Application for New License
Major Project – Existing Dam

Exhibit A
Project Description

Security Level: Public

Camp Far West Hydroelectric Project
FERC Project No. 2997

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None.

EXHIBIT A

PROJECT DESCRIPTION

1.0 Introduction

The South Sutter Water District (SSWD or Licensee) has prepared this Exhibit A, Project Description, as part of its Application for a New License Major Project – Existing Dam – (FLA) from the Federal Energy Regulatory Commission (FERC or Commission) for the Camp Far West Hydroelectric Project, FERC Project Number (No.) 2997 (Project). This exhibit is prepared in conformance with Title 18 of the Code of Federal Regulations (C.F.R.), Subchapter B (Regulations under the Federal Power Act), Part 4 (Licenses, Permits, Exemptions and Determination of Project Costs), Subpart F and, as applicable, Part 16 (traditional process). In particular, this exhibit conforms to the regulations in 18 C.F.R. Section 4.51(b), which describes the contents of Exhibit A, Project Description. This Exhibit A describes, in detail, all existing and SSWD proposed Project facilities and features. As a reference, 18 C.F.R. Section 4.51(b) states:

> Exhibit A is a description of the Project. This exhibit need not include information on project works maintained and operated by the U.S. Army Corps of Engineers, the Bureau of Reclamation, or any other department or agency of the United States, except for any project works that are proposed to be altered or modified. If the project includes more than one dam with associated facilities, each dam and the associated component parts must be described together as a discrete development. The description for each development must contain:
>
> (1) The physical composition, dimensions, and general configuration of any dams, spillways, penstocks, powerhouses, tailraces, or other structures, whether existing or proposed, to be included as part of the project;
>
> (2) The normal maximum surface area and normal maximum surface elevation (mean sea level), gross storage capacity, and usable storage capacity of any impoundments to be included as part of the project;
>
> (3) The number, type, and rated capacity of any turbines or generators, whether existing or proposed, to be included as part of the project;
>
> (4) The number, length, voltage, and interconnections of any primary transmission lines, whether existing or proposed, to be included as part of the project (see 16 U.S.C. 796(11));
>
> (5) The specifications of any additional mechanical, electrical, and transmission equipment appurtenant to the project; and
>
> (6) All lands of the United States that are enclosed within the project boundary described under paragraph (h) of this section (Exhibit G), identified and tabulated by legal subdivisions of a public land survey of the affected area or, in the absence of a public land survey, by the best available legal description. The tabulation must show the total acreage of the lands of the United States within the project boundary.

Besides introductory material, this exhibit includes five sections. The Project's location is described in Section 2.0. Section 3.0 provides details of the existing Project facilities and features, including dimensions, physical features, and other pertinent information. Section 4.0 describes the area within the existing FERC Project Boundary. Section 5.0 describes SSWD's

proposed changes to existing Project facilities and features. Section 6.0 provides a bibliography of the references listed in this exhibit.

See Exhibit B for a description of Project operations, Exhibit C for a construction schedule for any proposed new facilities, Exhibit D for costs and financing information, and Exhibit E for a discussion of potential environmental effects and SSWD's proposed resource management measures. Project design drawings and maps are included in Exhibits F and G, respectively. Exhibit H contains a detailed description of the need for the electricity provided by the Project, availability of electrical energy alternatives, and other miscellaneous information.

All elevation data in this exhibit is in United States Department of Commerce (USDOC), National Oceanic and Atmospheric Association (NOAA), National Geodetic Survey Vertical Datum of 1929 (NGVD 29), unless otherwise stated.

2.0 Project Location

The Camp Far West Hydroelectric Project, which ranges in elevation from 150 feet (ft) at the base of Camp Far West Dam to 320 ft at the upper elevation contour of the existing FERC Project Boundary, is located on the mainstem of the Bear River in northern California in Nevada, Yuba and Placer counties in the western foothills of the Sierra Nevada. The Bear River is a tributary to the Feather River and is part of the Sacramento River Basin, which drains into the San Francisco Bay. Figure 2.0-1 illustrates the general regional location of the Project. Figure 2.0-2 shows the Project Vicinity,[1] and the existing Project facilities and features and FERC Project Boundary.

[1] In this exhibit, "Project Vicinity" refers to the area surrounding the Project on the order of United States Geological Survey (USGS) 1:24,000 scale topographic quadrangle.

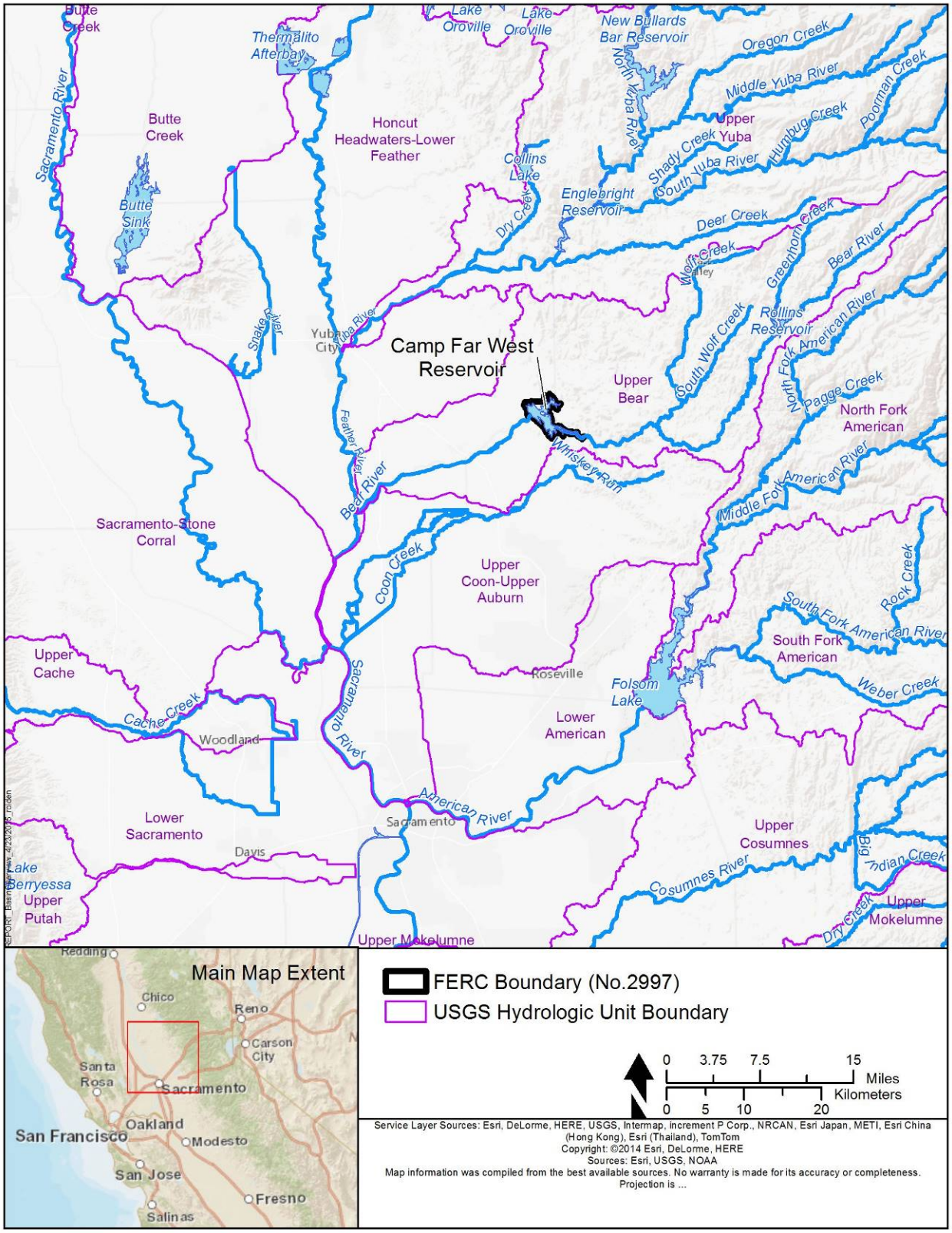


Figure 2.0-1. Bear River watershed in relation to the Feather River and other tributaries to the Sacramento River.

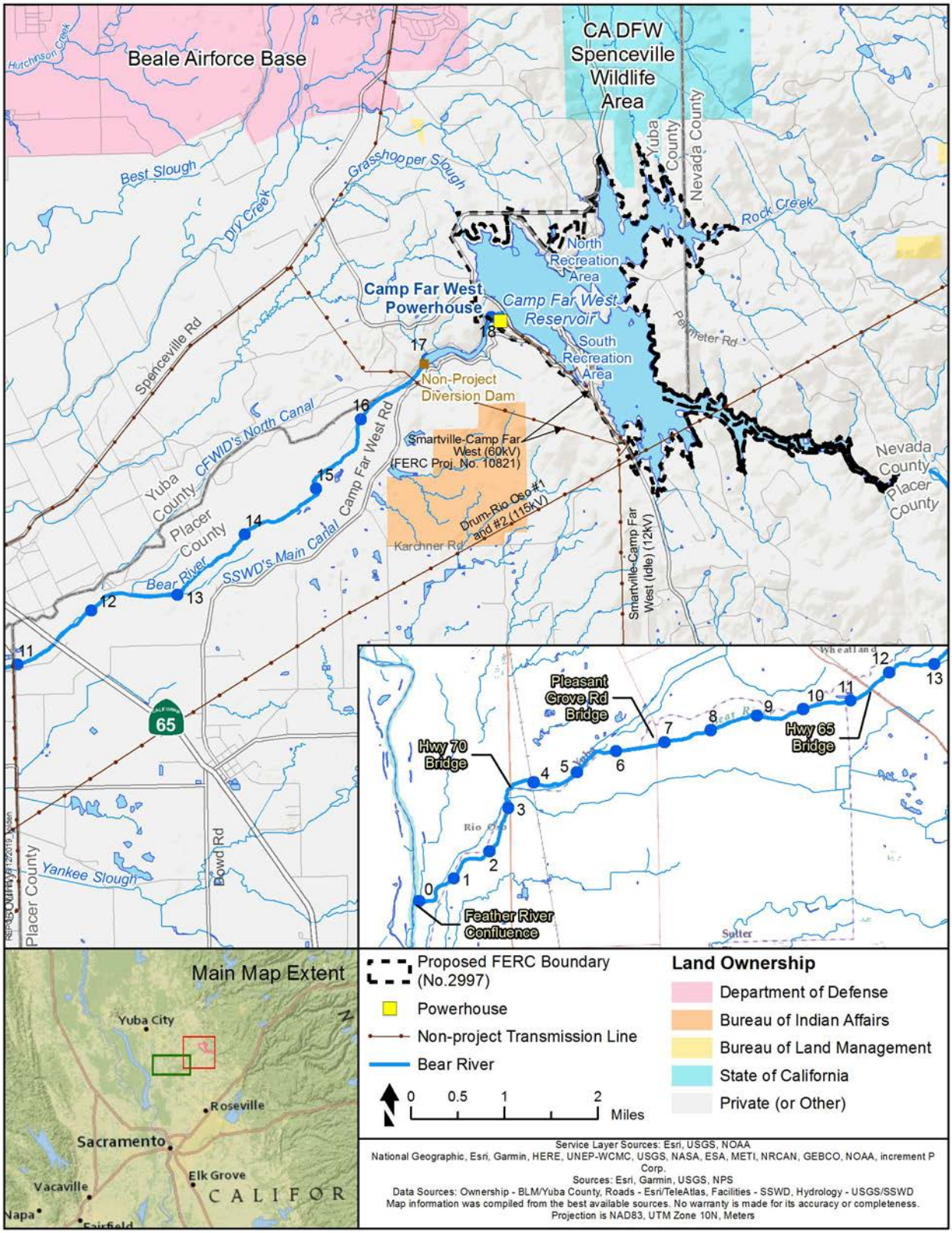


Figure 2.0-2. SSWD's Camp Far West Hydroelectric Project and Project Vicinity.

3.0 Existing Project Facilities and Features

The existing Project consists of one development - Camp Far West – that, in total, includes: one main dam; one powerhouse with an associated switchyard with a capacity of 6.8 megawatts (MW); and appurtenant facilities and structures, including recreation facilities and gages.

The Project does not include any open water conveyance facilities, transmission lines, active borrow or spoil areas, the diversion dam[2] located downstream from Camp Far West Dam, SSWD's Main Canal, Camp Far West Irrigation District's (CFWID) North and South canals, or the intake structures to these water delivery canals.

Table 3.0-1 and Table 3.0-2 summarize key information for the Project's powerhouse and reservoir, respectively.

Table 3.0-1. Key information regarding the Camp Far West Hydroelectric Project's powerhouse.

Powerhouse	Unit	Turbine Type	Rated Head (ft)	Rated Hydraulic Capacity (cfs)		Generation Capacity (kW)		Average Annual Energy (MWh/yr)[3]
				Minimum	Maximum	Nameplate Rating[1]	Dependable[2]	
Camp Far West	1	Francis	143	200	725	6,800	3,750	26,900

[1] Manufacturer's stated turbine and/or generator capacity, as shown on equipment nameplate.

[2] Defined as the average available capacity during the period of highest demand within the driest recent historical period, which for this purpose is July and August 1977.

[3] Megawatt hours: 1,000 kilowatt hours.

Table 3.0-2. Key morphological information regarding the Camp Far West Hydroelectric Project's reservoir.

Project Reservoir	NMWSE (ft)	Gross Storage[1] (ac-ft)	Usable Storage[2] (ac-ft)	Surface Area[3] (ac)	Maximum Depth[3] (ft)	Shoreline Length[3] (mi)	Drainage Area At Dam (sq mi)
Camp Far West	300	93,737	91,327	1,886	155	29	284

Key: NMWSE = normal maximum water surface elevation; ft =feet; ac-ft = acre-feet; ac = acres; mi = miles; and sq mi = square miles

[1] Defined as the reservoir storage between the NMWSE and the bottom of the reservoir.

[2] Defined as the reservoir storage between the NMWSE and the invert of the 72-inch hollow jet valve level outlet (i.e., 175 ft), below which there is 2,500 ac-ft of reservoir storage that is not available for release (i.e., dead storage).

[3] At NMWSE.

Existing Project facilities and features are described below.

[2] The non-Project diversion dam is approximately 1.3 mi downstream of Camp Far West Dam, and is a 38-ft high overflow dam where up to approximately 40 cfs is diverted into CFWID's South Canal, 435 cfs into SSWD's Main Canal, and 35 cfs into CFWID's North Canal. The water delivery period typically extends from April 15 through October 15, depending on the water year. SSWD initiates water deliveries by installing flashboards on the diversion dam (i.e., in accordance with the California Division of Safety of Dam, the flashboards cannot be in place from November 1 to April 1), which provides the head for the diversions into the canals. Water is released from the non-Project diversion dam into the Bear River through a fish release valve (refer to Section 3.8 in this Exhibit A). Higher flows spill over the diversion dam.

3.1 Main Dam and Auxiliary Dams

3.1.1 Main Dam

The first Camp Far West Dam was a 50-ft high concrete gravity structure built by the CFWID in 1927. Construction on the current dam was completed in January1964 by SSWD as part of the California State Water Plan to enhance water supply in California's Central Valley. Camp Far West Dam and Reservoir are not part of California's State Water Project.

The main embankment of the existing dam is a zoned earthfill structure, which is 185 ft high, 40 ft wide at the crest and 2,070 ft long. The dam has variable 2 to 1, 2.5 to 1, and 3 to 1 upstream slopes, with a 60-ft wide beam at an elevation of 200 ft, and a 2 to 1 downstream slope. The certified crest of the dam is at an elevation of 320 ft and has an additional 2.2 to 3.1 ft of camber resulting from roadway construction along the dam crest.

The central impervious core of the main embankment is comprised of compacted silts, clays, and gravels. Upstream from the core is a compacted shell of sand, gravel, and cobbles. Downstream and separated from the core by an inclined chimney drain is a shell of compacted clays and silts, which is further overlain by a shell of compacted rock with soil fines. Underlying the center portion of the embankment over the original river channel and extending from the 12-ft thick inclined chimney drain to the downstream toe is a 6-ft-thick, 100-ft-wide horizontal drain blanket. Both upstream and downstream slopes of the embankment are covered with a layer of riprap having a maximum diameter of 3 ft.

Figure 3.1-1 shows the Camp Far West Dam.

Figure 3.1-1. Photograph of some Camp Far West Hydroelectric Project facilities and features.

3.1.2 North and South Wing Dams

Adjacent to the left abutment of the main embankment is the south wing dam constructed of earthfill with a maximum height of 45 ft, a crest width of 20 ft, and length of 1,060 ft. Constructed to the north of the main embankment opposite the spillway is the north earthfill wing dam that is 25 ft in height, 20 ft in width at the crest, and 1,460 ft in length. The upstream slopes of the south and north wing dams are 2.5 to 1 and 3 to 1, respectively. The downstream slopes of both wing dams are 2.5 to 1. The north and south wing dams are constructed of compacted clays and silts. The upstream outside slope of the two wing dams is covered with 3 ft of riprap underlain by an 18-in. layer of gravel bedding. The downstream slope of the south wing dam is protected by a layer of riprap with a minimum thickness of 3 ft.

3.1.3 North Dike

The Project includes an earthfill dike constructed to the north of the north wing dam, and referred to as the north dike. The north dike is 15-ft-high, has a crest length of 1,450 ft, and a crest width of 20 ft. The nominal elevation at the top of the dike is 320 ft.

3.2 Camp Far West Reservoir

When the main dam was built, the reservoir had a surface area of 2,020 ac and storage volume of 104,000 acre-feet (ac-ft) at the Normal Maximum Water Surface Elevation (NMWSE) of 300 ft. Based on recent SSWD topographic and bathymetric surveys, the current reservoir surface area is 1,886 ac with a gross storage capacity of approximately 93,737 ac-ft at the NMWSE of 300 ft. The reservoir contains 1,307 ac-ft and has a surface area of about 74 ac at its minimum operating elevation of 175 ft, below which the reservoir storage is not available for release (i.e., dead storage). Maximum reservoir depth is approximately 155 ft, relative to the NMWSE. Figure 3.2-1 shows Camp Far West Reservoir.

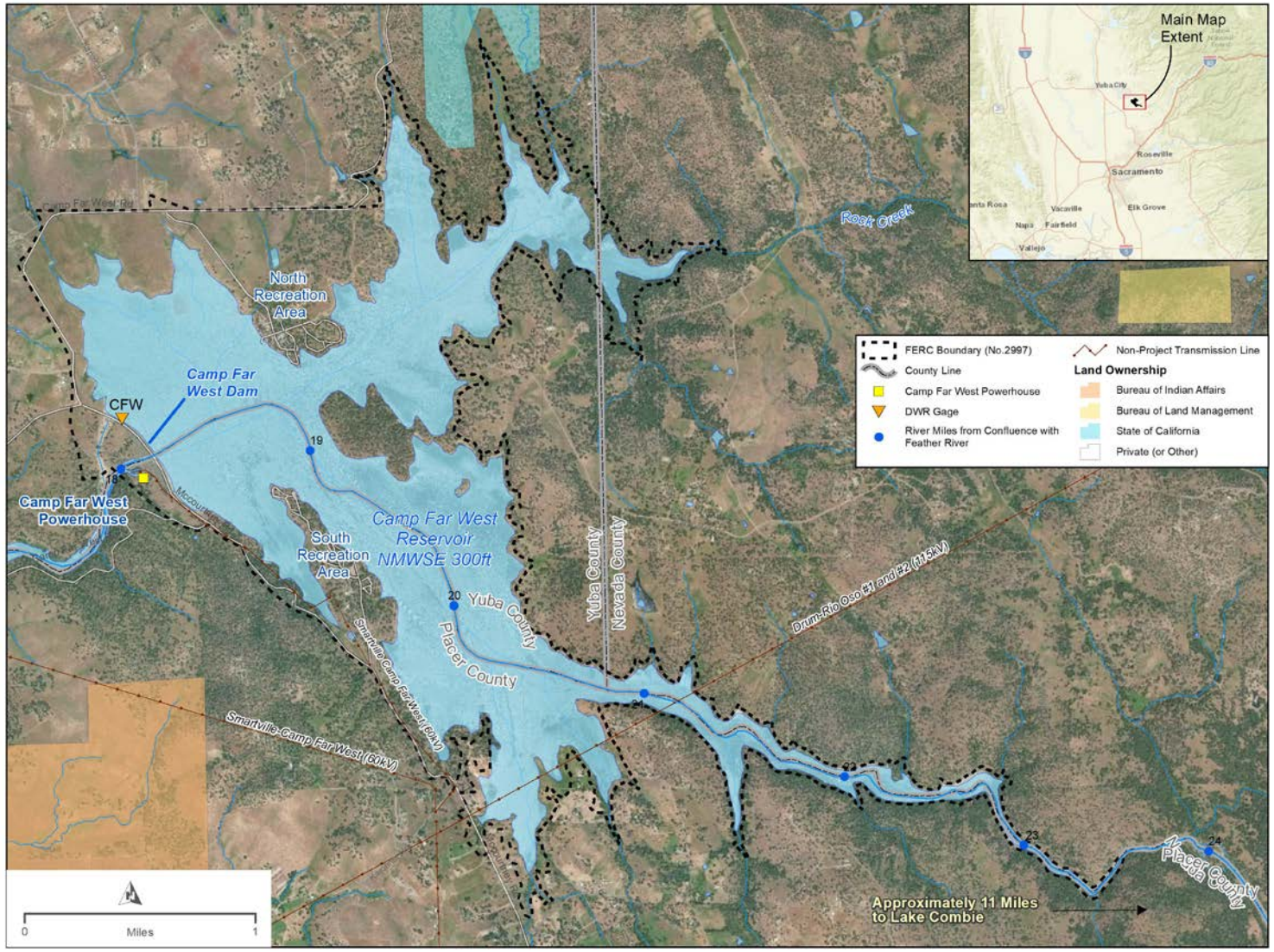


Figure 3.2-1. Camp Far West Reservoir and associated facilities and features.

3.3 Camp Far West Spillway

3.3.1 Existing Spillway

An overflow spillway is located adjacent to the right abutment of the Camp Far West main dam. The spillway structure consists of a 15-ft-wide reinforced concrete approach apron with the invert at 290 ft, an ungated, ogee-type reinforced concrete structure with a crest length of 300 ft, and a 77-ft long downstream reinforced concrete chute with vertical reinforced concrete counterforted sidewalls. The spillway crest elevation is 300 ft. The channel downstream of the spillway terminates in a chute excavated in solid rock. This unlined channel then joins the Bear River approximately 1,200 ft below the main dam. A 302.5-ft single-span, steel-truss bridge across the spillway crest provides access across the dam. The spillway has a maximum design capacity of 106,500 cubic feet per second (cfs) at a reservoir elevation of 320 ft. Figure 3.1-1 shows the existing Camp Far West Dam Spillway.

3.3.2 Ongoing Spillway Modification to Meet Probable Maximum Flood

In 2005, the probable maximum flood (PMF) was recalculated for the Camp Far West Hydroelectric Project resulting in a Camp Far West Dam spillway capacity of less than the PMF and consequently inadequate spillway capacity. Since the existing spillway capacity at NMWSE (i.e., 106,500 cfs) is less than the recalculated peak outflow during the PMF (i.e., approximately 126,600 cfs [NHC 2006]), FERC directed SSWD to increase the spillway capacity to accommodate passage of the revised PMF and avoid overtopping the dam at a reservoir elevation of 320 ft. Similarly, the California Division of Safety of Dams (DSOD) directed SSWD to increase the spillway capacity to ensure passage of the revised PMF with 1.0 ft of freeboard at the dam. The modification is needed to assure that the Camp Far West Dam spillway could accommodate the PMF wherein water would flow over the spillway rather than overtop the dam embankment thereby avoiding the risk of dam failure along with sudden and significant downstream flooding. SSWD is coordinating with FERC and DSOD to modify the spillway, as directed.

At the time this Application for New License is filed, the spillway modification, which has been agreed to by FERC,[3] includes the following:

- New Auxiliary Spillway Structure. The proposed new auxiliary spillway structure would be an ogee-type weir, horizontally concaved, with a crest length of 300 ft. The spillway would be constructed of reinforced concrete and be of similar design to the existing, adjacent spillway structure. Although the auxiliary spillway is being constructed to elevation 305 ft, it will not affect the existing Camp Far West Reservoir NMWSE because the reservoir will still spill over the existing elevation 300 ft spillway: the auxiliary spillway would only be activated at higher inflows.

[3] FERC approved the spillway modification in a memo filed on July 3, 2007 (Accession No. 200170709-0225).

- New Inlet Channel. A new unlined spillway inlet channel would be excavated upstream of the auxiliary spillway structure, within the Camp Far West Reservoir area, to divert water to the new auxiliary spillway. The width of the new auxiliary inlet channel would be a minimum of 300 ft at its narrowest, and the bottom elevation of the channel would be a constant 290 ft elevation. The side slopes of the channel would be constructed at 1:1 slopes where moderately weathered or un-weathered rock is encountered and 2:1 slopes for all other material types.
- New Outlet Channel. A new unlined auxiliary spillway outlet channel would be constructed downstream of the new auxiliary spillway structure to convey water back to the existing spillway channel. The channel would be approximately 805 ft long with a slope varying from -3 percent to -5.6 percent. The side slopes of the channel would be constructed at 1:1 slopes where moderately weathered or un-weathered rock is encountered and 2:1 slopes for all other material types.
- New Bridge. A new approximately 300-ft-long bridge would be constructed for the new auxiliary spillway to provide continuity and allow vehicular traffic to pass over the dam and along Blackford Road. The bridge would be constructed of precast concrete girders, and consist of side concrete barriers and a paved road surface. Guardrails would be placed at the ends of the bridge for transition from the road to the bridge. The bridge would be supported by concrete abutments at each end and two additional piers, evenly spaced.
- Grading and Raising Existing Blackford Road. Construction of the new bridge to a top-of-paved-surface-elevation of 325 ft would require the existing Blackford Road to be raised approximately 15 ft at the west end of the proposed new bridge to accommodate the approach to the bridge over the new auxiliary spillway. The new bridge would ramp back down to the existing road grade on the east end. Fill would be required on the west end of the bridge in order to accommodate the approach to the new spillway bridge. Maximum grade would be approximately 6 percent, similar to existing maximum grade. The road width would be 24 ft along Blackford Road and 20 ft along Camp Far West Road. Fill side slopes would be constructed at 2:1.
- Relocation of Existing Powerline. A segment of an existing distribution powerline, which is located just south of the proposed new auxiliary spillway and owned and operated by Pacific Gas and Electric (PG&E), would be relocated. The line serves only as a distribution line from the Camp Far West Powerhouse switchyard to the main grid and would not disrupt power distribution to other users.

SSWD anticipates that the auxiliary spillway would be constructed in the course of 3 months in fall 2020 and 5 months in spring-summer 2021.

When the spillway modification is complete, the auxiliary spillway in combination with the existing spillway will have a combined capacity of 134,600 cfs at a water surface elevation of 318.5 ft.

For the purposes of this Application for New License, SSWD assumes the spillway modification is fully implemented under the existing license and is in place when FERC issues a new license for the Project.

3.4 Water Intakes and Water Conveyance Systems

3.4.1 Intakes

There are two intake structures associated with the Camp Far West Dam; the power intake that was constructed when hydropower was added to the dam, and the intake structure for the outlet works. Both structures are submerged for most of the year and are located at the upstream toe of the main dam.

The power intake structure consists of a reinforced concrete ungated vertical intake tower 22-ft-high, with openings on three sides; two 10-ft-wide by 14-ft-high and one 10-ft-wide by 10-ft-high. The openings are protected by steel trashracks on 6-in. centers. A concrete bulkhead enables positive closure and the sill elevation measures 197.0 ft.

The intake for the outlet works consists of a reinforced concrete ungated vertical intake tower 25-ft-4 in. high, with openings on three sides – each 7-ft-wide by 8-ft-high. The openings are protected by steel trashracks on 6-in. centers and the sill elevation measures 175.0 ft.

3.4.2 Water Conveyance Systems

There are three main conveyance systems associated with the Camp Far West Dam. The overflow spillway discussed above flows into an unlined rock conveyance channel that carries the spill back into the Bear River downstream of the dam.

The power intake structure described above connects to a 760-ft-long, 8-ft diameter concrete tunnel through the left abutment of Camp Far West Dam that conveys water directly to the Camp Far West Powerhouse, which discharges to the Bear River at the base of Camp Far West Dam.

A 350-ft-long 48-in. diameter steel pipe connects the intake structure for the outlet works described above to a valve chamber, and a 400 ft long, 7.5-ft diameter concrete-lined horseshoe tunnel connects the valve chamber to a 48-in. diameter Howell Bunger outlet valve on the downstream face of Camp Far West Dam. The valve has a release capacity of 500 cfs at NMWSE and discharges directly into the Bear River.

Each facility is shown on Figure 3.1-1.

3.5 Camp Far West Powerhouse

The powerhouse was constructed in conjunction with the addition of hydropower licensed in 1981 after Camp Far West Dam was built and in operation. The powerhouse is an above-ground,

steel reinforced concrete structure that houses a single vertical-shaft Francis-type turbine. The turbine-generator unit is rated at 6,800 kilowatts (kW) under a rated head of 143 ft and a rated flow of 725 cfs. The unit includes a synchronous three-phase, 13.6 kilovolt (kV) generator with a capability of 6,800 kW. The intake is submerged in the reservoir. Figure 3.1-1 shows the Camp Far West Powerhouse.

3.6 Camp Far West Switchyard

The Camp Far West Switchyard is a fenced switchyard adjacent to the Camp Far West Powerhouse containing a 6/8 NVA, OH/FA, three phase, 13.8 kV – 60 kV, delta-ground wye power step-up transformer; a 60 KV, 31, 60 Marts, 600 ampere, 1,000 MVA short circuit bulk oil circuit breaker; and appropriate disconnect switches. The switchyard also contains PG&E electrical equipment facilities that are not part of the Project. Figures 3.1-1 shows the Camp Far West Switchyard.

3.7 Camp Far West Reservoir Recreation Facilities

There are two developed recreational areas on the Camp Far West Reservoir, both of which are owned by SSWD and leased to a private concessionaire to operate. The North Shore Recreation Area (NSRA) is located off of Camp Far West Road in Wheatland, CA. This campground is currently open year-round. The South Shore Recreation Area (SSRA) is located off of McCourtney Road (Placer Co. C6037) in unincorporated Lincoln, CA, and is only open from mid-May until September. The boat launching facility at the NSRA was reconstructed in 2003-2004. Table 3.7-1 provides details of the recreation facilities at the NSRA and the SSRA. Figure 3.1-2 shows the locations of the NSRA and SSRA. Figure 3.1-7 shows representative photographs of Project recreation facilities.

Table 3.7-1. Camp Far West Hydroelectric Project recreation facilities.

Facility	Amenity	North Shore Recreation Area	South Shore Recreation Area
Family Campgrounds	No. Sites (standard)	70	67
	Sites (RV with hookups)	10	none
	Parking Spurs	1 spur per site	1 spur per site
	Overflow Parking Spaces	None	18 single
	Restrooms	2 flush	1 flush, 2 vault
Group Campgrounds	Sites	2, 25-person group sites, 1, 50-person horse camp site	1, 50-person group site
	Parking Spaces	None[1]	10
	Restrooms	4 portable chemical toilets	None[2]
Day Use Areas	Picnic Sites	20	33
	Swim Beaches	1	1
	Parking Spaces	None[3]	44
	Restrooms	1 flush	None[4]
Boat Ramps	Number	1, 4-lane concrete ramp	1, 2-lane concrete ramp
	Parking Spaces	82 single, 73 vehicle with trailer	52 vehicle with trailer
	Restrooms	1 flush	1 flush
Dispersed Use Areas[5]	Sites	2	2
	Restrooms	6 portable chemical toilets	6 portable chemical toilets

Table 3.7-1. (continued)

Facility	Amenity	North Shore Recreation Area	South Shore Recreation Area
Other Facilities	Entrance Station	1	1
	Store	1	1
	RV Dump Station & Holding Pond	1	1
	Concessionaire Trailers	2	1
	Water Treatment Plant	1	None[6]
	Water Storage Tank	1, 60,000-gallon tank	None[6]

[1] The group campsites use the adjoining family campground restroom building.
[2] Parking is available in open areas adjacent to the group sites, but is not designated or defined.
[3] The day use area (picnic area and swim beach) uses the adjoining boat ramp parking area for parking.
[4] The picnic area uses the adjoining boat ramp restroom building.
[5] The dispersed use areas provide day use and overnight opportunities with minimal facilities (roads, portable chemical toilets and trash cans).
[6] Water is piped under the reservoir to South Shore Recreation Area from the North Shore Recreation Area treatment plant and storage tank.

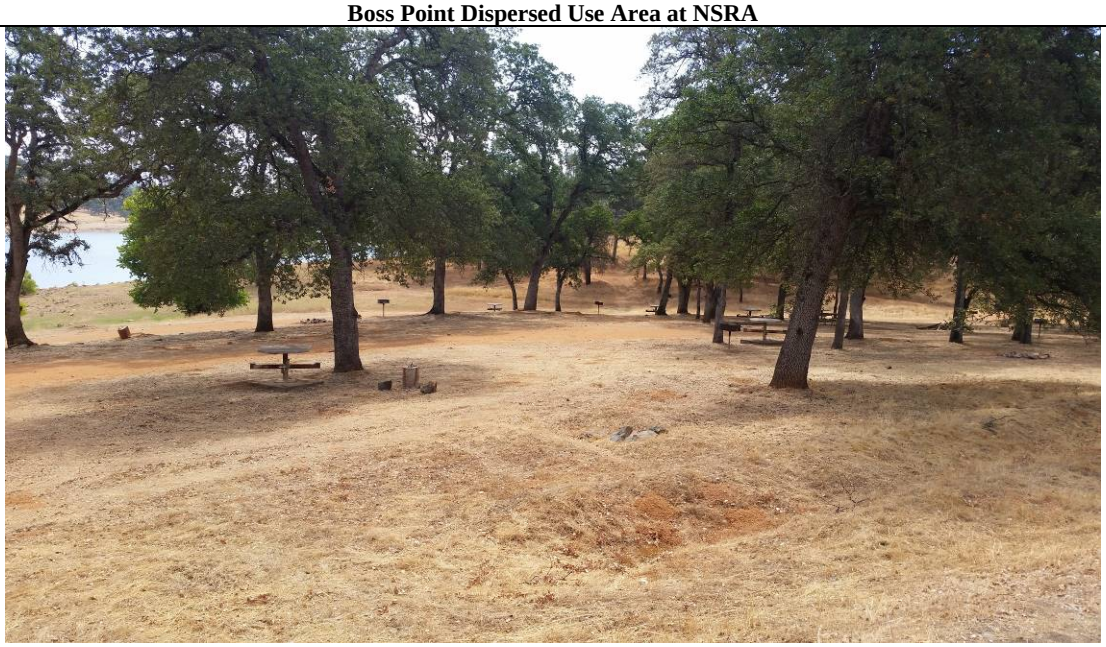
A recreational water system source is Camp Far West Reservoir, where two pumps in the reservoir deliver water at 70 gallons/minute (5,000,000 gallons or 15.3 ac-ft per year) uphill via underground piping to the water treatment facility in the NSRA. After being treated, the water is piped nearby to a 60,000-gallon storage tank constructed of belted steel and recently installed in 2011. From the storage tank, underground distribution piping sends the water throughout the NSRA and SSRA. The SSRA facilities are connected via two pipes under the reservoir that sends the water from the NSRA to the SSRA.

Both NSRA and SSRA have a sewage holding pond with an aerator to handle the sanitary needs of the flush restroom buildings and the RV dump stations at each recreation area. The NSRA and SSRA ponds have surface areas of approximately 1.5 and 0.5 ac, respectively. The NSRA sewage system uses a gravity-feed operation and is supplemented by a pump to get the sewage up to the holding pond. The SSRA sewage system is a gravity-fed system. SSWD maintains the sewage ponds in conformance with a permit issued by the Central Valley Regional Water Quality Control Board.

Family Campground campsite at NSRA

Boat Ramp at NSRA

Boss Point Dispersed Use Area at NSRA



Picnic Area at SSRA

Sewage Pond at NSRA

Water Treatment Facility at NSRA

Water Storage Tank at NSRA

Figure 3.7-1. Representative photographs (dated 07/21/15) of Project recreation facilities.

3.8 Gages

Flow data for the Project comes from four gages, data for two of which are published by the USGS (Table 3.8-1). SSWD also measures spill through the Camp Far West Dam spillway by indirect stage method.

Table 3.8-1. Streamflow and other gages in the Camp Far West Hydroelectric Project Vicinity.

United States Geological Survey (USGS) Identifier	California Data Exchange Center (CDEC) Identifier[1]	Gage Name	Measures
--	--	Camp Far West Dam Low-Level Outlet Flowmeter[2]	Low-level outlet discharge
--	--	Camp Far West Powerhouse Flowmeter[2]	Powerhouse discharge

Table 3.8-1. (continued)

United States Geological Survey (USGS) Identifier	California Data Exchange Center (CDEC) Identifier[1]	Gage Name	Measures
11423700[3]	CFW[4]	Bear River at Camp Far West Dam (Camp Far West Reservoir)	Reservoir Stage and Storage
11423800[5]	CFW[6]	Bear River Fish Release below Camp Far West Reservoir	Compliance with flow requirements in Existing FERC License

[1] Unlike USGS data which are reviewed for quality by USGS prior to publishing the data, CDEC data are not reviewed by CDEC before being made available.

[2] Flowmeters below Camp Far West Dam at low-level outlet and powerhouse are currently maintained by the Sacramento Municipal Utility District (SMUD) and data are not reported publicly.

[3] USGS gage 11423700 measured Camp Far West Reservoir storage, but has not been reported by USGS since September 30, 1983.

[4] CDEC gage CFW, maintained by DWR Flood Management, reports real-time Camp Far West Reservoir stage and end-of-month Camp Far West Reservoir storage-.

[5] USGS Gage 11423800, maintained by USGS, reports river flow below the non-Project diversion dam for compliance with the FERC license. It is not a full flow gage.

[6] CDEC gage CFW reported computed flow downstream from Camp Far West Dam, but is inactive as of June 1, 2018.

Figure 3.8-1 shows the fish release valve in the non-Project diversion dam. Water is released through a slide gate into a concrete structure on the south-side of the non-Project diversion dam. The structure includes a rectangular notch and weir plate. The water level is measured to determine the depth of flow over the weir and calculate flow.

Figure 3.8-1. Camp Far West Hydroelectric Project minimum flow compliance gage (USGS Gage 11423800, Bear River Fish Release below Camp Far West Reservoir.

Seven gages exist downstream of the Project. One gage is a stage gage that measures the stage of the pool formed by the non-Project diversion dam, and the other six are flow gages. One flow gage is located on CFWID's North Canal to measure diversions into the canal from the Bear River. Two flow gages are located on SSWD's Main Canal: one gage measures diversions from SSWD's Main Canal into CFWID's South Canal, and the second gage is located further along the Main Canal and measures flow in the Main Canal past the CFWID's South Canal withdrawal.[4] The fourth flow gage is USGS Gage 11424000, *Bear River near Wheatland*, reported by California Data Exchange Center (CDEC) as BRW, *Bear River near Wheatland*, located 6.5 mi downstream from Camp Far West Dam, 200 ft downstream of the State Highway 65 bridge crossing, which is a full-flow gage and is maintained by USGS and DWR. The last flow gage is CDEC Gage BPG, *Bear River at Pleasant Grove Road*, a full-flow gage maintained

[4] SSWD Main and Canal and CFWID South Canal and North Canal diversions are measured and reported in compliance with CA SWRCB Surface Water Measurement and Reporting Regulations (California Code of Regulations, Title 23, Chapters 2.7 and 2.8). Beginning January 1, 2020, hourly diversion data will be reported weekly, and will be publicly available.

by DWR and located 10.5 mi downstream from Camp Far West Dam. Figure 3.8-2 shows the location of the gages.

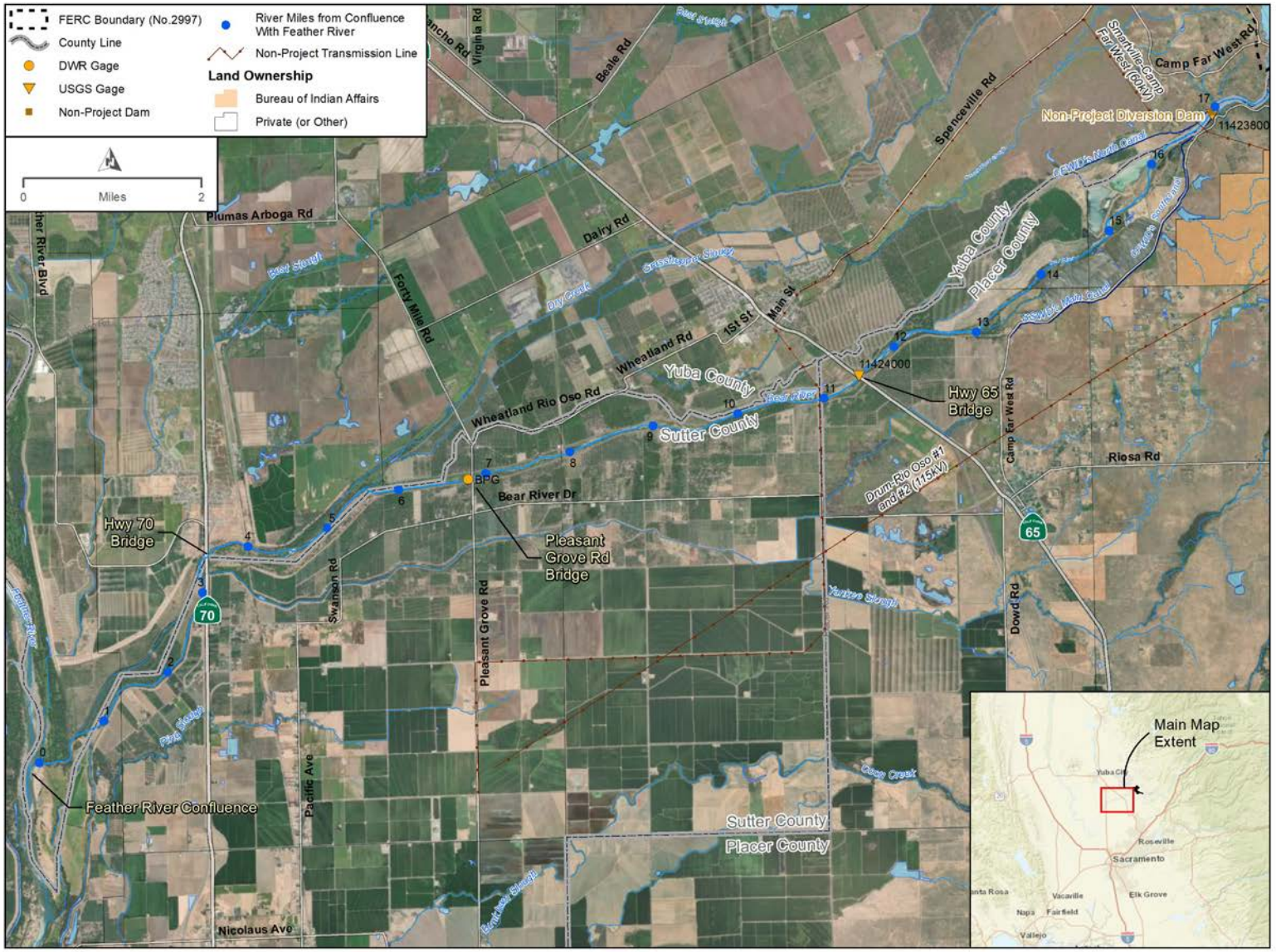


Figure 3.8-2. Location of streamflow gages.

3.9 Primary Project Roads and Trails

There are no Primary Project Roads or Trails explicitly included in the existing FERC-licensed Project facilities.

4.0 Existing Project Boundary

The FERC Project Boundary is intended to consist of all lands necessary for the safe operations and maintenance of the Project and other purposes, such as recreation, shoreline control, and protection of environmental resources. For the Camp Far West Hydroelectric Project, the existing FERC Project Boundary encompasses 2,863.7 ac of land. SSWD owns over 95 percent (2,710.5 ac) of the land within the boundary, and the remaining 5 percent (153.2 ac) of the land is owned by private parties – no federal or state land occurs within or adjacent to the FERC Project Boundary or along the Bear River downstream of the Project. The boundary generally follows the 320 ft elevation contour around Camp Far West Reservoir with the exception of the additional lands included at the northwest end of the reservoir that include the NSRA and additional lands included at the southwest end of the reservoir that include the SSRA.

5.0 Proposed Changes to Existing Project

SSWD proposes three general changes to existing Project facilities: 1) raising the NMWSE of Camp Far West Reservoir by 5 ft from an elevation of 300 ft to an elevation of 305 ft;[5] 2) modifications to Project recreation facilities at Camp Far West Reservoir; and, 3) addition of a single Primary Project Road. In addition, SSWD proposes a slight modification to the existing FERC Project Boundary. Each of these is discussed below.

5.1 Camp Far West Reservoir Pool Raise

Recent aerial surveying and topographic mapping shows that Camp Far West Reservoir stores 93,737 ac-ft of water at its existing Camp Far West Reservoir NMWSE of 300 ft. This is roughly 10 percent less than anticipated when the dam was enlarged in 1964, and the amount authorized in SSWD's water rights. Therefore, SSWD proposes to raise the NMWSE of Camp Far West Reservoir by 5 ft to an elevation of 305 ft. The Pool Raise would increase Camp Far West Reservoir storage by 9,836 ac-ft to a capacity of 103,573 ac-ft at Camp Far West Reservoir's new NMWSE of 305 ft.

The Pool Raise would involve demolition of the concrete cap on the existing Camp Far West Dam spillway, the addition of approximately 1,730 cy of concrete to raise the existing spillway crest from an elevation of 300 ft to an elevation 305 ft, and anchoring of the new concrete with steel dowels. The spillway design would not change from its existing reinforced concrete,

[5] For the purpose of this exhibit, this is referred to as the "Pool Raise."

ungated, ogee-type weir and the existing 300-ft crest length will not change. In addition, no changes would be required to the ongoing spillway modification. Figure 5.1-1 is a general conceptual-level plan showing the details of the Pool Raise. Figures 5.1-2 and 5.1-3 show profiles of the existing spillway and Blackford Road profiles. Figure 5.1-4 shows additional typical sections of the existing spillway. When the Pool Raise is complete, the auxiliary spillway in combination with the modified existing spillway will have a combined capacity of 126,600 cfs at a water surface elevation of 318.5 ft. Exhibit B describes Project operations with the Pool Raise, and Exhibit C presents SSWD's current plan for the Pool Raise construction. Estimated cost of the Pool Raise is provided in Exhibit D.

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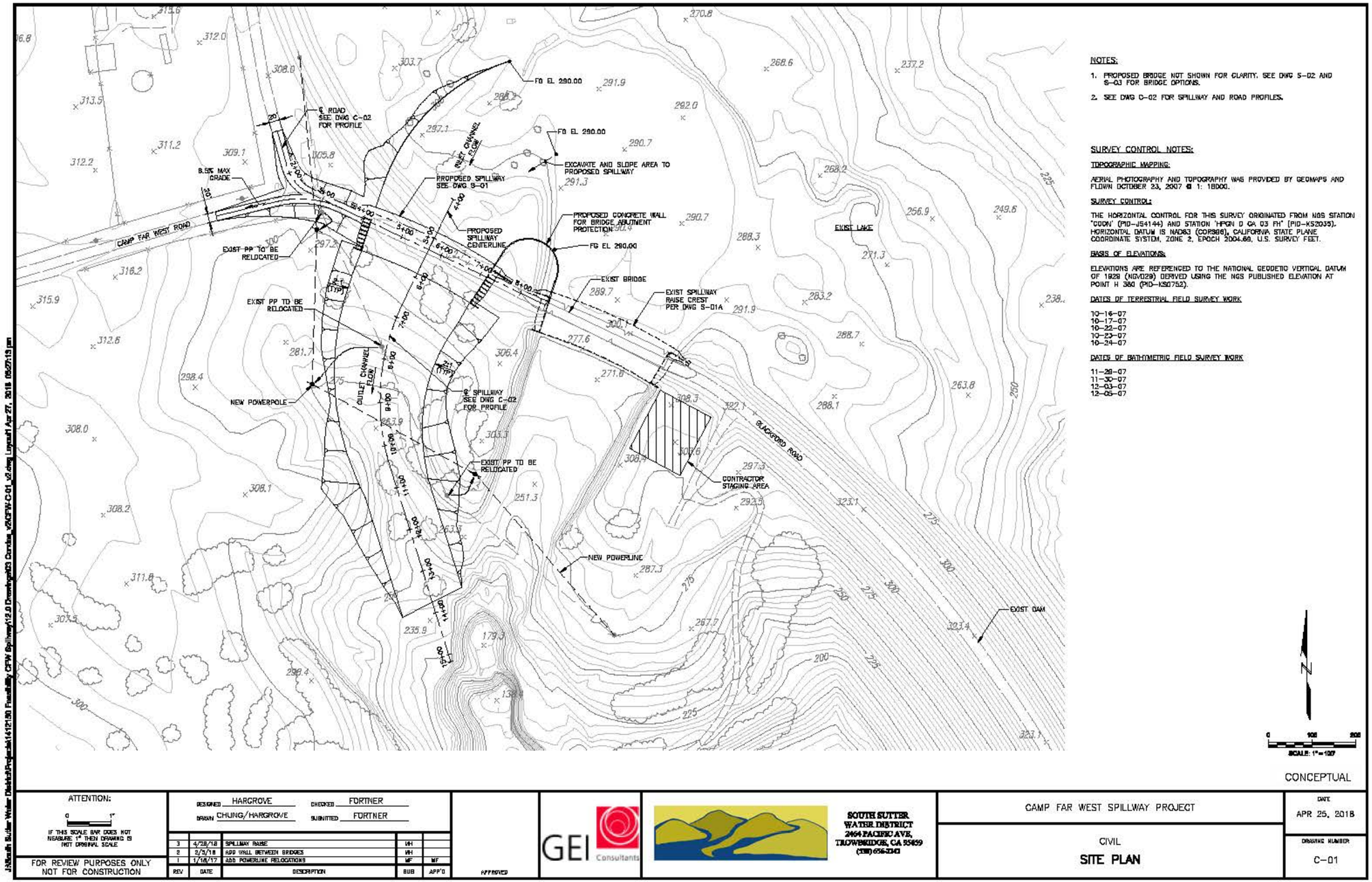

NOTES:

1. PROPOSED BRIDGE NOT SHOWN FOR CLARITY. SEE DWG S-02 AND S-03 FOR BRIDGE OPTIONS.
2. SEE DWG C-02 FOR SPILLWAY AND ROAD PROFILES.

SURVEY CONTROL NOTES:

TOPOGRAPHIC MAPPING:

AERIAL PHOTOGRAPHY AND TOPOGRAPHY WAS PROVIDED BY GEOMAPS AND FLOWN OCTOBER 23, 2007 @ 1: 18000.

SURVEY CONTROL:

THE HORIZONTAL CONTROL FOR THIS SURVEY ORIGINATED FROM NGS STATION "COON" (PID-JS4144) AND STATION "HPGN D CA 03 FH" (PID-KS2035). HORIZONTAL DATUM IS NAD83 (CORS96), CALIFORNIA STATE PLANE COORDINATE SYSTEM, ZONE 2, EPOCH 2004.69, U.S. SURVEY FEET.

BASIS OF ELEVATIONS:

ELEVATIONS ARE REFERENCED TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29) DERIVED USING THE NGS PUBLISHED ELEVATION AT POINT H 380 (PID-KS0752).

DATES OF TERRESTRIAL FIELD SURVEY WORK

10-16-07
10-17-07
10-22-07
10-23-07
10-24-07

DATES OF BATHYMETRIC FIELD SURVEY WORK

11-28-07
11-30-07
12-03-07
12-05-07

ATTENTION:
IF THIS SCALE BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT ORIGINAL SCALE
FOR REVIEW PURPOSES ONLY
NOT FOR CONSTRUCTION

DESIGNED HARGROVE CHECKED FORTNER
DRAWN CHUNG/HARGROVE SUBMITTED FORTNER

REV	DATE	DESCRIPTION	BUB	APP'D
3	4/28/18	SPILLWAY RAISE	VH	
2	2/2/18	ADD WALL BETWEEN BRIDGES	VH	
1	1/16/17	ADD POWERLINE RELOCATIONS	MF	MF

APPROVED

GEI Consultants

SOUTH SUTTER WATER DISTRICT
2464 PACIFIC AVE.
TROWBRIDGE, CA 95659
(209) 656-2043

CAMP FAR WEST SPILLWAY PROJECT

CIVIL
SITE PLAN

DATE
APR 25, 2018

DRAWING NUMBER
C-01

Figure 5.1-1. Conceptual level plan for Camp Far West Reservoir Pool Raise – general plan.

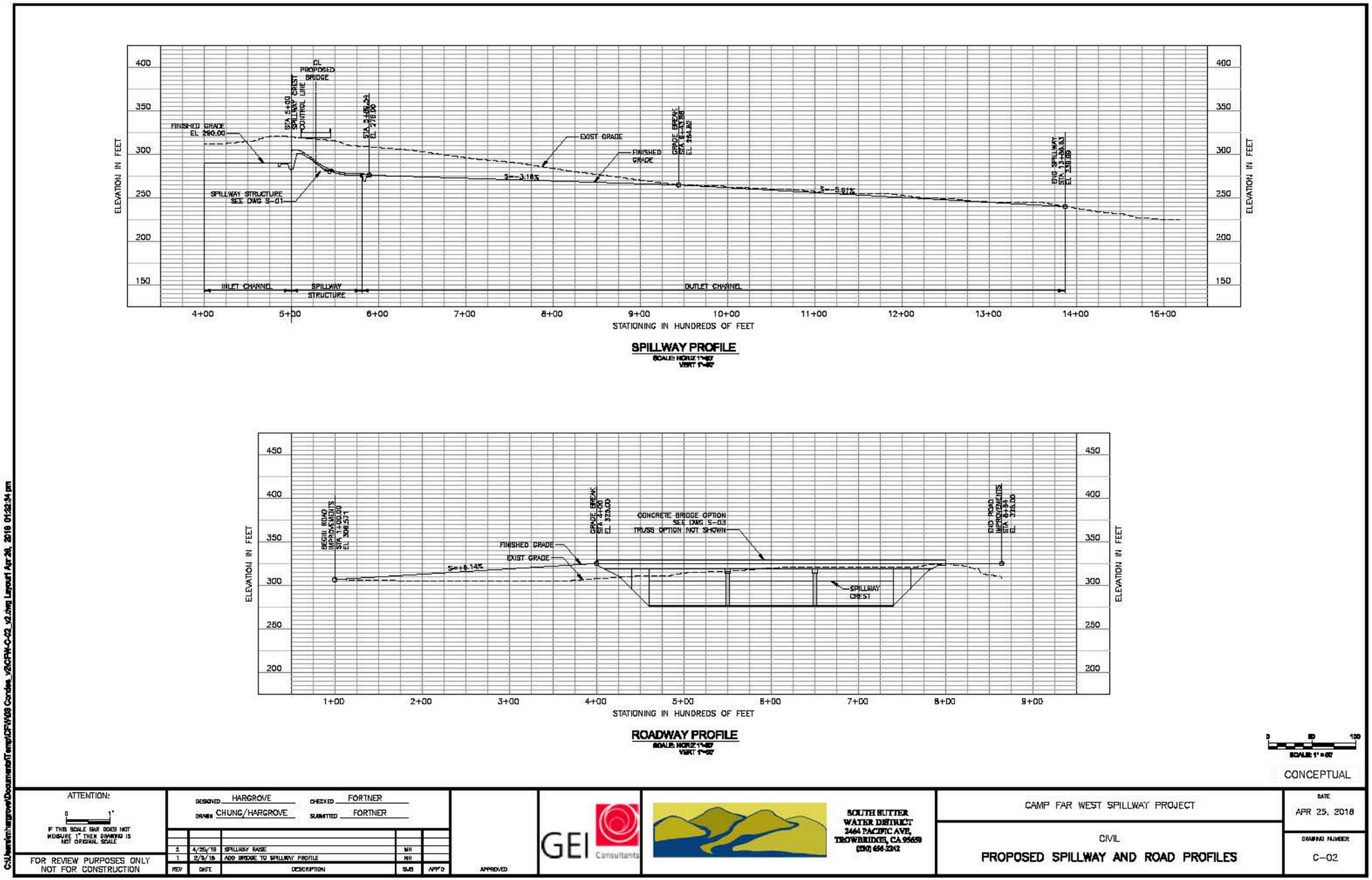

Figure 5.1-2. Conceptual level plan for Camp Far West Reservoir Pool Raise – spillway and road profiles.

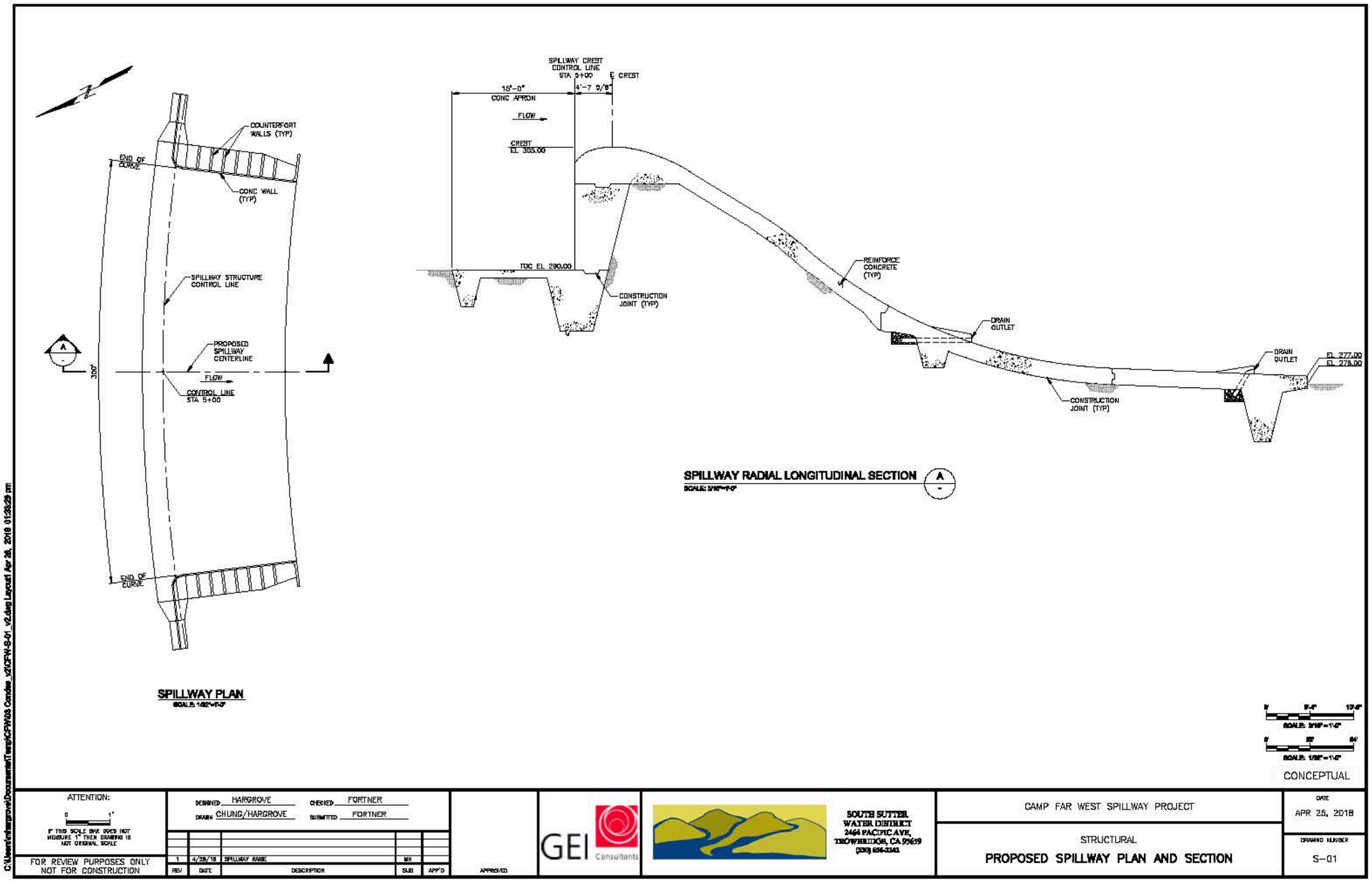

Figure 5.1-3. Conceptual level plan for Camp Far West Reservoir Pool Raise – spillway and road typical sections.

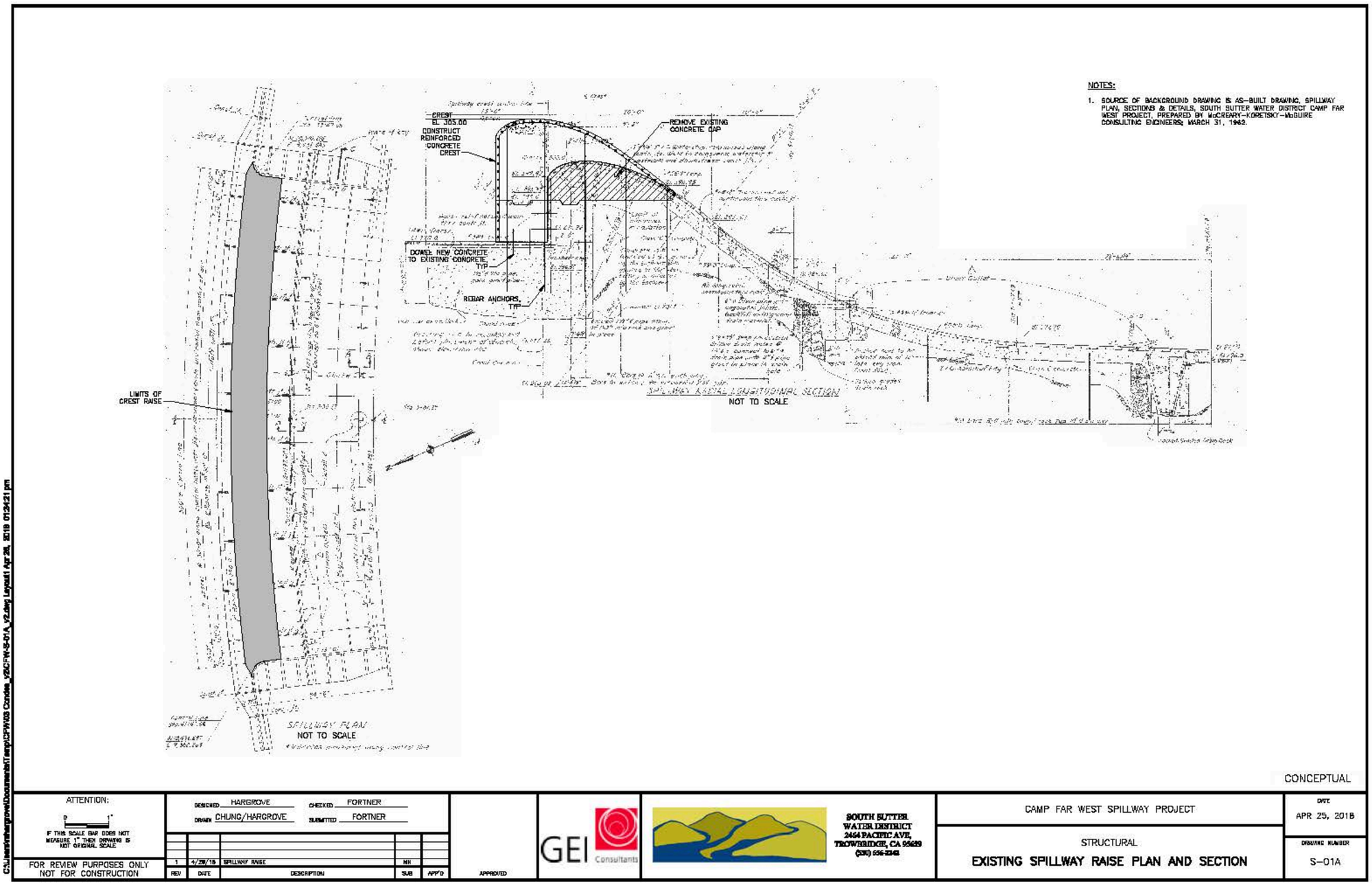

Figure 5.1-4. Conceptual level plan for Camp Far West Reservoir Pool Raise - spillway typical section.

5.2 Recreation Facilities

While the Project RAs are able to meet the current and future recreational demand, some of the recreation facilities are in need of replacement or rehabilitation to maintain the proper functioning condition of the facility. Nearly all of the facilities will require replacement or rehabilitation during the term of the new license to maintain the facilities in proper functioning condition; and, particularly the restrooms, potable water system and the circulation roads, which will need near-term rehabilitation in order to provide facilities in a safe and proper functioning condition. When constructing or rehabilitating Project recreation facilities, SSWD will obtain all necessary permits and approval for survey work, facility design and on-site resource evaluations.

As a result of the Pool Raise, approximately 104 recreational facilities or site features would be impacted along the shoreline at the NSRA and SSRA. Most of the impacted features (i.e., 59%) would be directly impacted by the pool raise by either partially or fully inundating the features. In these instances, the inundated features would be relocated, re-routed or re-aligned to avoid inundation. The remaining impacted features (i.e., 41%) would be indirectly impacted, whereby the Pool Raise would not inundate the feature, but would closely abut the feature likely resulting in flooding and/or erosion impacts to the features due to wind, wave or high flow events. In a few instances, a feature would be indirectly impacted and require relocation because an inundated segment of a circulation road would likely be re-aligned through these features. The construction work to relocate, re-route or realign the impacted features would be completed in one calendar year. Overall, the majority of the construction would occur outside the peak recreation season (i.e., Memorial Day through Labor Day holiday weekends). In instances where construction would be necessary during the peak season, the work would be restricted to select areas and conducted during low-use periods (i.e., weekdays) to minimize any impacts to the recreation facilities and visitor experiences.

At NSRA, approximately 57 site features would be impacted, including 21 campsite living spaces (i.e., table and/or grill area), 19 campsite vehicle spurs, 13 circulation road segments (i.e., 2,410 ft of dirt roads and 480 ft of paved roads), 2 boat ramp and parking area segments, 1 picnic site, and 1 water hydrant. The majority of the impacted recreational site features at NSRA would be at the family campground (i.e., 43 impacted features) followed by the dispersed use areas (i.e., 6 impacted features – all dirt roads), group campground (i.e., 4 impacted features), and the day use area and boat launch facilities (i.e., each with 2 impacted features). At the family campground, most of the impacted features would be campsite living spaces and vehicle spurs (i.e., each with 19 impacted sites) with a five impacted road (dirt surface) segments. At the group campground, one of the two group campsites would be fully inundated. At the dispersed use areas, all of the impacted features would be the dirt roads (i.e., 1,410 ft) that provide shoreline access. Overall, most of the impacted features at NSRA (i.e., 61%) would be directly impacted by the pool raise and the remaining impacted features would be indirectly impacted (i.e., features abutting the 305 ft NMWSE).

At SSRA, approximately 47 site features would be impacted, including 15 circulation road segments (i.e., 3,720 ft of dirt roads and 1,140 ft of paved roads), 11 campsite living spaces (i.e.,

table and/or grill area), 9 picnic sites, 7 campsite vehicle spurs, 1 boat ramp turnaround area, 1 parking area, 1 swim beach, 1 water hydrant, and 1 stage. The majority of the impacted recreational site features at SSRA would be at the family campground (i.e., 22 impacted features) followed by the day use area (i.e., 14 impacted features), dispersed use areas (i.e., 9 impacted features – all dirt road segments), the swim beach (i.e., 2 impacted features), and the boat launch (i.e., 1 impacted feature). At the family campground, most of the impacted features would be campsite living spaces (i.e., 11 sites), vehicle spurs (i.e., 7 sites) and road segments (i.e., 3 segments). At the dispersed use areas, all of the impacted features would be the dirt roads (i.e., 2,710 ft) that provide shoreline access. The entire swim beach would be inundated. Overall, most of the impacted features at SSRA (i.e., 55%) would be directly impacted by the Pool Raise and the remaining impacted features would be indirectly impacted (i.e., features abutting the 305 ft NMWSE). Notably, at five campsites in the family campground, the campsite living space and vehicle spurs would be indirectly impacted and require relocation because an inundated segment of the campground circulation road would likely be re-aligned through these campsites.

5.3 Primary Project Road

SSWD proposes to add to the new license as a Primary Project Road an existing road that accesses the Camp Far West Powerhouse. The existing road is within the proposed and existing FERC Project boundaries. The road extends approximately 0.25 miles from an existing SSWD locked gate at Camp Far West Road to the Camp Far West Powerhouse and Switchyard. The existing road is not open to the public for safety reasons, is used and maintained solely by SSWD to access the Camp Far West Powerhouse and Switchyard, and has an asphalt-paved surface approximately 20 ft wide and shoulder width of approximately two feet. While the road was constructed when Camp Far West Powerhouse and Switchyard were constructed and is SSWD's only vehicular access route to Camp Far West Powerhouse and Switchyard, the road is not identified in the existing license as a Project facility. Figure 2.1-1 in this Exhibit as well as Figure 2.0-1 and Attachment G-1 in Exhibit G of the FLA shows the location of the existing road.

Roads associated with recreation facilities are considered in SSWD’s proposed Recreation Facilities Plan.

5.4 Project Gages

SSWD does not propose any changes to Project gages described in Section 3.8.

5.4 FERC Project Boundary

SSWD proposes several changes to the existing FERC Project Boundary in order to more accurately define lands necessary for the safe operation and maintenance of the Project and other purposes, such as recreation, shoreline control, and protection of environmental resources. This includes modifying the existing FERC Project Boundary to remove lands surrounding the Camp Far West 60 kV transmission line, which is part of the Project, and other lands not used for

Project operations. The transmission line, which was built and is owned and operated by PG&E, was originally included in the license application as part of the Camp Far West Hydroelectric Project. However, on April 2, 1991, with the consent of PG&E, the transmission line from the Camp Far West switchyard was removed from the Camp Far West Hydroelectric Project FERC license and added to PG&E's Camp Far West Transmission Line Project (FERC Project No. 10821). SSWD inadvertently did not amend the FERC Project Boundary at that time.

There are two categories of proposed Project Boundary changes:

- Proposed addition of lands to the existing FERC Project Boundary that are currently utilized with a preponderance of use related to the Project operation and maintenance, and proposed removal of lands from the Project Boundary that do not have Project facilities and are not used or necessary for Project O&M. These proposed changes are essentially making corrections to the existing FERC Project Boundary.
- Proposed changes to the existing FERC Project Boundary around the Project reservoir and impoundments from surveyed coordinates to a contour located above the 300' elevation NMWSE or to a distance of 200 ft from the 300-ft elevation NMWSE. These changes are proposed as these are the preferred methods of defining project boundaries as outlined in the FERC Drawing Guide (FERC 2012), provide a minimum of 15 ft of dry shore for all locations around the reservoir and are a better representation of lands required for Project O&M around the Project reservoir.

Proposed changes are discussed below. All proposed changes are described in detail in Section 2.0 of Exhibit G.

SSWD proposes the following changes under the category of corrections to the existing FERC Project Boundary:

- The addition of the areas that encompass rights-of-way for road access to the Camp Far West Powerhouse used to access and maintain the dam outlet and powerhouse. Land in this proposed addition is owned by a private land owner (Placer County Assessor's Parcel Number 018-020-015-000).
- The removal of the land owned by SSWD to the west of the dam spillway (Yuba County Assessor's Parcel Number 015-370-016-000). These lands are not used or needed for Project O&M. Note that the area of the new Spillway Modification to the Bear River is retained in the proposed Project Boundary with a 15 ft buffer.
- The removal of the area in the existing Project Boundary bounded on the north and west by Camp Far West Road, extending to a boundary established at 200' from the NMWSE. This land is not used for Project O&M. Land in this proposed removal is owned by SSWD (Yuba County Assessor's Parcel Numbers 015840021000, 015840020000, 015370016000).

- The removal of the area in the existing Project Boundary bounded on the north by Camp Far West Road, extending to the northern use limit of the North Recreation Area. This land is not used as part of the recreation facility or for Project O&M. Land in this proposed removal is owned by SSWD (Yuba County Assessor's Parcel Number 015840022000).

SSWD proposes the following changes under the category of a contour 20 ft above the 300-ft NMWSE or proximity of 200 horizontal ft from the 300 ft NMWSE:

- The addition and removal of land such that the Project Boundary around Camp Far West Reservoir where the Project Boundary is not encompassing Project facilities is defined by the lesser (closer to reservoir NMWSE) of either the topographic contour of 320 ft, which is 20 ft above the 300-ft NMWSE, or 200 horizontal ft from the 300 ft NMWSE. Lands in this proposed change are a combination of lands owned by private land owners and SSWD. The corrections consist of many small additions and subtractions from the existing FERC boundary based on higher accuracy elevation data made available since the creation of the original boundary geometry. Areas of significant change are limited to the upland reaches of tributary canyons of unnamed creeks where the existing FERC Boundary extends beyond 200 ft horizontally from the 300 ft NMWSE. All of the upland canyon changes are removal of lands included in the existing FERC boundary.

Table 5.4-1 summaries SSWD's proposed changes to the existing FERC Project Boundary.

Table 5.4-1. Summary of proposed changes to the existing FERC Project Boundary.

Owner and Action	Added to Include Primary Project Roads (ac)	Beyond 200 ft from the 300-ft NMWSE (ac)	Correction to 320 ft contour (ac)	Not Used for Project O&M (ac)	Added to include recreation area (ac)	Total (ac)
EXISTING FERC PROJECT BOUNDARY						
Private Lands	--	--	--	--	--	139.6
SSWD Lands	--	--	--	--	--	2,724.1
Total	--	--	--	--	--	**2,863.7**
PROPOSED CHANGES TO EXISTING FERC PROJECT BOUNDARY						
Changes to Private Lands						
addition	+0.7	--	+7.2	--	--	+7.9
subtraction	--	-0.4	-0.4	--	--	-0.8
Subtotal	*+0.7*	*-0.4*	*+6.8*	*0.0*	--	*+7.1*
addition	0	--	+7.7	--	+6.7	+14.4
subtraction	--	-87.6	-2.0	-121.6	--	-211.2
Subtotal	*0*	*-87.6*	*+5.7*	*-121.6*	*+6.7*	*-196.8*
Total	**+0.7**	**-88.0**	**+12.5**	**-121.6**	**+6.7**	**-189.7**
PROPOSED FERC PROJECT BOUNDARY						
Private Lands	--	--	--	--	--	146.7
SSWD Lands	--	--	--	--	--	2,527.3
Total	--	--	--	--	--	**2,674.0**

Where SSWD proposes to add private lands to the FERC Project Boundary, SSWD has notified the land owner of this proposal.

Neither the existing FERC Project Boundary nor the Proposed FERC Project Boundary includes federal lands or tribal reservation lands.

6.0 List of Attachments

None.

7.0 References Cited

Northwest Hydraulic Consultants, Inc. (NHC) 2006. Probable Maximum Flood Study for Camp Far West Dam (FERC No. 2997). Prepared for South Sutter Water District.

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