1997), which likely is influenced by a combination of local infiltration and reservoir seepage from Lake Sterling. No wells have been identified within a mile of Lake Fordyce, although a small portion of Lake Fordyce would be dewatered temporarily, to provide a dry work area behind the dam during the summer construction seasons, water would be detained in the majority of Lake Fordyce during the summer, as per existing operations, and groundwater infiltration would continue to occur in these areas. The groundwater wells identified in the watershed were located near Lake Sterling or Meadows Lake and are not likely to be connected to Lake Fordyce. Thus, temporary dewatering of a small portion of Lake Fordyce between the dam and the cofferdam would not substantially deplete groundwater supplies or interfere with groundwater recharge in a manner that would cause a net deficit in aquifer volume or a lowering of the local groundwater table level. The impact would be **less than significant**. No mitigation is required.

c i. Erosion/Siltation – Less-than-Significant Impact with Mitigation Incorporated

Although the Proposed Project would not introduce a large amount of new impervious surfaces to the watershed that would affect the volume and/or peak flow of stormwater runoff from the site, drainage patterns near the dam would change during construction. Flows from the reservoir would be redirected temporarily around the work area through a bypass pipe in the cofferdam. Existing roadways also would be modified to address the need for wider turning radii to accommodate construction traffic. Although short-term changes in drainage patterns could increase erosion in the work area, erosion in upland areas would be controlled through implementation of BMPs developed for the SWPPP, and erosion in areas below the ordinary high water mark would be controlled by implementing the site-specific turbidity control measures (Section 2.6.1) during construction activities. Implementation of these control measures would minimize and substantially avoid adverse effects from erosion and siltation. Additionally, Mitigation Measure HYD-1 further requires the Project to manage turbidity levels at a SEV of 3.5 or less. The impact would be **less than significant with mitigation incorporated**.

c ii. On or Off-site Flooding – Less-than-Significant Impact

Flooding is not a widespread issue in the Fordyce Creek watershed. Although sections of Lake Fordyce and Lake Sterling have been identified as special flood hazard areas by FEMA, no FEMA-designated floodplains are on Fordyce Creek. The reservoir areas are considered to be floodplains because of the inundation that occurs related to the dam.

Project construction would not substantially increase the rate or amount of surface runoff in a manner that would result in flooding below the dam; for instance, reservoir drawdown rates would be similar to levels occurring during normal operations. However, a possibility would exist of on-site flooding from overtopping of the cofferdam during the summer construction season, an issue that has been addressed in the design of the cofferdam and bypass system. The cofferdam is designed to handle flows from summer thunderstorms and late-fall storm events through a combination of water releases and available storage upstream from the cofferdam. If a forecasted storm appeared to exceed the design storm for the bypass system, the reservoir water level behind the cofferdam would be lowered to maintain freeboard and provide additional storage for incoming precipitation, to help prevent overtopping of the cofferdam. The impact would be **less than significant**. No mitigation is required

c iii. Drainage Capacity/Polluted Runoff – Less-than-Significant Impact

Potential to provide substantial additional sources of polluted runoff: Construction activities would include importing materials (e.g., cofferdam bin-wall structures; clean rock and granular fill material; road base; concrete; formwork for concrete structures; and the impermeable liner), widening and regrading roads, installing the bin-wall cofferdam, excavating test pits and trenches, excavating fill behind the dam, plugging and grouting the original low-level outlet, constructing the concrete plinth, constructing the grout curtain, installing the impermeable liner, and removing and disposing materials. These construction activities could result in disturbed soils being exposed temporarily to the erosive forces of wind, rain, and stormwater runoff, thereby causing the release of construction-generated sediment to Fordyce Creek. In addition, stormwater runoff could be contaminated with chemicals used during construction (e.g., fuels, oils, and solvents) through the transportation, storage, and use of these materials, if they are not controlled properly. Activities such as grading, excavation, and trenching also would have the potential to affect groundwater quality, by providing a preferential pathway for infiltration of contaminated stormwater. This would be a potentially significant impact.

Although surface water and groundwater quality could be affected by construction activities, the contractor would implement industry-standard construction BMPs to control stormwater and nonstormwater discharges at the construction site, in compliance with the Statewide Construction General Permit (Order No. 2009-0009-DWQ, NPDES No. CAS000002, as amended) and conditions in the Clean Water Act section 401 Water Quality Certification. A SWPPP would be developed, specifying the BMPs to be used to minimize wind and water-related soil and sediment discharges from the work area, minimize potential contamination of stormwater and nonstormwater discharges, and prevent hazardous material spills. The contractor would implement these BMPs during construction.

Additionally, slit fences, wattles, and other measures would be used to control sediment-laden runoff from work sites in upland areas. Work areas in Lake Fordyce below the ordinary high-water mark would be dry during construction, and many of the BMPs applied to the upland areas outside the bed of the reservoir also would be applied there. Stormwater would be collected and used for dust control on the access road and laydown/staging areas, to the maximum extent possible, rather than discharging the water to Fordyce Creek. Implementation of industry standard BMPs to control stormwater and nonstormwater discharges as required by a Construction General Permit results in a **less-than-significant impact**.

Potential to create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems: The Proposed Project would not substantially increase surface water runoff in upland areas because it would not include large amounts of new impervious surfaces. Little to no change would occur in drainage patterns in upland areas during construction. Although road drainage systems would be modified to address the need for wider turning radii to accommodate construction traffic, these modifications would not be needed because of inadequate stormwater conveyance. Thus, water would be conveyed through the drainage system in the same manner, before and after the modifications.

The Proposed Project would not result in substantial additional sources of polluted runoff. Stockpiled clean rock and granular fill for use in upcoming construction seasons would be left on site between the construction seasons. These clean materials would be stored temporarily over the winter on a ledge in the upper portion of the reservoir, and then would be placed permanently in the reservoir during the construction season. The impact would be **less than significant.** No mitigation is required.

c iv. Impede Flood Flow – No Impact

The Proposed Project would alter drainage patterns during construction, but those alterations would not result in increased flooding or impede flood flows. A cofferdam would be built in the reservoir to maintain a dry work area during the summer construction seasons. As discussed above, the cofferdam would be used during summer and late fall for flow releases; at the end of each construction season, the bypass pipe would be removed and the work area would be rewatered. Winter inflows to the reservoir would raise water surface elevations and may fully inundate the cofferdam. Winter releases would not be impaired by the presence of the cofferdam. Because the cofferdam would not impede or redirect flood flows, no impact would occur to flood flows because of temporary changes in drainage patterns. **No impact** would occur.

d. Flood Hazard, Seiche, and Tsunami – Less-than-Significant Impact

The reservoir is within a flood hazard zone and could be subject to a seiche (a standing wave caused by earthquakes or by strong winds and rapid changes in atmospheric pressure that pushes water from one end of a water body to the other), but because the project area is inland, it is not in a tsunami zone. Some of the work area is within the flood hazard area defined by the reservoir; thus, the cofferdam is designed to handle flows from summer thunderstorms and late-fall storm events through a combination of water releases and available storage upstream from the cofferdam. If a forecasted storm

would appear to exceed the design storm for the bypass system, the reservoir water level behind the cofferdam would be lowered to maintain freeboard and provide additional storage for incoming precipitation, to help prevent overtopping of the cofferdam.

Similarly, construction activities would be unlikely to be affected by a seiche because adequate freeboard would be actively maintained at the cofferdam during summer and late fall, reducing the risk of potential overtopping that could be experienced with a seiche. Because water levels would be actively managed to reduce potential overtopping of the cofferdam, the risk of a release of pollutants from project inundation would be minimal. The impact would be **less than significant**. No mitigation is required.

e. Water Quality Control Plan Conflict – Less-than-Significant Impact with Mitigation Incorporated

The Proposed Project is not expected to conflict with or obstruct the implementation of any sustainable groundwater management plans.

As discussed in Section 3.11.2a, Water Quality Standards and Waste Discharge Requirements, the Proposed Project is expected to result in a temporary exceedance of the numeric water quality objective for turbidity in the applicable water quality control plan (Basin Plan), and therefore conflict with the Basin Plan. However, the significance of this conflict depends on multiple factors, including its magnitude, duration, and adverse impacts on beneficial uses. As discussed in Section 2.6.1, Actions to Control the Release of Turbidity to Fordyce Creek, the Proposed Project includes management actions to reduce exceedances of the turbidity water quality objective listed in the Basin Plan. Additionally, Mitigation Measure HYD-1 requires maintaining turbidity at a level that will result in an SEV of 3.5 or below for the protection of the cold freshwater habitat and cold water spawning beneficial uses. The resulting impact would be **less than significant with mitigation incorporated**.

3.12 Land Use Planning

XI. LAND USE AND PLANNING: Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Physically divide an established community?				X
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?				X

3.12.1 Environmental Setting

Land uses in the project area are regulated by counties through various plans and ordinances. General plans are long-term planning documents that guide growth and development in a particular jurisdiction. General plans provide goals, objectives, and policies and serve as the foundation for land use decisions. Zoning ordinances apply to land uses and developments within a jurisdiction and provide details such as allowed land uses and development standards.

As indicated in Figures 2-1 and 2-2, the vast majority of the project area is located in Nevada County. As discussed, a small portion of the access road (approximately 1,400 feet) near I-80 at Cisco Grove is located in Placer County. Plans and ordinances applicable to the Proposed Project include the Nevada County General Plan, Nevada County Zoning Ordinance, Placer County General Plan, and Placer County Zoning Ordinance.

The majority of the project area is located in unincorporated Nevada County and is designated as Forest–160 (160 acre minimum parcel size) in the Nevada County General Plan (Nevada County 2016). The intent of the Forest designation is to provide for production and management of timber resources. A smaller portion of the project area in Placer County is designated as Agriculture/Timberland (80-acre minimum parcel size) per the Placer County General Plan. Areas designated Agricultural or Timberland serve as

land identified for production of food and fiber or mountainous areas where the primary land use related to growing and harvesting timber (Placer County 2016). Portions of the project area in Nevada County are on Forest-designated lands in Tahoe National Forest (see Figure 2-2). Lake Fordyce Dam and reservoir are surrounded by PG&E-owned lands and Tahoe National Forest.

The majority of the project area is zoned as Forest and Timberland Production Zone per the Nevada County Zoning Ordinance (Nevada County 2015). The Forest zoning designation provides areas for protection, production, and management of timber. The Timber Production Zone zoning designation provides areas for forest resource management and timberland production. The intent of the Timberland Production Zone zoning designation is to dedicate the land for growing and harvesting of timber and other compatible uses (uses thatdo not detract from growing and harvesting timber). Lake Fordyce and Lake Fordyce Dam are designated as Open Space. The intent of the Open Space zoning designation is to provide areas of open space protected from development (Nevada County 2015). The portion of the project area in Placer County is in the Forest zoning district. The intent of the zoning designation is to designate mountainous areas where the primary land uses will relate to the growing and harvesting of timber and other forest products, together with public and commercial recreational uses (Placer County 2020).

3.12.2 Discussion

a. Physical Division of an Established Community – No Impact

No established communities exist in the project area. Big Bend, Troy, and Kingvale, the nearest communities to the dam site, are approximately five to 7 miles southeast of the dam. Although the access road would be closed at certain times during construction, this road does not constitute an access point for any communities in the area. In addition, the Proposed Project would not introduce any physical features that would create a barrier, divide, or separate adjacent uses; or impede movement or circulation on existing public roads, streets, or paths. None of the project components would result in displacement of existing land uses. Therefore, **no impact** would occur.

b. Land Use Plan and Policy Conflicts – No Impact

The Proposed Project would improve the safety of the dam by providing a permanent repair to reduce seepage. It would also make improvements to the access road. Construction activities would generally occur on PG&E-owned lands. However, special

use permits from USFS and permissions to use and alter private property from SPI and other private landowners would be needed to perform alterations to the access road and complete tree removal. No other permanent rights-of-way or acquisitions of USFS, SPI, or private property would be needed for project implementation.

The Proposed Project would not change land uses in the project area or conflict with existing or future designated land uses. The Proposed Project would not involve the construction of any new permanent structures. It would not change the forest and open space characters of the project area. The Proposed Project would comply with applicable regulations and would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Proposed Project.[15] Therefore, the Proposed Project would not cause an environmental impact because of a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. **No impact** would occur.

[15] Additionally, Government Code section 53091(e) exempts water storage projects from local zoning requirements.

3.13 Mineral Resources

XII. MINERAL RESOURCES: Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state?				X
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?				X

3.13.1 Environmental Setting

Under the Surface Mining and Reclamation Act of 1975 (SMARA), the California State Mining and Geology Board may designate certain mineral deposits as being regionally significant to satisfy future needs. Because available aggregate construction material is limited, four designations have been established for the classification of sand, gravel, and crushed rock resources. In compliance with SMARA, the following classification system was developed to denote both the location and significance of key extractive resources:

- **MRZ-1:** Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence
- **MRZ-2:** Areas where adequate information indicates that significant mineral deposits are present or where it is judged that a high likelihood for their presence exists
- **MRZ-3**: Areas containing mineral deposits, the significance of which cannot be evaluated from existing data

- **MRZ-4**: Areas where available data are inadequate for placement in any other mineral resource zone

The project area is in an area designated as MRZ-4, MRZ-3, and MRZ-2. Lake Fordyce Dam and portions of the access road are in areas designated MRZ-3 (CGS 1990a; 1990b). All construction activities that may affect mineral resources would occur within Nevada County. The Nevada County General Plan does not designate any areas of significant mineral resources in the project area (Nevada County 1995).

In addition, under the Guidelines for Classification and Designation of Mineral Lands, an exclusion category called the Economic Exclusion excludes major public or private engineering projects, including dams, from being classified as Aggregate Resource Areas (CGS 2000). As a result, the project area would be exempt from complying with state guidelines concerning minerals of statewide or regional importance.

3.13.2 Discussion

a. Loss of Regional or State-Valued Mineral Resources; and

b. Loss of Locally Important Mineral Resources – No Impact

The Proposed Project would not contain or affect minerals that are considered to be of statewide or regional importance.

Material from surficial excavations and removal of certain bedrock outcrops generally would be placed in the project area. To the greatest extent possible, excavated materials would be re-used as fill in the project area, unless material contains elevated levels of mercury and would be disposed of in accordance with state and federal laws (see Section 3.10.2, Hazards and Hazardous Materials). Therefore, the Proposed Project would not deplete mineral resources and would not adversely affect future mining in the area. Approximately 7,500 tons of aggregate materials would be imported. However, approximately 7.6 billion tons of permitted aggregate resources are available within 21 aggregate areas in the state; therefore, the Proposed Project would result in a minimal amount of aggregate resource depletion (CGS 2018). Additionally, because the proposed project would meet the requirements of the Economic Exclusion classification under the Guidelines for Classification and Designation of Mineral Lands, the Proposed Project would not contain or affect minerals that are considered to be of statewide or regional importance (CGS 2000). All ground-disturbing activities that have the potential to affect mineral resources would occur in Nevada County. The Proposed Project is not in an area

designated by the County as a Mineral Extraction Combining District (ME), an area known to contain potentially significant mineral resources and lie in compatible areas for surface mining (Nevada County 1995). Therefore, the Proposed Project would not affect local-important resource recovery sites delineated in a local land use plan.

Because the Proposed Project would not result in the loss of mineral of statewide, regional or local importance, there would be **no impact**. No mitigation is required.

3.14 Noise

XIII. NOISE: Would the project result in:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			X	
b) Generation of excessive groundborne vibration or groundborne noise levels?			X	
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				X

3.14.1 Environmental Setting

Noise may be defined as loud, unpleasant, or unwanted sound. Several methods exist for characterizing sound. The most common method is the “A-weighted sound level,” or dBA. This scale gives greater weight to the frequencies of sound to which the human ear typically is most sensitive. Thus, most environmental measurements are reported in dBA, meaning decibels on the A-scale.

Sound levels typically are not steady and can vary over a short period. The equivalent noise level (L_{eq}) is used to represent the average character of the sound over a certain period. L_{eq} represents the level of steady noise that would have the same acoustical energy as the sum of the time-varying noise measured over a given period. L_{eq} is useful for evaluating shorter time periods over the course of a day. The most common L_{eq} averaging period is hourly, but L_{eq} can describe any series of noise events over a given period.

Noise exposure over the course of an entire day is described by the day/night average sound level, or L_{dn}, and the community noise equivalent level. Both descriptors represent the 24-hour noise impact on a community. For L_{dn}, the 24-hour day is divided into a 15-hour daytime period (7 a.m. to 10 p.m.) and a 9-hour nighttime period (10 p.m. to 7 a.m.), and a 10 dB "penalty" is added to measure nighttime noise levels when calculating the 24-hour average noise level. For example, a 45 dBA nighttime sound level would contribute as much to the overall day-night average as a 55 dBA daytime sound level.

Existing Noise Environment

No substantial noise sources are in the project area. The project area is undeveloped and generally uninhabited. What noise is generated in the area would be from intermittent vehicle and OHVs using local roads, and potentially from timber harvest operations. Occasionally, PG&E requires helicopter operations to bring personnel or materials to the dam site. Noise-sensitive land uses generally consist of those uses where exposure to noise would result in adverse effects and uses for which quiet is an essential element of the intended purpose.

Residential areas, hospitals, schools, and parks are examples of noise-sensitive receptor locations that could be more acutely affected by changes in existing environmental noise levels. Visitors to Lake Fordyce would be considered noise-sensitive receptors; however, informal recreational opportunities at Lake Fordyce would be restricted during construction.

Applicable Noise Regulations

The Nevada County General Plan, Noise Element (adopted in 2014) and Nevada County Code outline acceptable exterior noise standards for varying land uses and zoning districts. The Nevada County Exterior Noise Limits establish the exterior noise standards for "Rural" land uses of 55 dBA L_{eq} and 75 dBA L_{max} for project activities between 7 a.m.

and 7 p.m.; 50 dBA L_{eq} and 65 dBA L_{max} for project activities between 7 p.m. and 10 p.m.; and 40 dBA L_{eq} and 55 dBA L_{max} for project activities between 10 p.m. and 7 a.m. As noted in the Nevada County Land Use Development Code, Chapter II, Zoning Regulations (Section L-II 4.1.7, Noise), construction activities are exempt from the County's noise standards (Nevada County 2019).

No Proposed Project construction activities would occur in Placer County. Additionally, as noted in the Placer County Code, Chapter 9, Article 9.36 (Section 9.36.030, Exemptions) sound emanating from construction activities between the hours of 6 a.m. and 8 p.m. Monday through Friday, and between the hours of 8 a.m. and 8 p.m. Saturday and Sunday are exempt, provided that all construction equipment is fitted with factory installed muffling devices and that all construction equipment is maintained in good working order (Placer County 2020).

Applicable Vibration Regulations

Nevada County does not have any standards regarding construction vibration and no construction activities resulting in vibration would occur in Placer County

3.14.2 Discussion

a. Exposure to Noise in Excess of Standards – Less-than-Significant Impact

Project construction would occur over an approximately 3-month work period from mid-July through mid-October in each of three construction seasons, and a limited duration during a fourth season, if necessary. Construction activities that would generate noise would include access road improvements and annual maintenance, and construction of the seepage repair at the dam. Blasting also may occur, to remove rock material along the access route. Construction typically would occur 6 to 7 days a week between 6 a.m. and 6 p.m., with some activities at the reservoir (e.g., cofferdam construction) scheduled for 24 hours per day.

Construction at the dam would generate noise from operating heavy equipment and any supporting stationary equipment, such as generators, materials, and screening equipment, as well as from heavy trucks used to transport materials. Blasting during the first season of construction would also generate intermittent short-term noise events. The majority of the construction activities would not occur near or adjacent to any sensitive receptors, and the temporary increase in noise would cease following completion of construction activities.

Certain material deliveries, such as HDPE pipe segments for the flow bypass, would need to be delivered via a helicopter sling operation. Helicopter operations are anticipated to be necessary for up to 6 days per construction season, with up to about 4 hours per day of overflights, representing a very small proportion of the total construction hours per season. This would generate short-term, intermittent noise that potentially would be heard by recreationists, depending on flight paths.

Minor road improvements on Lake Fordyce Road below Fordyce Summit would occur including near Woodchuck Campground; however, these activities would be limited to minor spot improvements, such as filling large potholes with aggregate rock and light grading. These activities would be short-term. The access road would be closed during much of the construction period, however if the campground were in use, campground users would experience intermittent noise from haul trucks passing by the campground, approximately 20 times per day at peak construction.

In addition, as noted in the Nevada County Land Use Development Code, Chapter II, Zoning Regulations (Section L-II 4.1.7, Noise), construction activities are exempt from the County's noise standards. Although project construction would generate noise, it would be temporary and would cease after construction completion. The impact would be **less than significant**. No mitigation is required.

b. Exposure to Groundborne Vibration – Less-than-Significant Impact

Construction activities would have the potential to result in varying degrees of ground vibration, depending on the specific construction equipment used and activities involved. Vibration generated by construction equipment would spread through the ground and diminish with increases in distance. The effects of ground vibration may be imperceptible at low levels, result in low rumbling sounds and detectable vibrations at moderate levels, and could disturb human activities, such as sleep and vibration-sensitive equipment at high levels. Ground vibration also potentially could damage the foundations and exteriors of existing structures, even if it does not result in a negative human response.

Groundborne vibration levels caused by various types of construction equipment are summarized in Table 3.14.1.

Table 3.14.1 Representative Vibration Source Levels for Construction Equipment

Equipment	PPV at 25 feet (inches/ second)	PPV at 50 feet (inches/ second)	Approximate L_v (VdB) at 25 feet	Approximate L_v (VdB) at 50 feet
Large Bulldozer	0.089	0.031	87	78
Small Bulldozer	0.030	0.014	58	Not perceivable
Jackhammer	0.035	0.012	79	70
Small Bulldozer	0.003	0.001	58	Not perceivable
Loaded Trucks	0.076	0.027	86	77
Auger Drill Rig	0.089	0.042	87	78

Notes:
L_v = the root mean square velocity expressed in vibration decibels (VdB) re 1 microinch per second, assuming a crest factor of 4.
PPV = peak particle velocity
Source: FTA 2006

As shown above, specific vibration levels associated with typical construction equipment are highly dependent on the type of equipment used. Each phase of construction would generate groundborne vibration from the operation of heavy equipment and any supporting stationary equipment, such as generators, materials, and screening equipment, as well as heavy-duty trucks used to transport materials. Furthermore, blasting and rock crushing potentially could occur and be intermittent sources of vibration.

However, sensitive receptors are not near Lake Fordyce Dam. The informal campground nearest Lake Fordyce would be closed, and other recreational opportunities would be limited for the duration of construction. Therefore, the impact would be **less than significant**. No mitigation is required.

c. Air Traffic Noise from Public Airports – No Impact

The project area is not within 2 miles of any public or private airport, airstrip, or planning area associated with an existing airport land use plan. The closest airport to Lake Fordyce is Blue Canyon-Nyack Airport, approximately 12.5 miles southwest of the dam. Therefore, the Proposed Project would not expose construction workers in the project area to excessive airport-related noise levels. **No impact** would occur.

3.15 Population and Housing

XIV. POPULATION AND HOUSING: Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				X
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				X

3.15.1 Environmental Setting

The California Department of Finance estimates that Nevada County's total population increased from 98,764 in 2010 to 98,904 in 2019, representing a 0.14 percent increase over the 9-year period. During that same time period, Placer County's total population increased from 348,432 to 396,691, representing a 13.9 percent increase over the 9-year period (DOF 2019). Approximately 67 percent (66,579 persons) resided in the unincorporated areas of Nevada County, and 33 percent (32,325 persons) resided in the incorporated cities. Approximately 30 percent (116,170 persons) resided in the unincorporated areas of Placer County, and 70 percent (280,521 persons) resided in the incorporated cities (DOF 2019).

3.15.2 Discussion

a. Population Growth – No Impact

Construction is expected to occur over an approximately three-month window between mid-July and mid-October each year for 3 years, and would require up to about 50

workers over the duration of the Proposed Project. A short construction window during the fourth year may be required to remove the cofferdam bin-walls. Construction worker numbers would vary during different construction seasons. The source of the construction labor force is unknown at this time, but workers would be likely to come from the local labor pool. The need may exist for temporary lodging for non-local workers during construction; however, existing housing and hotels/motels are expected to be able to supply temporary accommodations for non-local workers. Workers are not expected to permanently relocate to the project area from other areas in the county or region.

The Proposed Project would not induce substantial population growth, directly (i.e., construction of new homes or businesses) or indirectly (i.e., through extension of roads or other infrastructure). The Proposed Project would include improvements to the access road that would be necessary to allow suitable access to the dam for construction vehicles, and to increase worker safety. The proposed improvements would not induce planned growth in or around the project area because they would not be maintained over time. Therefore, the Proposed Project would not induce substantial population growth, either directly or indirectly. **No impact** would occur.

b. Displacement of Existing People and Housing – No Impact

There are no permanent residences within the project area. Therefore, the Proposed Project would not displace people or housing that would necessitate construction of replacement housing elsewhere. **No impact** would occur.

3.16 Public Services

XV. PUBLIC SERVICES:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the 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 public services:				
Fire protection?				X
Police protection?				X
Schools?				X
Parks?				X
Other public facilities?				X

3.16.1 Environmental Setting

Fire Protection Services

USFS provides fire protection services to the project area in Nevada County (Nevada County 2012). Truckee Fire Department provides fire protection services to the project area in Placer County (Placer County 2020a). The nearest USFS District office to the project area is the Truckee Ranger District, approximately 20 miles to the east.

Police Protection Services

The Nevada County Sheriff's Department provides law enforcement services to unincorporated areas of Nevada County (Nevada County 2019a). Sheriff's Department services include high country patrol, marine patrol, a narcotics task force, OHV patrol, search and rescue, and a special enforcement detail. The Placer County Sherriff's Office provides law enforcement services to unincorporated areas of Placer County, including contract law enforcement services to the city of Colfax and the township of Loomis. The Place County Sherriff's Office provides law enforcement including jail services, coroner's services, court security, and marshal duties (Placer County 2020b). The closest station is the Sheriff's Department's substation at 10075 Levon Avenue in Truckee, approximately 20 miles to the east.

Schools

Nevada County is served by 13 school districts (Nevada County 2019b). Placer County is served by 17 schools districts (Placer County 2012).The project area is between the Twin Ridge School District and Nevada Joint Union High School District and within the Tahoe Truckee Unified School District (Nevada County 2019b; Placer County 2012). The closest school is Donner Trail Elementary School, approximately 5 miles to the southeast.

Parks

There are four park and recreation districts in Nevada County: Western Gateway Park and Recreation District, Bear River Recreation and Park District, Oak Tree Park and Recreation District, and the Truckee-Donner Recreation and Park District. There are two park districts in Placer County: Truckee-Donner Recreation and Park District and Auburn Area Recreation and Parks District. Theproject area is located within the Tahoe National Forest, maintained by the U.S. Forest Service. See Section 3.17 Recreation, for further discussion on recreation facilities adjacent to and near project area.

3.16.2 Discussion

a. Adverse Impact to Public Services – No Impact

The Proposed Project would include improvements to the access road and making repairs to the dam. As such, the Proposed Project would not involve construction of new housing or other land uses that could increase the local population and demand for governmental facilities and services, such as fire protection, police protection, schools, or parks. The proposed construction and small number of short-term construction workers would not

generate a heavy demand on public services, which would be accommodated by the existing local service providers. The presence of project construction workers would not result in a need for new or physically altered police or fire facilities. After construction is completed, there would be no need for additional permanent staff in the project area, and thus no increased demand on public services would occur. Therefore, the Proposed Project would not affect USFS,Nevada County Sheriff's Department, or Placer County Sherriff's Officeresponse times or other performance objectives, local schools, or parks. The Proposed Project would not require eventual construction of new or expansions of existing fire or police protection facilities. **No impacts** would occur.

3.17 Recreation

XVI. RECREATION:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Would the project 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?			X	
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X

3.17.1 Environmental Setting

Portions of the project area are in the Tahoe National Forest, and parts the project area are used for (or access to) a number of recreational activities including camping, hiking, angling, whitewater boating (non-motorized), all-terrain vehicle (ATV) and off-highway vehicle (OHV) use in the summer, and cross-country skiing and snowmobiling in the winter.

Camping in the project area occurs at several locations, including the Woodchuck Campground, a USFS eight-site campground on the Lake Fordyce access road, approximately 3 miles from Cisco Grove. The southern arm of Lake Fordyce has six informal campsites with rock fire rings. USFS maintains a walk-in campground at nearby Sterling Lake, with six campsites, a restroom, and 10 parking spaces (FERC 2014). Furthermore, the Boy Scouts of America (BSA) maintain BSA Camp Robert E. Cole at Sterling Lake on PG&E and USFS property. This camp is used approximately four to five weeks per year. Typically, camp setup occurs in late June or early July, with three groups of campers rotating in and out on a one-week basis (typically Sunday to Saturday) for the

remainder of July. The Cisco Grove Campground and RV Park, located at 48415 Hampshire Rocks Road, is just outside the project area near the entrance to the Proposed Project access road.

Each year, the California Four Wheel Drive Association (Cal4Wheel) sponsors an event called the Sierra Trek. The event is geared toward everything from stock 4x4s on guided historic and slightly challenging tours, to technical tours that require the use of OHVs. The event occurs in early August and typically runs from Thursday to Sunday. Average attendance at the 4 -day annual event has been about 600 people. Attendees camp at Meadow Lake, northeast of Lake Fordyce. Lake Fordyce Road (the Proposed Project access road) is not one of the main off-road routes used by event participants, but it sometimes is used as a "shortcut" to enter the more challenging Fordyce Trail, which parallels and crosses Fordyce Creek west of the Proposed Project access road.

Whitewater boaters use the area below Lake Fordyce Dam as an informal put-in for navigating down Fordyce Creek, using Lake Fordyce Road to access the put-in site. Whitewater boating typically occurs when flows in Fordyce Creek are between 350 and 550 cfs. Operations at Lake Fordyce Dam and annual precipitation in the Lake Fordyce watershed affect the number of days when boatable flows exist in Fordyce Creek between the dam and the informal take-out at Lake Spaulding, resulting in an average of 9 and 20 days, depending on whitewater boat type, when flows are boatable. Boatable days typically occur during the months of May, June, and July, but have also occurred earlier in the spring and later in the summer. There have been some years, such as dry years, when there are no boatable days because flows in Fordyce Creek are too low. Vehicle access to the put-in location during the boatable days in the spring (before late June) can be limited due to snowpack on Lake Fordyce Road. The 10.6-mile reach is classified as a Class V reach in a wilderness setting with high quality scenery (NID and PG&E 2011, FERC 2014).

Angling opportunities are available on Rattlesnake Creek, Lake Sterling, Lake Fordyce, and Fordyce Creek. In the recreational flow study completed by NID and PG&E for Fordyce Creek, surveys anglers indicated that Fordyce Creek received minimal use for angling due to difficult access to the creek (NID and PG&E 2011).

3.17.2 Discussion

a. Recreational Facilities Use – Less-than-Significant Impact

During construction, informal recreational opportunities at Lake Fordyce would be restricted because Lake Fordyce Road would be closed at the north side of Fordyce

Summit, near its intersection with Lake Sterling Road. In the interest of public safety, restrictions on public access also may be made on the entire route, from Cisco Grove to Fordyce Summit, when construction traffic is anticipated to be heavy, particularly during the first construction season. Access to the Cisco Grove Campground and RV Park would not be affected.

OHV use of Lake Fordyce Road from Cisco Grove up to Lake Sterling Road may be altered because of the construction of improvements to the road, which may limit its function to enthusiasts as an OHV route. Thus, some OHV recreationists may elect to use other trails in the project area. Access beyond Fordyce Summit would be limited, and therefore access to the Committee Trail and use of Fordyce Road and the Committee Trail as a "shortcut" to access features of the Fordyce OHV trail would be restricted during much of the three construction seasons. Access road restrictions also would limit the use of the area for whitewater boating and camping.

In addition to the access road restrictions that would inhibit the use of the informal put-in at the base of Lake Fordyce Dam, the water levels in Lake Fordyce would be lowered on a different schedule during construction than as done under typical operating conditions. The drawdown of Lake Fordyce typically starts as early as April or as late as July. To prepare the area for construction, Lake Fordyce would be managed to have minimal storage during winter and early spring. Drawdown releases would increase as early as April, with releases up to 500 cfs, until reaching minimum pool elevation. During the three construction seasons, discharges from Lake Fordyce that could allow for whitewater boating conditions in Fordyce Creek may not occur due to the plans to minimize water storage in Lake Fordyce during the winter, or whitewater boating conditions may occur at times when Lake Fordyce Road is impassable because of snow conditions. This would be a temporary reduction of up to 20 days per year of whitewater boating opportunities at Fordyce Creek that would last for 3 years; however, there are multiple similar whitewater boating opportunities in the region that may be available for use, depending on seasonal flows. These areas includes sections of Canyon Creek, North Fork of the American River, South Fork of the Yuba River, Lavazolla Creek, Pauley Creek, Cherry Creek, and the North Fork of the Feather River. PG&E has met with representatives of the local OHV community (Cal4Wheel and others) and whitewater boating enthusiasts (American Whitewater), and has been in contact with representatives of the BSA Camp Robert E. Cole to discuss the Proposed Project. Although use of Lake Fordyce Road would be limited or may not be possible, the Sierra Trek event still would be held, because Lake Fordyce Road is not a primary road used during the event and the potential road closure would not affect camping at Meadow Lake, which is used by the event attendees. PG&E

has agreed to work with its contractor and representatives of BSA Camp Robert E. Cole, to coordinate the weekly entry and exits of caravans of vehicles to and from the camp in July. PG&E and its contractor would also work with the OHV community to coordinate use of the Committee Trail during the Sierra Trek Event.

PG&E would maintain contact with the recreationist groups, to provide information on closures and potential times when the road may be open (e.g., certain Sundays and holidays if work would not be occurring), or may make other arrangements with the groups to allow limited access. As noted in Chapter 2, Project Description, signs would be posted before the start of construction to inform the public about potential road closures.

Because no construction would occur in winter, no impact on winter recreational activities (e.g., cross-country skiing, snowmobiling) would occur.

Full restoration of access to the dam and reservoir post-construction would not result in long-term changes in recreational types, access, and/or opportunities. The Proposed Project would not permanently affect any officially designated federal, state, local, or PG&E-maintained campgrounds. Tahoe National Forest and other nearby areas provide multiple recreational opportunities, including camping and whitewater boating, and the temporary displacement in the summertime of small numbers of recreationists would not lead to substantial deterioration of other nearby facilities. In addition, larger events such as the Sierra Trek and the summertime activities at BSA Camp Robert E. Cole are likely to continue. The Proposed Project would not increase the use of existing recreational facilities so that substantial physical deterioration of other facilities would occur or be accelerated because of these opportunities being displaced. The impact would be **less than significant**. No mitigation is required.

b. Recreational Facilities Changes – No Impact

The Proposed Project would not involve the construction of new recreational facilities or require construction or expansion of recreational facilities that would generate an adverse physical effect on the environment. **No impact** would occur.

3.18 Transportation

XVII. TRANSPORTATION/TRAFFIC: Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?				X
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?			X	
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X
d) Result in inadequate emergency access?			X	

3.18.1 Environmental Setting

USFS manages 166 miles of roads in Nevada County. Most of these roads are in Tahoe National Forest (NCTC 2018). There are approximately 160 miles of maintained roads within USFS jurisdiction in Placer County (PCTPA 2019). USFS and PG&E entered into an agreement in 2011 to that allows PG&E to conduct road maintenance as needed for continued access to the Drum-Spaulding Hydroelectric Project facilities, of which the project area is a part. Roads maintained by USFS and PG&E would be used during project construction, including Rattlesnake (also known as USFS 85) and Lake Fordyce roads, and possibly Magonigal and Sterling Lake roads (as shown in Figure 2-4). These are unpaved dirt and rock roads. Access to Rattlesnake and Lake Fordyce roads would

be via I-80, Cisco Road, and Hampshire Rocks Road (Placer County), which are paved roads with designated traffic lanes.

The 2015 Caltrans Interregional Transportation Strategic Plan identifies I-80 as a priority interregional highway, which means it is among the most significant highways that serve interregional travel. Annual Average Daily Traffic (AADT) is the total volume of vehicle traffic on a highway or road for a year divided by 365 days. According to Caltrans 2017 traffic volume data, the AADT on I-80 at Cisco Grove during peak hour is 31,400 vehicles (Caltrans 2017).

3.18.2 Discussion

a. Traffic Plan or Policy Conflicts – No Impact

The Nevada County Regional Transportation Plan was prepared by the Nevada County Transportation Commission to document the transportation policy, actions, and funding strategies for short-term and long-term access and mobility needs of Nevada County. A review of the plan's goals, objectives, and policies indicates that project construction and operations would not conflict with programs addressing transit roadway, bicycle, or pedestrian facilities (NCTC 2018). Many of the policies in the plan relate to creating, maintaining or enhancing transportation systems in the County, and maintaining and improving safety. The Proposed Project would not affect these policies. Policies in the plan include:

- 2.1 Maintain existing and proposed facilities for pedestrians, bicyclists, and motorists, and regularly clear these facilities of debris;
- 2.9 Encourage jurisdictions to review and assess the impact of new development proposals on transit system; and
- 3.1 Establish and protect "scenic highways" in accordance with local general plans.

The Placer County Regional Transportation Plan was prepared by the Placer County Transportation Planning Agency (PCTPA) to document the policy direction, actions, and funding recommendations for short-term and long-term needs of Placer County. A review of the plan's goals, objectives, and policies indicates that project construction and operations would not conflict with programs addressing transit roadway, bicycle, or pedestrian facilities (PCTPA 2019). As discussed, approximately 1,400 feet of the southern portion of the access road (described in Section 2.1.1) is within Placer County

and no construction would occur on this portion of the access road. Therefore, the Proposed Project would not affect policies or goals contained within the Placer County Regional Transportation Plan.

The Proposed Project would not affect existing transportation facilities for pedestrians, bicyclists, or motorists, and it would not propose development that would affect the transit system. As described in Section 3.10, Hazards and Hazardous Materials, the project area is not within 2 miles of any public or private airports or within an airport land use plan. No project-related safety conflicts or airport hazards would be created. Furthermore, the Proposed Project would have no effects on any designated scenic highways.

Regionally, access to the project area during construction would be via I-80. The number of vehicles on the highway would temporarily increase during the three project construction seasons but would vary over the season. Initial equipment mobilization for road improvement during season one would require approximately 50 haul trips over 5 days to bring in heavy equipment. As work on the access road progresses, approximately 20 material delivery trips per day would be needed to deliver roadway materials. After work on the access road is completed, mobilization of heavy equipment for the seepage repair would involve approximately 10 trips per day over 2 weeks. Subsequent construction seasons would involve approximately 10 trips per day during the first 2 weeks. It would take approximately the same number of trips to demobilize the equipment at the end of each season. After the mobilization periods, an average of 100 material delivery trips would occur per week (about 15 to 20 per day), to transport aggregate fill pad material, concrete deliveries during construction of the plinth, and other construction materials. The majority of fill pad material would be brought to the work area during the first construction season and would be stored to be used during the second and third construction seasons. Trucking would occur 5 to 7 days per week.

The addition of 10 to 20 trucks per day would be a fractional increase in traffic volume and would be unlikely to cause substantial effects on I-80, based on existing freeway traffic levels and the location of the project area.

Vehicles on roadways during construction would not conflict with policies in the adopted transportation plan related to public safety, because construction vehicles are allowed on major roadways (e.g., policy G4-P1 of the Nevada County Regional Transportation Plan; NCTC 2018). **No impact** would occur.

b. Conflict or Be Inconsistent with State CEQA Guidelines Section 15064.3 – Less-than-Significant Impact

Section 15064.3(b) of the CEQA Guidelines includes provisions for evaluation a Proposed Project's transportation impacts by using the VMT metric. According to the guidelines, a lead agency may elect to be governed by the provisions of section 15064.3 immediately, or beginning July 1, 2020, when the provisions will apply statewide. Section 15064.3, subdivision (b)(3) of the CEQA Guidelines allows a qualitative analysis of potential impacts related to VMT.

Because the Proposed Project would involve only construction, it would not include new land uses or transportation facilities that would result in additional VMT. The work area is in a somewhat isolated context, but to the extent that it would occur in Nevada County and Placer County, the VMT associated with construction worker and haul truck traffic would be on a similar order of magnitude to that for other construction projects. As mentioned above, construction workers also would be hired locally, and therefore would be likely to come from the same pool of construction labor as that used on other projects in Nevada County, Placer County, and surrounding areas. Similarly, haul truck trips would be likely to involve equipment and materials primarily leased or procured locally, similar to other projects in Nevada County and Placer County and surrounding areas. Any VMT attributable to project construction activities would be temporary and subsequently would be re-allocated to construction activities of other projects. After construction, operation of the dam and reservoir would continue to be met by existing PG&E employees who currently commute to and from the project area for maintenance activities.

Based on these considerations, the Proposed Project would be unlikely to result in a substantial increase in VMT. Therefore, the impact would be **less than significant**. No mitigation is required.

c. Increase in Hazards – No Impact

The Proposed Project would not increase hazards because of geometric design features. No new roads are being designed, and the number of road improvements on Lake Fordyce Road would result in safer conditions for vehicle travel along it. Minor upgrades would involve smoothing the road, using aggregate fill. Other improvements would include grading and widening isolated locations of the road for turnouts. More substantial improvements would include widening the existing narrow portions by reducing rock outcrops along the side of the roadway that would prohibit the safe movement of

equipment on the road, improving turn radii at several locations, and realigning the curve at the stacked rock wall. Turnouts would be constructed at various locations, to create improved and safe movement of two-way traffic along the access route. Turnouts would be up to 25 feet in width, to allow safe passing of traffic, equipment, and trailers.

In addition, Lake Fordyce Road would be closed to public access between the dam tender's house and the dam site for the full duration of project construction (see Appendix A). Public access along the access road (including Rattlesnake Road, Sterling Lake Road, and Magonigal Road) would be restricted during times of heavy construction traffic. Heavy use of the roads could include times when improvements and vegetation removal occur and times when large amounts of construction materials (e.g., aggregate or concrete) are being delivered, and when construction equipment is being mobilized or demobilized.

No impact would occur.

d. Emergency Access Effects – Less-than-Significant Impact

Lake Fordyce Road may be closed temporarily to the public during certain phases of project construction. Physical impacts to roadways would be limited to roads used to access the dam and reservoir during improvement activities. However, access of these roads would be maintained for emergency response vehicles. Furthermore, road improvements, such as providing a smoother road surface by filling with aggregate base and adding turnouts, would improve access for public safety and emergency vehicles during the construction period. Increased construction vehicles on I-80 would not increase overall traffic volumes and congestion substantially, and therefore would not interfere substantially with emergency vehicle response. After construction is completed, project-related construction vehicle traffic would cease and operations at the dam would return to existing conditions. The impact would be **less than significant**. No mitigation is required.

3.19 Tribal Cultural Resources

XVIII. TRIBAL CULTURAL RESOURCES:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a) 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		X		

XVIII. TRIBAL CULTURAL RESOURCES:	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less-than-Significant Impact**	**No Impact**
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 Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.		X		

The information presented in this section is based on the Cultural Resources Inventory/National Register of Historic Places (NRHP) and California Register of Historic Resources (CRHR) evaluations, prepared for PG&E by Browning Cultural Resources (BCR 2019).

3.19.1 Environmental Setting

Section 4.6, Cultural Resources, presents a more detailed description of the environmental and archaeological settings for the Proposed Project related to cultural and tribal resources. Pertinent details related to tribal cultural resources are highlighted in this section. The study area considered in this section includes all areas of direct and indirect impacts associated with the Proposed Project and encompasses all project construction sites, the helicopter landing zone, and all access and staging areas. The study area encompasses approximately 121 acres.

Ethnography

The study area falls within lands claimed ethnographically by the Washoe and Nisenan peoples of California and Nevada. The high ranges of the Sierra were useable only during

the summer months, and ethnographic accounts reflect this (BCR 2019). The high country was used by both Nisenan and Washoe (BCR 2019). Washoe sources state that trading parties and those gathering and collecting regularly crossed the Sierra crest and ranged westward, possibly as far as Auburn (BCR 2019). The Nisenan, also referred to as the Southern Maidu, claimed areas west of the crest (BCR 2019). Nisenan society was organized into small, politically independent tribes or tribelets, each consisting of one or more villages and a number of smaller hamlets with populations ranging from about 20 to 100 people (BCR 2019). Nisenan economy depended extensively on acorns, which were gathered in the fall and stored for later use. Lands above about 3,500 feet mean sea level were considered to be open land, but rarely were entered by any Nisenan except those from mountain communities bordering the high country. Much of the current study area falls within this range of "open land" and would have been used jointly by all the people dwelling along its margins.

Neighboring the Nisenan to the east were the Washoe. Their core territory centered on montane valleys, including Sierra Valley northeast of the study area, the Lake Tahoe Basin southeast of the study area, and Antelope Valley south of Lake Tahoe (BCR 2019). The Washoe reportedly descended from the northeastern end of the project area to collect acorns along the Bear and Yuba rivers. They also may have wintered on the western slope occasionally, either with Nisenan acquaintances or in small camps (BCR 2019). The majority of the Washoe tended to remain near their home ranges, wintering together and dispersing into smaller mobile groups in spring and summer.

Sacred Lands File Search

In September 2018, PG&E requested a Sacred Lands File Search and CEQA Tribal Consultation List from the NAHC. On September 20, 2018, the NAHC responded with the findings of the Sacred Lands File Search and provided a list of contacts for the study area.

On February 28, 2019, a PG&E senior cultural resources specialist, Leslie Sakowicz, mailed letters to all tribal contacts on the NAHC list. On March 19, 2019, the United Auburn Indian Community of the Auburn Rancheria (UAIC) sent a letter response to PG&E, requesting copies of reports and commencement of consultation. This was followed on May 2, 2019 by an e-mail from UAIC, asking again for reports; inquiring about a prehistoric site recorded within the project footprint; and requesting information on how unanticipated discoveries would be treated. PG&E responded that provisions provided

in 36 C.F.R. § 800.13 would be followed, and that after draft documents are completed, they would be provided to the tribe. PG&E's consultation with UAIC is ongoing.

On May 3, 2019, Darrel Cruz, Tribal Historic Preservation Officer for the Washoe Tribe of California and Nevada, contacted PG&E via telephone and stated that he had no concerns specific to the Proposed Project but wanted to be apprised of any unanticipated discoveries associated with the Proposed Project. Similarly, on May 9, 2019, Pamela Cubbler, treasurer for the Colfax-Todd Valley Consolidated Tribe, sent an e-mail to PG&E, stating that she did not have any knowledge of resources in the area but asked to be contacted if any unanticipated discoveries occur.

Assembly Bill 52 Native American Consultation

Assembly Bill 52 (AB 52), approved in September 2014 and effective July 1, 2015, established a formal consultation process with California Native American tribes to identify potential significant impacts on tribal cultural resources, as defined by CEQA (Pub. Resources Code, § 21074). AB 52 applies to projects that file a Notice of Preparation or Notice of Negative Declaration/Mitigated Negative Declaration on or after July 1, 2015. CEQA lead agencies for such projects must initiate the consultation process by providing notice to tribes traditionally and culturally affiliated with the geographic area of a project that have submitted written requests to be notified (Pub. Resources Code, § 21080.3.1, subd. (b)). The tribe must respond to the lead agency within 30 days of receipt of notification if it wishes to engage in consultation on the proposed project (*Ibid.*). The lead agency must begin the consultation process within 30 days of receiving a tribe's request for consultation (*Id.* at subd. (e)).

Pursuant to AB 52, the State Water Board (the CEQA lead agency) initiated the consultation process by notifying the United Auburn Indian Community of the opportunity for consultation regarding tribal cultural resources related to the Proposed Project on November 1, 2019 by sending a letter to Chairman Gene Whitehouse. The State Water Board did not receive a request for consultation or any other response. On September 14, 2020, the State Water Board sent a follow-up email regarding its AB 52 consultation notification to the United Auburn Indian Community. No response has been received.

Records Search

A records search of the project area, including previously conducted study reports, site records, and GIS data, and a pedestrian survey were conducted by PG&E at the NCIC and Tahoe National Forest. A summary of the background research is presented in

Section 4.6, Cultural Resources. No tribal cultural resources or prehistoric archaeological resources were identified in the project area during the records search and pedestrian survey. Three prehistoric sites were recorded within 0.25 mile of the project area. Petroglyphs, bedrock milling features, and a lithic scatter were previously recorded within 0.25 mile of the project area (BCR 2019).

3.19.2 Discussion

ai, aii. Tribal Cultural Resources Adverse Change – Less than Significant with Mitigation Incorporated

Based on background research, a pedestrian survey, and Native American consultation, no tribal cultural resources have been identified in the project area. However, previously unknown buried resources potentially could be encountered during ground-disturbing work which could be a potentially significant impact. In the unlikely event that a tribal cultural resource is discovered, appropriate measures would be implemented to minimize potential impacts. Implementation of Mitigation Measures CUL-2 and CUL-3 would reduce impacts on tribal cultural resources. The impact would be **less than significant with mitigation incorporated**.

3.20 Utilities and Service Systems

XIX. UTILITIES AND SERVICE SYSTEMS: Would the project:	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less-than-Significant Impact**	**No Impact**
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?				X
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?			X	
c) Result in a determination by the wastewater treatment provider, which 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?				X
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?			X	
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?			X	

3.20.1 Environmental Setting

Water

The existing dam and reservoir facilities are not served by public water. Lake Fordyce Dam and reservoir are part of PG&E's Drum-Spaulding Hydroelectric Project. The reservoir provides cyclic water storage and regulates flow for uses downstream, including power production, irrigation, and domestic consumption. Water released from Lake Fordyce flows into Fordyce Creek, which then drains to PG&E's Lake Spaulding.

Wastewater

The existing dam and reservoir facilities are not served by public wastewater services.

Stormwater Drainage

The existing dam and reservoir facilities are not served by a public stormwater system. Stormwater in the project area either is absorbed by pervious surfaces or flows to an adjacent area including the reservoir, Fordyce Creek, or Rattlesnake Creek along the access road.

Solid Waste

Proposed Project related solid waste disposal would occur within Nevada County. The Solid Waste Division of the Nevada County Public Works Department manages garbage disposal, recycling services, and transportation station operations in Nevada County. Solid waste disposal in eastern Nevada County is provided by Tahoe Truckee Sierra Disposal (Nevada County 2019). In 2018, unincorporated Nevada County disposed 39,954.77 tons of solid waste (CalRecycle 2019). The majority of solid waste in eastern Nevada County is transferred to the Eastern Regional Landfill Material Recovery Facility and Transfer Station in Placer County. The Eastern Regional Landfill Material Recovery Facility and Transfer Station has a maximum permitted capacity of 600 tons per day and a maximum permitted throughput of 445 tons per day (CalRecycle 2019).

The facilities at the dam and reservoir do not generate garbage or other waste requiring regular waste disposal services.

Electricity and Natural Gas

The dam and reservoir are not served by an electrical delivery service or natural gas provider.

3.20.2 Discussion

a. Water, Wastewater Treatment Facility, Stormwater Drainage, Electric Power, Natural Gas and Telecommunications Expansion – No Impact

There is no water conveyance system associated directly with Lake Fordyce Dam. Water released from Lake Fordyce flows into Fordyce Creek, which then drains to PG&E's Lake Spaulding. Furthermore, no sanitary sewer system serves the project area, and no permanent restrooms or other uses would be installed by the Proposed Project that could affect demand for wastewater services or facilities. In addition, the project area does not have a storm drain system that is connected to a municipal stormwater runoff system. No activities would occur during project construction that would necessitate construction of stormwater conveyances that would discharge to a municipal stormwater system.

Electric power and natural gas services are not provided at the dam or reservoir. Power during construction would be provided by portable generators. Therefore, the Proposed Project would not require or result in new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunication facilities. **No impact** would occur.

b. Water Supply Availability – Less-Than-Significant Impact

As described in item a, the Proposed Project would not require or result in relocation or construction of new or expanded water facilities. PG&E has water contracts and agreements with two local entities: Nevada Irrigation District (NID) and Placer County Water Agency (PCWA). The water deliveries can come from any of PG&E's storage reservoirs and or runoff during snow melt. In a normal water year, PG&E currently has a contractual obligation to provide NID up to 54,361 acre-feet (AF) of water with reductions in dry years (NID 2016). In the last ten years, NID has purchased and average of less than 9,000 acre-feet per year from PG&E and nothing in the most recent years (NID 2016; Table 3.20-1).

Table 3.20-1 Water Deliveries from Fordyce Reservoir 2010-2019

Water Year	Total Annual NID Water Deliveries (Acre-Feet)	Total Annual PCWA Water Deliveries (Acre-Feet)
2010	8,014	52,456
2011	8,740	65,100
2012	4,608	71,916
2013	4,090	40,716
2014	13,792	35,741
2015	16,092	66,288
2016	487	61,535
2017	0	64,815
2018	0	64,815
2019	0	63,542

Source: NID 2016

The agreement between PG&E and PCWA allows for the delivery of up to 125,400 AF per year but does limit availability of water under certain conditions and maintenance needs (PCWA 2016). Under normal conditions, water stored in Fordyce is not available for use from November-April, as the outlet draining the reservoir is closed over the winter, so no impact on water supply is expected from November-April. PG&E would expect to begin the May-October period each year with approximately 72,000 AF of water stored in Lake Spaulding, and a further 10,000 AF in NID's Rollins Reservoir downstream, for a total of 82,000 AF available to meet PCWA May-October demand even if no additional water is provided from Fordyce or natural inflows. This quantity of water is expected to be available in May in even dry years, in wet years the full amount would be available further into the season as natural inflows and a longer drawdown period for Fordyce would augment storage. A review of PCWA water use from WY 2000-2019 for the May-October period shows that PCWA's water use has never exceeded 82,000 AF, and in dry years is considerably lower (e.g., 35,741 AF in WY 2014) (Table 3.20-1).

PG&E currently meets weekly with NID and PCWA to coordinate water use. This will continue through the Proposed Projects' three constructions seasons. The primary

function of these meetings is to confirm, schedule, and implement coordinated operations of the Projects, with the goal of achieving optimal beneficial use of each Party's available water as it is transported through their systems. During wet years, meeting water demands is not a concern. During dry years, options that PG&E has to meeting water requirements during project construction include managing the system to meet water supply needs only, slowing drawdown of Fordyce to allow for more storage of water in Lake Spaulding, and working with NID to negotiate water storage transfers with NID's Bowman and or Jackson Meadows reservoirs.

During construction, water would be needed for activities such as dust control and wetting of stockpiled materials. However, this water would be obtained from Lake Fordyce and Sterling Lake, and the quantity would be negligible compared with the available water quantities. After project construction, the reservoir would return to normal operational levels. Operation of the dam and reservoir after construction would remain the same as current operations and would not result in any permanent increase in water demand or decrease in supply. The impact would be **Less Than Significant**.

c. Wastewater Treatment Capacity – No Impact

As described in item a, no sanitary sewer system serves the project area. During construction, portable restrooms would be provided for construction workers. Wastewater would be disposed at an appropriately licensed local facility with adequate capacity to accommodate project needs. Operation of the dam and reservoir after construction would remain the same as current operations and would not result in generation of wastewater. **No impact** would occur.

d. Landfill Capacity – Less-than-Significant Impact; and

e. Solid Waste Statutes and Regulations – Less-than-Significant Impact

Waste generated from demolition and excavation work could include rebar, metal, concrete, shotcrete, and pipe from demolition of the original dam outlet gate and excavation of the debris-laden fill. The 2019 CalGreen Code (Cal. Code Regs., tit. 24, pt. 11) requires all construction contractors to reduce construction waste and demolition debris by 65 percent. Code requirements include preparing a construction waste management plan (where a local jurisdiction does not have a waste management ordinance that is more stringent) identifying the materials to be diverted from disposal by efficient use, recycling, or re-use by the Proposed Project, or salvaged for future use or sale; determining whether materials should be sorted on site or mixed; and identifying

diversion facilities where the materials collected should be taken. In addition, the 2019 CalGreen Code (Cal. Code Regs., tit. 14, pt. 11) requires that 100 percent of trees, stumps, rocks, and associated vegetation and soils resulting primarily from land clearing shall be re-used or recycled.

Much of the sediment that would be excavated at the toe of the dam to complete the seepage repair would remain on site and would be spread within the dewatered work area bottom, reducing the amount of soil waste to be hauled from the site and disposed. Solid waste generated in the form of construction debris that could not be re-used would be transported and disposed in accordance with all applicable federal and state laws at a nearby, appropriately licensed landfill. Although construction-generated solid waste likely would be minimal, a solid waste facility has not been identified at this time; however, solid waste generated by the Proposed Project would be unlikely to exceed the maximum daily disposal limits of any receiving landfill.

In addition, the Proposed Project would comply with all statues and regulations related to solid waste. Compliance with the 209 CalGreen Code (Cal. Code Regs., tit. 14, pt. 11) and AB 1826 would ensure that sufficient landfill capacity would be available to accommodate solid waste disposal needs for future development. Therefore, the two impacts would be **less than significant**. No mitigation is required.

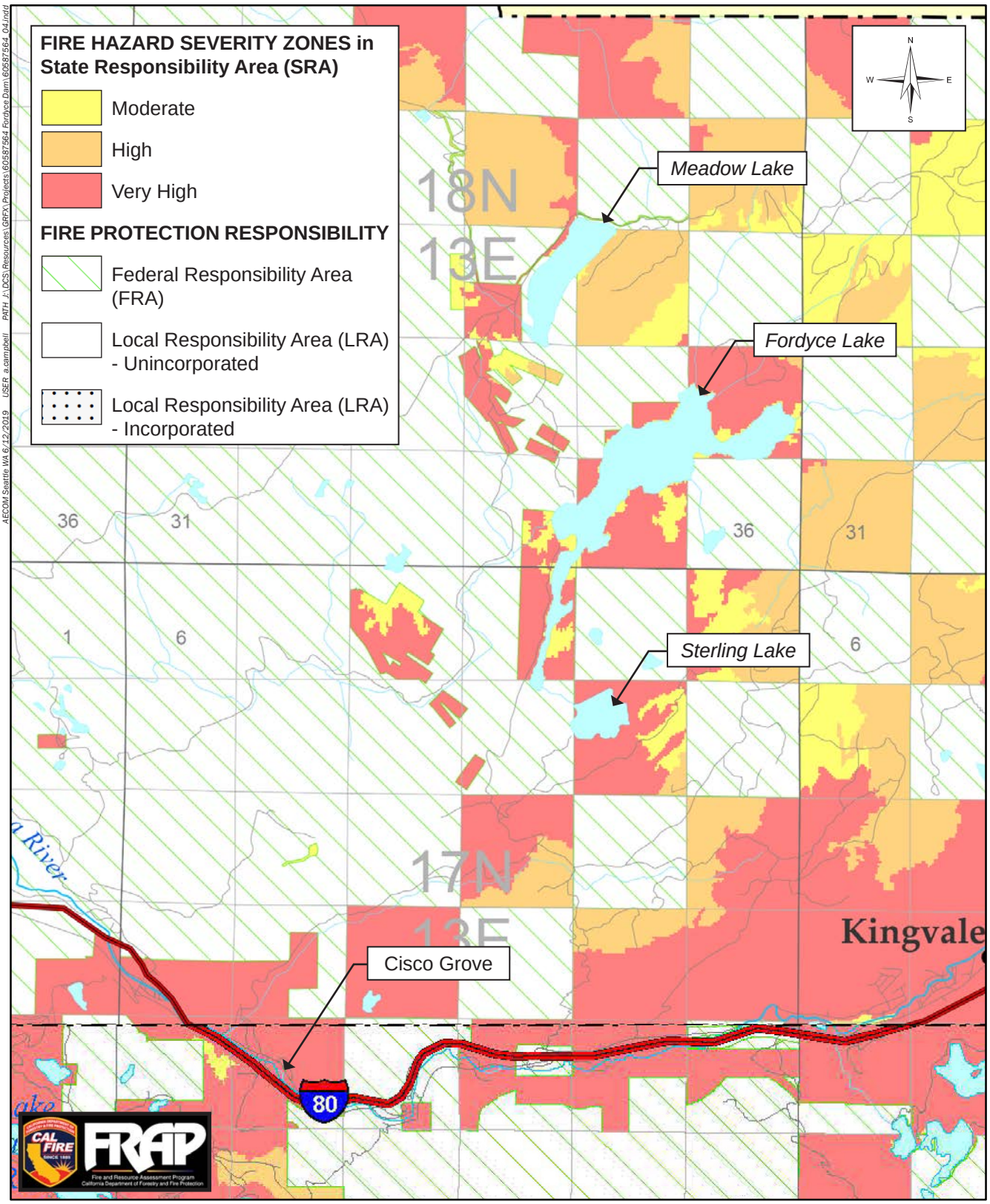
3.21 Wildfire

XX. WILDFIRE: **If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:**	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less-than-Significant Impact**	**No Impact**
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?			X	
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?		X		
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?			X	
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?				X

3.21.1 Environmental Setting

The project area is considered particularly susceptible to wildfires because of climate patterns as well as weather conditions, vegetation, and slope steepness. The project area is surrounded by undeveloped areas containing forestlands, dirt roads, creeks and lakes/reservoirs. There are both public and private campgrounds on the west shore of Lake Sterling. The USFS has the lake Sterling Campground (6 walk-in campsites) and there are structures associated with BSA Camp Robert E. Cole on the west shore of Sterling Lake. The USFS Woodchuck Campground is on the access road about 3 miles north of Cisco Grove. There are also structures associated with an abandoned private group camp, about a one-half mile north of Woodchuck Campground, and a PG&E dam tender's house just under one-half mile south of Lake Fordyce Dam. No other structures are in the general proximity of the dam.

Portions of the project area are in a State Responsibility Area (SRA). The California Department of Forestry and Fire Protection has the legal responsibility to provide fire protection on all SRA lands, which are defined based on land ownership, population density, and land use. Some of these SRA areas are classified as being in a very high fire hazard severity zone, and several small patches of the project area are classified as being in a moderate fire hazard severity zone (CAL FIRE 2007) (Figure 3.21-1). The parts of the project area classified as being in a moderate fire hazard severity zone are without vegetation cover. Other parts of the project area are in the Federal Responsibility Area (FRA). FRAs are areas where federal agencies are responsible for wildland fire protection. Because the terrain of the FRAs in the project area is congruous with the terrain of the SRAs, the fire hazard levels of the FRAs are assumed to be similar to those of the SRAs. USFS provides fire protection services to the project area, including privately-owned lands in Tahoe National Forest pursuant to a cooperative agreement with the state (Nevada County 2012). Truckee Fire Department provides fire protection services to the project area in Placer County (Placer County 2020). No Proposed Project activities would occur in Placer County except for vehicle transport to Hampshire Rocks Road and the initial 1,400 feet of the access road, staging of some equipment and materials at the privately owned equipment yard on Hampshire Rocks Road and helicopter pickup of material or equipment for the yard as described in Section 2.2.7.



AECOM Seattle WA 6/12/2019 USER: a.campbell PATH: J:\DCS\Resources\GRFX\Projects\60587564 Fordyce Dam\60587564_04.indd

Source: https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/

AECOM

Lake Fordyce Dam Seepage Mitigation Project

FIGURE 3.21-1

Fire Hazard Severity Zones in the Fordyce Project Area

3.21.2 Discussion

a. Substantially impair an adopted emergency response plan or emergency evacuation plan – Less than Significant Impact

As discussed in Section 3.10, Hazards and Hazardous Materials, no adopted emergency response plan or emergency evacuation plan exists for the project area, because of the isolated and undeveloped nature of the site. The project area could be subject to the Nevada County EOP if Nevada County is acting as the OA during an emergency event (Nevada County 2011a). Additionally, because a portion of the access road (approximately 1,400 feet) is in Placer County, the project area could be subject to the Placer County EOP if Placer County is acting as the OA during an emergency event (Placer County 2010). The California Emergency Services Act defines the OA (for each county in California) as an intermediate level of state emergency management organization, consisting of the County and all political subdivisions within the county area. Furthermore, Tahoe National Forest participates in the Local Hazard Mitigation Plan for Nevada County and Placer County, which identifies potential hazards and mitigation actions and strategies to reduce or eliminate long-term risk to people and property from natural and human-caused hazards, such as wildfires (Nevada County 2011b; Placer County 2016).

PG&E has an agreement with USFS that allows PG&E to conduct road maintenance, as needed, to provide access to the Drum-Spaulding Hydroelectric Project facilities, of which the project area is a part. USFS and PG&E are responsible for maintaining forest roads leading to the project area to reduce hazards identified in the Local Hazard Mitigation Plan. The Proposed Project would be consistent with the Nevada County EOP, Placer County EOP, and Local Hazard Mitigation Plan. There would be approximately 10 to 20 construction vehicles on I-80 per day, which is a small percentage of the approximately 31,400 vehicles per day on an annual daily average. None of the evacuation routes (including I-80, State Route 20, and State Route 49) would be impeded or disrupted by Proposed Project activities. In addition, strategies in the Local Hazard Mitigation Plan would be used during project construction to minimize any potential safety hazards, such as wildfires and landslides. Therefore, the impact would be **less than significant**.

b. Exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire – Less than Significant with Mitigation Incorporated

As discussed above, portions of the project area are in a very high fire hazard severity zone, and several small patches are identified as having moderate fire hazard severity (Figure 3.21-1). The work area also contains areas of steep slopes and high vegetation. The Proposed Project could expose the public to pollutant concentrations from a wildfire or the spread of a wildfire if activities during construction resulted in a wildfire which would be a potentially significant impact. Heat or sparks from construction equipment or vehicles would have the potential to ignite adjacent vegetation and start fire, especially during the fire season. The risk of potential ignitions resulting from construction activities involving the dam would be considered low, because the majority of the work area is free from vegetation. However, the greatest fire risks would be where improvements to the access road would occur, because of the steep slopes and vegetation along the roads.

To minimize and avoid the risk of a wildfire, Mitigation Measure FIRE-1 would be implemented.

Mitigation Measure FIRE-1: Wildland Fire Prevention.

PG&E will require its contractor to implement PG&E's *Utility Standard TD-1464S – Preventing and Mitigating Fires while Performing PG&E Work* (PG&E 2019c). This standard includes the following requirements:

1. The construction contractor must follow locally changing meteorological conditions as well as be aware of the possibility of increased fire danger during the time work is in progress.

2. No vehicles will drive overland (e.g., forests, fields) except when performing required work or during an emergency. When driving off roadways, driver must be aware of potential ignitions that could occur.

3. A shovel, fire extinguisher and one 5-gallon backpack pump or larger capacity water will be available inside construction vehicles and for heavy machinery or equipment (e.g., tractors, excavators, bulldozers) and.

4. Before starting work on or near any vegetation the following actions must be performed:

a. Review and understand the daily Utility Fire Potential Index

b. Review the Wildfire Mitigation Matrix (Attachment 1) and assess the required mitigations based on the Utility FPI provided by PG&E's Meteorology Team.

c. Participate in a tailboard for any of the work activities listed in the Wildfire Mitigation

5. While performing stationary ground level jobs or activities from which a spark, fire, or flame may originate all flammable material must be removed around the operation for 10 feet.

6. If fire ignites on jobsite, personnel must call 9-1-1 to report ignition and take safe, reasonable suppression actions consistent with the person's experience and training.

Implementation of Mitigation Measure FIRE-1 would help prevent wildland fire by minimizing the risk of sparks during construction. The impact would be reduced to **less than significant with mitigation incorporated**.

c. Require the installation or maintenance of associated infrastructure that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment – Less-than-Significant with Mitigation Incorporated

The seepage repair components that would be constructed at Lake Fordyce Dam would not exacerbate fire risk in the project area. These features would all be located within Lake Fordyce and would be submerged after construction. The work area is largely devoid of vegetation. The Proposed Project would also include improvements to and maintenance of the access road to the dam and reservoir in a high fire hazard severity zone. This improved access route would be used regularly by construction workers, and an increased risk of accidental fire would be possible from construction activities or use of the roadway. All project construction would follow state and federal fire regulations. In addition, fire risks would be minimized with the implementation of Mitigation Measure FIRE-1. The impact would be **less than significant with mitigation incorporated**.

d. Expose people or structures to significant risks – No Impact

Catastrophic wildfire can lead to secondary impacts or losses, such as flood-related landslides during the rainy season. No recent fires have occurred in the project vicinity that could result in post-fire slope instability or drainage changes. Therefore, the Proposed Project would not expose the public to a risk of post-fire slope instability or drainage changes. **No impact** would occur.

3.22 Mandatory Findings of Significance

XXI. 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 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 a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		X		
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)?		X		
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?		X		

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?

Based on background research, site visits, and the analysis presented herein, the Proposed Project would not have the potential to 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; or reduce the number or restrict the range of a rare or endangered plant or animal. As discussed in Section 3.5, Biological Resources, with implementation of Mitigation Measures BIO-1, BIO-2, BIO-3, BIO-4, BIO-5 and BIO-6, the impact would be **less than significant with mitigation incorporated**.

As concluded in Section 3.6, Cultural Resources, and Section 3.19, Tribal Cultural Resources, the Proposed Project would implement Mitigation Measures CUL-1, CUL-2, CUL-3, and CUL-4 to lessen any potential impacts on these resource areas. With implementation of these mitigation measures, the impact on historical and tribal cultural resources would be **less than significant with mitigation incorporated**.

b) Does the Project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of past, present and probable future projects)?

"Cumulative impacts" refers to two or more individual impacts that, when considered together, are considerable, or that compound or increase other environmental impacts (Cal. Code Regs., tit. 14, § 15355). Lists of current and potential projects in the region from PG&E, Nevada County, Placer County, and Caltrans were reviewed. No past, present, or reasonably foreseeable future projects in the project area were identified that, when taken together with the Proposed Project, would result in significantly cumulative impacts to any environmental factor. Given the short duration of the Proposed Project and its impacts and mitigation measures that would be implemented, as well as the fact that the Proposed Project would not involve the construction of any new permanent structures resulting in loss of habitats, the potential for a significant cumulative impact

resulting from the Proposed Project in combination with other planned or reasonably foreseeable projects is low.

Cumulative impacts related to greenhouse gas emissions and criteria air pollutants are based on the project-level analysis provided previously in this 3.9, as impacts in these areas are cumulative in nature. Emissions from Proposed Project activities would not be restricted to the project area. Most individual projects do not generate enough GHG emissions to influence global climate change and given the nature of environmental consequences from GHGs and global climate change, CEQA requires that lead agencies evaluate the cumulative impacts of GHGs, even relatively small additions, on a global basis. Therefore, the analysis of GHG emissions is by nature a cumulative analysis focused on whether an individual project's contribution to global climate change is cumulatively considerable. Similarly, the analysis of cumulative air quality impacts is considered to be the entire air basin because emissions can travel substantial distances and are not confined by jurisdictional boundaries; rather, they are influenced by large scale climatic and topographical features. Although some air quality emissions can be localized, such as odor, the overall consideration of cumulative air quality is typically more regional. By its very nature, air pollution is largely a cumulative impact.

As discussed in Section 3.9, Greenhouse Gas Emissions, the Proposed Project's unmitigated GHG emissions would be less than significant. Because the Proposed Project's GHG emissions are not considerable on an individual basis, neither are they considerable on a cumulative basis. The Proposed Project's contributions to cumulative impacts on GHG emissions would be **less than significant**.

Air Quality is discussed in Section 3.4 of this document. Both Nevada County and Placer County are currently in nonattainment for ozone and PM_{10} and as attainment or unclassified areas for all other pollutants. The main sources of emissions of ozone precursors (ROG and NO_X) are emissions transported from other air basins. Maximum daily emissions of these ozone precursors and PM_{10} due to Proposed Project construction activities are listed in Table 3.4-2. Construction would occur during an approximately 12-week window for three consecutive years. As explained in section 3.4.2, with implementation of Mitigation Measures AQ-1 and AQ-2, the Proposed Project's construction-related emissions would not exceed the thresholds of significance and would be less than significant with mitigation. These thresholds are designed to identify those projects that would result in significant levels of air pollution, and to assist the region in attaining the applicable CAAQS and NAAQS. As such, the Proposed Project's

contributions to cumulative impacts on criteria pollutants would be **less than significant with mitigation incorporated**.

Because no projects were identified in the region that would overlap geographically with the Proposed Project or within similar habitats, significant cumulative impacts on biological resources are unlikely. The implementation of Mitigation Measures BIO-1 through BIO-6 would reduce the Proposed Project's impacts on biological resources to less than significant and would further mitigate the Proposed Project's contribution to any cumulative impacts on these resources. Therefore, the Proposed Project's incremental effects on biological resources are not cumulatively considerable and its contribution to cumulative impacts on biological resources would be **less than significant with mitigation incorporated**.

The Proposed Project's impacts to hydrology and water quality are short-term in nature and geographically limited. There are no past, present, or reasonably foreseeable future projects that would impact the same water bodies as the Proposed Project. The implementation of management actions to control water quality and of Mitigation Measure HYD-1 would reduce the Proposed Project's impacts on hydrology and water quality to a less-than-significant level. Therefore, the Proposed Project's incremental effects on hydrology and water quality are not cumulatively considerable and its contribution to cumulative impacts on hydrology and water quality would be **less than significant with mitigation incorporated**.

c) Does the Project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

The Proposed Projects could cause substantial adverse effects on human beings by potentially exposing people to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. However, Mitigation Measure FIRE-1 would be implemented. As such, with mitigation in place, project impacts on human beings would be **less than significant with mitigation incorporated**.

This page intentionally left blank.

4 REFERENCES

Aesthetics

Nevada County. 1995. *Nevada County General Plan*. Available: https://www.mynevadacounty.com/DocumentCenter/View/12590/Chapter-18-Aesthetics-1995-PDF. Accessed November 25, 2019.

Nevada County Transportation Commission. 2018. *Nevada County Regional Transportation Plan 2015–2035*. Available: http://www.nctc.ca.gov/documents/RTP/Final%20Nevada%20Co%20RTP%201_17_18.pdf. Accessed November 20, 2019.

Caltrans. 2020. Scenic Highways. Available: https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways. Accessed September 14, 2020.

Agricultural and Forestry Resources

California Department of Conservation (DOC). 2019. *California Important Farmland Finder Map*. Available: https://maps.conservation.ca.gov/DLRP/CIFF/. Accessed October 2019.

Nevada County. 1995. *Nevada County General Plan*. Chapter 15, Forests. Available: https://www.mynevadacounty.com/DocumentCenter/View/12587/Chapter-15-Forest-1995-PDF. Accessed November 2019.

———. 2016. *Parcels Affected by Williamson Act*. Available: https://www.mynevadacounty.com/DocumentCenter/View/20274/2016-Parcels-Affected-By-Williamson-Act-PDF Accessed October 2019.

———. 2019. *Nevada County Code*. Available: https://qcode.us/codes/nevadacounty/?view=desktop&topic=3-ii-4-4_3-I__14. Accessed November 2019.

Placer County. 2020. *Land Information Search.* Available: http://maps.placer.ca.gov/Html5viewer/Index.html?configBase=http://arcgis/Geocortex/Essentials/REST/sites/LIS_Public/viewers/LIS_Base-Public/virtualdirectory/Resources/Config/Default. Accessed September 2020.

Air Quality

California Air Resources Board (ARB). 2018a. *Maps of State and Federal Area Designations*. Available: https://ww2.arb.ca.gov/resources/documents/maps-state-and-federal-area-designations. Accessed February 2020.

———. 2018b. *CARB Review of the Ozone Attainment Plan for Western Nevada County*. Available: https://ww3.arb.ca.gov/planning/sip/planarea/wnc/carb_staff_report.pdf. Accessed February 2020.

Northern Sierra Air Quality Management District (NSAQMD). 2009. *Guidelines for Assessing and Mitigating Air Quality Impacts of Land Use Projects*. Available: https://www.mynevadacounty.com/DocumentCenter/View/16960/NSAQMD-Attachment-Land-Use-Guidelines?bidId=. Accessed February 2020.

California Office of Environmental Health Hazard Assessment (OEHHA). 2015. *Hot Spots Guidance Manual*. Available: http://www.oehha.org/air/hot_spots/hotspots2015.html. Accessed February 2020.

Placer County Air Pollution Control District (PCAPCD). 2020. Staff Report: Reasonably Available Control Technology State Implementation Plan Analysis. Available: https://www.placer.ca.gov/DocumentCenter/View/44404/May-2020-RACT-SIP-Analysis-Staff-Report_final?bidId=. Accessed September 2020.

South Coast Air Quality Management District (SCAQMD). 2015. Brief of *Amicus Curiae in* Sierra Club, Revive the San Joaquin and League of Women Voters of Fresno v. County of Fresno and Friant Ranch. Available: https://www.courts.ca.gov/documents/9-s219783-ac-south-coast-air-quality-mgt-dist-041315.pdf. Accessed July 2020.

U.S. Environmental Protection Agency (EPA). 2020. *Nonattainment Areas for Criteria Pollutants* (Green Book). Available: https://www.epa.gov/green-book. Accessed February 2020.

Biological Resources

California Native Plant Society (CNPS). 2019a. Inventory of rare and endangered plants of California (online edition, v8-03 0.39). Rare Plant Program, California Native Plant Society, Sacramento, California. Accessed April 2019.

CNPS. 2019b. A Manual of California Vegetation, Online Edition. California Native Plant Society, Sacramento, CA. Available at: http://www.cnps.org/cnps/vegetation/. Accessed April–November 2019.

California Department of Fish and Wildlife (CDFW). 2020. California Natural Diversity Database. Rarefind 5 electronic database. Natural Heritage Division, California Department of Fish and Wildlife, Sacramento, CA. Available: http://www.dfg.ca.gov/biogeodata/cnddb/rarefind.asp.

eBird. 2020. eBird: An Online Database of Bird Distribution and Abundance. Ithaca, NY. Available: http://www.ebird.org.

Jennings, Mark R., and Marc P. Hayes. 1994. Amphibian and Reptile Species of Special Concern in California. Prepared for the California Department of Fish and Game.

NID and PG&E. 2010. Technical Memorandum 3-8 – Special-Status Amphibians – Sierra Nevada Yellow-legged Frog. Prepared for the Relicensing of NID's Yuba-Bear Hydroelectric Project (FERC Project No. 2266) and PG&E's Drum-Spaulding Project (FERC Project No. 2310).

Pacific Gas and Electric Company (PG&E). 2019a. Preliminary Delineation of Waters of the United States, Including Wetlands, for the Fordyce Dam Repair Project. Prepared by Stillwater Sciences, Berkeley, CA. November

Pacific Gas and Electric Company (PG&E). 2019b. Lake Fordyce Dam Seepage Mitigation – Reservoir Management Plan – DRAFT. PG&E Power Generation Department. November.

Stillwater Sciences. 2019. Botanical Surveys for the Fordyce Dam Repair Project. Final technical memorandum. Prepared for PG&E, San Ramon, CA.

———. 2020a (February 20). Biological Evaluation/Biological Assessment for Terrestrial and Aquatic Wildlife for the Lake Fordyce Dam Seepage Mitigation Project. Prepared for PG&E.

———. 2020b (January 16). Fordyce Creek Aquatic Habitat Assessment for the Lake Fordyce Dam Seepage Mitigation Project. Technical memorandum prepared for PG&E.

USFWS. 2020. IPaC, information for planning and consultation online system. Threatened and endangered species list. Electronic database. U.S. Fish and Wildlife Service, Washington D.C.

Cultural Resources

Browning Cultural Resources, Inc. (BCR). 2019 (December). *PG&E's Fordyce Dam Seepage Mitigation Project–Cultural Resources Inventory, NRHP and CRHR Evaluations*. Nevada and Placer Counties, CA.

Energy

Nevada County. 2019. *Nevada County Energy Action Plan*. Available: https://files.constantcontact.com/7649fea7001/0d90164c-614a-44f1-a0d1-26cbc2a4c866.pdf. Accessed February 2020.

Placer County. 2020. *Placer County Sustainability Plan.* Available: https://www.placer.ca.gov/DocumentCenter/View/42940/PCSP-ADOPTION?bidId=. Accessed September 2020.

Geology and Soils

Bateman, P. C. 1968 (April 1). Geologic Structure and History of the Sierra Nevada. *UMR Journal, UMR Journal – V. H. McNutt Colloquium Series*: Vol. 1, Article 8. Available: https://scholarsmine.mst.edu/cgi/viewcontent.cgi?article=1007&context=umr-journal. Accessed November 13, 2019.

California Department of Conservation (DOC). 2015. *Landslides Inventory*. Available: https://maps.conservation.ca.gov/cgs/lsi/app/. Accessed November 11, 2019.

———. 2018. *Geologic Data and Maps*. Available: https://maps.conservation.ca.gov/geology/. Accessed November 12, 2019.

Earthquake Track. 2019. *Recent Earthquakes Near Truckee, California, US*. Available: https://earthquaketrack.com/us-ca-truckee/recent. Accessed November 8, 2019.

Federal Energy Regulatory Commission (FERC). 2014. *Final Environmental Impact Statement for the Upper Drum-Spaulding Hydroelectric Project (P-2310-173), Lower Drum Hydroelectric Project (P-14531-000), Creek Hydroelectric Project (P-14530-000), and Yuba-Bear (P-2266-096) Hydroelectric Project*. Available:

https://ferc.gov/industries/hydropower/enviro/eis/2014/12-19-14.asp. Accessed November 5, 2019.

Natural Resources Conservation Services (NRCS). 2019. *Web Soil Survey*. Available: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Accessed November 5, 2019.

Nevada County. 2011. *Local Hazard Mitigation Plan for Nevada County 2011–2016*. Available: https://www.mynevadacounty.com/DocumentCenter/View/15423/Nevada-County-Local-Hazard-Mitigation-Plan-PDF?bidId=. Accessed November 19, 2019.

Society of Vertebrate Paleontology (SVP). 2011. *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources*. Available: http://vertpaleo.org/Membership/Member-Ethics/SVP_Impact_Mitigation_Guidelines.aspx. Accessed November 18, 2019.

U.S. Bureau of Reclamation (USBR). 2014. *Chapter 19, Paleontological Resources Draft – August 2014 – 19-1*. Available at: https://usbr.gov/mp/nepa/includes/documentShow.php?Doc_ID=19086. Accessed November 17, 2019.

U.S. Geological Survey. 2019a. *U.S. Quaternary Faults*. Available: https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=5a6038b3a1684561a9b0aadf88412fcf. Accessed November 11, 2019.

———. 2019b. *Liquefaction Susceptibility*. Available: https://earthquake.usgs.gov/education/geologicmaps/liquefaction.php. Accessed November 5, 2019.

Greenhouse Gas Emissions

California Air Resources Board (ARB). 2008. *Climate Change Scoping Plan*. Available: https://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. Accessed February 2020.

———.2014. *First Update to the Climate Change Scoping Plan: Building on the Framework. Pursuant to AB 32, the California Global Warming Solutions Act of 2006*. Available: https://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf. Accessed February 2020.

———. 2017. *California's 2017 Climate Change Scoping Plan*. Available https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed February 2020.

California Air Pollution Control Officers Association (CAPCOA). 2008. *CEQA & Climate Change*. Available: http://www.capcoa.org/wp-content/uploads/downloads/2010/05/CAPCOA-White-Paper.pdf. Accessed February 2020.

California Energy Commission (CEC). 2019. *Pacific Gas and Electric Company: 2018 Power Content Label*. Available: https://www.energy.ca.gov/sites/default/files/2020-01/2018_PCL_PG_and_E.pdf. Accessed February 2020.

Northern Sierra Air Quality Management District (NSAQMD). 2009. *Guidelines for Assessing and Mitigating Air Quality Impacts of Land Use Projects*. Available: https://www.mynevadacounty.com/DocumentCenter/View/16960/NSAQMD-Attachment-Land-Use-Guidelines?bidId=. Accessed February 2020.

Pacific Gas and Electric Company (PG&E). 2020. Corporate Responsibility and Sustainability Report.

Percival, Catherine. Pacific Gas and Electric Company (PG&E). February 19, 2020 and July 29, 2020 —e-mail communication with Bill Martin regarding loss of hydropower generation and potential for GHG increase for replacement power.

Placer County. 2020. Sustainability Plan. January. Available: https://www.placer.ca.gov/DocumentCenter/View/42940/PCSP-ADOPTION?bidId=. Accessed September 2020.

Placer County Air Pollution Control District (PCAPCD). 2017. *California Environmental Quality Act Handbook*. Available: https://www.placerair.org/1801/CEQA-Handbook. Accessed February 2020.

Sacramento Metropolitan Air Quality Management District (SMAQMD). 2018. *Guide to Air Quality Assessment in Sacramento County*. Available: http://www.airquality.org/businesses/ceqa-land-use-planning/ceqa-guidance-tools. Accessed February 2020.

Hazards and Hazardous Materials

California Department of Forest and Fire Protection (CAL FIRE). 2007. *Fire Hazard Severity Zones in State Responsibility Areas*. Available: https://osfm.fire.ca.gov/media/6735/fhszs_map29.pdf. Accessed November 14, 2019.

California Department of Toxic Substances Control (DTSC). 2019. *EnviroStor*. Available: https://www.envirostor.dtsc.ca.gov/public/map/?myaddress=lake+fordyce. Accessed November 12, 2019.

Nevada County. 2011a. *Basic Emergency Plan*. Available: https://www.mynevadacounty.com/1238/County-Emergency-Plans. Accessed November 14, 2019.

———. 2011b. *Local Hazard Mitigation Plan for Nevada County 2011–2016*. Available: https://www.mynevadacounty.com/DocumentCenter/View/15423/Nevada-County-Local-Hazard-Mitigation-Plan-PDF?bidId=. Accessed November 14, 2019.

State Water Board. 2019. *GeoTracker*. Available: https://geotracker.waterboards.ca.gov/map/?CMD=runreport&myaddress=lake+fordyce. Accessed November 13, 2019.

Hydrology and Water Quality

Anderson, P. G. 1996 (May). *Sediment Generation from Forestry Operations and Associated Effects on Aquatic Ecosystems. Proceedings of the Forest-Fish Conference: Land Management Practices Affecting Aquatic Ecosystems*.

Black & Veatch. 2020. *Dewatering/Removal of Water Plan.* Draft Technical Memorandum, Lake Fordyce Dam Seepage Mitigation Project. January 20.

Bisson, P. A., and R. E. Bilby. 1982. Avoidance of suspended sediment by juvenile coho salmon. North American Journal of Fisheries Management 4: 371-374.

California Department of Water Resources (DWR). 1979. *Water Well Drillers Report*. 18N14E31N, No. 049723.

———. 1985. *Water Well Drillers Report for the Glacial Trails Scout Ranch*. 17N13E11M, No. 198976 and 198999.

———. 1997. *Well Completion Report for the Glacial Trails Scout Camp*. 17N13E10G M, No. 413392.

———. 2013. *Well Completion Report for 53336 Meadows Lake Drive.* 18N13E27, No. E0180674 and E0180677.

Central Coast Regional Water Quality Control Board (RWQCB). 2005. *Final Project Report: Pajaro River Total Maximum Daily Loads for Sediment (including Llagas Creek, Rider Creek, and San Benito River)*. San Luis Obispo, CA.

Central Valley Regional Water Quality Control Board. 2018. The Water Quality Control Plan (Basin Plan) for the Sacramento River Basin and San Joaquin River Basin. Fifth Edition. Revised May 2018 with approved amendments.

Gregory, R. S., and C. D. Levings. 1996. The effects of turbidity and vegetation on the risk of juvenile salmonids Oncorhynchus spp., to predation by adult cutthroat trout, *O. clarki*. Environmental Biology of Fishes 47: 279-288.

Gregory, R. S., and C. D. Levings. 1998. Turbidity reduces predation in migrating juvenile Pacific salmon. Transactions of the American Fisheries Society 127: 275-285.

Newcombe, C. P. 2003. Impact Assessment Model for Clear Water Fishes Exposed to Excessively Cloudy Water. *Journal of the American Water Resources Association* 39:529–544.

Nevada Irrigation District and Pacific Gas and Electric Company (NID and PG&E). 2010a. Final License Application, Volume II, Part I. Yuba-Bear Hydroelectric Project and Drum Spaulding Project. April.

———. 2010b. Technical Memorandum 2-1. Water Quality. Yuba-Bear Hydroelectric Project and Drum Spaulding Project. February.

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.

Shaw, E. A., and J. S. Richardson. 2001. Direct and indirect effects of sediment pulse duration on stream invertebrate assemblages and rainbow trout (*Oncorhynchus*

mykiss) growth and survival. Canadian Journal of Fisheries and Aquatic Sciences 58(11): 2213-2221.

U.S. Environmental Protection Agency (EPA). 2019 (November). *Environmental Protection Agency Regional Screening Levels for Chemical Contaminants at Superfund Sites*.

———. 2002 (December). *A Guidance Manual to Support the Assessment of Contaminated Sediments in Freshwater Ecosystems*. Prepared by D. D. MacDonald and C. G. Ingersoll. EPA 905 B02 001 A.

U.S. Geological Survey (USGS). 2020. Reservoir storage at USGS gage 11414090, Fordyce Lake near Cisco, CA; Discharge at USGS gage 11414100, Fordyce Creek below Fordyce Dam near Cisco, CA. Retrieved July 2020.

Land Use Planning

Nevada County. 2015. *Nevada County Zoning Districts*. Available: https://www.mynevadacounty.com/DocumentCenter/View/12735/0-Zoning-Designations-PDF. Accessed October 2019.

———. 2016. *Nevada County General Plan, Land Use Element*. Available: https://www.mynevadacounty.com/DocumentCenter/View/12573/Chapter-1-Land-Use-2016-PDF. Accessed October 2019.

Placer County. 2016. *Land Use/Circulation Diagrams and Standards*. Available: https://www.placer.ca.gov/DocumentCenter/View/8572/Land-Use-and-Circulation-PDF. Accessed October 2019.

Placer County. 2020. *Placer County Code, 17.12.010 Forestry (FOR).* Available: http://qcode.us/codes/placercounty/view.php?topic=17-2-i-17_12-17_12_010&frames=on. Accessed September 2020.

Mineral Resources

California Geological Survey (CGS; formerly California Division of Mines and Geology). 1990a. Mineral Land Classification Map. Plate 6B, Central Nevada County.

———. 1990b. Mineral Land Classification Map. Plate 3C, Eastern Nevada County.

———. 2000. *Guidelines for Classification and Designation of Mineral Lands*. Available: http://www.conservation.ca.gov/smgb/Guidelines/Documents/ClassDesig.pdf.

———. 2018. *Aggregate Sustainability in California*. Available: https://www.conservation.ca.gov/cgs/Documents/MS_052_California_Aggregates_Report_201807.pdf. Accessed February 2020.

Nevada County. *Nevada County General Plan, Chapter 17: Mineral Management.* Available: https://www.mynevadacounty.com/DocumentCenter/View/12589/Chapter-17-Mineral-Management-1995-PDF. Accessed September 2020.

Noise

Federal Transit Administration (FTA). 2006. *Transit Noise and Vibration Impact Assessment Manual*. Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf. Accessed October 2019.

Nevada County. 2014. *Nevada County General Plan, Noise Element*. Available: https://www.mynevadacounty.com/DocumentCenter/View/12581/Chapter-9-Noise-2014-PDF. Accessed November 2019.

———. 2019. *Nevada County Code, Sec. L-II 4.1.7 Noise*. Available: https://qcode.us/codes/nevadacounty/?view=desktop&topic=2-v-2-v__7. Accessed November 2019.

Placer County. 2020. *Placer County Code, Article 9.36 Noise*. Available: http://qcode.us/codes/placercounty/view.php?topic=9-9_36&showAll=1&frames=off. Accessed September 2020.

Population and Housing

California Department of Finance (DOF). 2019. *Population and Housing Estimated for Cities, Counties, and the State, January 1,2011–2019, with 2010 Benchmark*. Available: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-5/. Accessed October 2019.

Public Services

Nevada County. 2012. Nevada County Fire District Map. Available: https://www.mynevadacounty.com/DocumentCenter/View/15858/Nevada-County-Fire-District-Map---April-2012-PDF. Accessed October 2019.

———. 2019a. *Nevada County Sheriff's Office, About Us*. Available: https://www.mynevadacounty.com/150/Sheriff-Coroner-Public-Administrator. Accessed October 2019.

———. 2019b. *Nevada County GIS*. Available: http://gis.nevcounty.net/myneighborhood/. Accessed October 2019.

Placer County Office of Education. 2020. *Placer County School Districts.* Available: http://moss_1.placercoe.k12.ca.us/Superintendent/documents/PCOESchoolDistrictMap.pdf. Accessed September 2020.

Placer County. 2020a. *Land Information Search.* Available: http://maps.placer.ca.gov/Html5viewer/Index.html?configBase=http://arcgis/Geocortex/Essentials/REST/sites/LIS_Public/viewers/LIS_Base-Public/virtualdirectory/Resources/Config/Default. Accessed September 2020.

Placer County. 2020b. *Your Sherriff's Office.* Available: https://www.placer.ca.gov/2017/Your-Sheriffs-Office. Accessed September 2020.

Recreation

Federal Energy Regulatory Commission (FERC). 2014 (December). *Final Environmental Impact Statement for Hydropower License: Upper Drum-Spaulding Hydroelectric Project; Lower Drum Hydroelectric Project; Deer Creek Hydroelectric Project; Yuba-Bear Hydroelectric Project*. FERC/EIS-F-0244.

Nevada Irrigation District and Pacific Gas and Electric Company (NID and PG&E). 2011 (October). *Technical Memorandum 8-1 – Recreation Flow*, Drum-Spaulding Project FERC Project No. 2310-173.

Transportation

California Department of Transportation (Caltrans). 2017. *2017 Traffic Volumes: Interstate 80*. Available: https://dot.ca.gov/programs/traffic-operations/census/traffic-volumes/2017/route-71-80. Accessed February 13, 2020.

Nevada County Transportation Commission (NCTC). 2018. *Nevada County Regional Transportation Plan 2015–2035*. Available: http://www.nctc.ca.gov/documents/RTP/Final%20Nevada%20Co%20RTP%201_17_18.pdf. Accessed November 20, 2019.

Placer County Transportation Planning Agency (PCTPA). 2019. *Placer County Regional Transportation Plan.* Available: http://pctpa.net/library/rtp/2040/Final RTP/RTP/Final_2040_RTP_Full_Document.pdf. Accessed September 2020.

Tribal Cultural Resources

Browning Cultural Resources (BCR). 2019. *PG&E's Fordyce Dam Seepage Mitigation Project, Cultural Resources Inventory, NRHP and CRHR Evaluations, Nevada and Placer Counties California*.

Utilities and Service Systems

CalRecycle. 2019. *Jurisdiction Diversions/Disposal Rate Detail*. Available: https://www2.calrecycle.ca.gov/LGCentral/DiversionProgram/JurisdictionSummary. Accessed October 2019.

Nevada County. 2019. *Solid Waste, Nevada County*. Available: https://www.mynevadacounty.com/1447/Solid-Waste. Accessed October 2019.

Nevada Irrigation District (NID). 2016. 2015 Urban Water Management Plan. Prepared by Brown and Caldwell. June.

Placer County Water Agency (PCWA). 2016. 2015 Urban Water Management Plan. Prepared by Tully & Young. June.

Wildfire

California Department of Forest and Fire Protection (CAL FIRE). 2007. *Fire Hazard Severity Zones in State Responsibility Areas*. Available: https://osfm.fire.ca.gov/media/6735/fhszs_map29.pdf. Accessed November 14, 2019.

Nevada County. 2011a. *Basic Emergency Plan*. Available: https://www.mynevadacounty.com/1238/County-Emergency-Plans. Accessed November 14, 2019.

———. 2011b. *Local Hazard Mitigation Plan for Nevada County 2011–2016*. Available: https://www.mynevadacounty.com/DocumentCenter/View/15423/

Nevada-County-Local-Hazard-Mitigation-Plan-PDF?bidId=. Accessed November 14, 2019.

———. 2012. *What Fire Department Are You In?* Available: https://www.mynevadacounty.com/DocumentCenter/View/15858/Nevada-County-Fire-District-Map---April-2012-PDF. Accessed November 19, 2019.

Pacific Gas and Electric Company (PG&E). 2019c (August). Utility Standard: TD-1464S – Preventing and Mitigating Fires While Performing PG&E Work.

Placer County. 2016. *Placer County Local Hazard Mitigation Plan Update.* Available: https://www.placer.ca.gov/DocumentCenter/View/397/Complete2016-LHMP--Including-ChaptersAnnexes-and-Appendices-PDF. Accessed September 2020.

_____. 2010. Emergency Operations Plan for Placer County and the Placer Operational Area. Published December 14, 2010.

5 LIST OF PREPARERS

State Water Resources Control Board

Jordan Smith, PE	Water Resource Control Engineer
Parker Thaler	Senior Environmental Scientist
Andrea Sellers	Environmental Scientist
David Rose	Staff Counsel
Stephanie Postal	Attorney

AECOM

Bill Martin	Project Manager
Emily Biro	Agriculture and Forestry; Land Use; Population and Housing; Public Services; Mineral Resources; Recreation; Utilities and Service Systems; Mandatory Findings of Significance
Peter Boice	Biological Resources
Elizabeth Nielsen	Hydrology and Water Quality
Stephanie Osby	Aesthetics; Geology and Soils; Hazards and Hazardous Materials; Noise; Transportation; Wildfire
Jennifer Redmond, RPA	Cultural Resources; Tribal Cultural Resources
Paola Pena	Air Quality, Greenhouse Gas, Energy
Beth Duffey	Senior Technical Editor
Derek McCulloch	Senior Formatter
Ryan Haines	GIS
Ann Campbell	Graphics

This page intentionally left blank.

Appendix A

90% Access Road Design Drawings

PROJECT PLANS FOR:

FORDYCE DAM SEEPAGE MITIGATION ACCESS ROAD IMPROVEMENTS

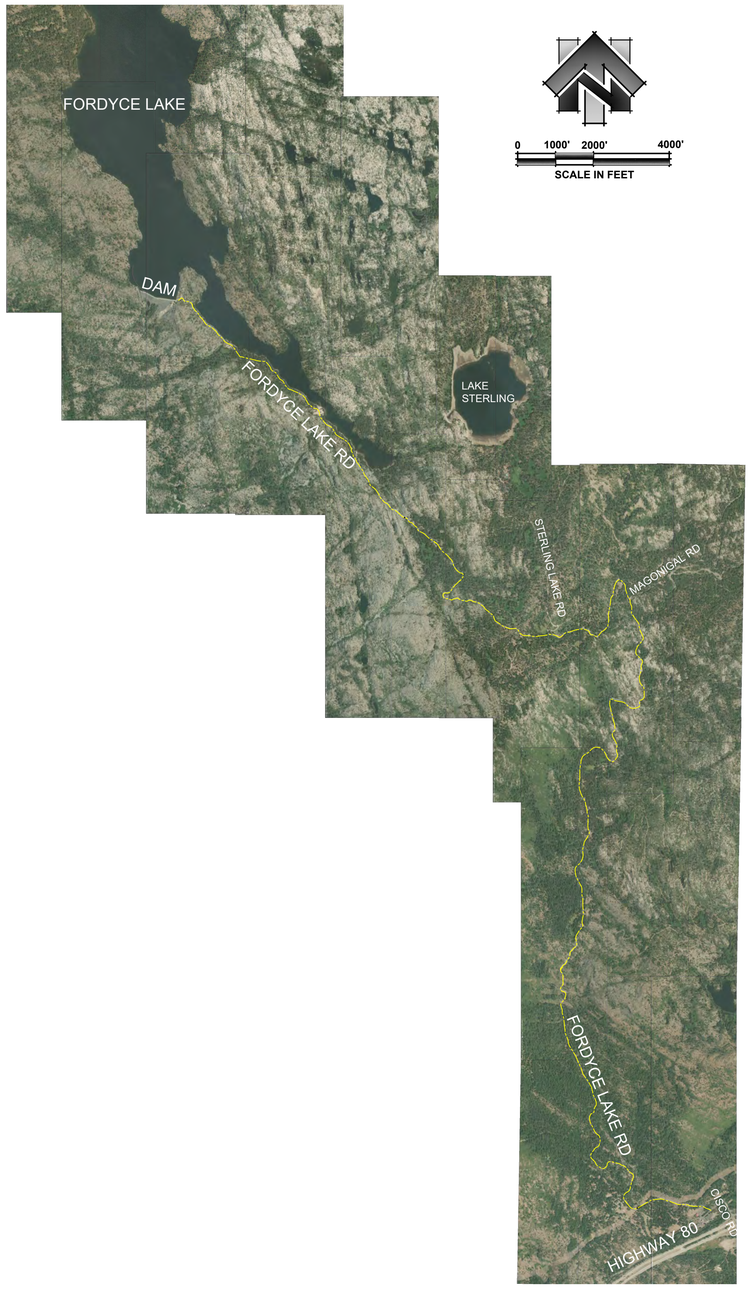
90% DESIGN PLANS

SHEET INDEX

C1	TITLE SHEET
C2	TYPICAL SECTIONS & DETAILS
C3	DRAINAGE DETAILS
C4	PLAN - STA 1+00 TO 75+00 (PM 0.0 TO 1.4)
C5	PLAN - STA 75+00 TO 137+00 (PM 1.4 TO 2.6)
C6	PLAN - STA 137+00 TO 213+00 (PM 2.6 TO 4.0)
C7	PLAN - STA 213+00 TO 297+00 (PM 4.0 TO 5.6)
C8	PLAN - STA 297+00 TO 359+00 (PM 5.6 TO 6.8)
C9	PLAN - STA 359+00 TO 414+00 (PM 6.8 TO 7.8)
C10	PLAN - STA 414+00 TO DAM (PM 7.8 TO 8.0)
C11	ROCK WALL IMPROVEMENTS 1 - EXISTING CONDITIONS & TREE REMOVAL
C12	ROCK WALL IMPROVEMENTS 2 - PROPOSED IMPROVEMENTS
C13	DAM TURNAROUND IMPROVEMENTS

ABBREVIATIONS

AB - AGGREGATE BASE
AC - ASPHALT CONCRETE
BC - BEGINNING OF CURVE
CL - CENTERLINE
DI - DRAINAGE INLET
DIA - DIAMETER
EC - END OF CURVE
EP - EDGE OF PAVEMENT
(E) - EXISTING
FG - FINISH GRADE
GB - GRADE BREAK
FL - FLOW LINE
LF - LINEAR FOOT
MH - MANHOLE
NTS - NOT TO SCALE
(P) - PROPOSED
PM - POST MILE
R - RADIUS
R/W - RIGHT OF WAY
STD - STANDARD
USDA - UNITED STATES DEPARTMENT OF AGRICULTURE
WH/AP - WHERE APPLICABLE



0 1000' 2000' 4000'
SCALE IN FEET

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

DRAWING SCALE
HOR. SCALE: AS NOTED
VERT. SCALE: N.T.S.

SYBLON REID CONTRACTORS

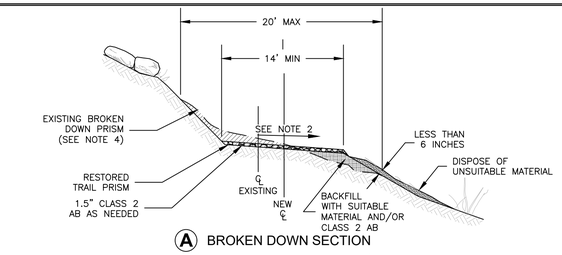
REY ENGINEERS, INC.
Civil Engineers | Land Surveyors | LiDAR
925 Juniper Street, Suite 200, Fallbrook, CA 92028
Phone: (760) 728-3040 | Fax: (760) 728-3333

FORDYCE DAM SEEPAGE MITIGATION
ACCESS ROAD IMPROVEMENTS
TITLE SHEET
NEVADA COUNTY CALIFORNIA

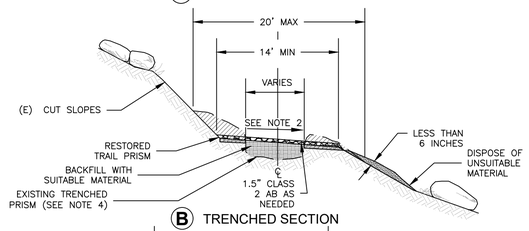
DRAWING INFO
DATE: 3/30/2020
DRAFTER: CDH/RJR
DESIGNER: RJR
REVIEWER: RJR

PROJECT NO.
8635.038
SHEET NO. C1 OF C13

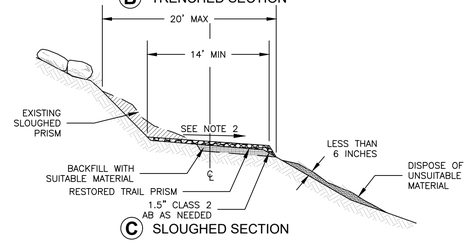
R:\8635 – SYBLON REID CONSTRUCTION\038 – Fordyce Dam Seepage Mitigation\10 – CAD Drawings\Improvement Plans\8635.038 C1 Title Sheet.dwg Mar 30, 2020 - 2:02pm, rruddick



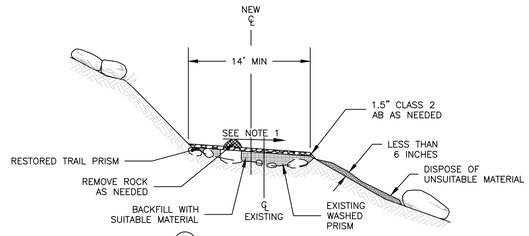
A BROKEN DOWN SECTION



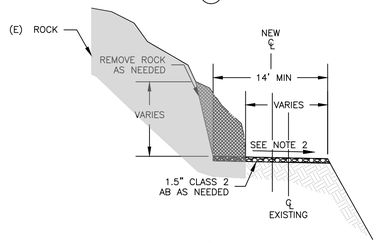
B TRENCHED SECTION



C SLOUGHED SECTION



D WASHED SECTION



E NARROW ROCK SECTION

NOTES:

1. ROAD RESTORATION WORK SHALL BE DONE IN ACCORDANCE WITH USDA FOREST SERVICE REGION 5 SPECIFICATIONS FOR MAINTENANCE OF ROADS (DATED 1997).
2. RESTORED SURFACE SHALL MAINTAIN EXISTING DRAINAGE PATTERN & GENERAL CROSS SLOPES.
3. RE-ESTABLISH AND ADJUST ANY (E) ROADSIDE DITCHES & ADJUST DRAINAGE STRUCTURE TO MATCH NEW TREAD SURFACE.
4. MAINTAIN (E) CHECK DAMS, DRAINAGE DIPS, CROSS DITCHES, OR OTHER DRAINAGE STRUCTURES PER THE USDA FOREST SERVICE REGION 5 SPECIFICATIONS FOR MAINTENANCE OF ROADS (DATED 1997).
5. USE ONLY SUITABLE MATERIAL TO CONSTRUCT RESTORED TRAIL PRISMS. DISPOSE OF UNSUITABLE MATERIAL AS SHOWN ON PLANS. SUITABLE MATERIAL INCLUDES ROCK THAT CAN BE ACCOMMODATED IN THE TRAIL STRUCTURE, AND SOIL FREE OF DUFF WITH A RECOGNIZABLE GRANULAR TEXTURE.
6. SEED OR MULCH DISTURBED AREAS AFTER RESTORATION

DETAIL 1 - TYPICAL SECTIONS FOR RESTORATION

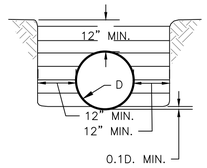
NTS

CULVERT EXTENSIONS - SUMMARY TABLE

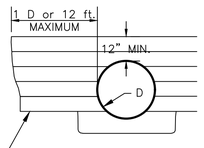
STA	GEOTEXTILE TYPE	BEDDING TYPE	CULVERT TYPE	RSP TYPE	RETAINER* TYPE	EXTENSION LENGTH	COMMENTS
99+00	N/A	B1/B2	C 1	RSP-1/2	ROCK	10±	EXTENSION AT OUTLET
193+00	N/A	B1/B2	C 1	RSP-1/2	ROCK	15±	EXTENSION AT OUTLET
322+80	N/A	B1/B2	C 1	RSP-1/2	ROCK	7±	EXTENSION AT INLET - SEE NOTE 4

N/A WHEN NOT APPLICABLE

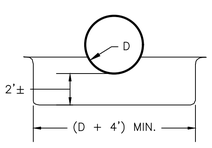
TYPICAL TRENCHING



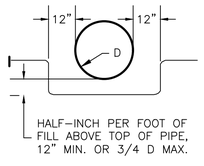
TYPICAL BACKFILL DETAIL



YIELDING FOUNDATION



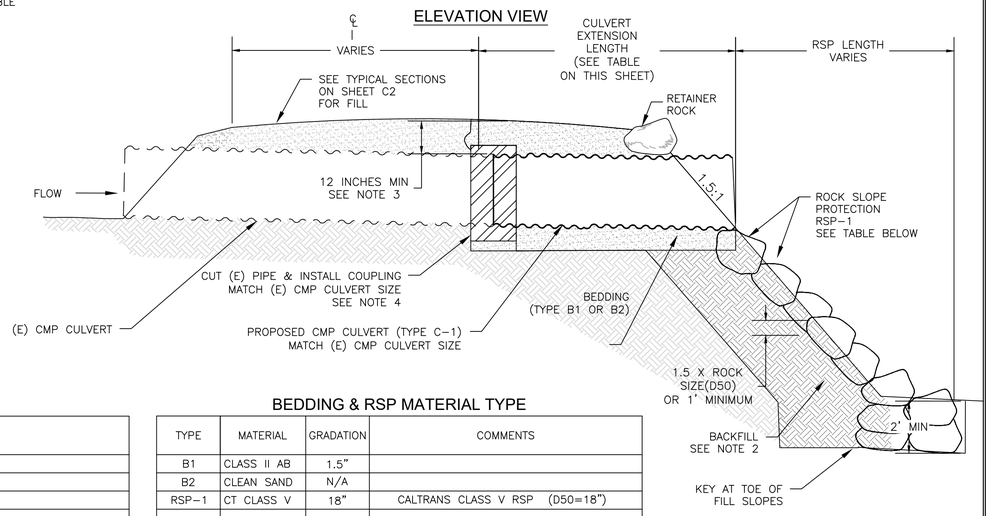
ROCK FOUNDATION



NOTES:

1. IF 12" MINIMUM COVER CANNOT BE ACHIEVED DUE TO EXISTING GRADES THEN A TRENCH PLATE MAY BE TEMPORARILY USED OVER THE CULVERT TO PERMIT HEAVY VEHICLE TRAVEL.
2. WORK SHALL BE PER USDA FOREST SERVICE SPECIFICATIONS FOR ROAD MAINTENANCE (DATED 1997). THIS INCLUDES REMOVAL OF EXISTING CULVERT, AND INSTALLATION AND BACKFILL OF NEW CULVERT PER SECTION 833 (CULVERT REPLACEMENT).
3. THIS DETAIL IS BASED ON USDA FOREST SERVICE STANDARD TRAIL PLAN 921 FOR CULVERTS AND MODIFIED FOR CULVERT EXTENSIONS

ELEVATION VIEW



CULVERT TYPE

TYPE	MATERIAL	COMMENTS
C1	CMP - GALV	CONNECT TO (E) CMP WITH COUPLING

BEDDING & RSP MATERIAL TYPE

TYPE	MATERIAL	GRADATION	COMMENTS
B1	CLASS II AB	1.5"	
B2	CLEAN SAND	N/A	
RSP-1	CT CLASS V	18"	CALTRANS CLASS V RSP (D50=18")

DETAIL 2 - CULVERT EXTENSION

NTS

NO.	REVISION DESCRIPTION	CHECKED BY	DATE
	PRELIMINARY DESIGN NOT FOR CONSTRUCTION		

DRAWING SCALE
HOR. SCALE: AS NOTED
VERT. SCALE: N.T.S.

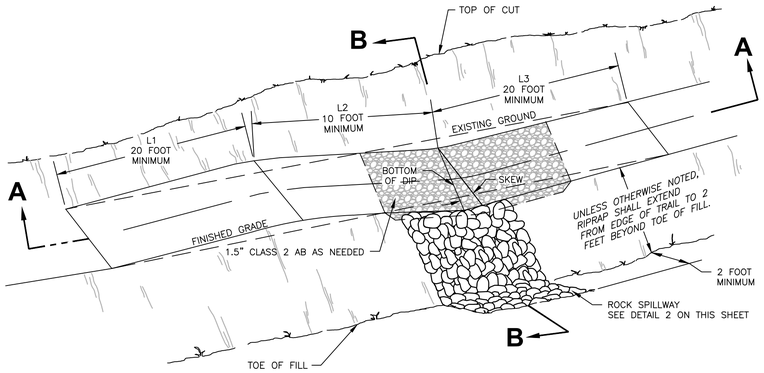
REY ENGINEERS, INC.
Civil Engineers | Land Surveyors | LIDAR
925 Sunrise Blvd., Suite 200, Folsom, CA 95630
Phone: (916) 365-3040 | Fax: (916) 365-3303

FORDYCE DAM SEEPAGE MITIGATION
ACCESS ROAD IMPROVEMENTS
TYPICAL SECTIONS & DETAILS
NEVADA COUNTY CALIFORNIA

DRAWING INFO
DATE: 3/30/2020
DRAFTER: CDH/RJR
DESIGNER: RJR
REVIEWER: RJR

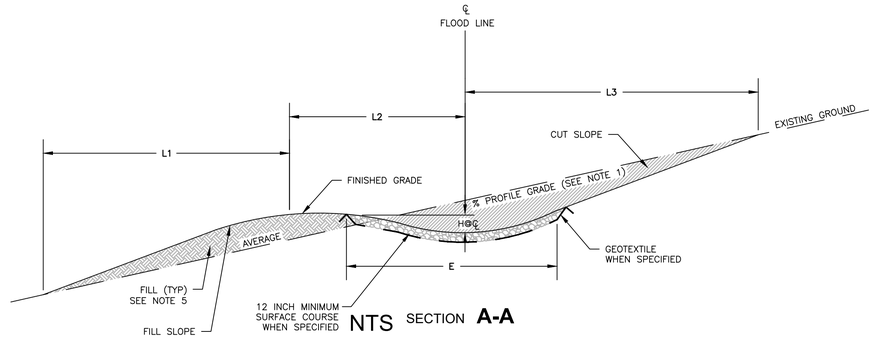
PROJECT NO. 8635.038
SHEET NO. C2 OF C13

R:\8635 - SYBLON REID CONSTRUCTION\.038 - Fordyce Dam Seepage Mitigation\.10 - CAD Drawings\Improvement Plans\8635.038 C2 Typical Sections & Details.dwg Mar 30, 2020 - 2:02pm, rruddick

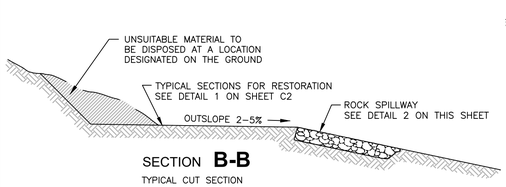


NOTES:

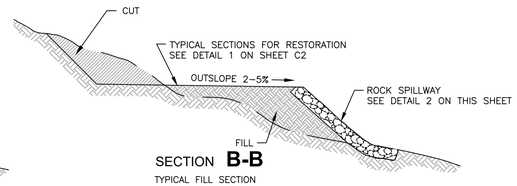
1. DRAIN DIP DETAIL NOT RECOMMENDED FOR PROFILE GRADES OVER 10%.
2. THE LENGTH OF THE DRAIN DIPS GRADE CHANGES (L1, L2, L3, E) SHOWN IN THE DETAIL BELOW SHALL BE DETERMINED IN THE FIELD OR BASED ON EXISTING DRAIN DIP DIMENSIONS.
3. THIS DETAIL IS A MODIFIED VERSION USDA FOREST SERVICE STANDARD TRAIL PLAN 927 FOR DRAIN DIPS AND CAN BE USED FOR RESTORATION/MAINTENANCE OF EXISTING DRAIN DIPS AND ROCK SPILLWAYS.
4. RESTORATION OF EXISTING DRAIN DIPS SHALL BE PER USDA FOREST SERVICE SPECIFICATIONS FOR ROAD MAINTENANCE (DATED 1997) INCLUDING, BUT NOT LIMITED TO; REMOVAL OF EXISTING MATERIALS, ROADWAY DRAINAGE MAINTENANCE, AND DRAINAGE DIP MAINTENANCE.
5. FILL SHALL COMPROMISE OF SATISFACTORY OR NATIVE MATERIALS AS SPECIFIED IN SECTION 312323 (FILL AND BACKFILL) OF THE PROJECT SPECIFICATIONS. DETERMINATION OF FILL MATERIAL'S CONFORMANCE WITH SPECIFICATION SHALL BE DONE BY CONTRACTOR.



NTS SECTION **A-A**

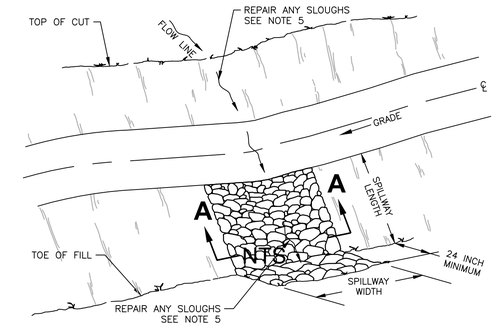


SECTION **B-B**
TYPICAL CUT SECTION



SECTION **B-B**
TYPICAL FILL SECTION

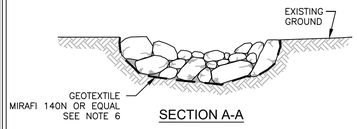
DETAIL 1 - DRAINAGE DIP



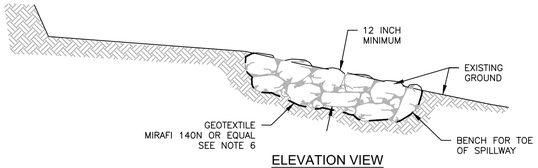
PERSPECTIVE VIEW

NOTES:

1. DRAIN DIP DETAIL NOT RECOMMENDED FOR PROFILE GRADES OVER 10%.
2. THE SPILLWAY LENGTH AND WIDTH SHOWN IN THE DETAIL BELOW SHALL BE DETERMINED IN THE FIELD OR BASED ON EXISTING SPILLWAY DIMENSIONS.
3. THIS DETAIL IS A MODIFIED VERSION USDA FOREST SERVICE STANDARD TRAIL PLAN 928 FOR ROCK SPILLWAYS AND CAN BE USED FOR RESTORATION OF EXISTING DRAIN DIPS AND ROCK SPILLWAYS.
4. RESTORATION OF EXISTING ROCK SPILLWAYS & OUTFALLS SHALL BE PER USDA FOREST SERVICE SPECIFICATIONS FOR ROAD MAINTENANCE (DATED 1997) INCLUDING, BUT NOT LIMITED TO; REMOVAL OF EXISTING MATERIALS, ROADWAY DRAINAGE MAINTENANCE, AND DRAINAGE DIP MAINTENANCE.
5. RESTORE ANY FAILING SLOPES (SLOUGHS OR SLIDES) PER USDA FOREST SERVICE SPECIFICATIONS FOR ROAD MAINTENANCE (DATED 1997) INCLUDING, BUT NOT LIMITED TO; REMOVAL OF EXISTING MATERIALS, MAINTENANCE FOR LIMITED USE, AND DRAWING 838–4.
6. ROCK PROTECTION SHALL BE CALTRANS NO. 2 BACKING, OR EQUAL, AT A MINIMUM DEPTH OF 1' WITH GEOTEXTILE LINING. GEOTEXTILE SHALL BE MIRAFI 140N OR APPROVED EQUAL INSTALLED PER MANUFACTURER'S GUIDELINES.



SECTION A-A



ELEVATION VIEW

ROCK SPILLWAY FOR DRAINAGE DIP OR CROSS DRAIN

DETAIL 2 - ROCK SPILLWAY

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

DRAWING SCALE
HOR. SCALE: AS NOTED
VERT. SCALE: N.T.S.

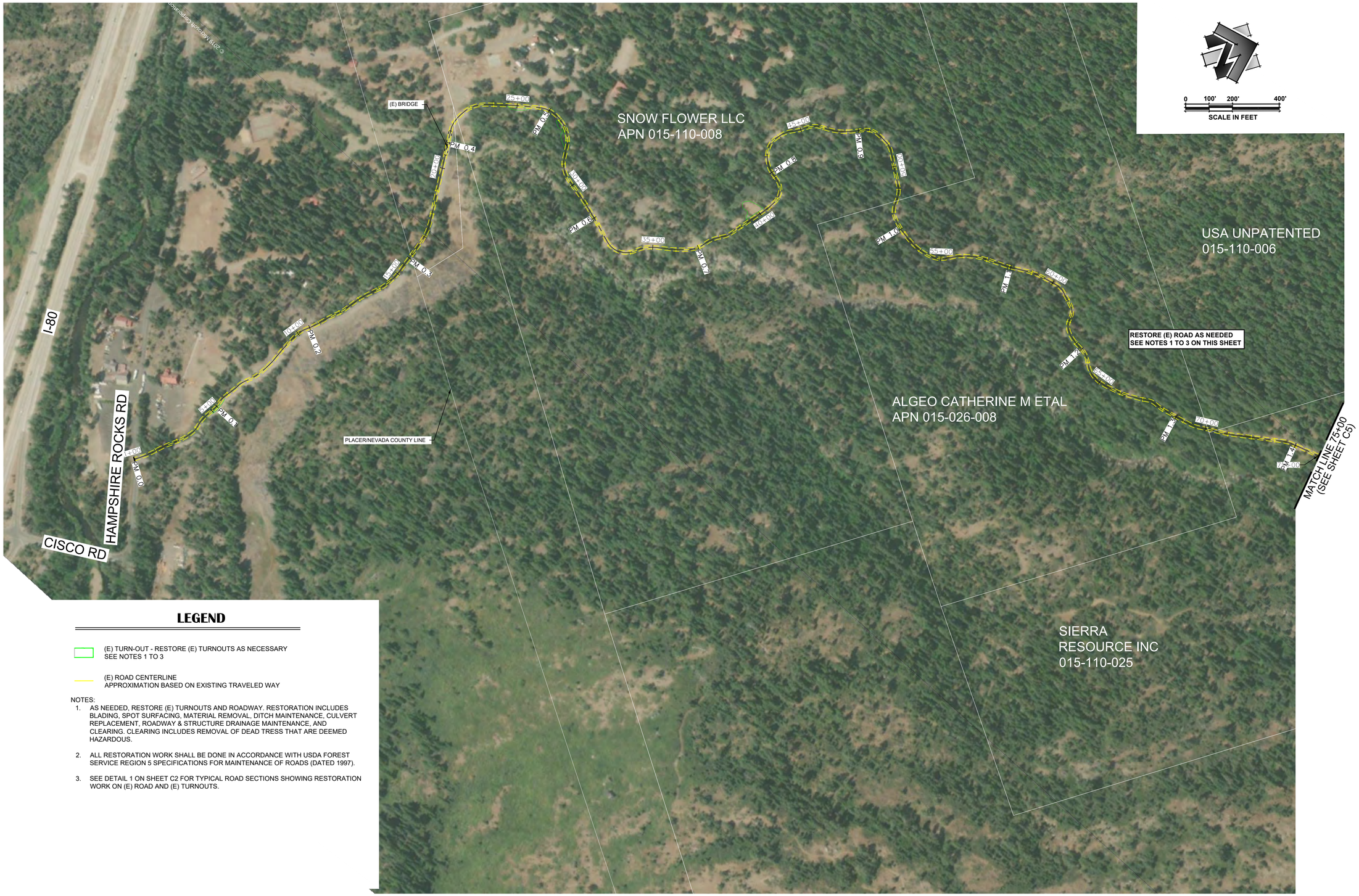
REY ENGINEERS, INC.
Civil Engineers | Land Surveyors | LIDAR
425 Sother Street, Suite 200, Folsom, CA 95630
Phone (916) 352-3047 Fax (916) 352-3303

FORDYCE DAM SEEPAGE MITIGATION
ACCESS ROAD IMPROVEMENTS
DRAINAGE DETAILS
NEVADA COUNTY CALIFORNIA

DRAWING INFO
DATE: 3/30/2020
DRAFTER: CDH/RJR
DESIGNER: RJR
REVIEWER: RJR

PROJECT NO.
8635.038
SHEET NO. **C3** OF **C13**

R:\8635 – SYBLON REID CONSTRUCTION\038 – Fordyce Dam Seepage Mitigation\10 – CAD Drawings\Improvement Plans\8635.038 C2 Typical Sections & Details.dwg Mar 30, 2020 – 2:02pm, rruddick



LEGEND

(E) TURN-OUT - RESTORE (E) TURNOUTS AS NECESSARY
SEE NOTES 1 TO 3

(E) ROAD CENTERLINE
APPROXIMATION BASED ON EXISTING TRAVELED WAY

NOTES:

1. AS NEEDED, RESTORE (E) TURNOUTS AND ROADWAY. RESTORATION INCLUDES BLADING, SPOT SURFACING, MATERIAL REMOVAL, DITCH MAINTENANCE, CULVERT REPLACEMENT, ROADWAY & STRUCTURE DRAINAGE MAINTENANCE, AND CLEARING. CLEARING INCLUDES REMOVAL OF DEAD TRESS THAT ARE DEEMED HAZARDOUS.
2. ALL RESTORATION WORK SHALL BE DONE IN ACCORDANCE WITH USDA FOREST SERVICE REGION 5 SPECIFICATIONS FOR MAINTENANCE OF ROADS (DATED 1997).
3. SEE DETAIL 1 ON SHEET C2 FOR TYPICAL ROAD SECTIONS SHOWING RESTORATION WORK ON (E) ROAD AND (E) TURNOUTS.

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

DRAWING SCALE
HOR. SCALE: AS NOTED
VERT. SCALE: N.T.S.

SYBLON REID CONTRACTORS

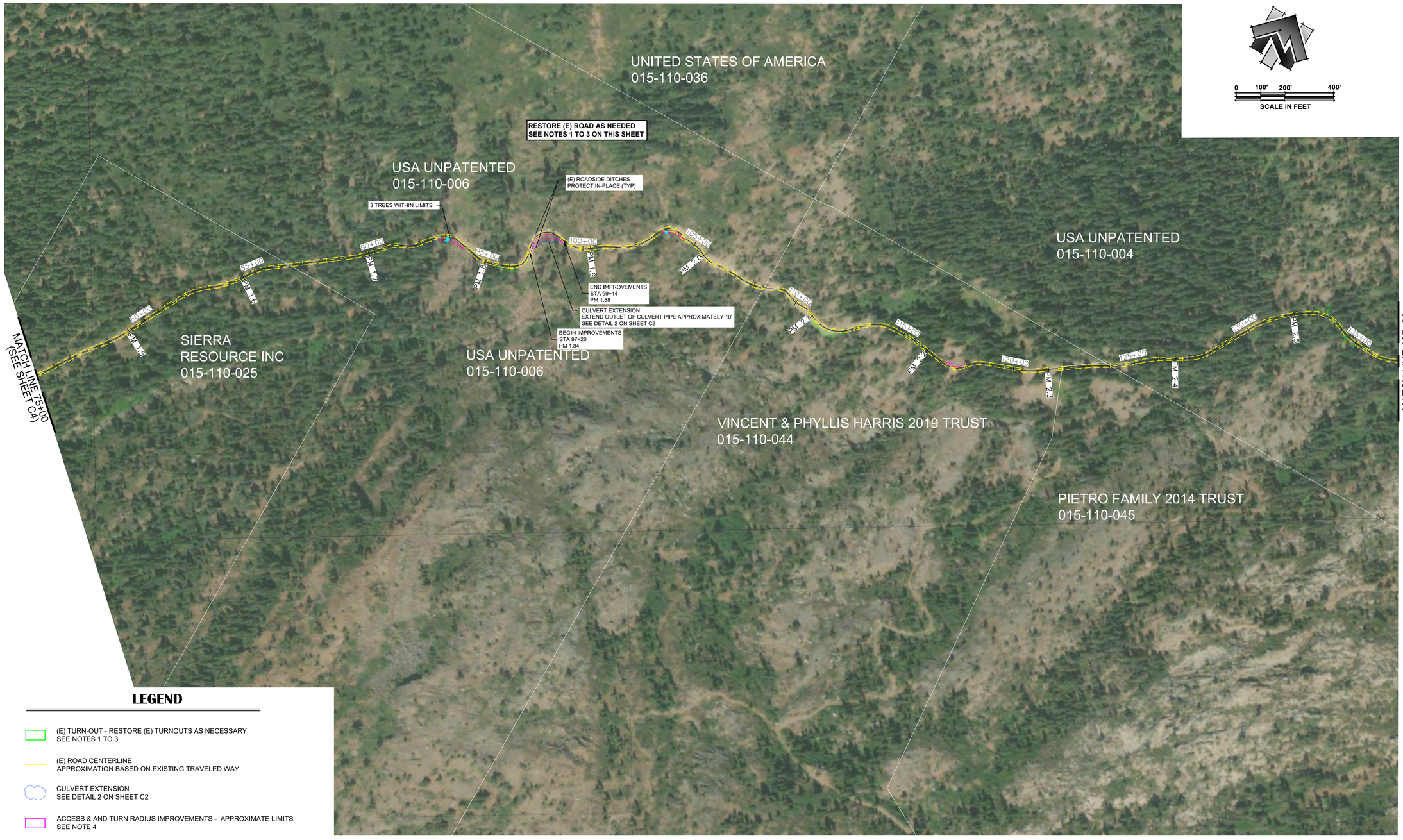
R.E.Y. ENGINEERS, INC.
Civil Engineers | Land Surveyors | LIDAR
905 Sutter Street, Suite 200 Folsom, CA 95630
Phone: (916) 366-3040 Fax: (916) 366-3303

FORDYCE DAM SEEPAGE MITIGATION
ACCESS ROAD IMPROVEMENTS
PLAN - STA 1+00 TO 75+00 (PM 0.0 TO 1.4)
NEVADA COUNTY CALIFORNIA

DRAWING INFO
DATE: 3/30/2020
DRAFTER: CDH/RJR
DESIGNER: RJR
REVIEWER: RJR

PROJECT NO.
8635.038
SHEET NO. C4 OF C13

R:\8635 – SYBLON REID CONSTRUCTION\038 – Fordyce Dam Seepage Mitigation\10 – CAD Drawings\Improvement Plans\8635.038 C4–C10.dwg Mar 30, 2020 – 2:02pm, rruddick



LEGEND

- (E) TURN-OUT - RESTORE (E) TURNOUTS AS NECESSARY SEE NOTES 1 TO 3
- (E) ROAD CENTERLINE APPROXIMATION BASED ON EXISTING TRAVELED WAY
- CULVERT EXTENSION SEE DETAIL 2 ON SHEET C2
- ACCESS & AND TURN RADIUS IMPROVEMENTS - APPROXIMATE LIMITS SEE NOTE 4
- REMOVE (E) TREE - APPROXIMATE LOCATIONS AND QUANTITY

NOTES:

1. AS NEEDED, RESTORE (E) TURNOUTS AND ROADWAY. RESTORATION INCLUDES BLADING, DITCH MAINTENANCE, CULVERT REPLACEMENT, ROADWAY & STRUCTURE DRAINAGE MAINTENANCE, AND CLEARING. CLEARING INCLUDES REMOVAL OF DEAD TRESS THAT ARE DEEMED HAZARDOUS.
2. ALL RESTORATION WORK SHALL BE DONE IN ACCORDANCE WITH USDA FOREST SERVICE REGION 5 SPECIFICATIONS FOR MAINTENANCE OF ROADS (DATED 1997).
3. SEE DETAIL 1 ON SHEET C2 FOR TYPICAL ROAD SECTIONS SHOWING RESTORATION WORK ON (E) ROAD AND (E) TURNOUTS.
4. ACCESS AND TURN RADIUS IMPROVEMENTS SHOWN ARE DETERMINED USING TURNING MOVEMENTS AND VEHICLE TRACKING OF A SEMI TRUCK WITH A 48' LONG TRAILER (AASHTO DESIGN VEHICLE WB-62)
5. ONLY PROPOSED DRAINAGE IMPROVEMENTS ARE SHOWN. (E) DRAINAGE FEATURES ARE EXCLUDED FOR CLARITY.

NO.	REVISION	DESCRIPTION	CHECKED BY	DATE
		PRELIMINARY DESIGN NOT FOR CONSTRUCTION		

DRAWING SCALE
HOR. SCALE: AS NOTED
VERT. SCALE: N.T.S.

SYBLON REID CONTRACTORS

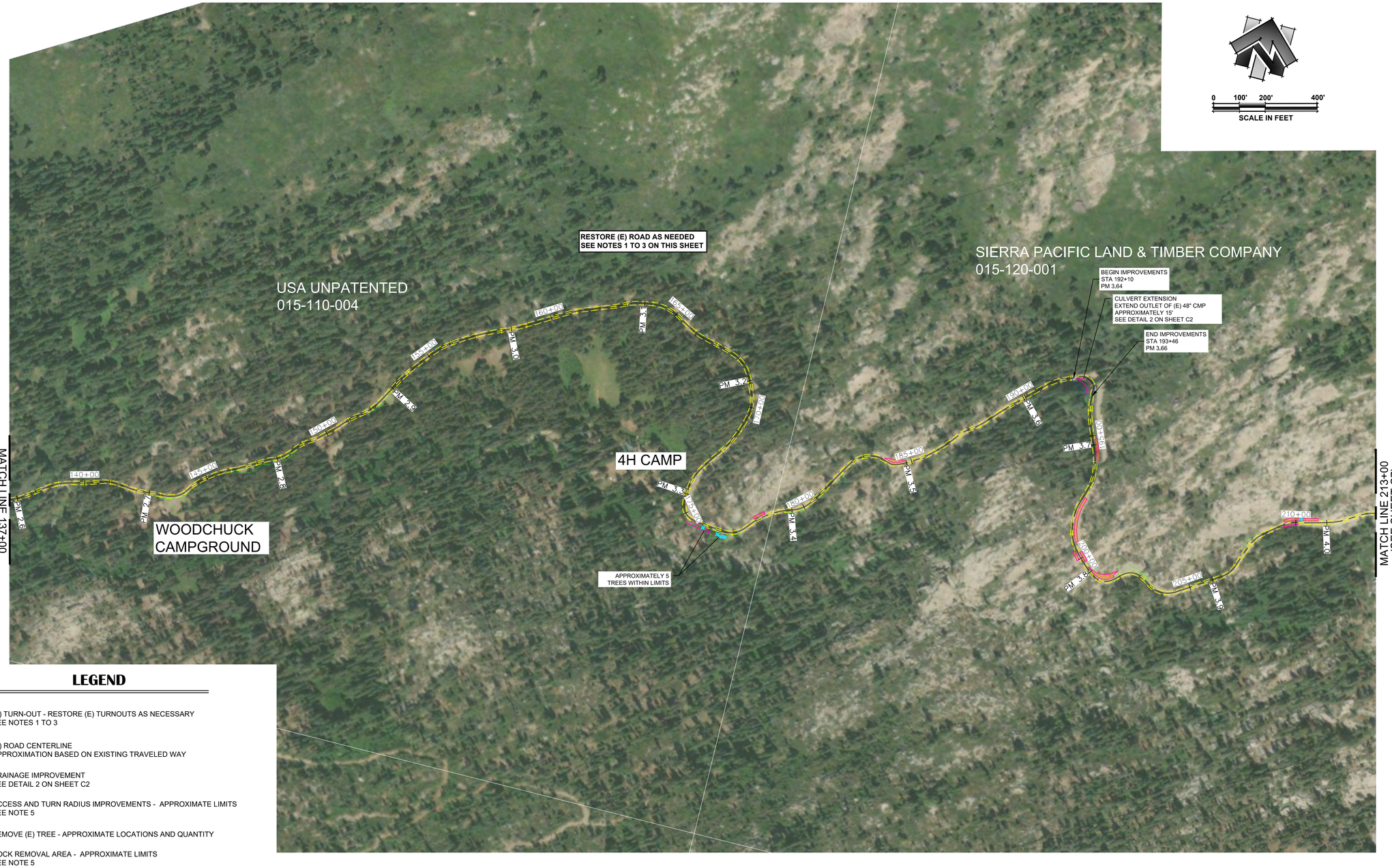
REY ENGINEERS, INC.
Civil Engineers | Land Surveyors | LiDAR
925 Juniper Street, Suite 200, Folsom, CA 95630
Phone (916) 356-3040 Fax (916) 356-3333

FORDYCE DAM SEEPAGE MITIGATION
ACCESS ROAD IMPROVEMENTS
PLAN - STA 75+00 TO 137+00 (PM 1.4 TO 2.6)
NEVADA COUNTY CALIFORNIA

DRAWING INFO
DATE: 3/30/2020
DRAFTER: CDH/RJR
DESIGNER: RJR
REVIEWER: RJR

PROJECT NO.
8635.038
SHEET NO. C5 OF C13

R:\8635 - SYBLON REID CONSTRUCTION\038 - Fordyce Dam Seepage Mitigation\10 - CAD Drawings\Improvement Plans\8635.038 C4-C10.dwg Mar 30, 2020 - 2:02pm, rruddick



LEGEND

- (E) TURN-OUT - RESTORE (E) TURNOUTS AS NECESSARY
  SEE NOTES 1 TO 3
- (E) ROAD CENTERLINE
  APPROXIMATION BASED ON EXISTING TRAVELED WAY
- DRAINAGE IMPROVEMENT
  SEE DETAIL 2 ON SHEET C2
- ACCESS AND TURN RADIUS IMPROVEMENTS - APPROXIMATE LIMITS
  SEE NOTE 5
- REMOVE (E) TREE - APPROXIMATE LOCATIONS AND QUANTITY
- ROCK REMOVAL AREA - APPROXIMATE LIMITS
  SEE NOTE 5

NOTES:

1. AS NEEDED, RESTORE (E) TURNOUTS AND ROADWAY. RESTORATION INCLUDES BLADING, DITCH MAINTENANCE, CULVERT REPLACEMENT, ROADWAY & STRUCTURE DRAINAGE MAINTENANCE, AND CLEARING. CLEARING INCLUDES REMOVAL OF DEAD TRESS THAT ARE DEEMED HAZARDOUS.
2. ALL RESTORATION WORK SHALL BE DONE IN ACCORDANCE WITH USDA FOREST SERVICE REGION 5 SPECIFICATIONS FOR MAINTENANCE OF ROADS (DATED 1997).
3. SEE DETAIL 1 ON SHEET C2 FOR TYPICAL ROAD SECTIONS SHOWING RESTORATION WORK ON (E) ROAD AND (E) TURNOUTS.
4. ACCESS AND TURN RADIUS IMPROVEMENTS SHOWN ARE DETERMINED USING TURNING MOVEMENTS AND TRACKING OF A SEMI TRUCK WITH A 48' LONG TRAILER (AASHTO DESIGN VEHICLE WB-62)
5. ROCK REMOVAL MAY INCLUDE DRILLING, SPLITTING, BLASTING, OR GRINDING. ROCK REMOVAL IS REQUIRED TO PROVIDE ADEQUATE ROAD WIDTH AND ACCESS AND TURN RADIUS IMPROVEMENTS.
6. ONLY PROPOSED DRAINAGE IMPROVEMENTS ARE SHOWN. (E) DRAINAGE FEATURES ARE EXCLUDED FOR CLARITY.

NO.	REVISION	DESCRIPTION	CHECKED BY	DATE

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

DRAWING SCALE
HOR. SCALE: AS NOTED
VERT. SCALE: N.T.S.

SYBLON REID CONTRACTORS

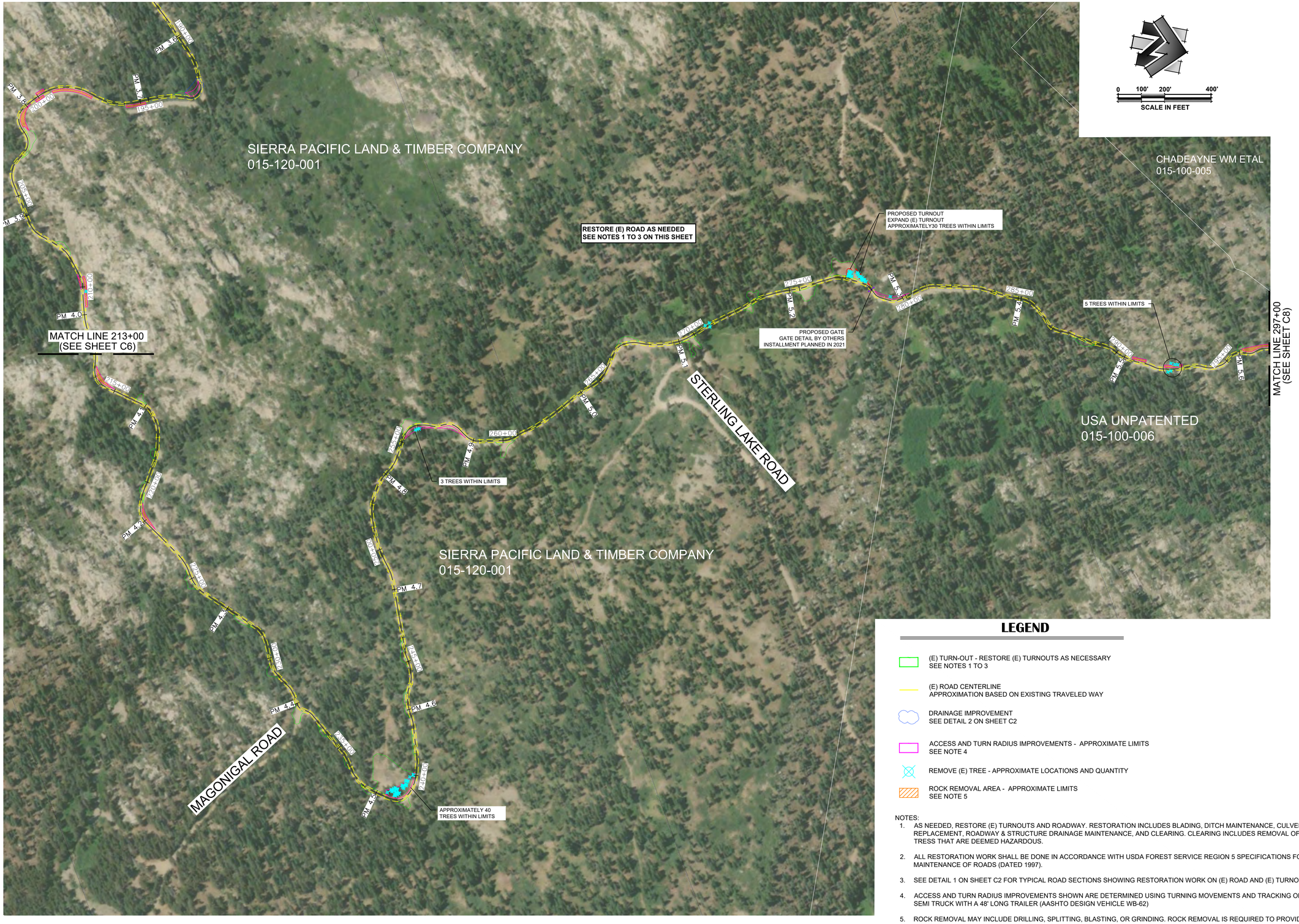
REY ENGINEERS, INC.
Civil Engineers | Land Surveyors | LiDAR
905 Sutter Street, Suite 200, Folsom, CA 95630
Phone (916) 358-3040 Fax (916) 358-3303

FORDYCE DAM SEEPAGE MITIGATION
ACCESS ROAD IMPROVEMENTS
PLAN - STA 137+00 TO 213+00 (PM 2.6 TO 4.0)
NEVADA COUNTY **CALIFORNIA**

DRAWING INFO
DATE: 3/30/2020
DRAFTER: CDH/RJR
DESIGNER: RJR
REVIEWER: RJR

PROJECT NO.
8635.038
SHEET NO. **C6** OF **C13**

R:\8635 – SYBLON REID CONSTRUCTION\038 – Fordyce Dam Seepage Mitigation\10 – CAD Drawings\Improvement Plans\8635.038 C4-C10.dwg Mar 30, 2020 – 2:02pm, rruddick



LEGEND

- (E) TURN-OUT - RESTORE (E) TURNOUTS AS NECESSARY SEE NOTES 1 TO 3
- (E) ROAD CENTERLINE APPROXIMATION BASED ON EXISTING TRAVELED WAY
- DRAINAGE IMPROVEMENT SEE DETAIL 2 ON SHEET C2
- ACCESS AND TURN RADIUS IMPROVEMENTS - APPROXIMATE LIMITS SEE NOTE 4
- REMOVE (E) TREE - APPROXIMATE LOCATIONS AND QUANTITY
- ROCK REMOVAL AREA - APPROXIMATE LIMITS SEE NOTE 5

NOTES:

1. AS NEEDED, RESTORE (E) TURNOUTS AND ROADWAY. RESTORATION INCLUDES BLADING, DITCH MAINTENANCE, CULVERT REPLACEMENT, ROADWAY & STRUCTURE DRAINAGE MAINTENANCE, AND CLEARING. CLEARING INCLUDES REMOVAL OF DEAD TRESS THAT ARE DEEMED HAZARDOUS.
2. ALL RESTORATION WORK SHALL BE DONE IN ACCORDANCE WITH USDA FOREST SERVICE REGION 5 SPECIFICATIONS FOR MAINTENANCE OF ROADS (DATED 1997).
3. SEE DETAIL 1 ON SHEET C2 FOR TYPICAL ROAD SECTIONS SHOWING RESTORATION WORK ON (E) ROAD AND (E) TURNOUTS.
4. ACCESS AND TURN RADIUS IMPROVEMENTS SHOWN ARE DETERMINED USING TURNING MOVEMENTS AND TRACKING OF A SEMI TRUCK WITH A 48' LONG TRAILER (AASHTO DESIGN VEHICLE WB-62)
5. ROCK REMOVAL MAY INCLUDE DRILLING, SPLITTING, BLASTING, OR GRINDING. ROCK REMOVAL IS REQUIRED TO PROVIDE ADEQUATE ROAD WIDTH AND ACCESS AND TURN RADIUS IMPROVEMENTS.
6. ONLY PROPOSED DRAINAGE IMPROVEMENTS ARE SHOWN. (E) DRAINAGE FEATURES ARE EXCLUDED FOR CLARITY.

NO.	REVISION DESCRIPTION	CHECKED BY	DATE
	PRELIMINARY DESIGN NOT FOR CONSTRUCTION		

DRAWING SCALE
HOR. SCALE: AS NOTED
VERT. SCALE: N.T.S.

SYBLON REID CONTRACTORS

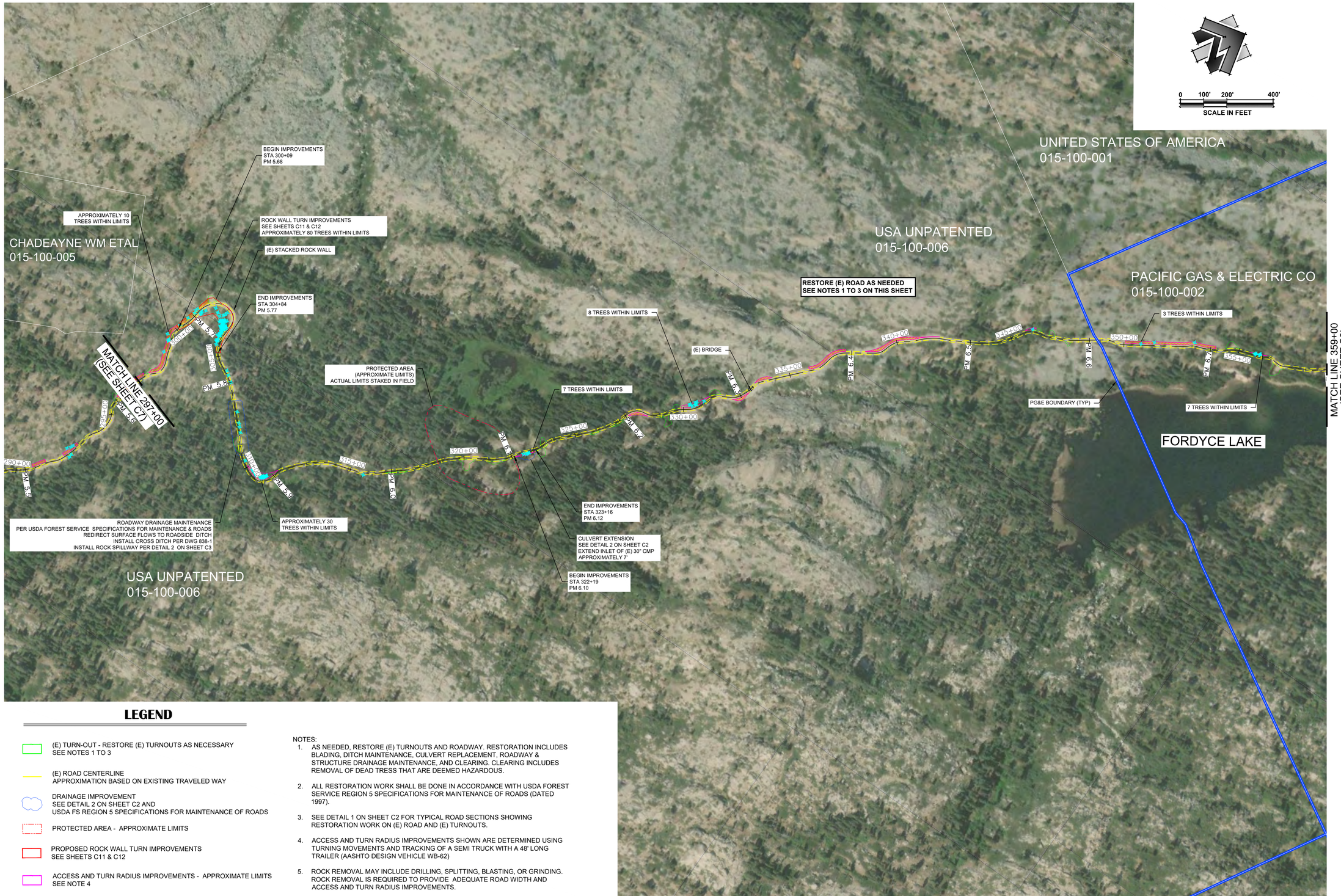
REY ENGINEERS, INC.
Civil Engineers | Land Surveyors | LiDAR
425 Sutter Street, Suite 200, Folsom, CA 95630
Phone: (916) 355-3047 Fax: (916) 355-3333

FORDYCE DAM SEEPAGE MITIGATION
ACCESS ROAD IMPROVEMENTS
PLAN - STA 213+00 TO 297+00 (PM 4.0 TO 5.6)
NEVADA COUNTY CALIFORNIA

DRAWING INFO
DATE: 3/30/2020
DRAFTER: CDH/RJR
DESIGNER: RJR
REVIEWER: RJR

PROJECT NO. 8635.038
SHEET NO. C7 OF C13

R:\8635 – SYBLON REID CONSTRUCTION\038 – Fordyce Dam Seepage Mitigation\10 – CAD Drawings\Improvement Plans\8635.038 C4-C10.dwg Mar 30, 2020 – 2:03pm, rruddick



LEGEND

- (E) TURN-OUT - RESTORE (E) TURNOUTS AS NECESSARY SEE NOTES 1 TO 3
- (E) ROAD CENTERLINE APPROXIMATION BASED ON EXISTING TRAVELED WAY
- DRAINAGE IMPROVEMENT SEE DETAIL 2 ON SHEET C2 AND USDA FS REGION 5 SPECIFICATIONS FOR MAINTENANCE OF ROADS
- PROTECTED AREA - APPROXIMATE LIMITS
- PROPOSED ROCK WALL TURN IMPROVEMENTS SEE SHEETS C11 & C12
- ACCESS AND TURN RADIUS IMPROVEMENTS - APPROXIMATE LIMITS SEE NOTE 4
- REMOVE (E) TREE - APPROXIMATE LOCATIONS AND QUANTITY
- ROCK REMOVAL AREA - APPROXIMATE LIMITS SEE NOTE 5

NOTES:

1. AS NEEDED, RESTORE (E) TURNOUTS AND ROADWAY. RESTORATION INCLUDES BLADING, DITCH MAINTENANCE, CULVERT REPLACEMENT, ROADWAY & STRUCTURE DRAINAGE MAINTENANCE, AND CLEARING. CLEARING INCLUDES REMOVAL OF DEAD TRESS THAT ARE DEEMED HAZARDOUS.
2. ALL RESTORATION WORK SHALL BE DONE IN ACCORDANCE WITH USDA FOREST SERVICE REGION 5 SPECIFICATIONS FOR MAINTENANCE OF ROADS (DATED 1997).
3. SEE DETAIL 1 ON SHEET C2 FOR TYPICAL ROAD SECTIONS SHOWING RESTORATION WORK ON (E) ROAD AND (E) TURNOUTS.
4. ACCESS AND TURN RADIUS IMPROVEMENTS SHOWN ARE DETERMINED USING TURNING MOVEMENTS AND TRACKING OF A SEMI TRUCK WITH A 48' LONG TRAILER (AASHTO DESIGN VEHICLE WB-62)
5. ROCK REMOVAL MAY INCLUDE DRILLING, SPLITTING, BLASTING, OR GRINDING. ROCK REMOVAL IS REQUIRED TO PROVIDE ADEQUATE ROAD WIDTH AND ACCESS AND TURN RADIUS IMPROVEMENTS.
6. ONLY PROPOSED DRAINAGE IMPROVEMENTS ARE SHOWN. (E) DRAINAGE FEATURES ARE EXCLUDED FOR CLARITY.

NO.	REVISION DESCRIPTION	CHECKED BY	DATE
	PRELIMINARY DESIGN NOT FOR CONSTRUCTION		

DRAWING SCALE
HOR. SCALE: AS NOTED
VERT. SCALE: N.T.S.

SYBLON REID CONTRACTORS

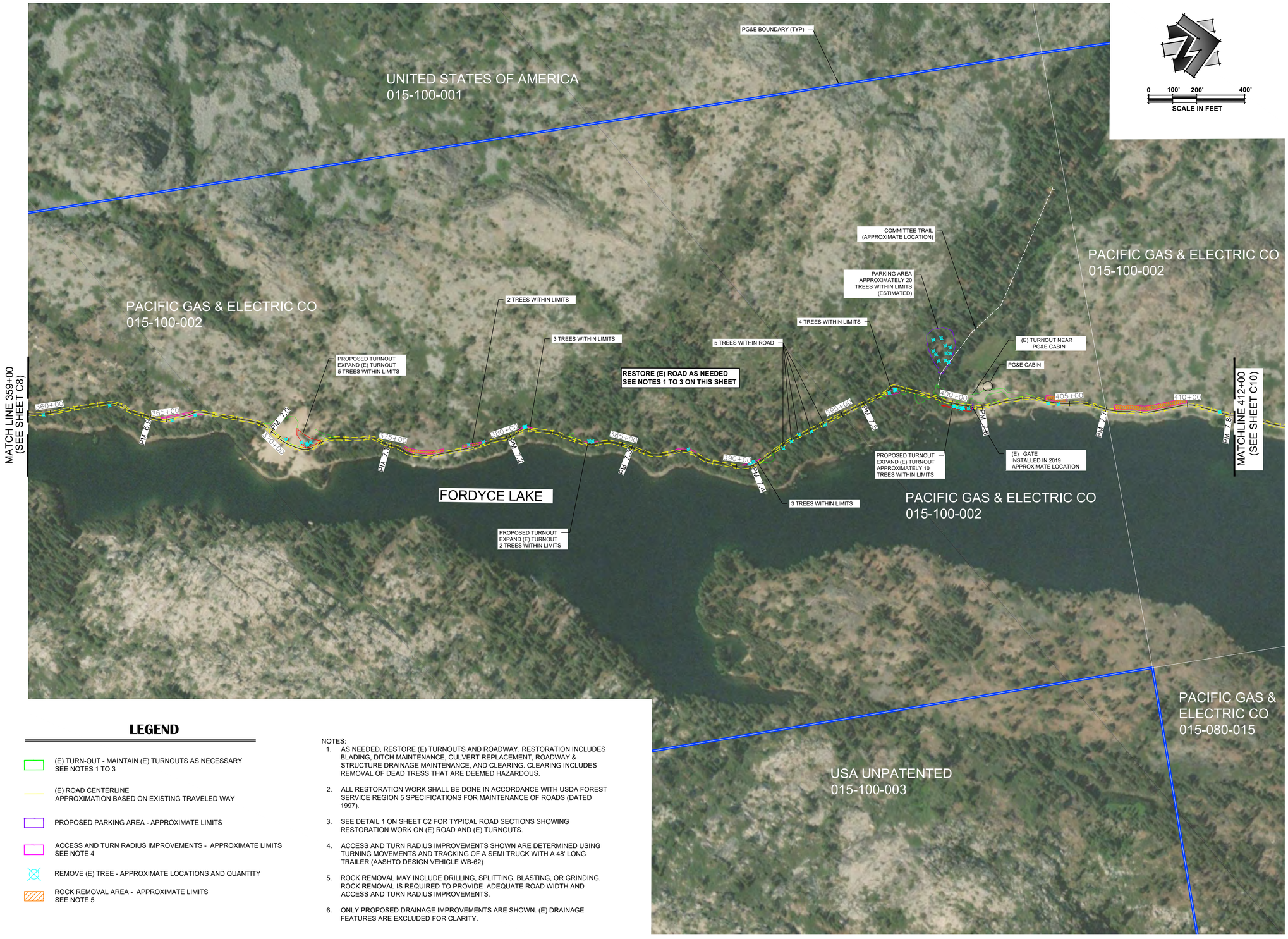
REY ENGINEERS, INC.
Civil Engineers | Land Surveyors | LiDAR
925 Juniper Street, Suite 200, Folsom, CA 95630
Phone (916) 358-3040 | Fax (916) 364-3303

FORDYCE DAM SEEPAGE MITIGATION
ACCESS ROAD IMPROVEMENTS
PLAN - STA 297+00 TO 359+00 (PM 5.6 TO 6.8)
NEVADA COUNTY CALIFORNIA

DRAWING INFO
DATE: 3/30/2020
DRAFTER: CDH/RJR
DESIGNER: RJR
REVIEWER: RJR

PROJECT NO. 8635.038
SHEET NO. C8 OF C13

R:\8635 – SYBLON REID CONSTRUCTION\038 – Fordyce Dam Seepage Mitigation\10 – CAD Drawings\Improvement Plans\8635.038 C4–C10.dwg Mar 30, 2020 – 2:03pm, rruddick



LEGEND

- (E) TURN-OUT - MAINTAIN (E) TURNOUTS AS NECESSARY SEE NOTES 1 TO 3
- (E) ROAD CENTERLINE APPROXIMATION BASED ON EXISTING TRAVELED WAY
- PROPOSED PARKING AREA - APPROXIMATE LIMITS
- ACCESS AND TURN RADIUS IMPROVEMENTS - APPROXIMATE LIMITS SEE NOTE 4
- REMOVE (E) TREE - APPROXIMATE LOCATIONS AND QUANTITY
- ROCK REMOVAL AREA - APPROXIMATE LIMITS SEE NOTE 5

NOTES:

1. AS NEEDED, RESTORE (E) TURNOUTS AND ROADWAY. RESTORATION INCLUDES BLADING, DITCH MAINTENANCE, CULVERT REPLACEMENT, ROADWAY & STRUCTURE DRAINAGE MAINTENANCE, AND CLEARING. CLEARING INCLUDES REMOVAL OF DEAD TRESS THAT ARE DEEMED HAZARDOUS.
2. ALL RESTORATION WORK SHALL BE DONE IN ACCORDANCE WITH USDA FOREST SERVICE REGION 5 SPECIFICATIONS FOR MAINTENANCE OF ROADS (DATED 1997).
3. SEE DETAIL 1 ON SHEET C2 FOR TYPICAL ROAD SECTIONS SHOWING RESTORATION WORK ON (E) ROAD AND (E) TURNOUTS.
4. ACCESS AND TURN RADIUS IMPROVEMENTS SHOWN ARE DETERMINED USING TURNING MOVEMENTS AND TRACKING OF A SEMI TRUCK WITH A 48' LONG TRAILER (AASHTO DESIGN VEHICLE WB-62)
5. ROCK REMOVAL MAY INCLUDE DRILLING, SPLITTING, BLASTING, OR GRINDING. ROCK REMOVAL IS REQUIRED TO PROVIDE ADEQUATE ROAD WIDTH AND ACCESS AND TURN RADIUS IMPROVEMENTS.
6. ONLY PROPOSED DRAINAGE IMPROVEMENTS ARE SHOWN. (E) DRAINAGE FEATURES ARE EXCLUDED FOR CLARITY.

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

DRAWING SCALE
HOR. SCALE: AS NOTED
VERT. SCALE: N.T.S.

SYBLON REID CONTRACTORS

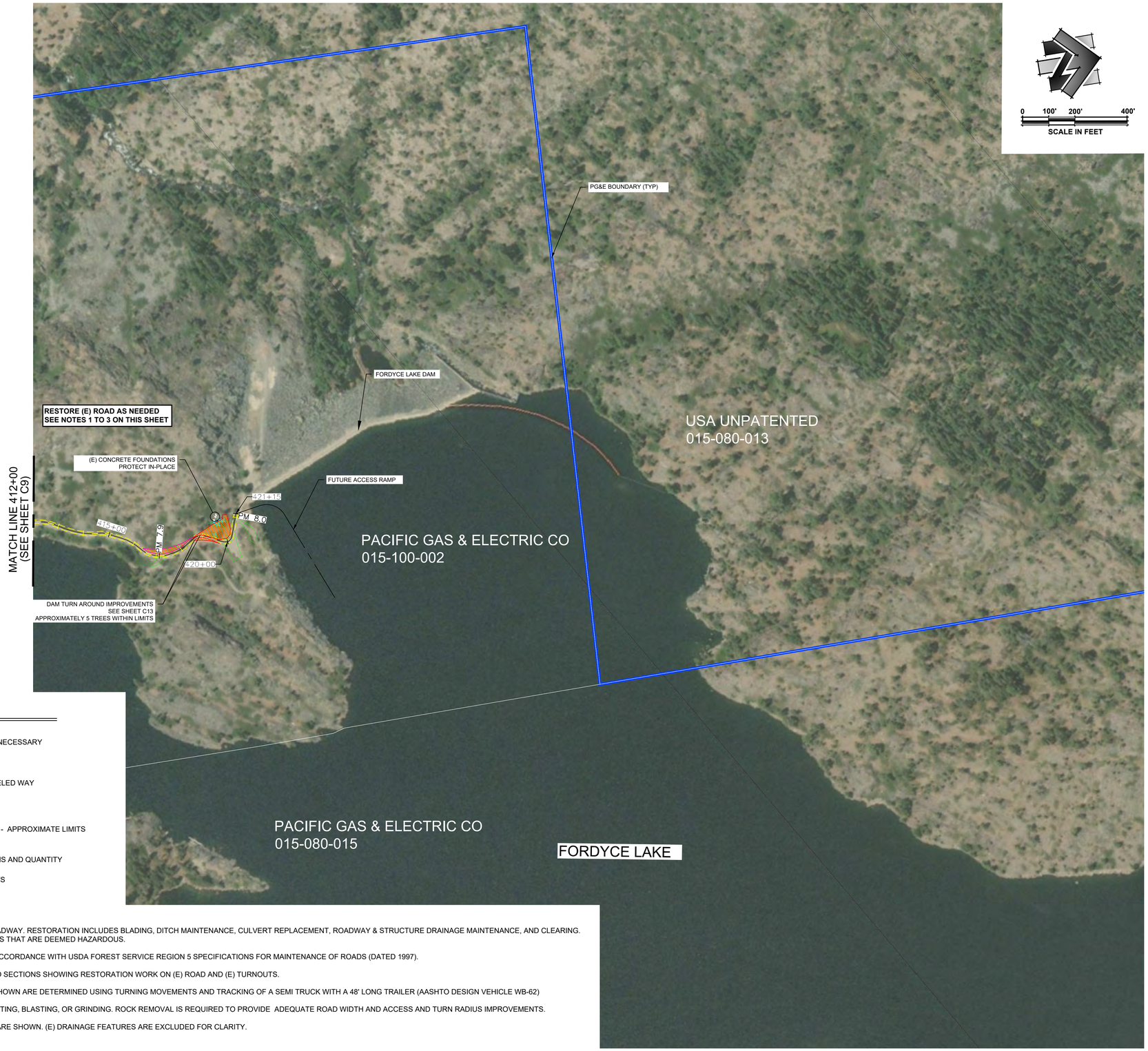
REY ENGINEERS, INC.
Civil Engineers | Land Surveyors | LiDAR
905 Jones Street, Suite 200, Folsom, CA 95630
Phone: (916) 353-3040 Fax: (916) 353-3333

FORDYCE DAM SEEPAGE MITIGATION
ACCESS ROAD IMPROVEMENTS
PLAN - STA 359+00 TO 414+00 (PM 6.8 TO 7.8)
NEVADA COUNTY CALIFORNIA

DRAWING INFO
DATE: 3/30/2020
DRAFTER: CDH/RJR
DESIGNER: RJR
REVIEWER: RJR

PROJECT NO.
8635.038
SHEET NO. C9 OF C13

R:\8635 – SYBLON REID CONSTRUCTION\038 – Fordyce Dam Seepage Mitigation\10 – CAD Drawings\Improvement Plans\8635.038 C4–C10.dwg Mar 30, 2020 – 2:03pm, rruddick



LEGEND

- (E) TURN-OUT - MAINTAIN (E) TURNOUTS AS NECESSARY SEE NOTES 1 TO 3
- (E) ROAD CENTERLINE APPROXIMATION BASED ON EXISTING TRAVELED WAY
- PROPOSED TURN-AROUND AT DAM SEE SHEET C13
- ACCESS AND TURN RADIUS IMPROVEMENTS - APPROXIMATE LIMITS SEE NOTE 4
- REMOVE (E) TREE - APPROXIMATE LOCATIONS AND QUANTITY
- ROCK REMOVAL AREA - APPROXIMATE LIMITS SEE NOTE 5

NOTES:

1. AS NEEDED, RESTORE (E) TURNOUTS AND ROADWAY. RESTORATION INCLUDES BLADING, DITCH MAINTENANCE, CULVERT REPLACEMENT, ROADWAY & STRUCTURE DRAINAGE MAINTENANCE, AND CLEARING. CLEARING INCLUDES REMOVAL OF DEAD TRESS THAT ARE DEEMED HAZARDOUS.
2. ALL RESTORATION WORK SHALL BE DONE IN ACCORDANCE WITH USDA FOREST SERVICE REGION 5 SPECIFICATIONS FOR MAINTENANCE OF ROADS (DATED 1997).
3. SEE DETAIL 1 ON SHEET C2 FOR TYPICAL ROAD SECTIONS SHOWING RESTORATION WORK ON (E) ROAD AND (E) TURNOUTS.
4. ACCESS AND TURN RADIUS IMPROVEMENTS SHOWN ARE DETERMINED USING TURNING MOVEMENTS AND TRACKING OF A SEMI TRUCK WITH A 48' LONG TRAILER (AASHTO DESIGN VEHICLE WB-62)
5. ROCK REMOVAL MAY INCLUDE DRILLING, SPLITTING, BLASTING, OR GRINDING. ROCK REMOVAL IS REQUIRED TO PROVIDE ADEQUATE ROAD WIDTH AND ACCESS AND TURN RADIUS IMPROVEMENTS.
6. ONLY PROPOSED DRAINAGE IMPROVEMENTS ARE SHOWN. (E) DRAINAGE FEATURES ARE EXCLUDED FOR CLARITY.

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

DRAWING SCALE
HOR. SCALE: AS NOTED
VERT. SCALE: N.T.S.

SYBLON REID CONTRACTORS

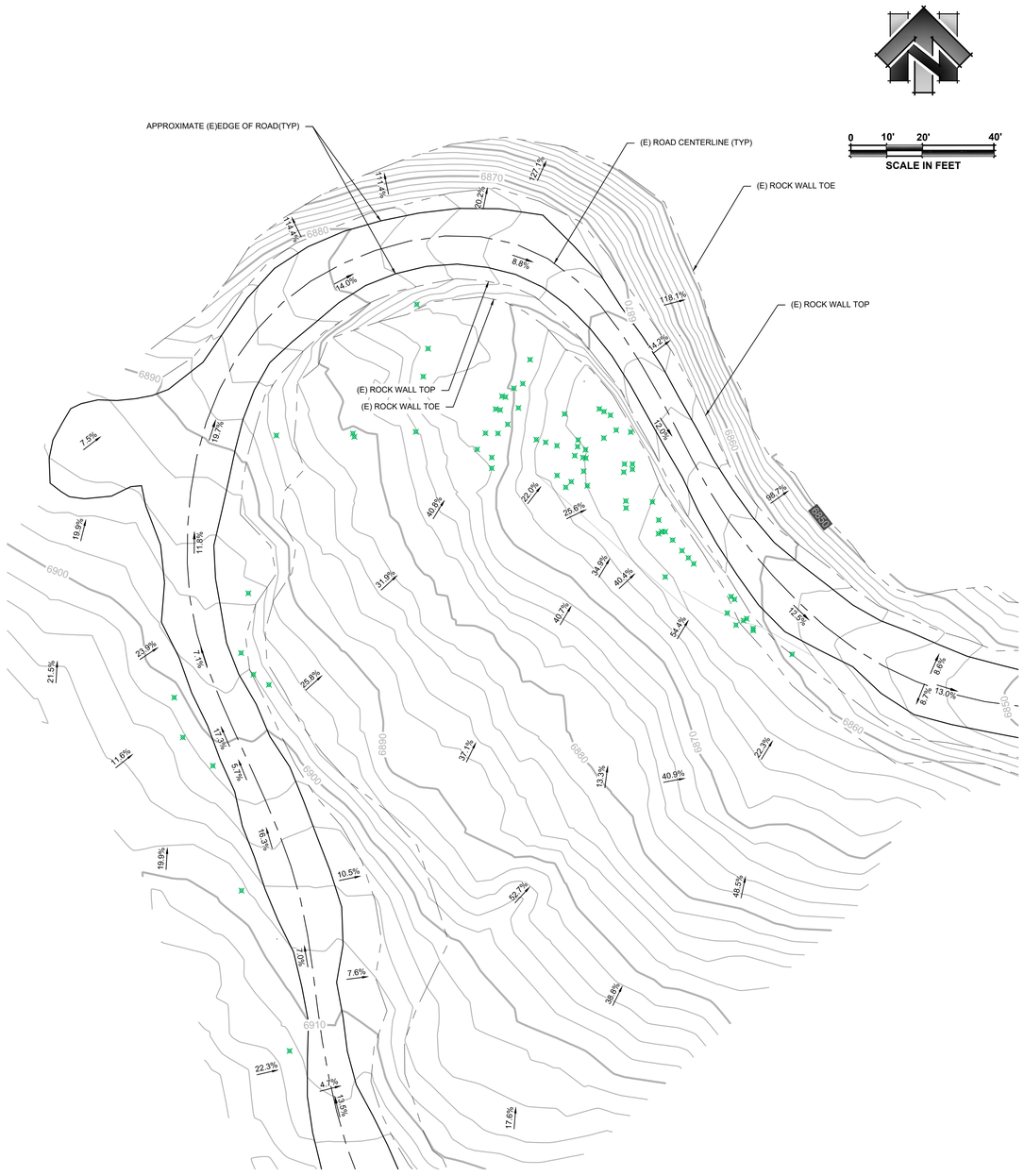
R.E.Y. ENGINEERS, INC.
Civil Engineers | Land Surveyors | LIDAR
905 Sutter Street, Suite 200 Folsom, CA 95630
Phone: (916) 366-3040 Fax: (916) 366-3303

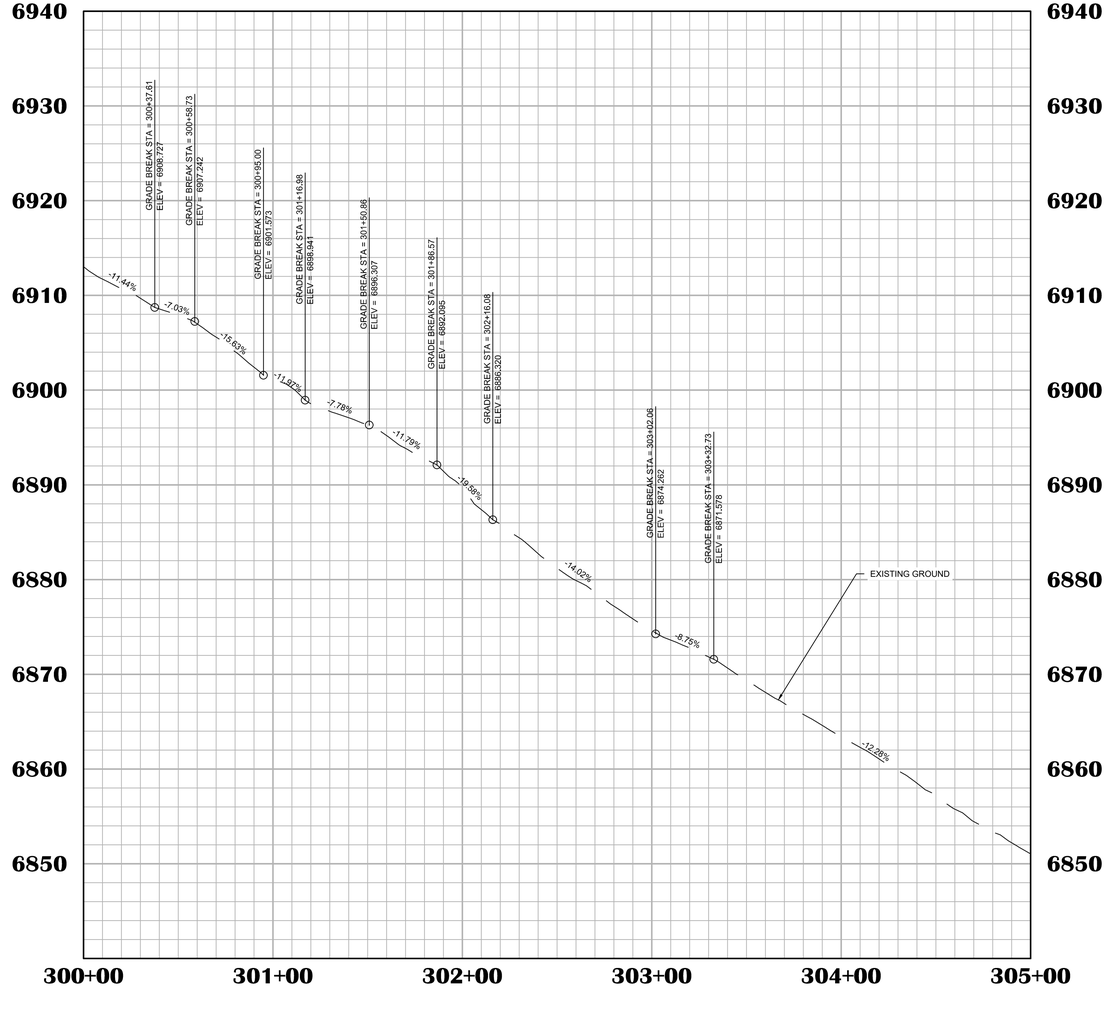
FORDYCE DAM SEEPAGE MITIGATION
ACCESS ROAD IMPROVEMENTS
PLAN - STA 414+00 TO DAM (PM 7.8 TO 8.0)
NEVADA COUNTY CALIFORNIA

DRAWING INFO
DATE: 3/30/2020
DRAFTER: CDH/RJR
DESIGNER: RJR
REVIEWER: RJR

PROJECT NO. 8635.038
SHEET NO. C10 OF C13

R:\8635 – SYBLON REID CONSTRUCTION\038 – Fordyce Dam Seepage Mitigation\10 – CAD Drawings\Improvement Plans\8635.038 C4-C10.dwg Mar 30, 2020 – 2:03pm, rruddick





(E) ROAD CENTERLINE

LEGEND

SCALED FOR CLARITY

- (E) EDGE OF ROAD
- (E) TREE - APPROXIMATE LOCATION
- (E) TOP/TOE OF SLOPE

NOTES:

1. EXISTING SURFACE WAS DEVELOPED BASED ON FIELD SURVEYS PERFORMED IN AUGUST 2019 AND MAY HAVE CHANGED.
2. APPROXIMATELY 80 TREES ESTIMATED TO BE REMOVED FROM STA 300+00 TO 304+84. TREES IDENTIFIED ARE THOSE ESTIMATED TO HAVE A DIAMETER GREATER THAN 4" NEAR THE BASE. DETERMINATION OF THE TREES THAT REQUIRE REMOVAL IS BASED ON THE IMPROVEMENTS SHOWN ON SHEET C11.

NO.	REVISION DESCRIPTION	CHECKED BY	DATE

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

DRAWING SCALE
HOR. SCALE: AS NOTED
VERT. SCALE: N.T.S.

SYBLON REID CONTRACTORS

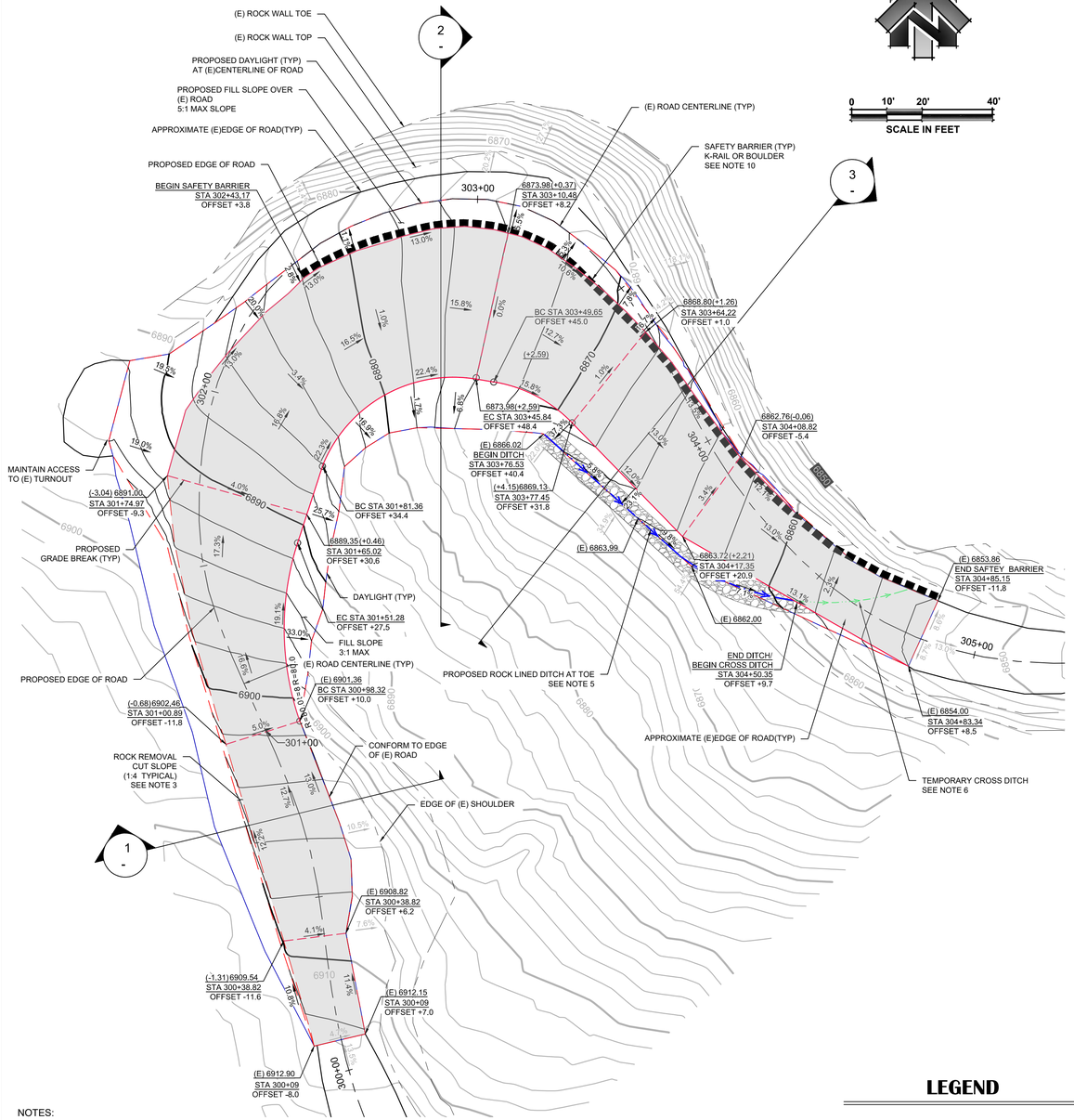
REYENGINEERS, INC.
Civil Engineers | Land Surveyors | LIDAR
405 Sutter Street, Suite 200, Folsom, CA 95630
Phone: (916) 353-3047 Fax: (916) 353-3333

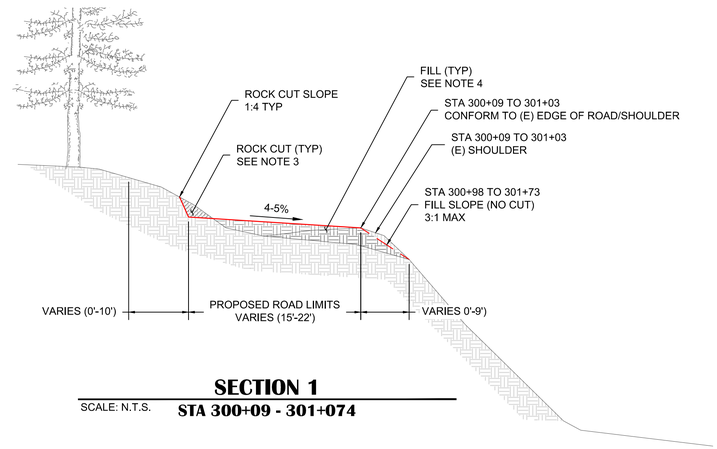
FORDYCE DAM SEEPAGE MITIGATION
ACCESS ROAD IMPROVEMENTS
ROCK WALL IMPROVEMENTS 1
EXISTING CONDITIONS & TREE REMOVAL
NEVADA COUNTY CALIFORNIA

DRAWING INFO
DATE: 3/30/2020
DRAFTER: CDH/RJR
DESIGNER: RJR
REVIEWER: RJR

PROJECT NO.
8635.038
SHEET NO. C11 OF C13

R:\8635 – SYBLON REID CONSTRUCTION\038 – Fordyce Dam Seepage Mitigation\10 – CAD Drawings\8635.035 – ROCK WALL.dwg Mar 30, 2020 – 2:03pm, rruddick

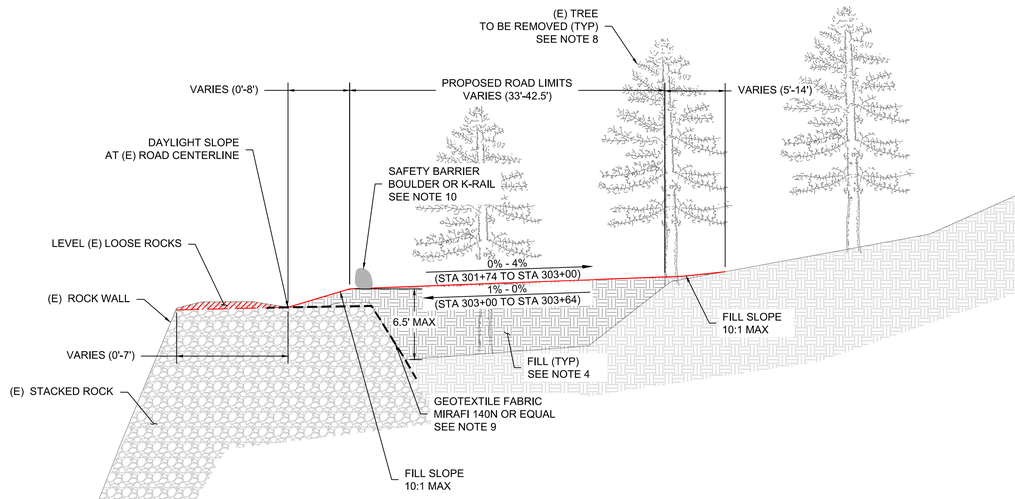




SECTION 1

SCALE: N.T.S.

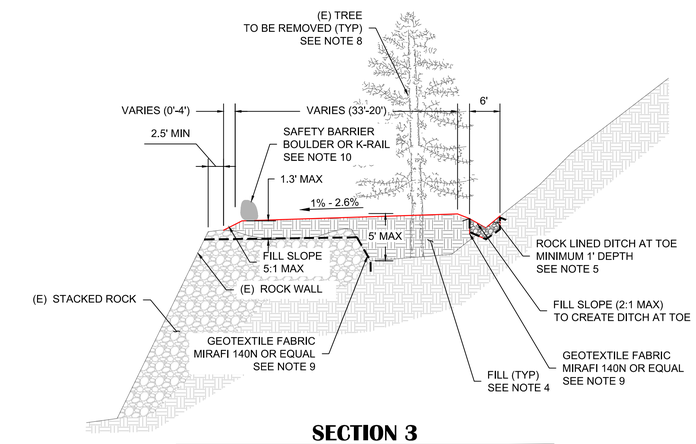
STA 300+09 - 301+074



SECTION 2

STA 301+74 TO 303+64

SCALE: N.T.S.



SECTION 3

SCALE: N.T.S.

STA 303+64 TO 304+84

NOTES:

1. DIFFERENCE FROM EXISTING GRADE TO FINISH GRADE IS SHOWN IN PARENTHESIS
2. ACCESS AND TURN RADIUS IMPROVEMENTS SHOWN ARE DETERMINED USING TURNING MOVEMENTS AND TRACKING OF A SEMI TRUCK WITH A 48' LONG TRAILER (AASHTO DESIGN VEHICLE WB-62).
3. CUT MAY REQUIRE ROCK REMOVAL. ESTIMATED CUT VOLUME FROM EXISTING GROUND TO FINISH GRADE IS 310 CUBIC YARDS.
4. FILL SHALL COMPROMISE OF SATISFACTORY OR NATIVE MATERIALS AS SPECIFIED IN SECTION 312323 (FILL AND BACKFILL) OF THE PROJECT SPECIFICATIONS. DETERMINATION OF FILL MATERIAL'S CONFORMANCE WITH SPECIFICATION SHALL BE DONE BY CONTRACTOR. TOP 6" OF ROAD SHALL BE 1.5" CLASS 2 AB. ESTIMATED FILL VOLUME FROM EXISTING GROUND TO FINISH GRADE IS 610 CUBIC YARDS.
5. INSTALL ROADSIDE DITCH AT TOE OF SLOPE FROM STA 303+76 TO 304+50 WITH ROCK PROTECTION. ROCK PROTECTION SHALL BE NO. 2 BACKING AT A MINIMUM DEPTH OF 1' WITH GEOTEXTILE LINING. GEOTEXTILE SHALL BE MIRAFI 140N OR APPROVED EQUAL INSTALLED PER MANUFACTURER'S GUIDELINES.
6. DURING SEASONAL WINTERIZATION OF ROAD, INSTALL TEMPORARY CROSS DITCH PER USDA FOREST SERVICE REGION 5 SPECIFICATIONS OF MAINTENANCE OF ROADS DRAWING 838-1.
7. EXISTING SURFACE WAS DEVELOPED BASED ON FIELD SURVEYS PERFORMED IN AUGUST 2019 AND MAY HAVE CHANGED.
8. APPROXIMATELY 80 TREES ESTIMATED TO BE REMOVED FROM STA 300+00 TO 304+84 . TREES TO BE REMOVED ARE SHOWN ON SHEET 1 OF THIS EXHIBIT.
9. INSTALL GEOTEXTILE FABRIC BETWEEN INTERFACE OF EXISTING ROCK WALL AND PROPOSED FILL. GEOTEXTILE SHALL BE MIRAFI 140N OR APPROVED EQUAL INSTALLED PER MANUFACTURER'S GUIDELINES.
10. SAFETY BARRIER SHALL BE K-RAIL OR BOULDER AND BE PLACED AT INSIDE OR OUTSIDE THE EDGE OF THE ROAD AS SHOWN ON PLANS.

LEGEND

- PROPOSED ROAD LIMITS
- (E) EDGE OF ROAD
- PROPOSED EDGE OF ROAD
- PROPOSED GRADE BREAK
- PROPOSED DAYLIGHT
- PROPOSED CROSS DITCH (SEE NOTE 6)
- PROPOSED DITCH AT TOE (SEE NOTE 5)
- FINISH GRADE MAJOR CONTOUR (10')
- FINISH GRADE MINOR CONTOUR (2')
- SAFETY BARRIER K-RAIL OR BOULDER

NO.	REVISION DESCRIPTION	CHECKED BY	DATE
	PRELIMINARY DESIGN NOT FOR CONSTRUCTION		

DRAWING SCALE
HOR. SCALE: AS NOTED
VERT. SCALE: N.T.S.

SYBLON REID CONTRACTORS

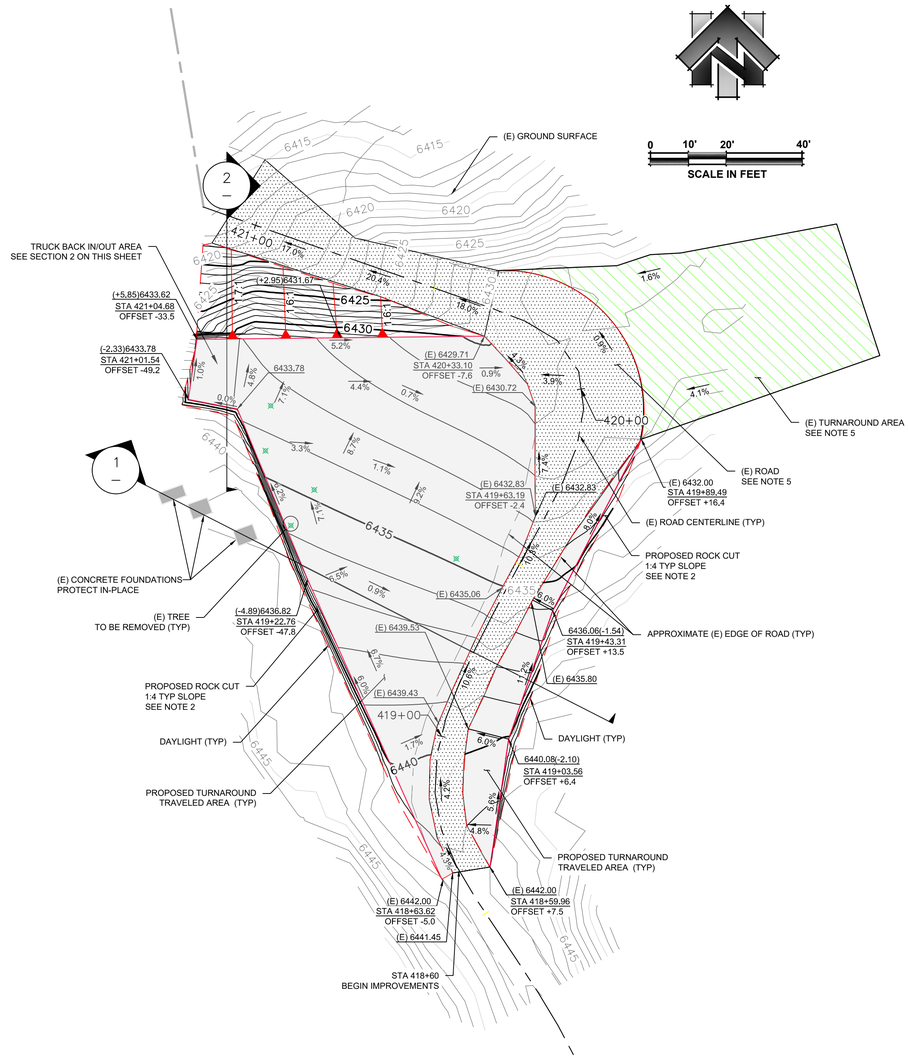
REY ENGINEERS, INC.
Civil Engineers | Land Surveyors | LiDAR
425 Salmon Street, Suite 200, Fulton, CA 95439
Phone (707) 525-3040 Fax (707) 525-3303

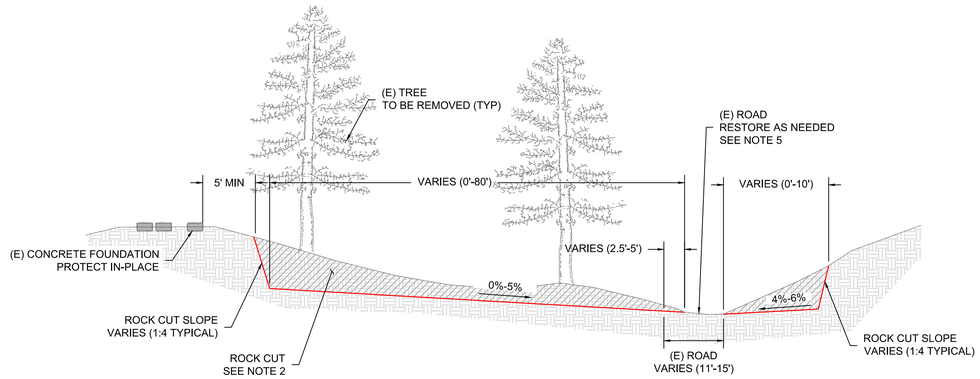
FORDYCE DAM SEEPAGE MITIGATION
ACCESS ROAD IMPROVEMENTS
ROCK WALL IMPROVEMENTS 2
PROPOSED IMPROVEMENTS
NEVADA COUNTY CALIFORNIA

DRAWING INFO
DATE: 3/30/2020
DRAFTER: CDH/RJR
DESIGNER: RJR
REVIEWER: RJR

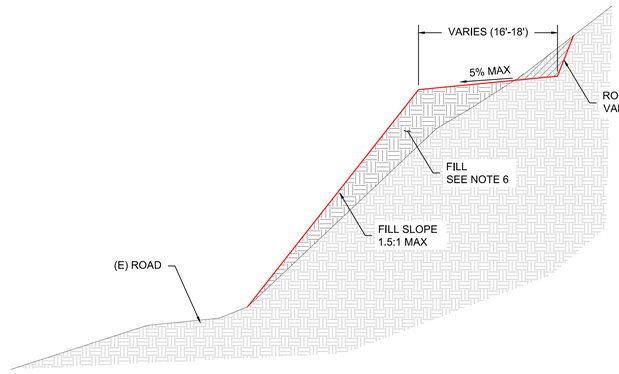
PROJECT NO. 8635.038
SHEET NO. C12 OF C13

R:\8635 - SYBLON REID CONSTRUCTION\038 - Fordyce Dam Seepage Mitigation\10 - CAD Drawings\8635.035 - ROCK WALL.dwg Mar 30, 2020 - 2:03pm, rruddick





SECTION 1
STA 418+60 TO 420+40 NTS



SECTION 2
TRUCK BACK IN/OUT AREA NTS

NOTES:

1. CUTS AND FILLS FROM FINISHED GROUND TO EXISTING GROUND ARE SHOWN IN PARENTHESIS.
2. CUT MAY REQUIRE ROCK REMOVAL. GRADES AND CUTS/FILLS SHOWN MAY BE ADJUSTED IN FIELD TO REDUCE ROCK REMOVAL & FILLS WHILE STILL MAINTAINING A DRIVABLE SURFACE TO ALLOW FOR A TRUCK TO TURNAROUND. ESTIMATED CUT VOLUME FROM EXISTING GROUND SURFACE TO FINISH GRADE SURFACE SHOWN IN THIS SHEET IS 490 CUBIC YARDS.
3. EXISTING SURFACE WAS DEVELOPED BASED ON FIELD SURVEYS PERFORMED IN AUGUST 2019 AND MAY HAVE CHANGED.
4. APPROXIMATELY 5 TREES ESTIMATED TO BE REMOVED FROM STA 418+60 TO 420+24. TREES IDENTIFIED ARE THOSE ESTIMATED TO HAVE A DIAMETER GREATER THAN 4" NEAR THE BASE. DETERMINATION OF THE TREES THAT REQUIRE REMOVAL IS BASED ON THE LIMITS OF THE IMPROVEMENTS SHOWN ON THIS SHEET.
5. RESTORE (E) TURNOUT AND (E) ROAD AS NEEDED. GRADE AREA TO PROVIDE DRIVABLE SURFACE & MAINTAIN (E) DRAINAGE PATTERN & GENERAL CROSS SLOPES.
6. FILL SHALL COMPROMISE OF SATISFACTORY OR NATIVE MATERIALS AS SPECIFIED IN SECTION 312323 (FILL AND BACKFILL) OF THE PROJECT SPECIFICATIONS. DETERMINATION OF FILL MATERIAL'S CONFORMANCE WITH SPECIFICATION SHALL BE DONE BY CONTRACTOR. TOP 6" OF ROAD SHALL BE 1.5" CLASS 2 AB. ESTIMATED FILL VOLUME FROM EXISTING GROUND TO FINISH GRADE IS 70 CUBIC YARDS.

LEGEND

- PROPOSED TURNAROUND TRAVELED AREA
- EXISTING TURNAROUND AREA - RESTORE (E) TURNOUT AS NECESSARY (SEE NOTE 5)
- EXISTING ROAD - RESTORE (E) ROAD AS NECESSARY (SEE NOTE 5)
- PROPOSED FILL SLOPE (1.5:1 MAX)
- PROPOSED DAYLIGHT / TURNAROUND IMPROVEMENT LIMITS
- (E) EDGE OF ROAD
- FINISH GRADE MAJOR CONTOUR (5')
- FINISH GRADE MINOR CONTOUR (1')
- REMOVE (E) TREE - APPROXIMATE LOCATION (SEE NOTE 4)

NO.	REVISION	DESCRIPTION	CHECKED BY	DATE
		PRELIMINARY DESIGN NOT FOR CONSTRUCTION		

DRAWING SCALE
HOR. SCALE: AS NOTED
VERT. SCALE: N.T.S.

SYBLON REID CONTRACTORS

REY ENGINEERS, INC.
Civil Engineers | Land Surveyors | LiDAR
425 Jones Street, Suite 200, Folsom, CA 95630
Phone (916) 355-3047 Fax (916) 355-3303

FORDYCE DAM SEEPAGE MITIGATION
ACCESS ROAD IMPROVEMENTS
DAM TURNAROUND IMPROVEMENTS
NEVADA COUNTY CALIFORNIA

DRAWING INFO
DATE: 3/30/2020
DRAFTER: CDH/RJR
DESIGNER: RJR
REVIEWER: RJR

PROJECT NO.
8635.038
SHEET NO. C13 OF C13

R:\8635 – SYBLON REID CONSTRUCTION\038 – Fordyce Dam Seepage Mitigation\10 – CAD Drawings\8635.035 – TURNAROUND.dwg Mar 30, 2020 – 2:03pm, rruddick

Appendix B

Mitigation Monitoring and Reporting Plan

The State Water Resources Control Board (State Water Board) is the lead agency under the California Environmental Quality Act (CEQA) for the Fordyce Dam Seepage Mitigation Project (Proposed Project). In conjunction with approval of this Proposed Project, the State Water Board adopts this Mitigation Monitoring and Reporting Program (MMRP) for implementation of mitigation measures (MMs) for the Proposed Project to comply with Public Resources Code section 21081.6, subdivision (a), and State CEQA Guidelines sections 15091, subdivision (d), and 15097.

PURPOSE

It is important that significant impacts from the Proposed Project are mitigated to the maximum extent feasible. The purpose of an MMRP is to ensure compliance and implementation of MMs; this MMRP shall be used as a working guide for implementation, monitoring, and reporting for the Proposed Project MMs.

ENFORCEMENT AND COMPLIANCE

The State Water Board is responsible for enforcing this MMRP. The Project Applicant is responsible for the successful implementation of and compliance with the MMs identified in this MMRP. This includes all field personnel and contractors working for the Applicant.

MONITORING

The State Water Board staff may delegate duties and responsibilities for monitoring to other environmental monitors or consultants as necessary. Some monitoring responsibilities may be assumed by other agencies, such as affected jurisdictions. The State Water Board and/or its designee shall ensure that qualified environmental monitors are assigned to the Proposed Project.

Environmental Monitors. To ensure implementation and success of the MMs, an environmental monitor must be on-site during all Proposed Project activities that have the potential to create significant environmental impacts or impacts for which mitigation is required. Along with State Water Board staff, the environmental monitor(s) are responsible for:

- Ensuring that the Applicant has obtained all applicable agency reviews and approvals;
- Coordinating with the Applicant to integrate the mitigation monitoring procedures during Project implementation; and
- Ensuring that the MMRP is followed.

The environmental monitor shall immediately report any deviation from the procedures identified in this MMRP to State Water Board staff or its designee. State Water Board staff or its designee shall approve any deviation and its correction.

Workforce Personnel. Implementation of the MMRP requires the full cooperation of Proposed Project personnel and supervisors. Many of the MMs require action from site supervisors and their crews. The following actions shall be taken to ensure successful implementation.

- Relevant mitigation procedures shall be written into contracts between the Applicant and any contractors.

General Reporting Procedures. A monitoring record form shall be submitted to the Applicant, and once the Proposed Project is complete, a compilation of all the logs shall be submitted to the State Water Board staff. State Water Board staff or its designated environmental monitor shall develop a checklist to track all procedures required for each MM and shall ensure that the timing specified for the procedures is followed. The environmental monitor shall note any issues that may occur and take appropriate action to resolve them.

Public Access to Records. Records and reports are open to the public and would be provided upon request.

MITIGATION MONITORING TABLE

This section presents the mitigation monitoring table (Table B-1) for the following environmental disciplines: Aesthetics, Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Hazards and Hazardous Materials, Hydrology and Water Quality, Tribal Cultural Resources, and Wildfire. All other environmental disciplines were found to have less than significant or no impacts and are, therefore, not included below. The table lists the following information by column:

- Potential Impact;
- Mitigation Measure (full text of the measure);
- Location (where impact occurs and MM should be applied);
- Monitoring/Reporting Action (action to be taken by monitor or lead agency);
- Timing (before, during, or after construction; during operation, etc.);
- Responsible Party; and
- Effectiveness Criteria (how the agency can know if the measure is effective).

Table B-1. Mitigation Monitoring and Reporting Program

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
Aesthetics						
Create a new source of substantial light or glare	**MM AES-1: Minimize Nighttime Lighting Effects.** Night-lighting during project construction will be shielded and directed downward, toward the work area, to minimize light trespass to adjacent areas.	Fordyce Dam Work Area	Observe nighttime lighting positioning for compliance	Throughout construction	Applicant and State Water Board	Off-site light spillage minimized
Air Quality						
Cumulative criteria pollutant increases	**MM AQ-1: Mitigations for Use during Project Design and Construction.** i) Alternatives to open burning of vegetative material will be used unless otherwise deemed infeasible by the District. Among suitable alternatives are chipping, mulching, or conversion to biomass fuel. ii) Temporary traffic control shall be provided during all phases of the construction to improve traffic flow as deemed appropriate by local transportation agencies and/or Caltrans.	Fordyce Dam Work Area	Observe during construction for compliance	Throughout construction	Applicant and State Water Board	Reduction in construction-related emissions is achieved

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	iii) Construction activities shall be scheduled to direct traffic flow to off-peak hours as much as practicable.					
	MM AQ-2: Recommended Dust Control Plan Conditions. i) The applicant would be responsible for ensuring that all adequate dust control measures are implemented in a timely manner during all phases of project development and construction. ii) All material excavated, stockpiled, or graded would be sufficiently watered, treated, or covered to prevent fugitive dust from leaving the property boundaries and causing a public nuisance or a violation of an ambient air standard. Watering should occur at least twice daily, with complete site coverage. iii) All areas with vehicle traffic would be watered or have dust palliative applied as necessary for regular stabilization of dust emissions.	Fordyce Dam Work Area	Observe during construction for compliance	Throughout construction	Applicant and State Water Board	Reduction in fugitive dust generation is achieved

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	iv) All on-site vehicle traffic would be limited to a speed of 15 mph on unpaved roads. v) All land clearing, grading, earth moving, or excavation activities on a project would be suspended as necessary to prevent excessive windblown dust when winds are expected to exceed 20 mph. vi) All inactive portions of the development site would be covered, seeded, or watered until a suitable cover is established. Alternatively, the applicant may apply County-approved nontoxic soil stabilizers (according to manufacturers' specifications) to all inactive construction areas (previously graded areas which remain inactive for 96 hours) in accordance with the local grading ordinance.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	vii) All material transported off-site would be either sufficiently watered or securely covered to prevent public nuisance, and there must be a minimum of 6 inches of freeboard in the bed of the transport vehicle. viii) Paved streets adjacent to the project would be swept or washed at the end of each day, or more frequently if necessary, to remove excessive or visibly raised accumulations of dirt and/or mud which may have resulted from activities at the project site. ix) Prior to the completion of construction activities, the applicant would re-establish ground cover on the site through seeding and watering in accordance with the local grading ordinance.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
Biological Resources						
Potential disturbance/ impacts to any species identified as a candidate, sensitive, or special status species	**MM BIO-1: Avoid Impacts on Special-Status Plants.** A qualified botanist will conduct focused botanical surveys in the areas at seven locations, including three culvert extensions and four drainage dips that were not covered by 2019 surveys during the appropriate phenotypic period. If any special-status plant species are identified during these surveys, the following measures will be implemented: a) If ground disturbance is planned to occur in areas documented as containing populations of special-status species, the top 6 inches of soil in these areas will be stockpiled during construction and replaced following construction.	Fordyce Dam Work Area	Project schedule/ Document site visit/Review and confirm Survey	Prior to construction	Applicant and State Water Board	Avoid special-status plants by scheduling pre-construction surveys Stockpile top 6 inches/ collect seeds of applicable species or set up flagging if present

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	b) If it is not feasible to retain the top 6 inches of soil in areas where sensitive plant species will be affected, then qualified biologists will collect seeds of the applicable sensitive species during the appropriate blooming season, for reseeding temporarily affected areas as part of site restoration. c) If feasible, work activities in habitats occupied by special-status plants will occur before germination or following special-status plant species seed production, to allow maximum seed set and avoidance of direct mortality. Work in habitats occupied by special-status plants will not occur from germination through seed set, based on the special-status species present in the project area.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	d) In the event that construction cannot avoid populations of special-status plant species during the growing/ blooming season, special-status plant populations will be flagged before construction. The timing of the flagging efforts will correspond with the blooming period when the species is most conspicuous and easily recognizable.					
	MM BIO-2: Implement Standard Best Management Practices. The following standard BMPs will be implemented: a) All heavy equipment, vehicles, and construction activities will be confined to existing roads, road shoulders, and disturbed/developed or designated work areas. Work areas will be limited to what is absolutely necessary for construction.	Fordyce Dam Work Area	Incorporation of Best Management Practices	During construction	Applicant and State Water Board	Impacts to species are further avoided with incorporation of Best Management Practices

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	b) Vehicular speeds will be limited to 15 miles per hour on unpaved roads. c) Control measures for erosion, excessive sedimentation, and sources of turbidity will be implemented and in place prior to the commencement of, during, and after any ground clearing activities, excavation, or any other Project activities that could result in erosion or sediment discharges to surface water. d) Caution will be used when handling and or storing chemicals (e.g., fuel, hydraulic fluid) near waterways. The Proposed Project will comply with any and all applicable laws and regulations related to the handling and storage of chemicals. Appropriate materials will be on site to prevent and manage spills.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	e) When not in use, equipment will be stored in upland areas outside the boundaries of waterways. f) All construction equipment will be inspected for leaks before being brought on site. All equipment will be well maintained and inspected daily while on site to prevent leaks of fuels, lubricants, or other fluids into waters of the United States or waters of the state. Stationary equipment (e.g., generators) within 100 feet of aquatic habitat will be parked over secondary containment. g) Service and refueling procedures will be conducted in a designated area, where no potential exists for fuel spills to seep or wash into waterways.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	h) Stockpiles will be located outside of riparian habitat and protected with appropriate stock pile management BMPs. If more than 0.25 inch of rain is forecasted during construction, all spoil piles will be covered with plastic and surrounded with sediment control technologies or berms to prevent sediment run-off. i) No pets, hunting, open fires (such as barbecues), or firearms will be permitted in the work area. j) During Proposed Project construction, all trash that may attract predators will be properly contained in covered garbage receptacles and removed from the project area daily. After construction, all trash and construction debris will be removed from the project area.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	MM BIO-3: Implement Standard Avoidance and Minimization Measures for Wildlife. The following avoidance and minimization measures (AMMs) will be implemented: a) A qualified biologist will develop an environmental training program and present this training to all construction workers before they begin work on the Proposed Project. The training will include a description of special-species with potential to occur, life history and habitat associations, general measures that are being implemented to conserve the species as they relate to the Proposed Project; the terms and conditions of project permits, approvals, and certifications; penalties for non-compliance; and the boundaries of the work area and project area. A handout will be provided to all participants, and at	Fordyce Dam Work Area	Document environmental training program/ Incorporation of Avoidance and Minimization Measures	Prior to construction/ During construction	Applicant and State Water Board	Avoid impacts by scheduling environmental training program Impacts to wildlife are further avoided with incorporation of Avoidance and Minimization Measures

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	least one copy of this information will be kept on site, in the job packet, during construction activities. Upon completion of the training, attendees will sign a form stating that they have participated in the training and understand the AMMs. b) All construction workers will check visually for wildlife beneath vehicles and construction equipment before moving or operating them. c) If animals are observed in the work area or the immediate vicinity, work will stop until the animal leaves the area of its own volition. The animal will not be harried or harassed into leaving the area. If the animal does not leave of its own accord, the PG&E biologist will be contacted, who in turn will report such observations to the appropriate agency. If this involves a listed or sensitive species, PG&E, in					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	consultation with the appropriate agencies, will develop a plan to relocate that animal. d) Grading and vegetation removal along roads and construction work areas will be minimized to the extent feasible. PG&E will trim, clear, or remove vegetation only as necessary to establish the access routes and allow equipment use. e) Only tightly woven netting or similar material will be used for all geosynthetic erosion control materials, such as coir rolls and geotextiles. No plastic monofilament matting will be used.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	MM BIO-4: Implement Specific Avoidance and Minimization Measures for Sierra Nevada Yellow-legged Frog. The following modifications will be implemented within suitable habitat for Sierra Nevada yellow-legged frog habitat specifically to avoid or minimize potential effects on Sierra Nevada yellow-legged frog: a) A qualified biologist shall conduct preconstruction surveys at work sites that contain suitable aquatic habitat for the frog (e.g., staging areas or road work within or adjacent to streams). Surveys shall be conducted within 24 hours prior to the start of work at that location. If work will occur at a location over multiple years, the work site shall be resurveyed each year prior to resuming construction.	Fordyce Dam Work Area	Document site visit/ Incorporation of Avoidance and Minimization Measures	Prior to construction/ During construction	Applicant and State Water Board	Avoid Sierra Nevada yellow-legged frog by scheduling pre-construction surveys Impacts to Sierra Nevada yellow-legged frog are further avoided with incorporation of Avoidance and Minimization Measures

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	b) A USFWS-approved monitor shall be present during roadwork activities (i.e., culvert modifications or construction of low water crossings) with suitable frog habitat when water is present in the work site. c) Staging areas along Magonigal Road will not be used for helicopter operations. Measures will be designated in the Stormwater Pollution Prevention Plan (SWPPP) at these areas to limit sediment of construction materials from cascading downslope to protect known occurrences of the frog in Rattlesnake Creek. d) If a frog is encountered, the general procedure is to leave the animal alone. If a frog is encountered in an active area of the Proposed Project, the first priority is to stop all activities in the surrounding area that may have the potential to result in take (e.g., harassment, injury, or death) of					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	the frog. A photograph will be taken (without handling the frog), and the project biologist shall be contacted. If the project biologist determines that it is a Sierra Nevada yellow-legged frog, it shall be permitted to leave the project area on its own. If it does not leave, work will be delayed until the frog leaves the area or until a relocation plan can be developed in consultation with USFWS and/or CDFW. PG&E shall contact USFWS, CDFW, and USFS within 48 hours for guidance on how to proceed. e) At the end of the day, all steep-sided excavations more than 2 feet deep will be provided with one or more ramps, installed at an angle of no more than 45 degrees to allow egress. The ramps will be constructed of earthen material or plywood (or similar material) and be a minimum width of 6 inches.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	f) All excavations will be inspected before being backfilled or graded, to ensure that no listed species are trapped within them. g) All open ends of pipes will be covered at the end of each work day. If this is not possible, all ends of pipes will be elevated to a minimum of 3 feet above the ground.					
	MM BIO 5: Implement Specific Measures for Nesting Birds. A qualified biologist will implement a nesting bird management plan to ensure that construction, including blasting and helicopter use will not result in significant impacts to nesting birds or nest abandonment by sensitive or special status bird species. The nesting bird management plan will include the following components:	Fordyce Dam Work Area	Document site visit/ Incorporation of mitigation strategies	Prior to construction/ During construction	Applicant and State Water Board	Avoid Nesting Birds by scheduling pre-construction surveys Impacts to Nesting Birds are further avoided with incorporation of mitigation strategies

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	a) Complete preconstruction surveys for active nests within a timeframe prior to construction that is suitable for detection of recently established nests and no more than 14 days prior to activity commencement within pre-determined buffer zones. The surveys will determine nesting bird presence and identify the need to implement or adjust construction buffers. Where suitable nesting habitat is present, the buffer to survey for bald eagle will be at least ½ mile for project activities including blasting locations and helicopter landing zones or zones where helicopter operations will be below 1,000 feet above the tree canopy.. Where nesting suitable habitat is present, the buffer to survey for active nests of California spotted owl and northern goshawk will be at least 0.25 mile for project activities					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	including blasting locations and helicopter landing zones or zones where helicopter operations will be below 1,000 feet above the tree. The surveys will: • Document habitat types present at the site that are suitable for nesting birds. • Document nesting birds that are present on or adjacent to the site. Nesting pairs or nests will be recorded using a GPS unit to record the location of the observed nest, the species, and the estimated distance from the planned activities. All nesting birds encountered during the surveys will be recorded • Assign and document the appropriate buffers distance based on activity types.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	• Provide recommendations and guidelines for nesting avoidance and minimization measures or nesting deterrence. Recommendations may include alterations to helicopter flight paths based on observed raptors, the use of other rock removal activities during roadway improvements if nests are found to be within the appropriate buffers of planned blasting areas, the need for additional nest surveys to discover any nests established during the construction season, and a biological monitor to monitor nesting behaviors if active nests are found within the planned buffer areas. • Buffer distances will be provided to the PG&E Environmental Lead and communicated to the foreman.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	b) PG&E will apply buffers and other applicable nesting bird avoidance and minimization measures around active nests based on the biologist's recommendations to avoid and minimize impacts to birds that nest or may nest in the vicinity of project activities. If the buffer will constrain a planned construction activity, the biologist will consider the following to determine whether a "reduced buffer" is appropriate: • Activity disturbance type • Existing conditions • Nest concealment • The natural history, behavior, and nest chronology of the species • Habituation • Environmental conditions					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	c) The biologist will ensure an appropriate buffer for high intensity activities before such activities occur. High intensity activities include blasting and helicopter operations. The appropriate buffer for these activities will be developed by the biologist on a case-by-case basis. d) The biologist will determine if a biological monitor is necessary for activities with “reduced buffers.” The biological monitor will implement the established buffer, monitor adjacent construction activity, and document active nest status. The biological monitor will observe nesting behavior to determine whether reduced buffers need to be increased. The potential effects of disturbance will be considered by the biological monitor and the biologist, and buffers will be adjusted as necessary. The biological monitor					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	will be responsible for determining when a nest is no longer active based on nest observations. Monitoring will commence with activity onset and if no behavioral response to the activity is observed (agitation, extended non-attendance) then periodic monitoring may be performed.					
	MM BIO-6: Implement Specific Avoidance and Minimization Measures for Special-status Bat Species. 1. If feasible, work should be scheduled between September 1 and April 30 to avoid the bat maternity season. 2. If work is conducted during the bat maternity season (May 1 to August 31), a pre-construction survey for special-status bat (i.e., Townsend's big-eared bat, pallid bat, and fringed myotis) habitat shall be conducted by a qualified biologist (e.g., who is experienced in the	Fordyce Dam Work Area	Document site visit/ Incorporation of avoidance and minimization measures	Prior to construction/ During construction	Applicant and State Water Board	Avoid special-status bats by scheduling pre-construction surveys Impacts to special-status bats are further avoided with avoidance and minimization measures

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	identification of special-status bat habitat) in advance of any rock or tree removal, to identify signs of potential bat use (e.g., large cavities or crevices in rocks or trees, basal hollows in large trees or snags, spaces under loose/exfoliating tree bark, or deep bark fissures). 3. Should potential roosting habitat or active bat roosts be found in trees to be removed, the following measures shall be implemented: a. Tree removal shall occur when bats are active (approximately April 1 to November 1) and outside of months of winter torpor (approximately October 31 to March 31), to the extent feasible. b. A qualified biologist shall be present during tree removal if it has been determined during the pre-construction survey that bat roosts or habitat are present.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	Trees shall be disturbed only when no rain is occurring or is not forecast to occur for 3 days and when daytime temperatures are at least 50 degrees Fahrenheit (°F). 4. Removal of trees containing or suspected to contain roost sites shall be done under supervision of a qualified biologist.					
Cultural Resources						
Disturbance of known archeological resources	**MM CUL-1: Procedures to Avoid Impacts on Archaeological Resources.** Before the start of construction, known archaeological sites in the APE/API that are eligible for listing on the National Register or California Register or are considered eligible for the purposes of this project (P-29-000690/FS # 05175500001 and P-29-004042/FS # 05175300937) will be flagged as avoidance areas during construction. These sites will be subject	Fordyce Dam Work Area	Document site visit/Document any findings of known archaeological sires	Prior to construction	Applicant and State Water Board	Any known archaeological resources are flagged and avoided during construction

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	to archaeological spot monitoring, to ensure that no impacts occur inadvertently because of implementation of the Proposed Project.					
Disturbance of archaeological resources	**MM CUL-2: Procedures for Unanticipated Discovery of Archaeological Resources.** In the event that deposits of prehistoric or historic-era archaeological resources are encountered during Proposed Project construction activities, all work within approximately 100 feet around the discovery will be stopped, and a qualified archeologist meeting federal criteria (36 C.F.R. § 61) will be contacted to assess the deposit(s) and make recommendations. This work will be conducted in accordance with 36 Code of Federal Regulations section 800.13 (Post-Review Discoveries) and CEQA Guidelines (Cal. Code Regs., tit. 14, § 15064.5). PG&E will also notify the tribes who requested consultation or	Fordyce Dam Work Area	Inform Project contractors of archaeological resource notification procedure/ Document any reported finds	Throughout construction	Applicant and State Water Board	Any unanticipated cultural resource finds are avoided until evaluated and mitigated

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	to be notified of unanticipated discoveries in the event that prehistoric archaeological resources are encountered. These tribes are the Colfax-Todd Valley Consolidated Tribe, United Auburn Indian Community of the Auburn Rancheria, and Washoe Tribe of California and Nevada (see Section 3.19 for summary of tribal consultation). During the project, it is anticipated that debris associated with former maintenance and construction projects may be encountered near the toe of the dam. Debris may include concrete rubble, scraps of metal, and other industrial items such as cables and machinery as well as trash that has deposited from the surface of the lake. Said items will be treated as isolates and will warrant no further management considerations given their lack of both provenience and the ability to yield data.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	However, in the event that features, such as stacked rock platforms or intact railroads are encountered, the unanticipated discovery protocol detailed herein must be followed. If deposits of prehistoric or historic archeological materials cannot be avoided by Proposed Project activities, PG&E will retain a qualified archaeologist to evaluate the potential historic significance of the resource(s). The resource will be determined whether it is: (1) a historical resource as defined in CEQA Guidelines ((Cal. Code Regs., tit. 14, § 15064.5) and thus eligible for listing in the California Register of Historical Resources (CRHR); (2) a unique archaeological resource as defined in the Public Resources Code (Pub. Resources Code, § 21083.2, subd. (g)); (3) a potential tribal cultural resource (TCR) as defined in the Public Resources					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	Code (Pub. Resources Code, § 21074, subd.(a)) and/or (4) a historic property as defined in the Code of Federal Regulations (36 C.F.R. § 800.16, subd. (l)(1)) and thus eligible for listing in the National Register of Historic Places (NRHP). Tribes will also be consulted to determine the significance of a resource. If the deposits are determined to be non-significant by a qualified archaeologist and are determined to not be TCRs through consultation with the tribe(s), avoidance will not be necessary. If the deposits are determined to be potentially significant by the qualified archaeologist or are TCRs, the resources will be avoided if feasible. In-place preservation of the archaeological resources will be the preferred manner of mitigating potential impacts, because this will maintain the relationship between the resource and					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	the archaeological context. In-place preservation also will reduce the potential for conflicts with the religious or cultural values of groups associated with the resource. Other mitigation options will include the full or partial removal and curation of the resource. If avoidance is not feasible, Proposed Project impacts will be mitigated in accordance with the recommendations of the archaeologist, in coordination with PG&E and CEQA Guidelines (Cal. Code Regs., tit. 14, § 15126.4, subd. (b)(3)(C)), which requires implementation of a data recovery plan, and with the consulting tribes, as appropriate. The data recovery plan will include provisions for adequately recovering all scientifically consequential information from and about any discovered archaeological materials, and will include recommendations for the treatment of these resources.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	PG&E will confirm that a qualified archeologist will be retained for preparation and implementation of the data recovery plan, which will be conducted before any additional earth-moving activities in the area of the resource. The recovery plan will be submitted to PG&E and the NCIC. After the recovery plan is reviewed and approved by PG&E and any appropriate resource recovery is completed, project construction activity in the area of the find may resume. A data recovery plan will not be required for resources that have been deemed by the NCIC as adequately recorded and recovered by studies previously completed.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
Disturbance of cultural resources	**MM CUL-3: Worker Training.** Before the start of construction, all construction workers will undergo training to ensure awareness of the potential for previously undiscovered cultural resources on-site, including TCRs, and to become familiar with the laws protecting these resources and associated penalties, as well as the procedures to follow if they discover cultural resources during project-related work.	Fordyce Dam Work Area	Document worker training	Prior to construction	Applicant and State Water Board	Avoid impacts by scheduling worker training
Disturbance of human remains	**MM CUL-4: Treatment of Human Remains.** Discovery of human remains on federal lands will be subject to the Native American Grave Protection and Repatriation Act (NAGPRA). In accordance with the NAGPRA, if human remains are uncovered during ground-disturbing activities, all activities within 100 feet will be halted and the PG&E Cultural Resource Specialist will notify the appropriate federal agency by telephone within 24 hours, followed	Fordyce Dam Work Area	Inform Project contractors of human remains notification procedure/ Document any reported finds	Throughout construction	Applicant and State Water Board	Any unanticipated human remains are avoided until evaluated and mitigated

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	within 3 days by written confirmation. Human remains will not be excavated or removed unless a permit is issued under the Archaeological Resources Protection Act and after consultation with appropriate Native American representatives. The activity that resulted in the inadvertent discovery may resume 30 days after certification by the notified federal agency of receipt of the written confirmation of notification of inadvertent discovery. The activity may also resume at any time that a written, binding agreement is executed between the federal agency and the affiliated Indian tribe(s) that adopt a recovery plan for the excavation or removal of the human remains, funerary objects, sacred objects, or objects of cultural patrimony. Discovery of human remains on PG&E or private lands must comply with the Health and Safety Code (Health & Saf.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	Code, § 7050.5, subd. (b)) and Public Resources Code (Pub. Resources Code, § 5097.98). In accordance with these state laws, if human remains are uncovered during ground-disturbing activities, all such activities within 100 feet will be halted, and the PG&E Cultural Resource Specialist and the appropriate county Coroner will be contacted immediately. The Coroner is required to examine all discoveries of human remains within two working days of receiving notice of a discovery on private or state lands (Health & Saf. Code, § 7050.5, subd. (b)). If the Coroner determines that the remains are of Native American origin, he or she must contact the California Native American Heritage Commission (NAHC) by phone within 24 hours of making that determination (Health & Saf. Code, § 7050, subd. (c)). The County or its appointed representative and the					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	professional archaeologist will consult with a Most Likely Descendent, determined by the NAHC, regarding the removal or preservation and avoidance of the remains.					
Geology and Soils						
Disturbance of paleontological resources	**MM GEO-1: Discovery of Paleontological Resources.** If any paleontological resources are uncovered during Proposed Project construction activities, all work within 20 feet of the discovery will be halted or diverted to other areas on the site and PG&E's Cultural Resources Specialist will be notified immediately. A qualified paleontologist will be retained to evaluate the finds and recommend appropriate measures for the unanticipated discovered paleontological resources.	Fordyce Dam Work Area	Retain paleontologist/ Document any reported finds	Throughout construction	Applicant and State Water Board	Paleontological resources are avoided or appropriately mitigated (e.g., collected and curated)

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
Hazards and Hazardous Materials						
Hazards from unanticipated contamination	**MM HAZ-1: Unanticipated Contamination**. During ground-disturbing activities throughout the project area, the contractor(s) will inspect the exposed soil and associated dewatering effluent for obvious signs of contamination from hazardous materials such as odors, stains, or other suspect materials. Should signs of unanticipated contamination be encountered, work will be suspended, the area will be secured and the Resident Engineer and PG&E manager(s) will be notified. An investigation will be designed and performed to verify the presence and extent of hazardous material contamination at the site, and a site-specific soil management plan will be prepared and implemented.	Fordyce Dam Work Area	Document any reported finds	During ground-disturbing activities	Applicant and State Water Board	Unanticipated contamination avoided or appropriately mitigated

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	In addition to visual observations, composite samples will be collected from the excavated debris-laden fill and analyzed for mercury to characterize the spoils material prior to spreading on the lake bottom. Spoils characterization will be conducted by analyzing and a composite sample for every 2,000 cubic yards of soil that would be spread on the bottom. Any soils deemed hazardous would be hauled offsite for disposal at an appropriately permitted commercial facility.					
Hazards from wildland fire	Implement the following measures (see below): **MM FIRE-1: Wildland Fire Prevention.**					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
Hydrology and Water Quality						
Substantially degrade water quality	**MM HYD-1: Monitor and Implement Adaptive Management Strategy.** A Water Quality Management Plan will be developed to protect water quality objectives and beneficial uses from impacts due to Proposed Project activities, such as increases in turbidity associated with the Proposed Project. The Water Quality Management Plan will require management of turbidity levels in Fordyce Creek at or below a "severity-of-ill-effect" (SEV) of 3.5 on the Newcombe (2003) ranking model (SEV Model). The Water Quality Management Plan shall include protocols used to monitor turbidity, dissolved oxygen, pH, and temperature. At a minimum, the Water Quality Management Plan shall include: • monitoring locations, frequency, and duration;	Lake Fordyce	Incorporation of Water Quality Management Plan	During construction	Applicant and State Water Board	Turbidity limits in Section 401 Water Quality Certification

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	• adaptive management actions to implement if turbidity increases begin to approach SEV 3.5; • adaptive management actions to implement if water quality objectives are determined to be adversely impacted by the Proposed Project; and • reporting to the State Water Board. A minimum of three monitoring locations shall be required with stations located both above and below the Proposed Project. Monitoring shall occur via a sensor system to continuously monitor water quality at a minimum of 20-minute intervals. Each construction season, monitoring shall begin prior to dewatering the work area and use of the cofferdam bypass system, and shall continue for the duration of the construction season, and for a minimum of three days following the completion of the construction season.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
Tribal Cultural Resources						
Disturbance of tribal cultural resources	Implement the following measures (see above): **MM CUL-2: Inadvertent Discovery of Archaeological Resources.** **MM CUL-3: Worker Training.**					
Wildfire						
Hazards from wildland fire	**MM FIRE- 1: Wildland Fire Prevention.** PG&E will require its contractor to implement PG&E's *Utility Standard TD-1464S – Preventing and Mitigating Fires while Performing PG&E Work* (PG&E 2019c). This standard includes the following requirements: 1. The construction contractor must follow locally changing meteorological conditions as well as be aware of the possibility of increased fire danger during the time work is in progress.	Fordyce Dam Work Area	Incorporation of PG&E's *Utility Standard TD-1464S – Preventing and Mitigating Fires while Performing PG&E Work*	Prior to construction/ During construction	Applicant and State Water Board	Hazards from wildland fire are minimized

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	2. No vehicles will drive overland (e.g., forests, fields) except when performing required work or during an emergency. When driving off roadways, driver must be aware of potential ignitions that could occur. 3. A shovel, fire extinguisher and one 5-gallon backpack pump or larger capacity water will be available inside construction vehicles and for heavy machinery or equipment (e.g., tractors, excavators, bulldozers) and. 4. Before starting work on or near any vegetation the following actions must be performed: a. Review and understand the daily Utility Fire Potential Index b. Review the Wildfire Mitigation Matrix (Attachment 1) and assess the required mitigations based on the Utility FPI provided by PG&E's Meteorology Team.					

Potential Impact	Mitigation Measure (MM)	Location	Monitoring/ Reporting Action	Timing	Responsible Party	Effectiveness Criteria
	c. Participate in a tailboard for any of the work activities listed in the Wildfire Mitigation. 5. While performing stationary ground level jobs or activities from which a spark, fire, or flame may originate all flammable material must be removed around the operation for 10 feet. 6. If fire ignites on jobsite, personnel must call 9-1-1 to report ignition and take safe, reasonable suppression actions consistent with the person's experience and training.					

Appendix C

Technical Memorandum

Hydrology and Water Quality

AECOM
300 Lakeside Drive
Suite 400
Oakland, CA 94612
aecom.com

To:
Mr. Jordan Smith
State Water Resources Control Board
Division of Water Rights – Water Quality Certification Program
P.O. Box 2000 Sacramento, CA 95812-2000

Project name:
Lake Fordyce Seepage Mitigation Project

Project ref:

From:
AECOM

Date:
September 21, 2020

Memo

Subject: Hydrology and Water Quality Technical Memorandum

This technical memorandum summarizes the results of the sediment and water quality sampling at Lake Fordyce collected in 2019 as part of the Lake Fordyce Seepage Mitigation Project.

1.1 Sediment Quality

AECOM reviewed the results from two reservoir sediment samples collected from borings advanced in Lake Fordyce in August 2019 as part of the Lake Fordyce Seepage Mitigation Project. Samples were selected from soil borings C-1, C-2, and C-3 located near the proposed cofferdam alignment (see Figure 1) and material from soil borings C-1 and C-2 were combined prior to sediment quality analysis. These borings were collected as part of a larger a geotechnical assessment associated with the cofferdam.

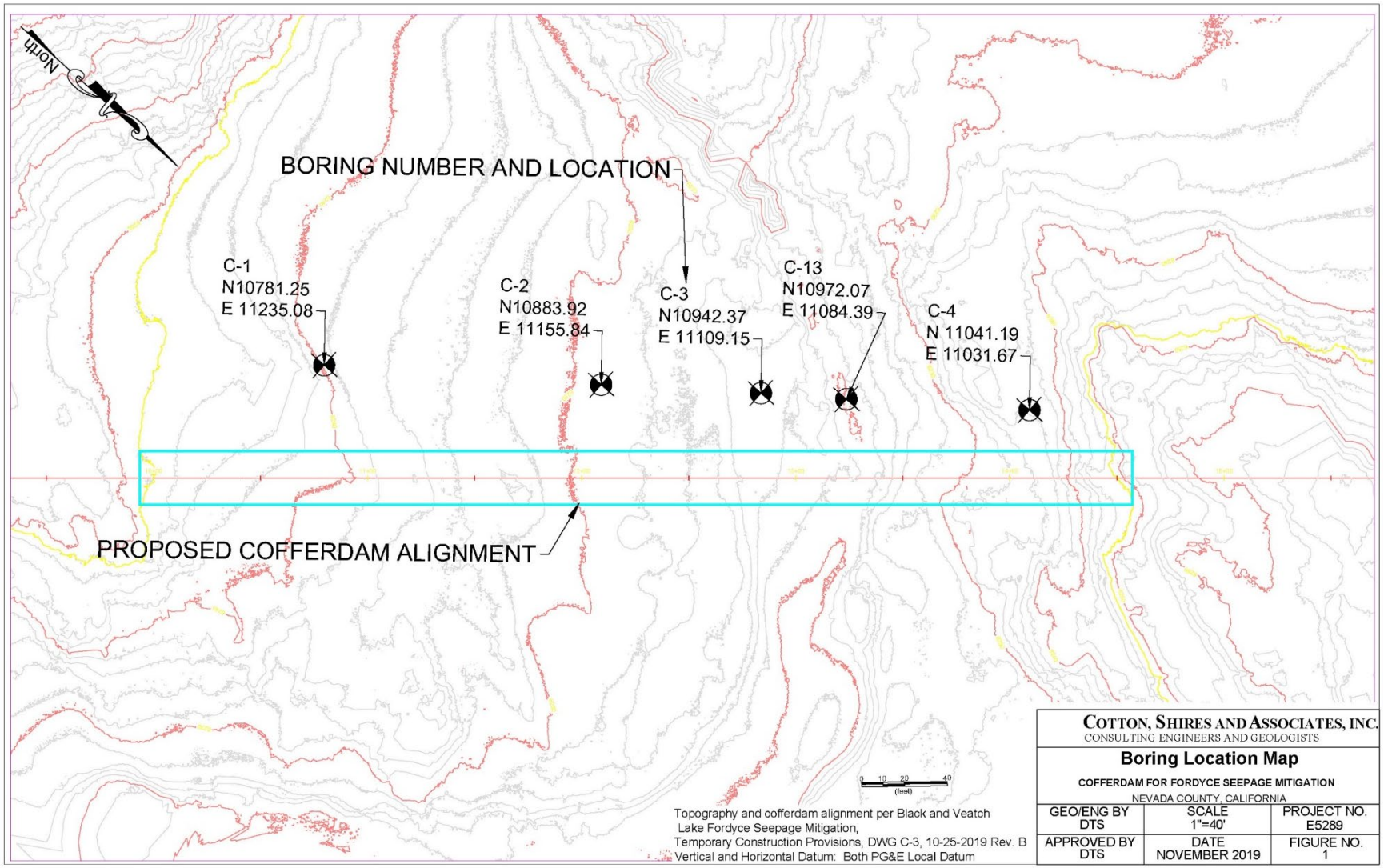


Figure 1. Boring Location Map

Sediment samples collected from the borings were analyzed for metals and mercury, petroleum hydrocarbons (i.e., gasoline, diesel, motor oil), and volatile organic compounds. Motor oil and toluene were found one sample (C-1/C-2), but at concentrations below sediment screening levels (toluene at 22 µg/kg and motor oil at 8.9 mg/kg). The metal and mercury results for C-1/C-2 and C-3 are provided in Table 1. Sediment screening levels are also provided to provide context for interpreting the metals and mercury concentrations in the reservoir sediments. These sediment screening levels are not regulatory values.

- The ecological effects-based screening levels shown in Table 1 are freshwater sediment quality guidelines categorized as either threshold effects or probable effect levels, corresponding to thresholds below which effects to aquatic species are unlikely and thresholds above which effects to aquatic species are likely (Corps 2007). The threshold effect levels are described in scientific literature under a variety of names including "threshold effects levels" or TELs, "effects range low" or ER-L, and "threshold effect concentrations" or TECs. The probable effect levels include "probable effects levels" or PELs, "range effects median" or ER-M, "probable effect concentrations" or PECs, and "upper effects thresholds" or UETs (EPA 2002, NOAA 2008). These screening levels are based on the potential effects to more sensitive aquatic species.

- EPA regional screening levels are also shown in Table 1. These screening levels address human health endpoints, not ecological impacts. The EPA regional screening level for soil to groundwater considers the groundwater-soil system and is designed to be protective of groundwater MCLs. The resident soil screening level is recommended for residential soils. The composite worker soil screening level is protective of outdoor workers.

- The environmental screening levels shown on Table 1 were developed for by the SF Bay RWQCB for a variety of endpoints. The Tier 1 screening level is the threshold for unrestricted exposure to soils. The shallow soil exposure threshold for nonresidential areas applies where contamination is only found in the first few inches of the soil. The threshold for exposure of construction workers to "any land use/any soil depth" is applicable to construction work with deep excavations.

- The hazardous waste characterization criteria shown in Table 1 provide a general indication of whether additional waste characterization would be needed prior to any offsite disposal of the reservoir sediments. Wet leachate procedures (TCLP and STLC) are recommended when soil/sediment concentrations are greater than the decision factors shown in Table 1. (As shown in Table 1, reservoir sediments are found below hazardous waste criteria.)

Table 1. Metals in Freshwater Sediment at Lake Fordyce

Metals in mg/kg	C-1/C-2	C-3	Threshold Effect Conc (TEC) [1,2]	Threshold Effect Level (TEL) [1,2]	Effects Range Low (ER-L) [1,2]	Probable Effect Level (PEL) [1,2]	Probable Effect Conc (PEC) [1,2]	Effects Range Median (ER-M) [1,2]	Upper Effects Threshold (UET) [1,2]	Soil to Ground-water (MCL) [3]	Resident Soil[3]	Composite Worker Soil[3]	Tier 1 Screening Level[4]	Construc-tion Worker Exposure[4]	Commercial Industrial Shallow Soil[4]	Decision Factor for STLC, State[5]	Decision Factor for TCLP, Federal[5]	TTLC, State (wet weight)[5]
Antimony	< 5	< 5	—	—	—	—	—	—	3	0.27	3.1	47	11	50	164	150	—	500
Arsenic	4.5	5.9	9.8	5.9	33	17	33	85	17	0.29	0.68	3.0	0.07	0.98	0.31	50	100	500
Barium	30	32	—	—	—	—	—	—	—	82	1,500	22K	390	3K	220K	1K	2K	10K
Beryllium	< 1	< 1	—	—	—	—	—	—	—	3.2	16	230	5	27	232	7.5	—	75
Cadmium	< 1	< 1	0.99	0.596	5	3.53	4.98	9	3	0.38	—	—	1.9	51	1,100	10	20	100
Chromium	8.1	5.5	43.4	37.3	80	90	111	145	95	180K	12K	180K	160	—	—	50	100	2,500
Cobalt	4.2	3.2	—	—	—	—	—	—	—	—	2.3	35	23	28	350	800	—	8K
Copper	23	10	31.6	35.7	70	197	149	390	86	46	310	4,700	180	14K	47K	250	—	2,500
Lead	< 5	< 5	35.8	35	35	91.3	128	110	127	14	400	800	32	160	320	50	100	1K
Mercury	0.23	< 0.1	0.18	0.174	0.15	0.486	1.06	1.3	0.56	0.1	1.1	4.6	13	44	190	2	4	20
Molybdenum	< 2	< 2	—	—	—	—	—	—	—	—	39	580	6.9	1,800	5,800	3,500	—	3,500
Nickel	5	4.1	22.7	18	30	36	48.6	50	43	—	150	2,200	86	86	11K	200	—	2K
Selenium	< 5	< 5	—	—	—	—	—	—	—	0.26	39	580	2.4	1,700	5,800	10	20	100
Silver	< 2	< 2	—	—	—	—	—	—	4.5	—	39	580	25	1,800	5,800	50	100	500
Thallium	< 2	< 2	—	—	—	—	—	—	—	0.14	0.08	1.2	0.78	3.5	12	70	—	700
Vanadium	27	38	—	—	—	—	—	—	—	—	39	580	18	470	5,800	240	—	2,400
Zinc	19	22	121	123	120	315	459	270	520	—	2,300	35K	340	106K	350K	2,500	—	5K

Source:

[1] EPA (United States Environmental Protection Agency). 2002. *A Guidance Manual to Support the Assessment of Contaminated Sediments in Freshwater Ecosystems. Volume III.* Prepared by DD MacDonald and CG Ingersoll. EPA 905 B02 001 A. December.

[2] NOAA (National Oceanic and Atmospheric Administration). 2008. *NOAA Screening Quick Reference Tables, NOAA OR&R Report 08 01*. Prepared by M.F. Buchman, Office of Response and Restoration Division.

[3] EPA (United States Environmental Protection Agency). 2019. Regional Screening Levels for Chemical Contaminants at Superfund Sites. November.

[4] SF Bay RWQCB (San Francisco Bay Regional Water Quality Control Board). 2019. *Environmental Screening Levels.* Rev. 1. January.

[5] 22 CCR § 66261.24

The samples tested had concentrations above screening levels for certain metals. Arsenic and mercury were found in at least one of the two samples at concentrations at or greater than human health regional screening levels and ecological-based threshold effect concentrations for freshwater sediments (EPA 2002, 2019). Cobalt and vanadium were also detected at concentrations above the resident soil screening level and the Tier 1 screening level, respectively, but these criteria are not directly applicable to work at Lake Fordyce.

In addition to the sediment quality analyses described above, particle size distribution/sieve tests were conducted for sediments collected from boring C-1, C-2, C-3, and C-13 and strength tests, hydraulic conductivity, and plasticity tests were conducted on select borings as part of the geotechnical investigation. The engineering geologic cross section developed for this area (Figure 2) was based on this data.

1.2 Water Quality

A sensor system was installed in October 2019 to continuously monitor turbidity and temperature at the existing stream gauging station on Fordyce Creek downstream of Fordyce Dam (Figure 3). Data were collected in October and November 2019 prior to winterization of the site: the turbidity and temperature data are shown in Figures 4 and 5. A short-term increase in turbidity occurred when the flows were increased from 8 to 14 cubic feet per second at the end of October (Figure 6).

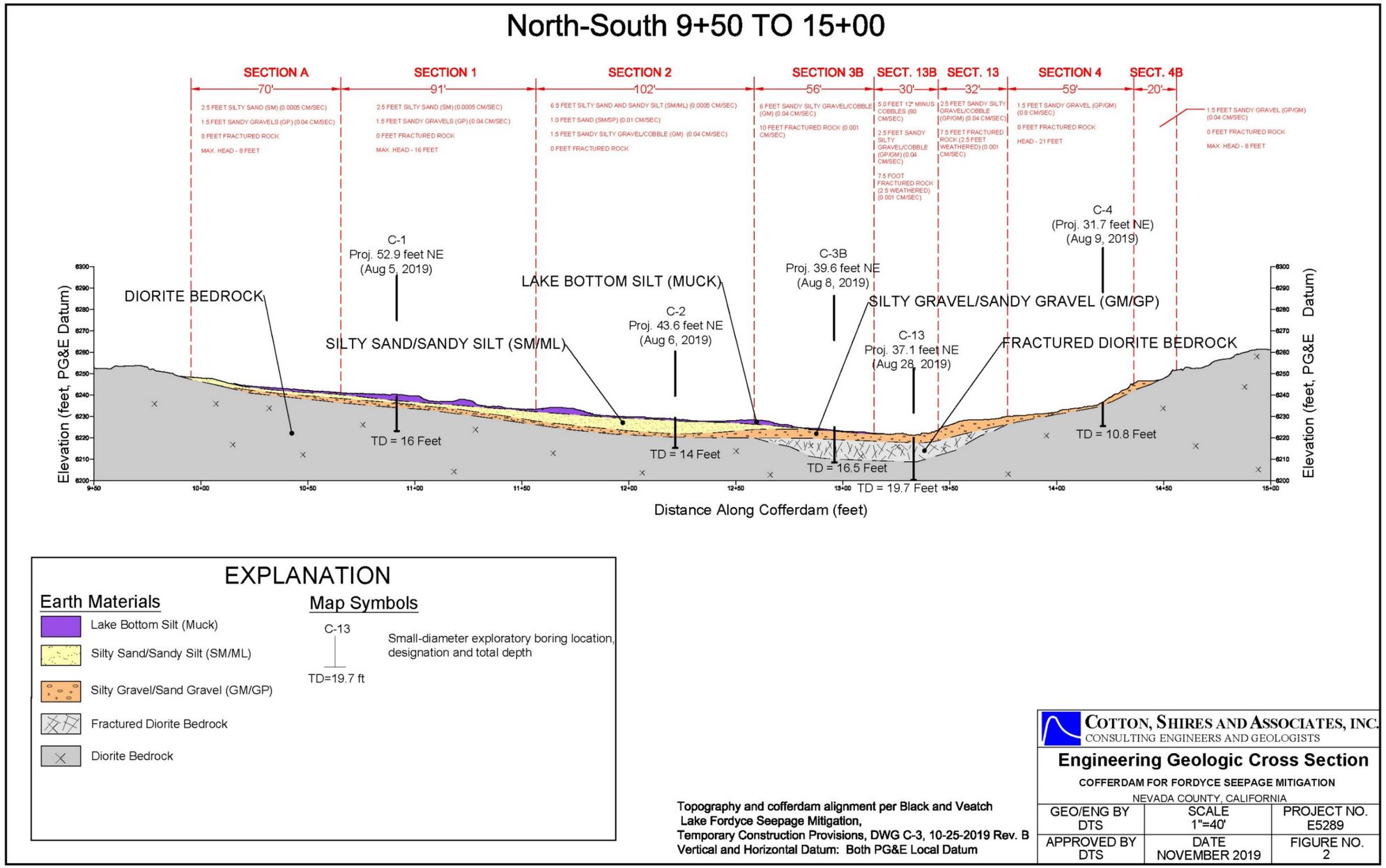


Figure 2. Engineering Geologic Cross Section

AECOM

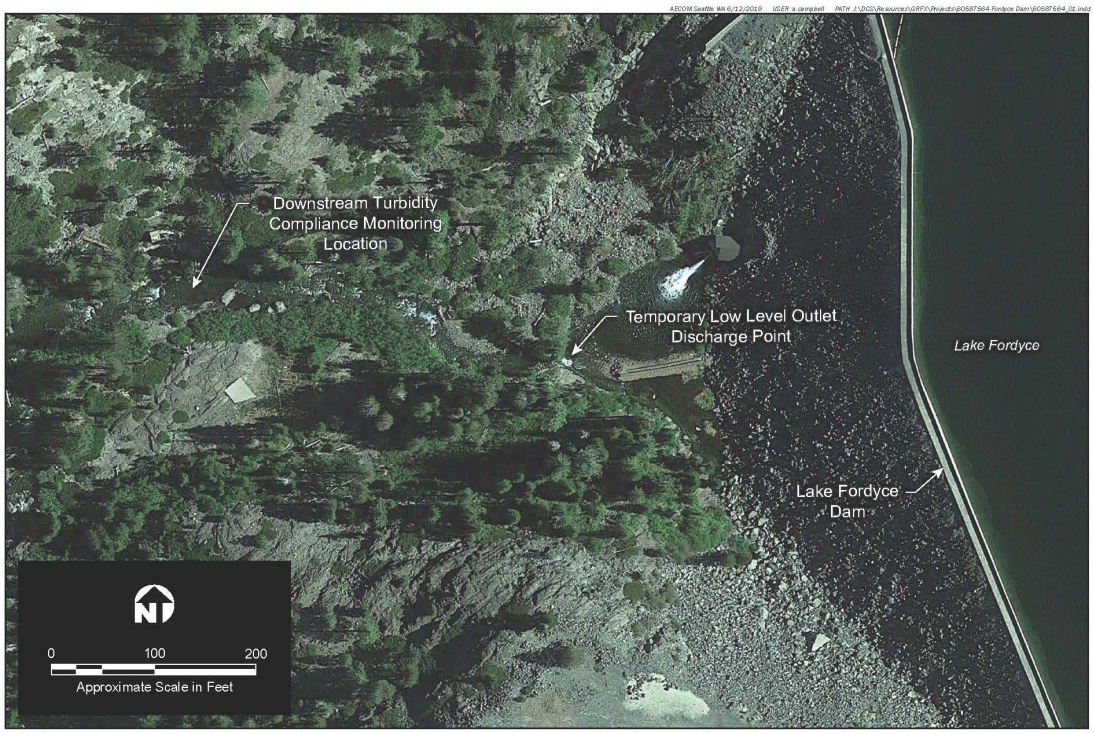


Figure 3. Downstream Monitoring Location

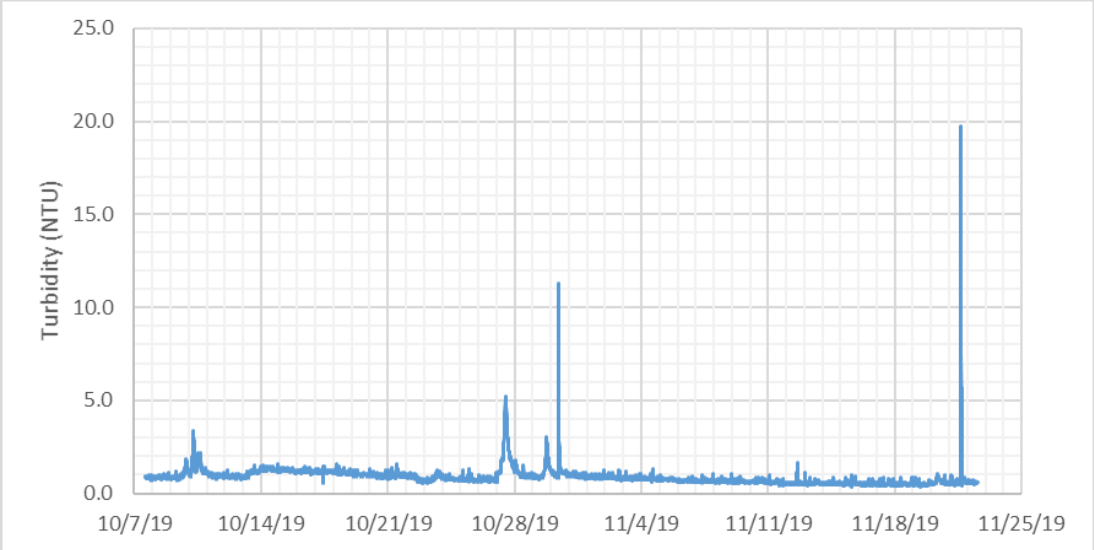


Figure 4. Turbidity in Fordyce Creek, October and November 2019

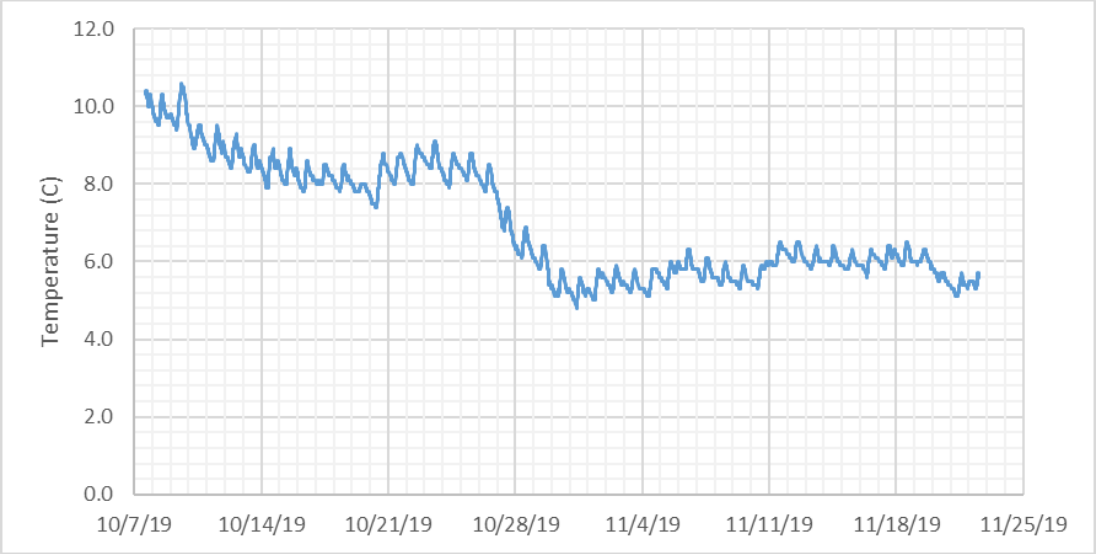


Figure 5. Temperature in Fordyce Creek, October and November 2019

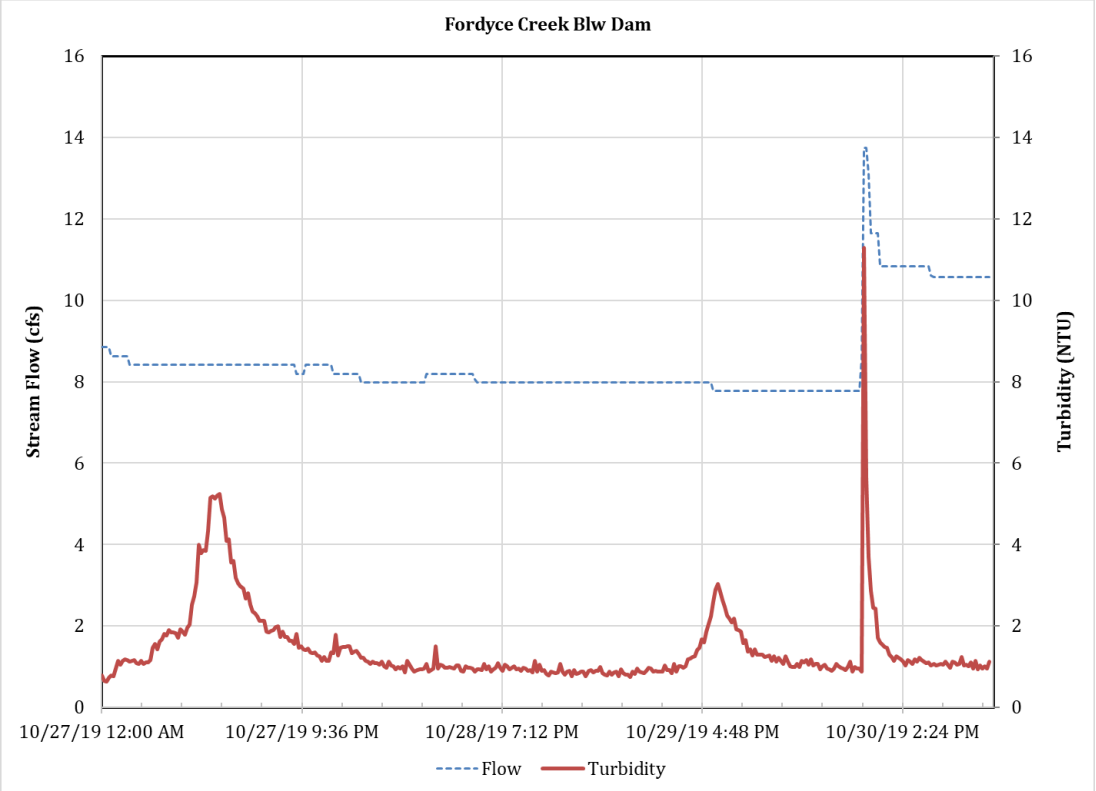


Figure 6. Flow and Turbidity, October 30, 2019

1.3 References

Corps (United States Army Corps of Engineers). 2007. Summary of Available Guidance and Best Practices for Determining Suitability of Dredged Material for Beneficial Uses. Dredging Operations and Environmental Research Program. ERDC/EL TR-07 27. November.

EPA (United States Environmental Protection Agency). 2002. A Guidance Manual to Support the Assessment of Contaminated Sediments in Freshwater Ecosystems. Volume III. Prepared by DD MacDonald and CG Ingersoll. EPA 905 B02 001 A. December.

———. 2019. Regional Screening Levels for Chemical Contaminants at Superfund Sites. November.

NOAA (National Oceanic and Atmospheric Administration). 2008. NOAA Screening Quick Reference Tables, NOAA OR&R Report 08 01. Prepared by M.F. Buchman, Office of Response and Restoration Division.

SF Bay RWQCB (San Francisco Bay Regional Water Quality Control Board). 2019. Environmental Screening Levels. Rev. 1. January.

Appendix D

Technical Memorandum
Estimation of Turbidity During Dewatering

AECOM
300 Lakeside Drive
Suite 400
Oakland, CA 94612
aecom.com

To:
Bill Martin, AECOM

CC:
Jordan Smith, State Water Board

Project name:
Fordyce Dam Seepage Mitigation Project

Project ref:

From:
Phil Mineart, Jason Zhou

Date:
August 13, 2020

Memo

Subject: Estimation of Turbidity During Dewatering

To conduct the Fordyce Dam Seepage Mitigation Project, a work area upstream of the dam would be dewatered. To limit the area that needs to be dewatered, a cofferdam would be constructed approximately 700 feet upstream from the dam. The work area between the cofferdam and Fordyce Dam would then be dewatered. Initial dewatering would be through the low-level outlet (LLO). However, as the water level in the work area decreases, the turbidity in the discharge could increase. If the turbidity of the discharge nears an agreed upon criteria, water would be pumped from the work area to an embayment in the reservoir that has been isolated from the reservoir with a turbidity curtain. To maintain the instream flow requirement (IFR), PG&E would release water from the reservoir upstream of the cofferdam using a pumped bypass system with water flowing over the Fordyce Dam spillway. The purpose of this analysis is to provide an estimate of the turbidity in the discharge from the reservoir to Fordyce Creek due to potential migration of turbid water through the turbidity curtain mitigation measure.

Table 1 from the Fordyce Dam Seepage Mitigation Project Dewatering/Removal of Water Plan (Black & Veatch, 2020) provides a schedule for dewatering. Initially, water would be removed

Table 1. Plan for Dewatering of the Work Area

System	Quantity	Beginning WSEL	Ending WSEL	Volume (acre-feet)	Flow Range	Drawdown Time
Existing LLO	1	6,245.4	6,236	110	100 cfs (High El.) 25 cfs (Low El.)	24 hours
Trailer-Mount Pumps (8-inch)	3 to 4	6,236	6,220	90	25 cfs (High El.) 20 cfs (Low El.)	48 hours
Submersible Pumps (3-inch)	2 to 8	6,220	6,212	3.5	5 cfs (High El.) 1 cfs (Low El.)	24 hours

Source: Black & Veatch, 2020

from the reservoir through the LLO down to the Lake Fordyce minimum pool elevation, as is typically done each year during normal reservoir drawdown operations. During the initial construction year, a cofferdam would be constructed with reservoir at approximately minimum pool elevation. The next phase of dewatering includes complete dewatering of the work area between the cofferdam and Fordyce Dam. Dewatering of the work area would initially use the Fordyce Dam LLO until the water level falls to a level at or near the LLO elevation. Dewatering of the remaining water in the work area would be accomplished using three to four trailer mounted pumps to lower the lake 16 feet from elevation 6,236 to 6,220 feet. These pumps would withdraw water though floating intakes located about 100 feet from the cofferdam at an expected rate of 20 to 25 cubic feet per second (cfs). The use of floating intakes results in maximum water velocities near the surface close to the pumps and lesser and more uniform velocities far from the pumps. Below elevation 6,220 feet, submersible pumps would be installed in the low points in the reservoir. Withdrawal rates would be 1 to 5 cfs. These pumps would withdraw water near the bottom and pump to a nearshore area of the lake, upstream of the cofferdam, separated by a turbidity curtain.

This memo consists of the following sections:

1. The amount of fine sediment in the reservoir that could potentially be entrained during the dewatering.

2. The relationship between pumping rate, depth of water, and turbidity.
3. Calculation of the transport of sediment from the turbidity curtain area to the location where water is pumped for IFR.

1. Sediment in the Reservoir that could Potentially be Entrained

Based on the available boring data and surrounding topography at each location, the lakebed soil material was characterized with the following available data from Sage Engineering's Seepage Mitigation Improvement Plan (Final 90% Submittal Package):

- Surface data provided in AutoCAD format as part of 2014 bathymetry and topographic surface which covers the entire extents of Lake Fordyce.
- The 1911 bedrock surface was approximated from historic survey contours at 10-foot intervals. The surface covers roughly 500 feet upstream and downstream of the existing Fordyce Dam.
- Boring investigations performed within Lake Fordyce for the purposes of the Seepage Mitigation Project and design of the proposed upstream cofferdam. The borings were drilled in August 2019 and are located primarily at either the upstream toe of Fordyce Dam or near the proposed cofferdam alignment.

The original 1911 bedrock surface contours were extended 500 feet further upstream in order to fully cover the extents of the dewatered work area. The extended contours were approximated based on the general topography of the work area and considering the sediment depths reported at the applicable boreholes. A surface comparison between the approximate rock surface and the 2014 bathymetry surface was the basis for estimating the total volume of sediment that has deposited within the study area; where the 1911 bedrock surface was used as a base "datum" surface and the relative increase in ground elevation from the 2014 bathymetry surface was presumed as areas of sediment deposition.

As shown in Figure 1, the resulting sediment deposition area was divided into three representative fill groups (Channel; Terrace; Hillside) in order to approximate a spatial distribution of sediment classifications. The sediment fill groups were delineated based on the overall topography of the study area and the available boring log data. The deposited sediments above bedrock consists primarily of three classifications as indicated by the available boring logs:

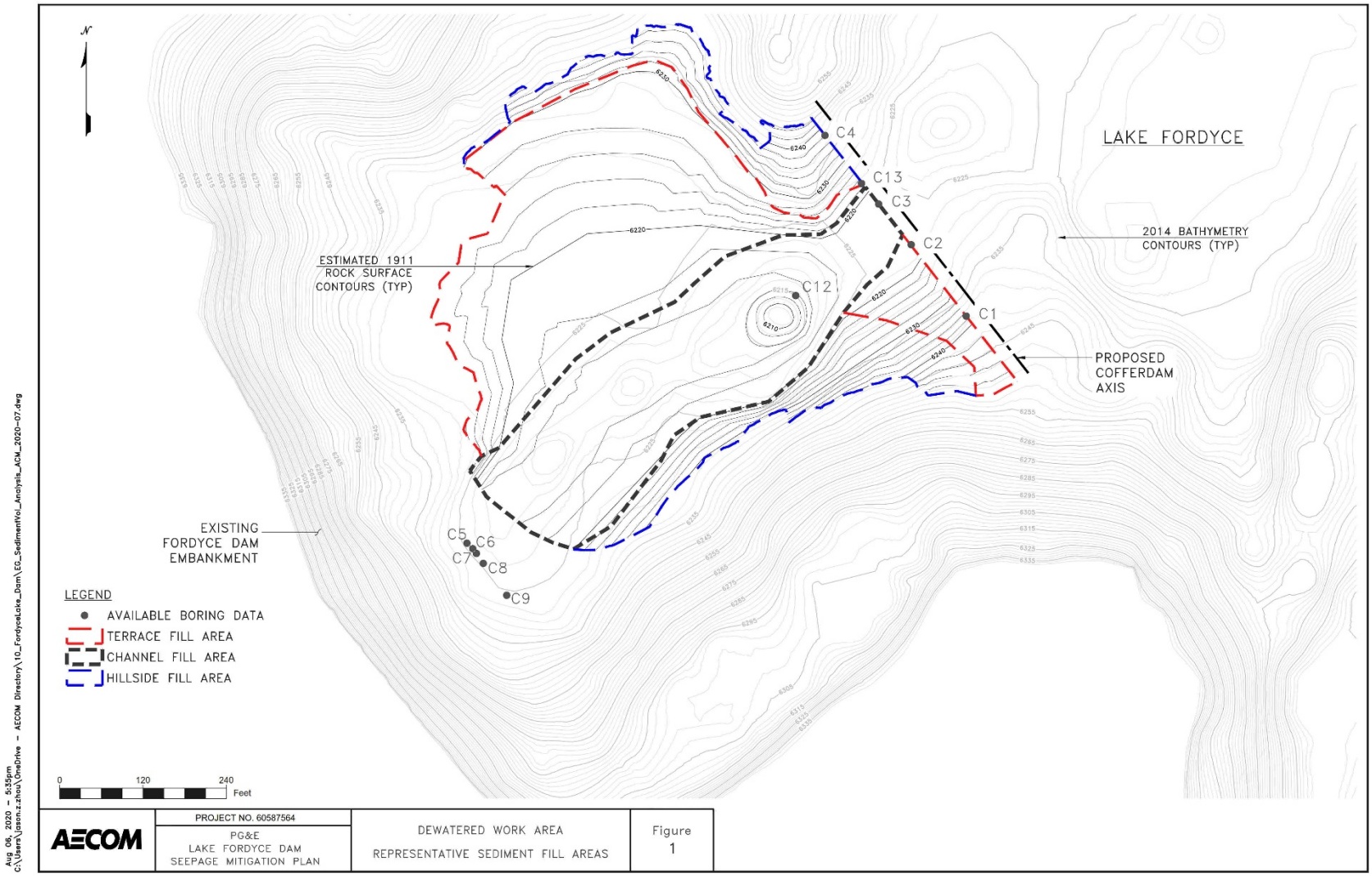


Figure 1. Locations of Representative Sediment Types

- Lake bottom Silt with Organics (Lake Muck)
- Silty Sand/Sandy Silt (SM/ML)
- Silty Gravel/Sandy Gravel (GM/GP)

Within each fill group, a representative distribution of the primary soil classification was determined from the boring log data. The relative depths recorded at each borehole served as the basis for determining a representative distribution of sediment classifications for each sediment fill group.

Table 2 summarizes the resulting distribution of sediment material assumed for each deposition area for the purposes of this analysis. Figure 2 shows the resulting depths of total sediment estimated for the study area and summarizes corresponding the volume of deposits for each sediment classification.

An overall conservative approach was taken in estimating the amount of sediment, particularly in quantifying the finer “Lake Muck” sediment that is most likely to erode from the dewatering process. Figure 3 shows the resulting depths of the Lake Muck sediments estimated for the study area.

Table 2. Approximate Sediment Volume and Classification Distribution for the Dewatered Work Area

Sediment Classification	Terrace Fill Distribution	Channel Fill Distribution	Hillside Fill Distribution	Total Volume (CY)	% Total Volume
Lake Muck (Silt w/ Organics)	10%	10%	0%	4,280	9%
Silty Sand/Sandy Silt (SM/ML)	60%	0%	0%	13,800	28%
Silty Gravel/Sandy Gravel (GM/GP)	30%	90%	100%	30,620	63%

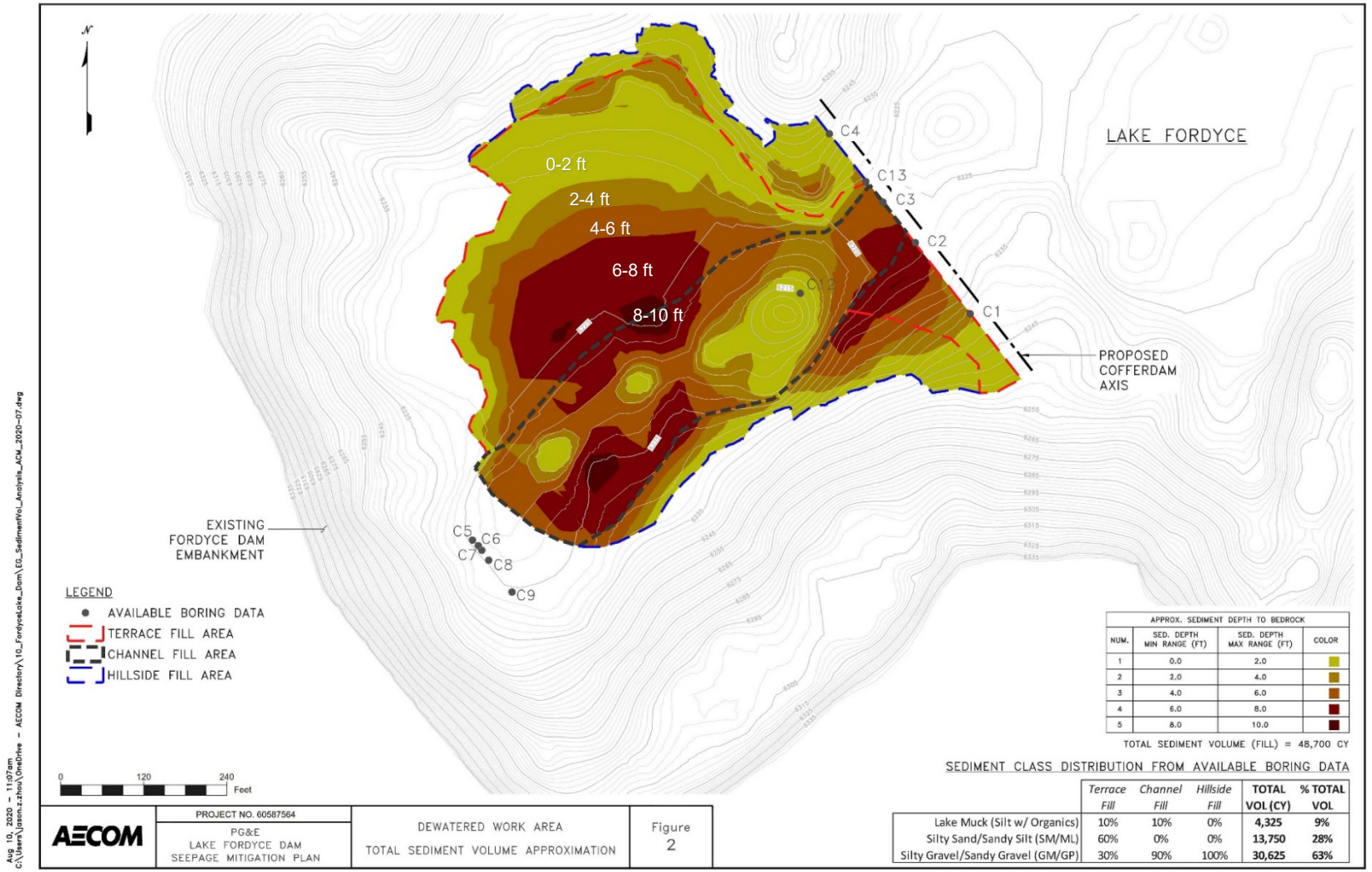


Figure 2. Estimated Depth of Sediment in Lake Fordyce

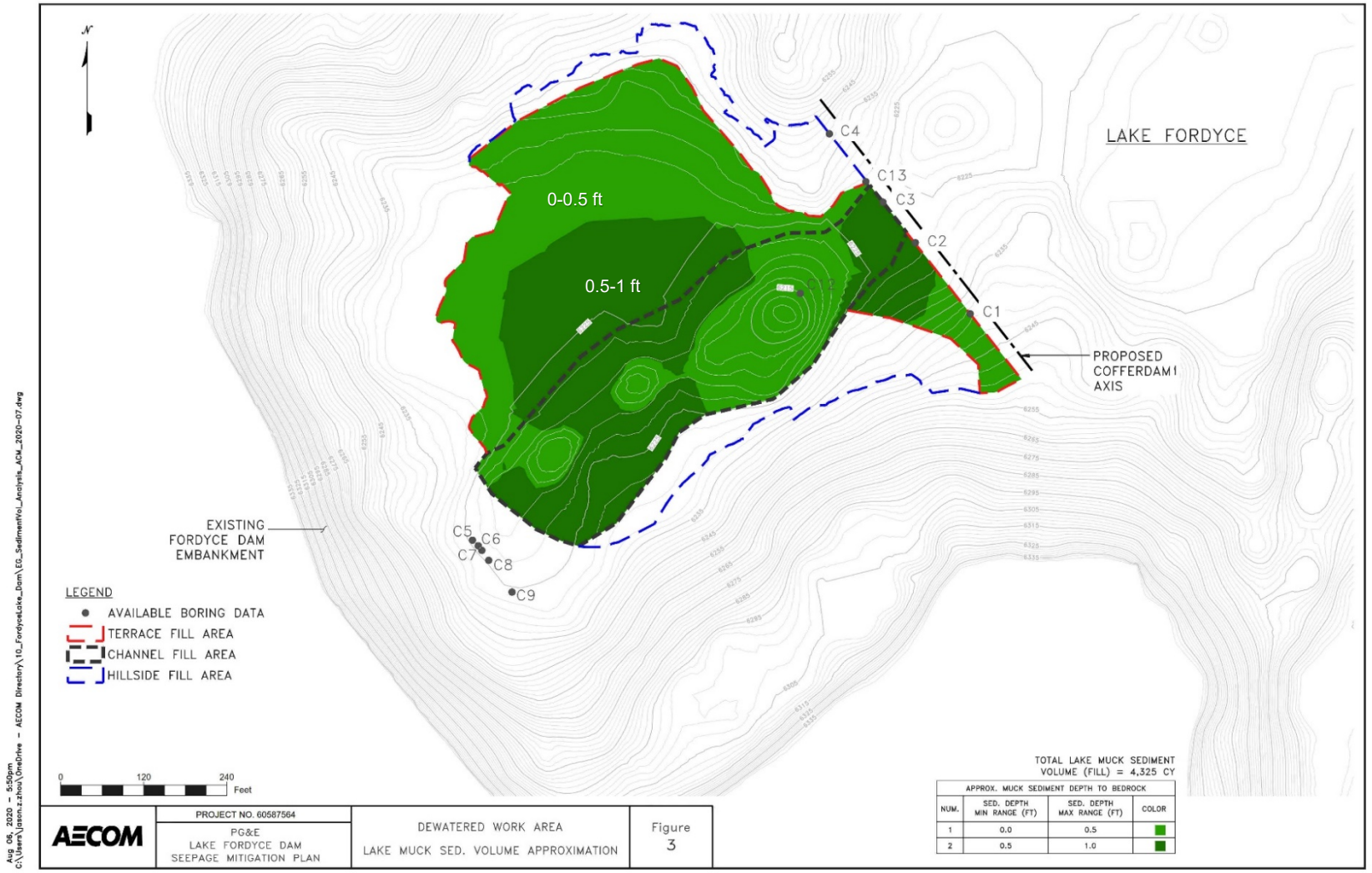


Figure 3. Estimated Depth of Lake Muck in Lake Fordyce.

2. Relationship between Pumping Rate, Depth of Water, and Turbidity

The erosion rate of sediment from the lake bottom is dependent on the velocity and depth of water. The turbidity is dependent upon the erosion rate and water pumping rate.

2.1 Velocity

The velocity was estimated using two methods. Assuming the flow is frictionless with no rotation and calculating the 3-D flow field for a source near the surface. The second method assumes that the velocity is uniform with depth and the flow is approximately radial towards the pump intakes. Assuming a uniform flow with depth over-estimates the velocity near the bottom but is approximately correct farther from the intakes. In this case the velocity can be estimated as the flow through a cylinder with a radius equal to the distance from the pump intakes and the height equal to the depth of water.

Table 3 shows the estimated velocities assuming radial flow through a cylinder for 25 cfs withdraw rate and Table 4 assuming 20 cfs withdraw rate. The velocity using frictionless flow theory at a distance 0.5 foot above the bottom is estimated to be less than 0.5 foot per second (ft/s) within 10 feet of the discharge for even shallow depths of water. This is consistent with the results shown in Tables 3 and 4. Both methods indicate that the velocities drop off quickly with depth and distance from the pumps.

Table 3. Estimated Velocities during Dewatering assuming Flow through Cylinder, 25 cfs Withdraw Rate

Distance (feet)	1-foot Depth	1.5-foot Depth	2-foot Depth	3-foot Depth	5-foot Depth	10-foot Depth
2 feet	1.99	1.33	0.99	0.66	0.40	0.20
5 feet	0.80	0.53	0.40	0.27	0.16	0.08
10 feet	0.40	0.27	0.20	0.13	0.08	0.04
15 feet	0.27	0.18	0.13	0.09	0.05	0.03
20 feet	0.20	0.13	0.10	0.07	0.04	0.02
50 feet	0.08	0.05	0.04	0.03	0.02	0.01
100 feet	0.04	0.03	0.02	0.01	0.01	0.00

Note: Withdraw Rate 25 cfs

Table 4. Estimated Velocities during Dewatering assuming Flow through Cylinder, 20 cfs Withdraw Rate

Distance (feet)	1-foot Depth	1.5-foot Depth	2-foot Depth	3-foot Depth	5-foot Depth	10-foot Depth
2 feet	1.59	1.06	0.80	0.53	0.32	0.16
5 feet	0.64	0.42	0.32	0.21	0.13	0.06
10 feet	0.32	0.21	0.16	0.11	0.06	0.03
15 feet	0.21	0.14	0.11	0.07	0.04	0.02
20 feet	0.16	0.11	0.08	0.05	0.03	0.02
50 feet	0.06	0.04	0.03	0.02	0.01	0.01
100 feet	0.03	0.02	0.02	0.01	0.01	0.00

Note: Withdraw Rate 20 cfs

2.2 Erosion Rate

The erosion rate was calculated using procedures described in Van Rijn (1984). The method consists of calculating erosion based on excess shear stress and assumed velocity and concentration profiles. The excess shear stress is the amount of shear stress generated by flow on the lakebed that is greater than the critical shear stress. The critical shear stress is the shear stress required to mobilize the representative sediment particle. The velocity profile is assumed to have a logarithmic shape which is determined by the shear stress and roughness of the bottom. This assumption isn't strictly true in the case where water is drawn off the surface rather than over the entire depth. However, it overestimates the actual shear stress at the bottom.

Van Rijn (1984) calculated bottom shear stress assuming uniform flow in the water body. Since this does not apply to the case of pumping water from the surface of Lake Fordyce the calculation of bottom shear stress was calculated using procedures presented in Berenbrock and Tranmer (2008). Berenbrock and Tranmer provide a relationship for bottom shear stress based on near bottom velocity.

The suspended sediment concentration profile is based on the balance between turbulence (generated by bottom shear) which keeps sediment in suspension and settling velocity (determined by particle size) which removes sediment from suspension.

Data needed and the values used in the analysis are provided in Table 5.

Table 5. Input Data Used to Estimate Sediment Erosion Rate

Parameter	Value	Units	Source
Particle Size, D_{50}	0.035	mm	Particle size distribution from boring C-2
Particle Size, D_{90}	0.15	mm	Particle size distribution from boring C-2, provided in Attachment A
Water Density	999.921	kg/m^3	10°C
Particle Density	2650	kg/m^3	assumed
Kinematic Viscosity	1.31e-6	m^2/s	10°C
Water Depth	Variable	m	
Velocity	Variable	m/s	
Flow Rate	20 and 25	cfs	Lake Fordyce Dam Seepage Mitigation Project, Dewatering/Removal of Water Plan (Black and Veatch 2020)

3. Results

The erosion rate was calculated at different distances from the intake for depths of water from 0.5 to 3 feet. The velocity used in the analysis was estimated using frictionless flow at 0.1 foot off the bottom. This results in a slightly higher velocity than calculated assuming flow through a cylinder (uniform with depth as shown in Tables 3 and 4). Withdrawing water at 25 cfs resulted in no erosion for depths greater than 3 feet. For depths between 3 and 1.5 feet, concentrations were less than 10 milligrams per liter (mg/L). If there is no decreases in the flow rate (from 20 or 25 cfs),a sharp increase in concentration is possible to greater than 100 mg/L as the depth decreases to less than 1.5 feet. However, the dewatering plan calls for decreasing the flow rate from 25 cfs to 20 cfs as the water level gets below elevation 6,220 feet, at which point the water is restricted to just the lowest points in the reservoir. Submersible pumps would then be used with a flow rate of between 1 and 5 cfs. By controlling the flow to 5 cfs or less, the concentration should be able to be maintained at less than 30 mg/L.

The turbid water would be discharged into an isolated area of Lake Fordyce. A silt curtain would keep the area isolated from the Lake. A silt curtain would reduce sediment discharges to the main body of the lake. The concentration behind the silt curtain can increase above the concentration in the discharge to the lake, because the mass of sediment leaving the isolation area is less than the mass of sediment being added, until the sediment behind the curtain settles and diffuses through the curtain at the same rate as it is being discharged from the lake to the isolation area (under steady state conditions). The mass settling rate depends upon surface area behind the silt curtain. The exact size of the area has yet to be determined but preliminary drawings indicate it will be about 7,000 square feet (ft^2). The settling rate for a D_{50} particle size of 0.035 mm (from Table 5) is about 1.017e-4 ft/s (see van Rijn 1984 for settling velocity relationship). The concentration increase in the isolation area can be calculated by balancing the three fluxes listed below.

1. Inflow of sediment = $Q^* C_i$, the inflow rate to isolation area times the concentration in the discharge.
2. Settling of sediment = A^*Vs^*C, the area of isolation area times the settling velocity times the concentration in isolation area.
3. Diffusion of sediment through curtain = $Q^*C^*(1-\varepsilon)$, the inflow rate times the concentration in isolation area times the leakage rate (equal to 1 minus curtain efficiency). This assumes steady-state flow (i.e., discharge into the isolation area equals flow out of isolation area).

Steady-state concentration will be reached when the inflow of sediment equals the sediment settling in the isolation area plus diffusion of sediment through the curtain. If the curtain was 100 percent efficient, the increase in concentration behind the silt curtain would be between 1.5 times to over 25 times the input concentration(see Table 6). If, however, the silt curtain is 90 percent efficient at retaining sediment, in this case, the increase in concentration above the inflow concentration is expected to vary from between 1.2 and 7 to 8 times the inflow concentration. The variation depends primarily upon the rate of pumping (e.g., 1 cfs to 25 cfs). For low flow rates, much of the sediment can either settle or leak through the curtain, so the increase in concentration behind the curtain will be small. For large flow rates only a small percentage of the sediment can settle or leak through the curtain so the increase in concentration behind the curtain will be larger. Under the existing plan (see Table 1), when the water gets shallow so that concentrations (turbidity) could increase small flow rates are proposed (5 cfs or less).

Table 6. Ratio of Steady-State Concentration in the Isolation Area to Inflow Concentration for Different Constant Inflow Rates and Silt Curtain Efficiencies

Scenario	Ratio for 1 cfs Inflow	Ratio for 3 cfs Inflow	Ratio for 5 cfs Inflow	Ratio for 10 cfs Inflow	Ratio for 15 cfs Inflow	Ratio for 18 cfs Inflow	Ratio for 20 cfs Inflow	Ratio for 25 cfs Inflow
Silt curtain efficiency = 100%; Isolation Area = 7,000 ft^2	1.4	4.2	7.0	14	21	25	28	35
Silt curtain efficiency = 90%; Isolation Area = 7,000 ft^2	1.2	3.0	4.1	5.8	6.8	7.2	7.3	7.8
Silt curtain efficiency = 80%; Isolation Area = 7,000 ft^2	1.1	2.3	2.9	3.7	4.0	4.2	4.2	4.4
Silt curtain efficiency = 90%; Isolation Area = 14,000 ft^2	0.66	0.95	2.6	4.1	5.1	5.6	5.8	6.3
Silt curtain efficiency = 90%; Isolation Area = 3,000 ft^2	2.5	3.3	6.2	7.7	8.3	8.6	8.7	8.9

*Notes: Ratio = C/Ci = Q/((1-ε)*Q+VsA), Setting velocity = 0.0001017 ft/s*

To be conservative a scenario of an increase of 25 times a concentration of 30 mg/L was assumed. This means that the isolation area behind the silt curtain could have a concentration of 750 mg/L, assuming steady-state conditions are reached. This should be considered a very high estimate since the flow rate will be reduced to 5 cfs or less when the water level in the Lake gets shallow and erosion increases. Assuming a 90 percent efficiency for the silt curtain and an 5 cfs inflow rate, in this case, the increase would be closer to 4 times (rather than 25 times) for a steady-state concentration of 120 mg/L (see Table 6 to see how the increase in concentration varies with pumping, efficiency, and isolation size). Under actual field conditions the high concentrations in the discharge from the Lake will likely last only 1 to 2 days, so it is unlikely that steady-state conditions will be reached

The steady-state turbidity concentration in the isolation area is proportional to the flow rate and inversely proportional to the area behind the silt curtain (i.e., increasing the flow rate increases the concentration, increasing the area decreases the concentration). It is unknown at this time if it is possible to substantially increase the size of the isolation zone (a bigger area would require a longer curtain and would be in deeper water). However, as an example, if the isolation area was increased to 14,000 square feet (double the proposed size), the expected maximum concentration in the isolation area would decrease between 20 to 50 percent, depending on inflow rate (see Table 6)

It was conservatively assumed that the silt curtain would reduce sediment concentrations by 90 percent (USACE 1978). Residual turbid water could seep into the lake and possibly diffuse to the intake for IFR water over a distance of approximately 600 feet. The concentration in the lake due to diffusion was estimated assuming 2-dimensional diffusion with a uniform concentration with depth (i.e., line source). The source was assumed to be steady-state, that is a continuous release at a constant rate over the depth of the curtain (see Socolofsky and Jirka, 2005 Attachment A for diffusion relationships). The concentration is sensitive to the diffusion coefficient value selected. Figure 4 from Shanahan (2000) provides a relationship between diffusion coefficient and length scale. The length scale is proportional to the size of the plume. The intake to the IFR is about 500 to 600 feet (150 to 180 m) from the silt curtain. This results in a diffusion coefficient of 0.08 square meter per second (m^2/s).

Figure 5 shows the concentration in the lake assuming a continuous sediment release from the silt curtain with a concentration behind the curtain of 750 mg/L. This would be due to pumping at 20 cfs at 30 mg/L into a 7,000 ft^2 isolation area with no leakage. After the maximum concentration was reached, it was assumed that the curtain starts to release at a concentration of 75 mg/L, assuming the curtain was 90 percent efficient. If the curtain was assumed to release sediment as sediment is pumped into the isolation area, the release concentration would be about 20 mg/L (approximately 200 mg/L behind the curtain, based on an inflow rate of 20 cfs at 30 mg/L with a 90 percent efficient curtain, see Table 6). A more likely release concentration would be closer to 12 mg/L (approximately 120 mg/L behind the curtain, based on an inflow of 5 cfs at 30 mg/L with a 90 percent efficient curtain). However, to account for the simple analysis and uncertainties in the inputs, a more conservative value for concentration was considered appropriate.

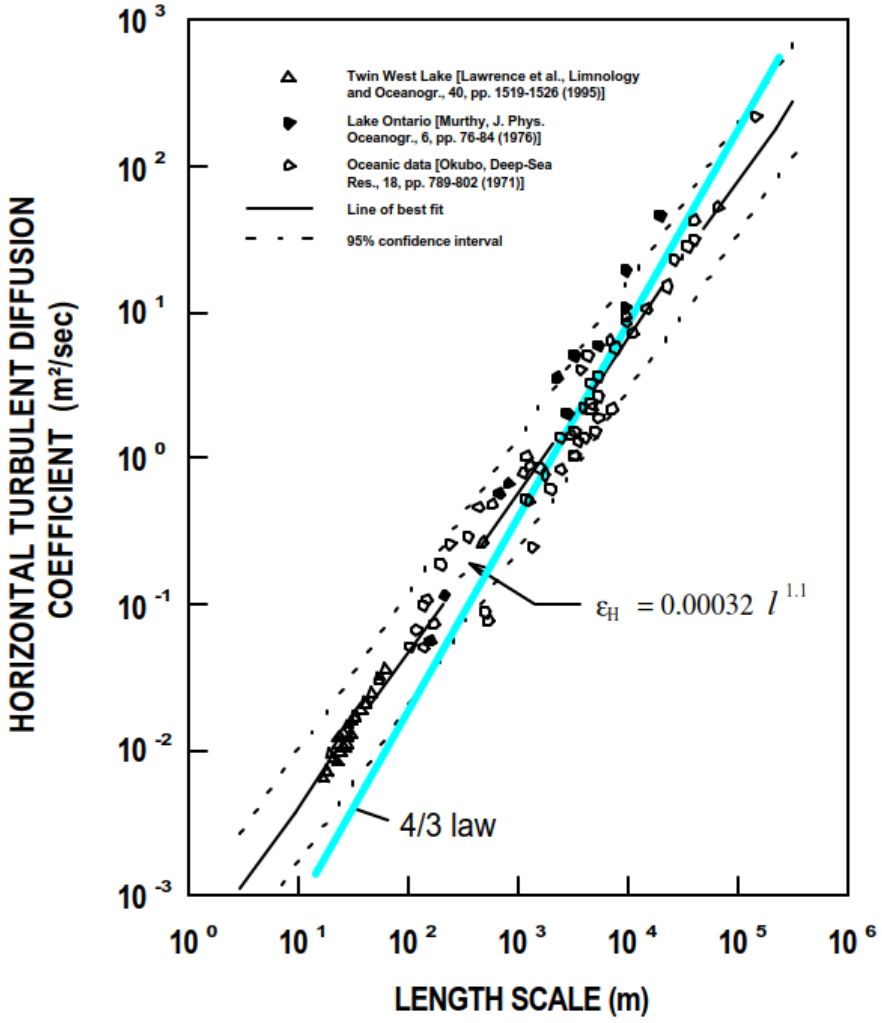


Figure 5B-2
Horizontal Turbulent Diffusivity in Oceans and Large Lakes as a Function of Length Scale
[based on Lawrence et al., Limnology and Oceanogr., 40, pp. 1519-1526 (1995),
reproduced with permission]

Figure 4. Diffusivity Values for Diffusion Calculation of Sediment Released from Isolation Area

Results for two other values for diffusion coefficient are included to show sensitivity. Note that the concentration behind the silt curtain could be much less than 750 mg/L if the pumping rate is controlled to keep the concentration low, as is planned. Results for a case with the concentration equal to 375 mg/L (one-half 750 mg/L) within the isolation area and results in a

concentration within the lake adjacent to the silt curtain of 37 mg/L are shown on Figure 5 as dashed lines. For the two cases shown, the concentration 600 feet from the silt curtain varies from about 2 mg/L to approximately 19 mg/L. This represents the expected increase in concentration at the intake and is representative of what could be expected within Fordyce Creek. Similar to the analysis above, these results assume that the silt curtain leaks over its entire depth. If the release occurs over only a portion of the silt curtain, concentrations at 600 feet would be lower.

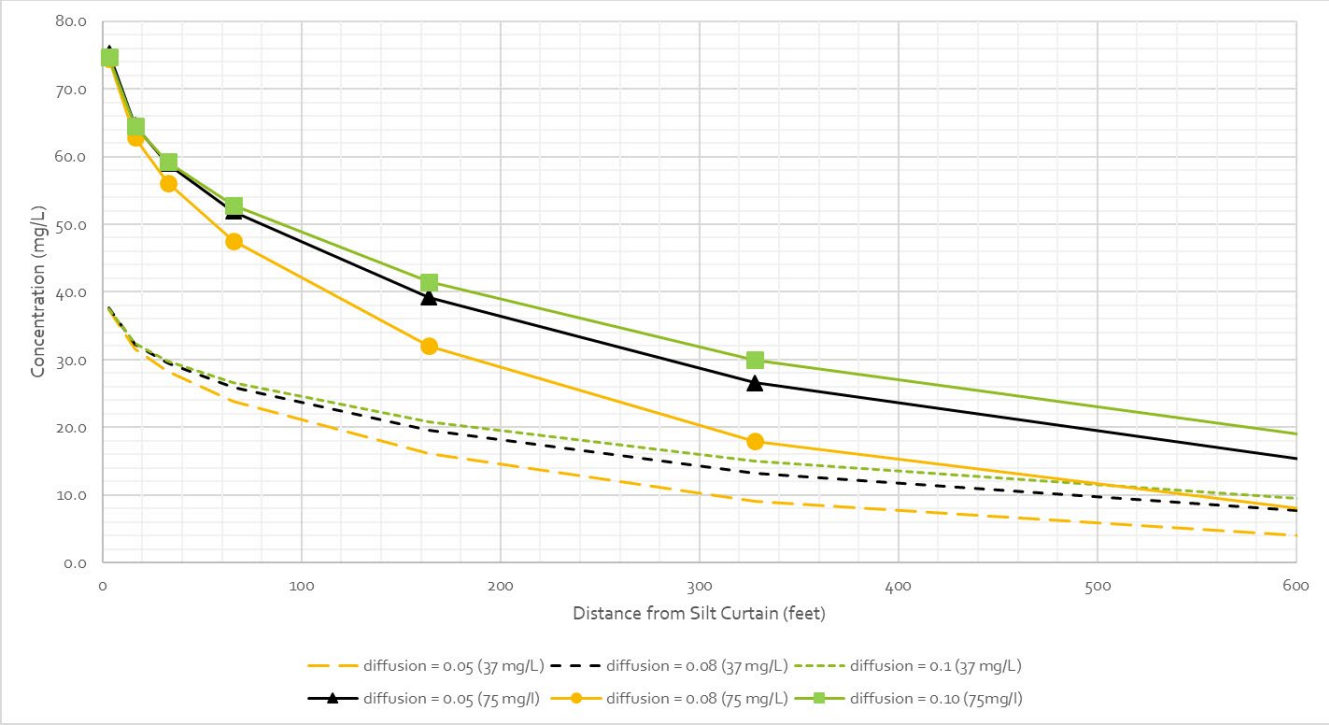


Figure 5. Estimated Concentration in Lake Fordyce due to Release from Silt Curtain

The above results are provided in mg/L; however, field monitoring is typically measured in units of Nephelometric Turbidity units (NTUs). The conversion between NTU and mg/L is site specific due to differences in particle type and size; however, is often found to be close to 1:1.

These results indicate that additional mitigation measures, such as Baker tanks, are unlikely be needed. Any short-term spikes in concentrations that do occur, would be reduced when mixed with water in the turbidity isolation area.

4. Limitations

No field work was conducted for this study. Background information and other data used by AECOM in preparing this report have been furnished by third parties. AECOM has relied on this information as furnished, and is neither responsible for nor has confirmed the accuracy of this information.

The calculations presented in this memorandum apply to the dewatering of the work area and pumping of cofferdam seepage to Lake Fordyce upstream of the cofferdam to an area behind a silt curtain. These results do not apply to turbidity generated specifically during the small dredging operation or construction of the cofferdam (surrounded by a silt curtain).

This sediment study was conducted with limited sediment data. Reasonable assumptions on the properties of the erodible sediment (i.e., muck) based on the available data were made, but it is possible that actual field conditions would vary.

Assumptions made for the analysis include:

- The D_{50} particle size used for the analysis was 0.035 mm. This is approximately the D_{50} size from the sediment sample collected in boring C2, the boring with the finest sediment. The other sediment samples had significantly coarser material. If coarser material is eroded during dewatering, the concentration in the isolation area would be smaller due to the higher settling rate of the coarser material.
- The silt curtain was assumed to be 90 percent effective in removing sediment. Operating according to manufactures specifications can result in higher efficiencies.
- It was assumed that flow ramping would occur during dewatering, that is, as the water depth gets shallow, the pumping rate will be reduced to prevent excessive concentrations in the discharge.
- A constant concentration was assumed to occur for a specified depth and pumping rate. In practice, the concentration in the discharge pipe may vary depending upon the type and mix of sediments encountered (fine, coarse, or mixture). However, the concentration behind the silt curtain should be more uniform due to mixing and dilution.

The services presented herein were conducted in a manner consistent with the standard of care ordinarily applied as the state of practice in the profession. No other warranties, expressed or implied, are included or intended in this document.

5. References

Berenbrock, Charles and Andrew W. Tranmer. 2008. Simulation of Flow, Sediment Transport and Sediment Mobility of the Lower Coeur d'Alene River, Idaho. United States Geological Survey, Scientific Investigations Report 2008-5093.

Black and Veatch, 2020. Lake Fordyce Dam Seepage Mitigation Project. Dewatering/Removal of Water Plan. Technical Memorandum – Draft. Prepared for Syblon Reid Contractors. January.

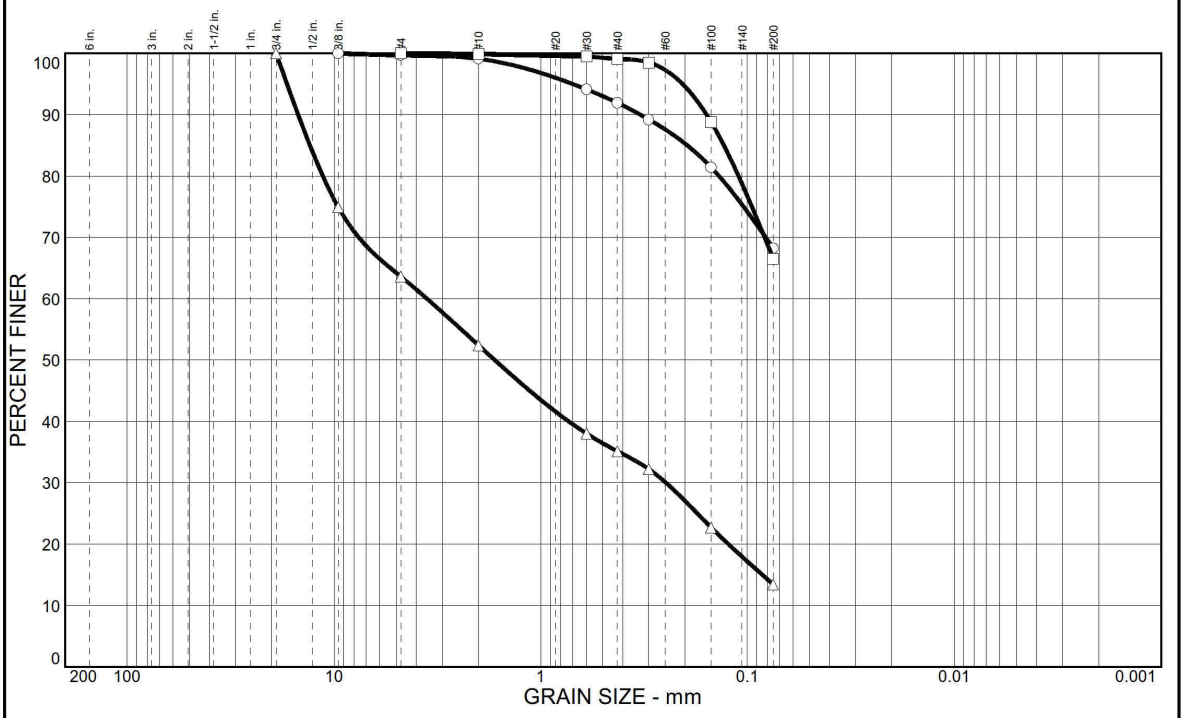
Socolofsky, Scott A., and Gerhard H. Jirka. 2005. CVEN 489-501: Special Topics in Mixing and Transport Processes in the Environment. Engineering – Lectures.

US Army Corp of Engineers (USACE). 1978. An Analysis of the functional Capabilities and Performance of Silt Curtains. Technical Report D-78-39. Dredged Material Research Program. July.

Van Rijn, Leo C. 1984. Sediment Transport, Part II: Suspended Load Transport. ASCE Journal of Hydraulic Engineering, Vol. 10, No. 11, November.

Attachment A Particle Size Distribution from Boring C-2

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		0.3	31.5	68.2					
□			33.5	66.5		ML		NP	
△		36.4	50.2	13.4					

SIEVE inches size	PERCENT FINER ○	□	△
3/4"			100.0
3/8"	100.0		74.9
GRAIN SIZE			
D_{60}			3.55
D_{30}			0.248
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	99.7	100.0	63.6
#10	99.1	99.9	52.4
#30	94.1	99.5	38.0
#40	91.9	99.1	35.1
#50	89.2	98.5	32.2
#100	81.4	88.8	22.7
#200	68.2	66.5	13.4

SOIL DESCRIPTION
○ Gray Sandy SILT
□ Gray Sandy SILT
△ Gray Silty SAND w/ Gravel

REMARKS:
○
□
△

○ Source: C-2	Sample No.: T-4	Elev./Depth: 5.5'
□ Source: C-2	Sample No.: T-5	Elev./Depth: 6.5'
△ Source: C-2	Sample No.: T-6	Elev./Depth: 7'

COOPER TESTING LABORATORY

Client: Cotton, Shires & Associates
Project: Fordyce - E5289
Project No.: 026-705
Figure