P.O. Box 367
Elmira, CA 95625

707-718-1416 ▲ Fax 707-451-4775
www.solanoarchaeology.com

CULTURAL RESOURCES CONSTRAINTS ANALYSIS ADDENDUM

Date: September 21, 2022

To: Augustine Planning, Inc.

From: Solano Archaeological Services, LLC

Subject: Groveland Community Services District Forest Fuels Reduction Project – Additional Sites, Tuolumne County, California

This technical memorandum prepared by Solano Archaeological Services, LLC (SAS) summarizes the results of a constraints analysis for a forest fuels reduction efforts being proposed by the Groveland Community Services District (CSD) for three locations in the vicinity of the town of Groveland, in Tuolumne County, California (the "Project") (Attachment A, Figure 1). This memorandum is for informational and planning purposes only and does not provide Project-based recommendations or resource evaluations per federal, state, or local environmental regulatory compliance guidelines.

PROJECT LOCATION

The project area consists of three CSD facility locations (Bairds Road, Vernal Drive, and Big Creek 1, and 2) that encompass a total of approximately 5.34 acres to the south, and west of downtown Groveland. The project area locations are situated on the U.S. Geological Survey (USGS) *Groveland, California* topographic 7.5-minute quadrangle, in Township 1 South, Range 16 East, sections 20, and 28, and Township 1 South, Range 17 East, Section 30 (Attachment A, Figures 2, 3).

CULTURAL SETTING

Prehistoric Setting

Recent investigations (see Rosenthal et al. 2006) have shed new light on some of the least understood time periods of Native American occupation of the region between 6,500 to 3,000 years before the present day (BP) and have led to a reassessment of previously established cultural chronologies. Based on a large-scale analysis of assemblages from the Calaveras/Tuolumne counties region, Rosenthal et al. (2006) have proposed the following regional chronological sequence expressed in years BP:

- Recent Prehistoric II 610–100
- Recent Prehistoric I 1100–610
- Late Archaic 3,000–1,100
- Middle Archaic 7,000–3,000
- Early Archaic 11,500–7,000

The Archaic represents a long-term, stable period characterized by small, highly-mobile social groups that followed seasonal rounds, moving into the coniferous forest uplands in the summer and returning to base camps in the lower foothill regions for fall and winter. Although acorns were used, gray pine nuts were the most important local plant food during this period and milling stones and hand stones were the dominant milling tools rather than mortars and pestles.

The Recent Prehistoric I period is marked by the appearance of small, corner-notched, or contracting-stemmed arrow points recovered from widely scattered contexts. Excavations at many Recent Prehistoric II sites, marked by the presence of Desert Side-notched and Cottonwood series arrow points, point to a clear population increase fueled by more intensive use of acorns and a wider range of plant foods, with an accompanying switch from milling slabs and hand stones to mortars and pestles, particularly bedrock mortars.

Ethnographic Setting

The project area and surrounding region were traditionally occupied by the Central Sierra Miwok, a Miwokan subgroup of the Penutian language family (Hull 2007). It is estimated that the Miwok entered the Sierra Nevada region sometime within the last 500 to 800 years (Moratto 1984:312). At the time of initial European contact, the Central Sierra Miwok inhabited lands that included the foothill and mountain portions of the Stanislaus and Tuolumne drainages. It was estimated that the pre-contact population was approximately 4,400 individuals, with a dramatic decline in population because of the influx of miners following the start of the Gold Rush in 1849.

Permanent village sites were typically located near sources of water, such as springs and small creeks, and were situated below the snowline at about 2,000 to 3,000 ft. amsl. Subsistence focused on hunting, fishing, and the gathering of wild plants, seeds, and nuts. During the summer and fall, groups would travel to higher elevations to obtain seasonal plant and animal foods (Hull 2007; Rosenthal et al. 2006). At lower elevations, the staple plant food source was acorn, which were gathered after ripening and falling off the oak tree. Granite and basalt outcroppings in the region facilitated the processing of these plant resources. Mortars were formed in the bedrock where the seeds, nuts, and small mammals were processed by using a cobble pestle (Hull 2007; Levy 1978).

Historic Setting

Although trappers and explorers made occasional forays into the region that would become Tuolumne County, it was only during the early decades of the 19th century that the native residents of the region began to see sustained contact with Euro-American fur trappers and the U.S. military. For example, in 1826 Jedediah Strong Smith led a fur trapping company into California from Utah and became the first American to enter the region that would come to be referred to as the Mother Lode (Mace 1991).

Following the initial discovery of gold in El Dorado County in Coloma in 1848, would-be miners and entrepreneurs flooded into the foothill regions. The first miners known to have settled in Tuolumne County began prospecting and working placer deposits in what would become the town of Sonora. Known locally as the Sonoranians, they were often veterans of the Mexican-American War (1846–1848) and miners from the Mexican state of Sonora. Mining was and still is a "boom and bust" business and many factors affected the size of mining operations and the personnel required to work them.

By the 1860s, mining was on the decline in Tuolumne County and throughout the foothills region as deposits played out and existing technologies did not allow for the economically viable processing of lower-grade ores. To a certain degree, this mining bust prompted the development of the Sonora-Mono Toll Road which followed roughly the same route as today's Highway 108. Completed in 1864, it was constructed to increase the flow of supplies from Tuolumne and neighboring counties to the gold camps east of the Sierra Nevada. The route also had the added benefit of further encouraging emigration to the region and by the mid-1860s the area's economy began to boom once again (Hoover et al. 2002).

Groveland

When present-day Groveland was first established in 1848, it was part of the Savage Diggins' area, settled by local resident James Savage. Savage was well-known for hunting down bandits that plagued the area but were eventually hanged at an oak tree near the town's trading post. The mining camp then became

known as "Garrote," the Spanish word for "death by strangulation." With the booming Gold Rush and outlaws somewhat under control, the population of Garrote grew quickly during the 1850s but crashed by the late 1860s when the once-bustling town only had 100 residents. Cattle ranching replaced mining as the town's economic foundation and the remaining residents decided to give their town a more respectable image with a new name. They re-named the once rough mining camp Groveland after the Massachusetts hometown of one of the town's prominent citizens.

Gold fever returned to Groveland in 1875 when the price of gold increased, and new technologies allowed for the profitable extraction of gold from once inferior or previously inaccessible ores. Mine operators sunk deep shafts and the boom lasted well into the 20th century. As the rich deposits played out, Groveland saw another economic boom as workers set up headquarters for building the Hetch Hetchy Dam, a number of other reservoirs, canals, mountain tunnels, and a rail line. Dam construction began in 1915 and continued until 1925.

ARCHIVAL RESEARCH

On September 1st, 2022, The Central California Information Center (CCIC) of the California Historical Resources Information System forwarded the results of a record search for the project area locations (CCIC File No. 12292-O) (Attachment B). The CCIC archives were reviewed for information on previously known or recorded cultural resources situated in the project area locations and within a 1/8-mile (mi.) radius. This research included, but was not necessarily restricted to a review of the following sources:

- *National Register of Historic Places*;
- *California Register of Historic Places*;
- *California Historical Landmarks* (California Office of Historic Preservation);
- *California Points of Historical Interest* (California Office of Historic Preservation);
- *California Inventory of Historic Resources.*

The CCIC record search demonstrated that three previously recorded historic-era sites have been documented within the Big Creek 1, and 2 project area location (Table 1) with an additional four historic-era sites and features being outside the project area but within the 1/8-mi. search radius. The CCIC also reported that 13 previous studies have incorporated at least a portion of the three project area locations, and another 13 investigations occurred outside the Bairds Road, Vernal Drive, and Big Creek 1, and 2 locations but within 1/8-mi. (Attachment B). Of the resources noted in Table 1, only one (P-55-002994) has been evaluated and recommended eligible for National Register of Historic Places (NRHP) or California Register of Historical Resources (CRHR) listing. The proposed Project, however, would not affect this site location.

Table 1. Cultural Resources Documented within the Project Area (Big Creek 1,2 Location)

Resource No.	Association	Type	Last Recorded
P-55-000441	Historic era	Structures, tailings associated with Big Creek Shaft - Hetch Hetchy Water System	2018
P-55-000442	Historic era	Debris scatter associated with Hetch Hetchy Water System Big Creek Camp	1995
P-55-002994	Historic era	Mountain Tunnel - Hetch Hetchy Water System	2014

Historic Map Reviews

To determine if any previously unidentified cultural resources could be present within the project area locations or if potentially sensitive landforms have been documented, SAS reviewed historic USGS mapping, and General Land Office (GLO) maps dating to the latter decades of the 19th century. The earliest GLO plats showing the three project area locations date to 1877, 1878, and 1880 and clearly shows significant residential, mine, agricultural, and transportation infrastructure in Township 1 South,

Range 16 East, Section 20 where the Bairds Road project location is situated. These developments consist of a "Quartz Mill" in the northwestern-most ¼ of the section, the "Hoisting works of Mt. Jefferson Mine" (recorded with the CCIC as P-55-004934) in the northeastern-most ¼, and a schoolhouse on the south side of "Yosemite Valley Road" (present-day State Route 120). Section 28 (where the Vernal Drive project area location has been mapped), also in Township 1 South, Range 16 East, no developments of any kind were depicted but in Township 1 South, Range 17, Section 30 (east of Groveland), the Yosemite Valley Road is again shown, along with a single house is depicted on the north side of that road in the southwest ¼ of the northeast ¼ of the section. In this section (and adjacent sections), the Yosemite Valley Road alignment no longer follows the present-day route of State Route 120. Regardless of road alignments and the depicted house, no historic-era developments appear to have occurred within or immediately adjacent to the Big Creek 1, and 2 project area location.

While GLO mapping dates to the last quarter of the 19th century, USGS mapping and aerial photography only dates to the mid-late 1940s at the earliest and proved to be of limited value in identifying possibly undocumented cultural resources within or near the project area locations. Based on the 1949 USGS quadrangle (the earliest available), no developments are shown in lands within or immediately adjacent to the Bairds Road, and Vernal Drive locations. Similarly, and with the exception of the Hetch Hetchy Aqueduct alignment, no buildings, structures, or other developments are depicted at the Big Creek 1, and 2 location. Similarly, the 1945 aerial (also the earliest available) shows a comparable lack of identifiable development at the project area locations (Nationwide Environmental Title Research 2022). These sources probably reflect the "sleepy" nature of Groveland and the fact that mining had generally ceased to exist as a major driver of the local economy decades previously. Clearly, by the 1940s, any significant mine complexes had long since been dismantled or deteriorated to a point where they were no longer being mapped or appearing visible on aerial photography.

CULTURAL RESOURCES SENSITIVITY ASSESSMENT

- *Historic-era Resources* – Archival research indicates that three previously documented historic-era resources, including one recommended NRHP/CRHR-eligible, are located within the project area at the Big Creek 1, and 2 location. No sites, features, or artifacts have been documented at or near the Bairds Road or Vernal Drive locations. However, considering the occurrences of mine sites and other locations depicted on early mapping and the history of the Groveland area as a Gold Rush mining center, all three of the project area locations should be considered highly sensitive for retaining presently undocumented historic-era resources.

- *Prehistoric Resources* – Archival research indicates that no documented early Native American cultural resources are known to be present within the project area locations. However, the presence of an un-named drainage adjacent to the Bairds Road location, and Big Creek at the Big Creek 1, and 2 project area location suggests these areas exhibit characteristics (perennial water sources) that might have been attractive to early Native American peoples. Consequently, the Bairds Road, and Big Creek 1, and 2 locations only should be considered moderately sensitive for exhibiting traces of prehistoric activities and habitation.

SUMMARY

- The CCIC record search noted that three historic-era cultural resources were known to be located within and/or immediately adjacent to the Big Creek 1, and 2 portion of the project area.
- The CCIC record search did not note the presence of documented prehistoric or historic-era sites, features, or artifacts within or near the Bairds Road, and Vernal Drive project area locations.
- One resource (P-55-0002994) in the Big Creek 1, and 2 project area location has been recommended eligible for NRHP/CRHR listing but would not be impacted by the Project.
- The three project area locations are highly sensitive for containing early historic-era resources.

- Due to the nearby location of perennial water sources, the Bairds Road, and Big Creek 1, and 2 locations are moderately sensitive for retaining traces of early Native American habitation and other activities.

RECOMMENDATIONS

Prior to Project implementation, SAS recommends that the boundaries of each documented cultural resource in the Big Creek 1, and 2 project area location be flagged and Project activities within those site bounds be limited. Although two of the sites (P-55-000441, P-55-000442) have yet to be fully evaluated for NRHP/CRHR listing eligibility, given the wealth of archival data that exists concerning the construction of the Hetch Hetchy Water System, further research may determine they retain the integrity, associations, and/or data potential that could render them NRHP/CRHR eligible. Consequently, any Project activities within or immediately adjacent to these sites that could result in disturbances to the ground surface or visible features should be restricted.

In the event that presently undocumented buried archaeological deposits are encountered during Project-associated activities, work must cease within a 50-ft. radius of the discovery. A qualified archaeologist must be retained to document the discovery, assess its significance, and recommend treatment. If human remains or any associated funerary artifacts are discovered during Project activities, all work must cease within the immediate vicinity of the discovery. In accordance with the California Health and Safety Code (Section 7050.5), the Tuolumne County Sheriff/Coroner must be contacted immediately. If the Coroner determines the remains to be of Native American origin, the Coroner will notify the Native American Heritage Commission, which will in turn appoint a Most Likely Descendent (MLD) to act as a tribal representative. The MLD will work with the project proponent/applicant and a qualified archaeologist to determine the proper treatment of the human remains and any associated funerary objects. Project activities will not resume until either the human remains are exhumed, or the remains are avoided via Project design change.

REFERENCES

Hoover, Mildred B., Eugene Rensch, Ethel Rensch, William Abeloe
2002 *Historic Spots in California*. Stanford University Press, Stanford, CA

Hull, Kathleen L
2007 The Sierra Nevada: Archaeology in the Range of Light P177-190. California Prehistory: Colonization, Culture and Complexity. Edited by Terry L. Jones and Kathryn A. Klar. AltaMira Press.

Levy, Richard.
1978 Eastern Miwok. Handbook of North American Indians 8: 398–413. Smithsonian Institution. Washington, DC.

Mace, O. Henry
1991 Between the Rivers - A History of Early Calaveras County. Gold Country Enterprises, Angels Camp, CA

Moratto, M. J.
1984 *California Archaeology*. Academic Press, San Francisco, CA.

Nationwide Environmental Title Research
2022 https://www.historicaerials.com/viewer. Site accessed September 12, 2022.

Rosenthal, Jeffery S., Erick Wohlgemuth, Kimberley Carpenter, and Paul Brandy
2006 Land use and subsistence in the West-Central Sierra Nevada Region during the Archaic and Recent Prehistoric Periods. In The Prehistory of the Sonora Region: Archaeological and Geoarchaeological Investigations for Stage I of the East Sonora Bypass Project, State Route 108, Tuolumne County, California, pp. 290- 331, by J.S. Rosenthal. Report prepared for Caltrans District 10, Stockton, CA.

U.S. Bureau of Land Management (BLM)
2022 https://glorecords.blm.gov/. Site accessed September 6, 2022

ATTACHMENT A

Figures

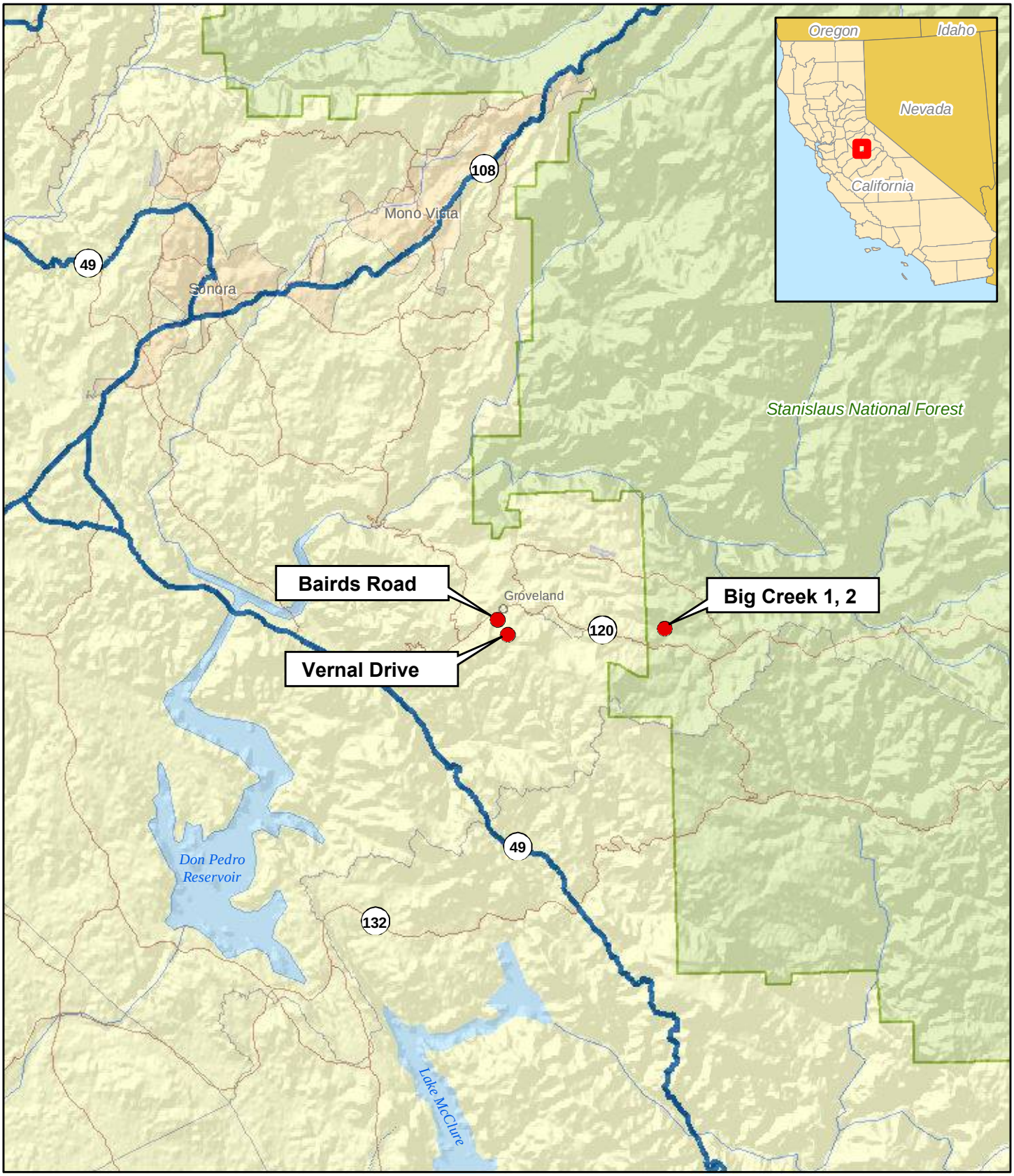


Figure 1. Project Vicinity Map

● Groveland CSD II Project Area

1:250,000

0 3 Miles

0 6 Kilometers

Sources: *USA Base Map* [layer],*Data and Maps* [CD]. ESRI, 2006.

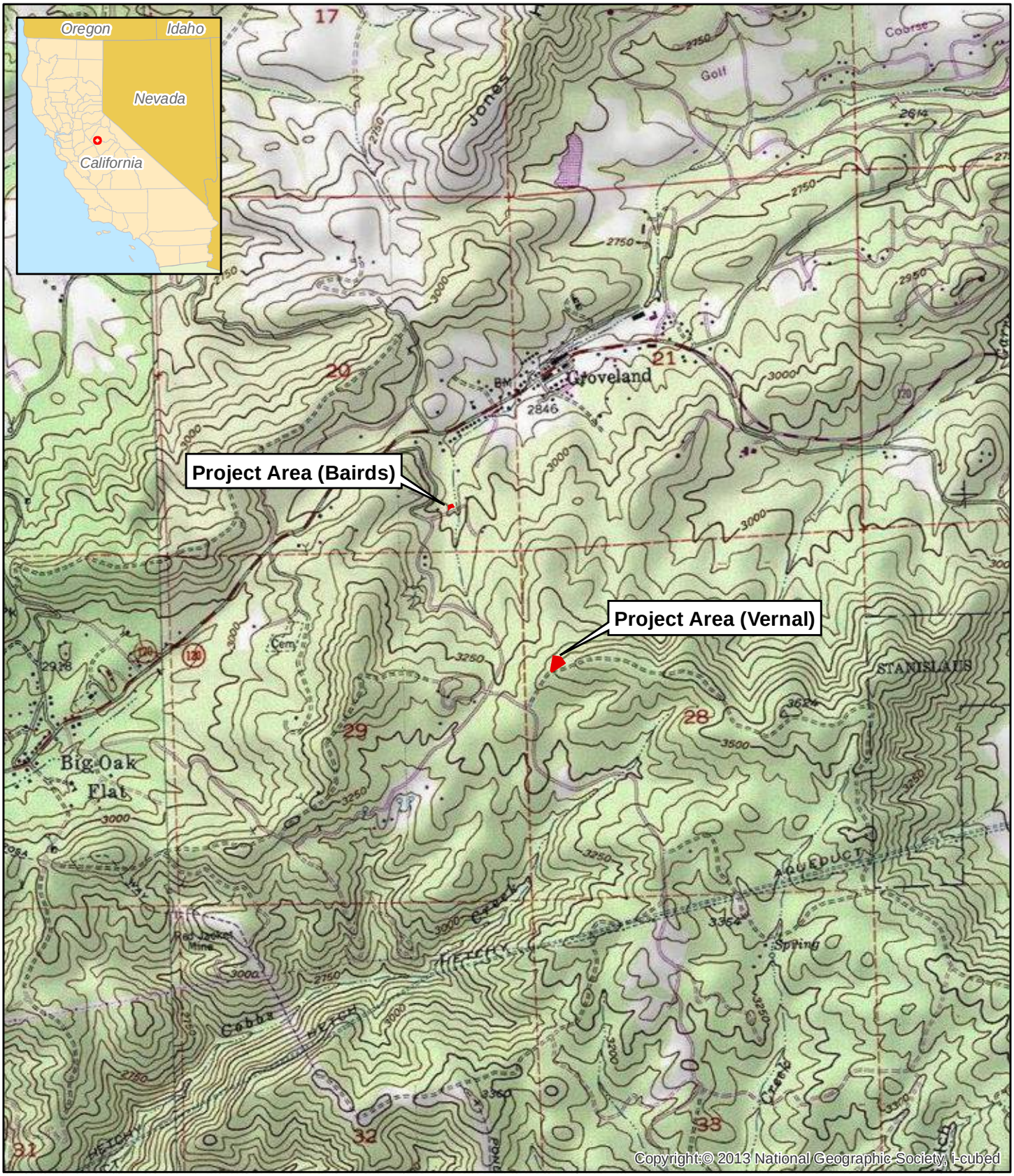


Figure 2a. Project Area Locations Map

1:24,000

Groveland CSD II Project Area

0.5 Miles

1 Kilometers

T01S, R17E, Section 30.
Groveland 7.5' Series Quadrangle, USGS, 1977.

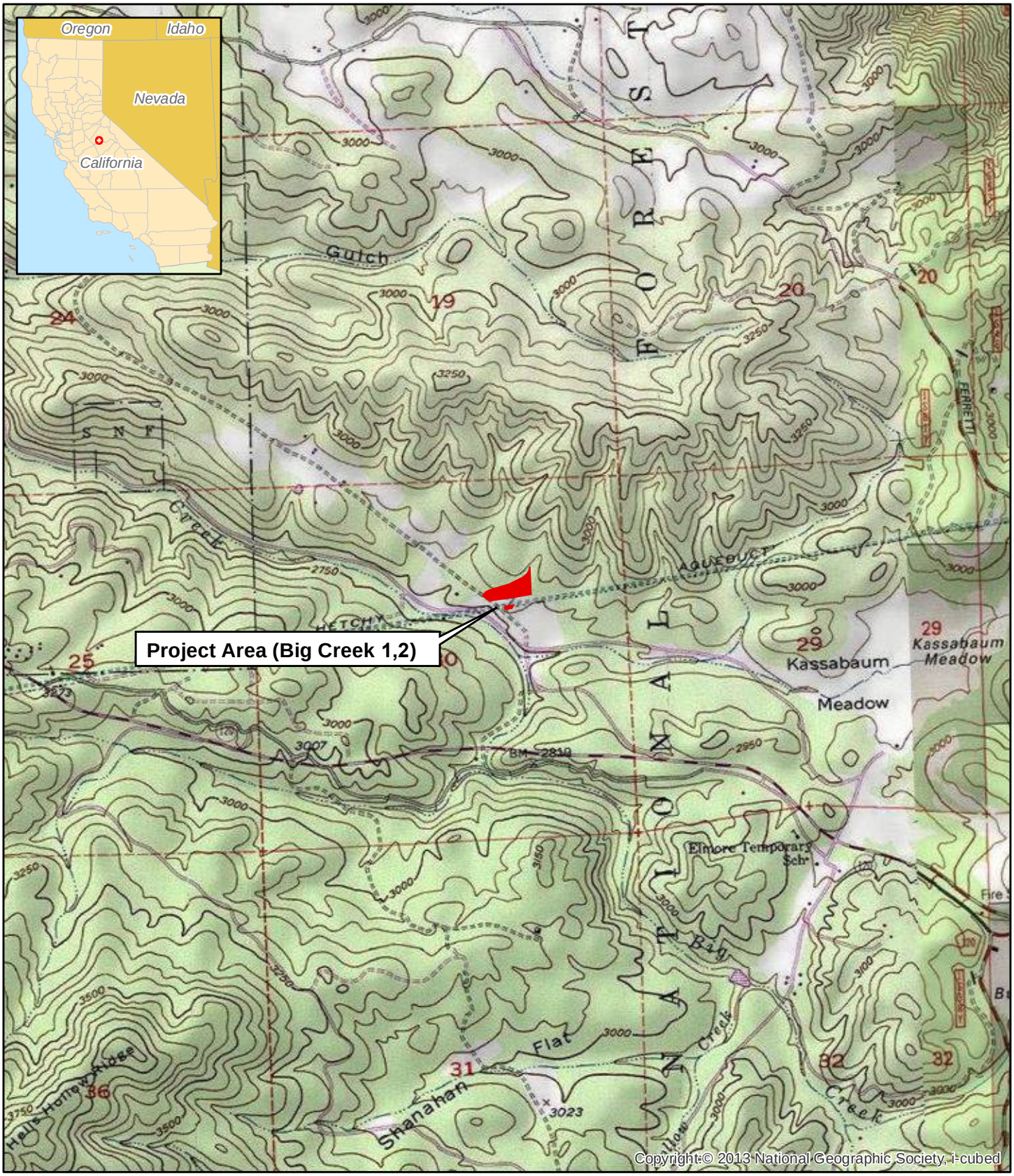


Figure 2b. Project Area Locations Map

Groveland CSD II Project Area

T01S, R17E, Section 30.
Groveland 7.5' Series Quadrangle, USGS, 1977.

1:24,000

0.5 Miles

1 Kilometers

Figure 3a. Project Area Map - Bairds Road Location

Groveland CSD II Project Area

Total Acres: 5.12

1:1,000

0 50 Feet

0 25 Meters

Figure 3b. Project Area Map - Vernal Drive Location

1:1,000

Groveland CSD II Project Area

0 50 Feet

0 25 Meters

Total Acres: 5.12

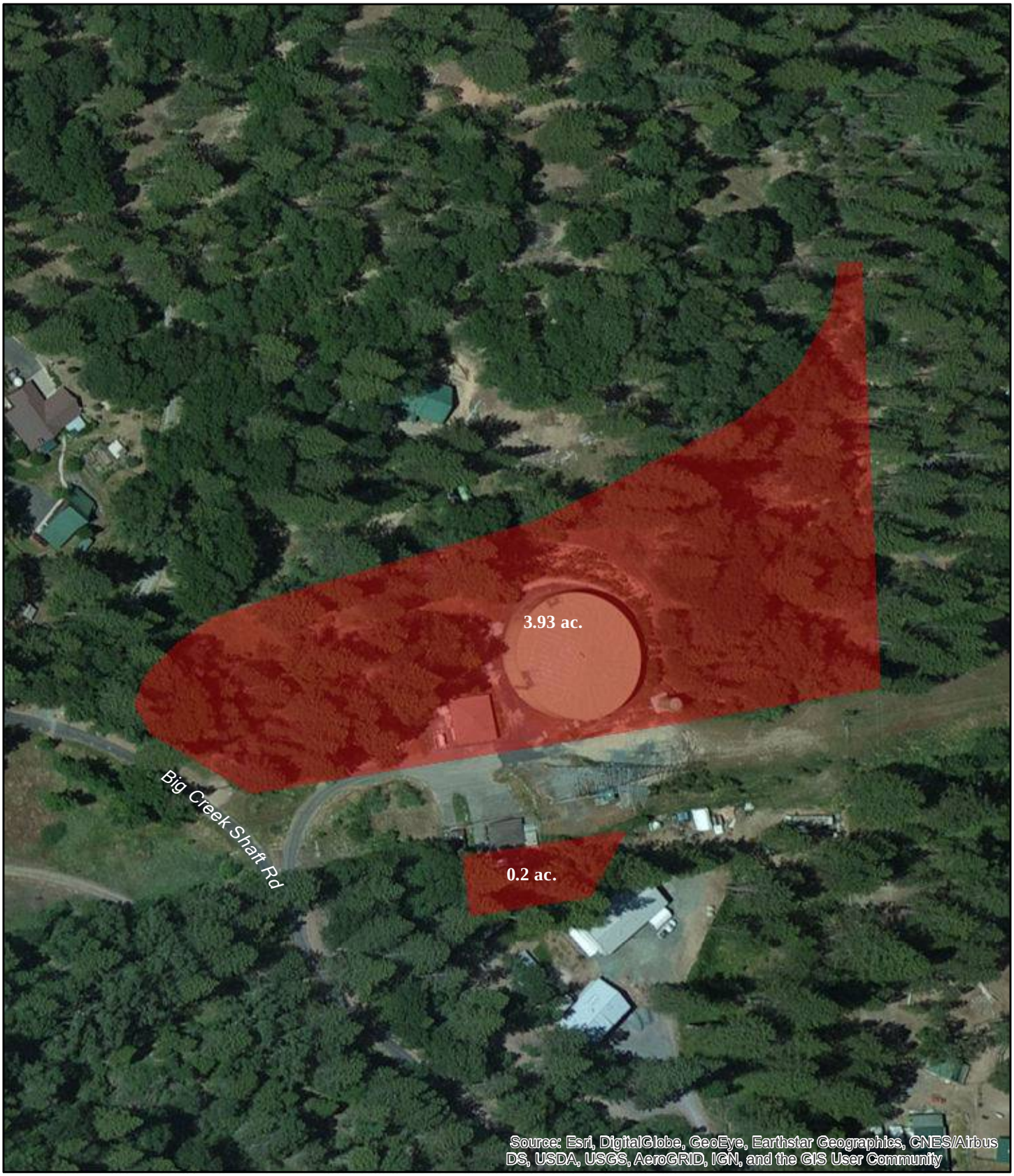


Figure 3c. Project Area Map - Big Creek 1, 2 Location

1:1,600

Groveland CSD II Project Area

0 100 Feet

0 50 Meters

Total Acres: 5.12

ATTACHMENT B

CCIC Record Search Results

CENTRAL CALIFORNIA INFORMATION CENTER

California Historical Resources Information System
Department of Anthropology – California State University, Stanislaus
One University Circle, Turlock, California 95382
(209) 667-3307

Alpine, Calaveras, Mariposa, Merced, San Joaquin, Stanislaus & Tuolumne Counties

Date: 9/1/2022

Records Search File No.: 12292O
Project: Groveland Community Services District Fuelbreaks II

Jason Coleman
Solano Archaeological Services
P. O. Box 367
Elmira, CA 94625
707-718-1416 jason@solanoarchaeology.com

Dear Mr. Coleman:

The Central California Information Center received your record search request for the project area/radius referenced above, located on the Groveland 7.5' quadrangle in Tuolumne County. The following reflects the results of the records search for the project study area and radius:

As per data currently available at the CCaIC, the locations of resources/reports are provided in the following format: ☒ custom GIS maps ☐ GIS Data/shape files ☐ hand-drawn maps

Summary Data:

Resources within the project area:	3: P-55-000441, 442, 2994
Resources within the 1/8-mile radius:	4: P-55-000443, 522, 9021, 9022
Reports within the project area:	13: TO-01193, 1196, 1871, 2465, 2591, 4348, 4362, 6589, 6878, 6886, 8041, 8068, 9113
Reports within the 1/8-mile radius:	13: TO-01425, 2341, 2448, 2865, 2938, 4372, 6617, 6944, 7219, 7912, 7921, 8560, 9085

Resource Database Printout (list):	☐ enclosed	☒ not requested	☐ nothing listed
Resource Database Printout (details):	☒ enclosed	☐ not requested	☐ nothing listed
Resource Digital Database Records:	☐ enclosed	☒ not requested	☐ nothing listed
Report Database Printout (list):	☒ enclosed	☐ not requested	☐ nothing listed
Report Database Printout (details):	☐ enclosed	☒ not requested	☐ nothing listed
Report Digital Database Records:	☐ enclosed	☒ not requested	☐ nothing listed
Resource Record Copies:	☒ enclosed	☐ not requested	☐ nothing listed
Report Copies:	☐ enclosed	☒ not requested	☐ nothing listed

OHP Historic Properties Directory: New Excel File: Built Environment Resource Directory (BERD) Dated 11/17/2021

Not all resources listed in the BERD are mapped in GIS, nor do we have records on file for; if you identify additional resources in the BERD that you need copies of, contact the IC.

☐ enclosed ☐ not requested ☒ nothing listed

Archaeological Determinations of Eligibility:	☐ enclosed	☐ not requested	☒ nothing listed
CA Inventory of Historic Resources (1976):	☐ enclosed	☐ not requested	☒ nothing listed
Caltrans Bridge Survey:	☐ enclosed	☒ not requested	☐ nothing listed
Ethnographic Information:	☐ enclosed	☒ not requested	☐ nothing listed
Historical Literature:	☐ enclosed	☒ not requested	☐ nothing listed
Historical Maps:	☐ enclosed	☒ not requested	☐ nothing listed
Local Inventories:	☐ enclosed	☒ not requested	☐ nothing listed
GLO and/or Rancho Plat Maps:	☐ enclosed	☒ not requested	☐ nothing listed

Shipwreck Inventory: ☒ not available at CCIC; please go to http://shipwrecks.slc.ca.gov/ShipwrecksDatabase/Shipwrecks_Database.asp

Soil Survey Maps: ☒ not available at CCIC; please go to http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Resources that are known to have value to local cultural groups: None has been formally reported to the Information Center. However, if the portion of the project in Tuolumne County involves the evaluation of buildings, structures or objects, the following agencies would like to be consulted:

Heritage Preservation Review Committee
48 Yaney Avenue
Sonora, CA 95370
Mailing address:
2 South Green Street
Sonora, CA 95370
209-533-5633

Tuolumne County Historical Society Landmarks Committee
158 Bradford Street
Sonora, CA 95370
209-532-1317
info@tchistory.org

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you do not include resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at the phone number listed above.

The provision of CHRIS Data via this records search response does not in any way constitute public disclosure of records otherwise exempt from disclosure under the California Public Records Act or any other law, including, but not limited to, records related to archeological site information maintained by or on behalf of, or in the possession of, the State of California, Department of Parks and Recreation, State Historic Preservation Officer, Office of Historic Preservation, or the State Historical Resources Commission.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

Should you require any additional information for the above referenced project, reference the record search number listed above when making inquiries. Requests made after initial invoicing will result in the preparation of a separate invoice.

Thank you for using the California Historical Resources Information System (CHRIS).

Note: Billing will be transmitted separately via email by our Financial Services office *($396.00), payable within 60 days of receipt of the invoice.

If you wish to include payment by Credit Card, you must wait to receive the official invoice from Financial Services so that you can reference the CMP # (Invoice Number), and then contact the link below:

https://commerce.cashnet.com/ANTHROPOLOGY

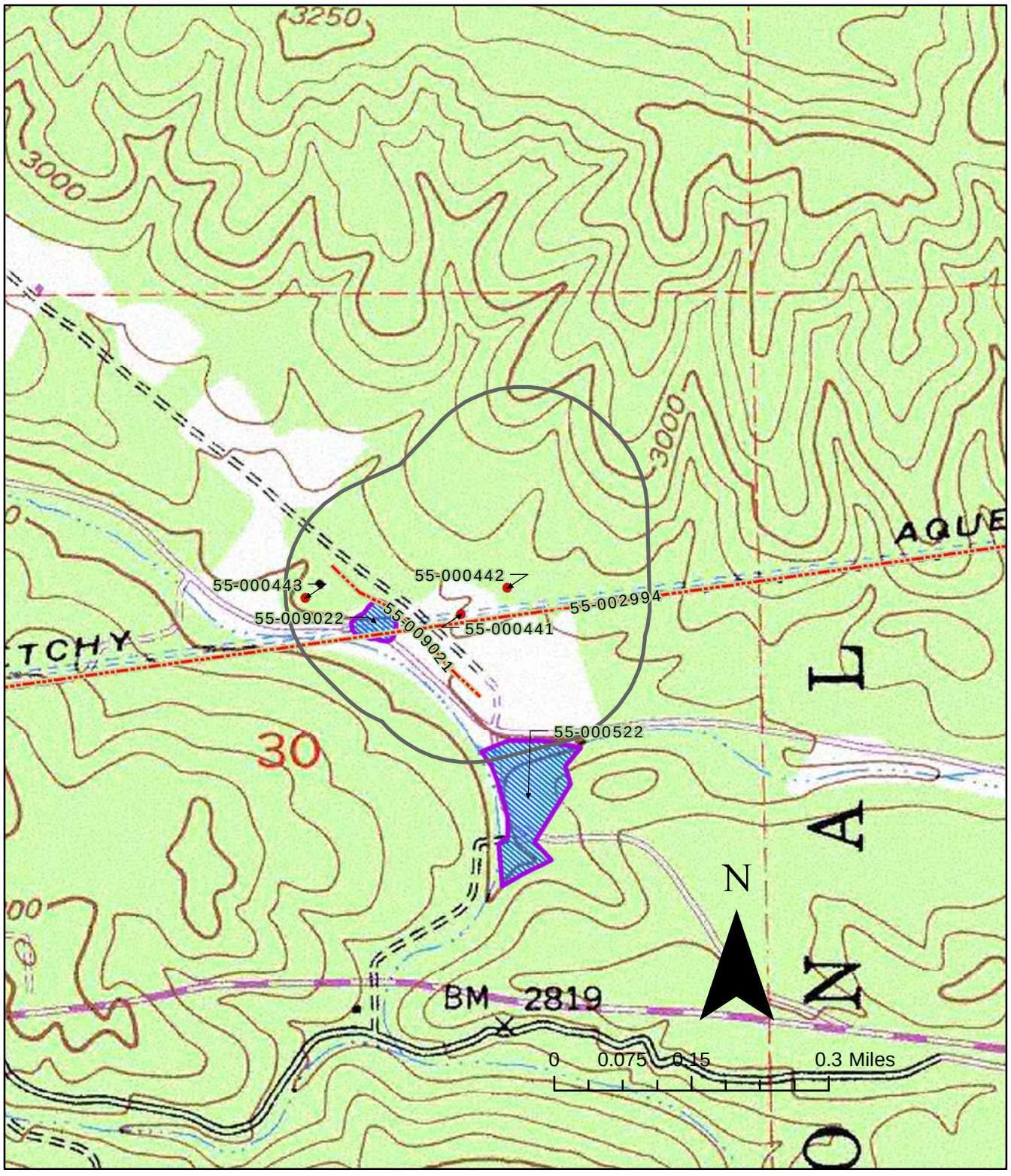
Sincerely,

E. A. Greathouse

E. A. Greathouse, Coordinator
Central California Information Center
California Historical Resources Information System

* Invoice Request sent to: ARBilling@csustan.edu, CSU Stanislaus Financial Services

CCaIC 12292O Groveland Community Services District Fuelbreaks II
Resources 1/8-mile radius 1:10,000-scale
Groveland USGS 7.5' Quadrangle



Resource Detail: P-55-000441

Identifying information

Primary No.: P-55-000441

Trinomial: CA-TUO-003625H

Name: ASI-1 (ASI); Big Creek Shaft-H.H.W.P.(Sierra Heritage Services)

Other IDs:

Type	*Name*
Resource Name	ASI-1 (ASI); Big Creek Shaft-H.H.W.P.(Sierra Heritage Services)

Cross-refs:

Attributes

Resource type: Site

Age: Historic

Information base: Survey, Other

Attribute codes: AH02 (Foundations/structure pads); AH16 (Other)

Disclosure: Not for publication

Collections: No

Accession no(s):

Facility:

General notes

Foundations, metal trays, tailings assoc'd with hoist mechanism used in construction of the Big Creek Shaft of the HH Water System. The 1995 record corrects the earlier location by ASI.

Recording events

Date	*Recorder(s)*	*Affiliation*	*Notes*
9/15/1994	E. Teixeira	ASI	Big Creek Alternatives
1/18/1995	C. Francis, M. Thornton	Sierra Heritage Services; prepared for Groveland Community Services District	Recording and evaluation
5/3/2018	Guerrero & Simon	AECOM	TO-09113

Associated reports

Report No.	*Year*	*Title*	*Affiliation*
TO-02465	1994	An Archaeological Survey of Proposed Groveland Community Services District Water Improvements Big Creek Alternatives, Tuolumne County, California.	ASI Cartography and Geographic Information Systems; prepared for Dennis Dickman & Associates
TO-02591	1995	Archaeological and Historical Evaluation of CA-TUO-3525H, CA-TUO-3526H, P-55-441, and P-55-442; Big Creek and Second Garrote Shafts, Hetch Hetchy Water and Power.	Sierra Heritage Services; prepared for Groveland Community Services District
TO-09113	2019	Historic Context and Archaeological Survey Report for Mountain Tunnel Improvements Project, Tuolumne County, California (CASE No. 2017-014249ENV)	AECOM for The San Francisco Public Utilities Commission

Location information

County: Tuolumne

USGS quad(s): Groveland

Address:

PLSS: T1S R17E SW of NE of Sec. 30 MDBM
T1S R17E SE¼ of NE¼ of Sec. 30 MDBM

UTMs: Zone 10 751200mE 4190280mN NAD27 (ASI 9/1994 record)
Zone 10 751340mE 4190260mN NAD27 (Francis and Thornton 1/1995 recor

Management status

Resource Detail: P-55-000441

Database record metadata

	Date	User	
Entered:	5/9/2011	jay	
Last modified:	11/4/2019	egreathouse	
IC actions:	*Date*	*User*	*Action taken*
	5/9/2011	jay	Appended records from old OHP database.
	11/4/2019	egreathouse	eg
Record status:			

Resource Detail: P-55-000442

Identifying information

Primary No.: P-55-000442

Trinomial: CA-TUO-003626H

Name: ASI-2 (ASI); Big Creek Shaft Can Dump-H.H.W.P. (Sierra Heritage Services)

Other IDs:

Type	*Name*
Resource Name	ASI-2 (ASI); Big Creek Shaft Can Dump-H.H.W.P. (Sierra Heritage Services)

Cross-refs:

Attributes

Resource type: Site

Age: Historic

Information base: Survey, Other

Attribute codes: AH04 (Privies/dumps/trash scatters)

Disclosure: Not for publication

Collections: No

Accession no(s):

Facility:

General notes

1995 Francis and Thornton record corrects the location given on the ASI record.

Recording events

Date	*Recorder(s)*	*Affiliation*	*Notes*
9/15/1994	E. Teixeira	ASI	Big Creek Alternatives
1/18/1995	C. Francis, M. Thornton	Sierra Heritage Services; prepared for Groveland Community Services District	Recording and evaluation

Associated reports

Report No.	*Year*	*Title*	*Affiliation*
TO-02465	1994	An Archaeological Survey of Proposed Groveland Community Services District Water Improvements Big Creek Alternatives, Tuolumne County, California.	ASI Cartography and Geographic Information Systems; prepared for Dennis Dickman & Associates
TO-02591	1995	Archaeological and Historical Evaluation of CA-TUO-3525H, CA-TUO-3526H, P-55-441, and P-55-442; Big Creek and Second Garrote Shafts, Hetch Hetchy Water and Power.	Sierra Heritage Services; prepared for Groveland Community Services District

Location information

County: Tuolumne

USGS quad(s): Groveland

Address:

PLSS: T1S R17E SW of NE of Sec. 30 MDBM

UTMs: Zone 10 751160mE 4190320mN NAD27 (9/94 ASI record)
Zone 10 751360mE 4190300mN NAD27 (1/95 Francis and Thornton record)

Management status

Database record metadata

	Date	*User*	
Entered:	5/9/2011	jay	
Last modified:	9/11/2015	Anthro	
IC actions:	*Date*	*User*	*Action taken*
	5/9/2011	jay	Appended records from old OHP database.

Record status:

Resource Detail: P-55-000443

Identifying information

Primary No.: P-55-000443
Trinomial: CA-TUO-003627H
Name:
Other IDs:

Type	*Name*
Other	BIG CREEK ALTERNATIVES, ASI-3

Cross-refs:

Attributes

Resource type: Site
Age: Historic
Information base: Survey
Attribute codes: AH06 (Water conveyance system); AH16 (Other)
Disclosure: Not for publication
Collections: No
Accession no(s):
Facility:

General notes

Recording events

Date	*Recorder(s)*	*Affiliation*	*Notes*
1/9/1994	TEIXEIRA	Archaeological Services	
5/20/1993	E. Carson, K.J. Peet, & S. Loucks	USDA Forest Service	

Associated reports

Report No.	*Year*	*Title*	*Affiliation*
TO-02465	1994	An Archaeological Survey of Proposed Groveland Community Services District Water Improvements Big Creek Alternatives, Tuolumne County, California.	ASI Cartography and Geographic Information Systems; prepared for Dennis Dickman & Associates

Location information

County: Tuolumne
USGS quad(s): Groveland
Address:
PLSS: T1S R17E SW of NE of Sec. 30 MDBM
T1S R17E NE¼ of SE¼ of Sec. 30 MDBM
T1S R17E NE¼ of NW¼ of Sec. 30 MDBM
UTMs: Zone 10 751020mE 4190250mN NAD27
Zone 10 751350mE 4189930mN NAD83

Management status

Database record metadata

	Date	*User*	
Entered:	5/9/2011	jay	
Last modified:	5/9/2016	Anthro	
IC actions:	*Date*	*User*	*Action taken*
	5/9/2011	jay	Appended records from old OHP database.
	5/9/2016	Anthro	EAK

Record status:

Resource Detail: P-55-000522

Identifying information

Primary No.: P-55-000522
Trinomial: CA-TUO-003693H
Name: FS 05-16-54-1128
Other IDs:

Type	*Name*
USFS	05-16-54-1128
Resource Name	FS 05-16-54-1128

Cross-refs:

Attributes

Resource type: Site
Age: Historic
Information base: Survey
Attribute codes: AH02 (Foundations/structure pads) - Structure pads; AH04 (Privies/dumps/trash scatters) - Trash and various types of debris; AH07 (Roads/trails/railroad grades) - Old roads; AH16 (Other) - Bridge remains, 2 pits
Disclosure: Not for publication
Collections: No
Accession no(s):
Facility:

General notes

Recording events

Date	*Recorder(s)*	*Affiliation*	*Notes*
5/20/1993	E. Carson, K. Peet, S. Loucks	Groveland Ranger District, SNF, USFS	CRMR 05-16-559 Hamm Hasloe Reforestation
1/25/2007	P. Riefkohl	Groveland Ranger District, SNF, USFS	Monitoring Record; CRMR 05-16-4279 and CRMR 05-16-4274
2/1/1996	J. Ruhan, D. Letendre, G. Alvarez	Groveland Ranger District, SNF, USFS	Monitoring Record; CRMR 05-16-4066 Front Country (Taylor) Salvage Sale
1/30/2017	Kruger	Garcia and Associates	

Associated reports

Report No.	*Year*	*Title*	*Affiliation*
MP-02587	1994	Hamm-Hasloe Reforestation Project: Hamm-Hasloe Reforestation and 1992 Mechanical Site Prep, CRMR 05-16-559.	Groveland Ranger District, SNF, USFS
MP-06622	2007	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Project Certification PG&E Hazard Trees Project Cultural Resource Management Report 05-16-4279	P. Riefkohl
MP-07165	2009	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Project Certification: FY09 Pacific Gas & Electric Power Line Hazard Trees, Cultural Resource Management Report 05-16-4313.	Groveland Ranger District, Stanislaus National Forest, USFS
TO-02448	1994	Archaeological Investigation and Management Plan of the Proposed Hazard Tree Removal Project, Tuolumne and Mariposa Counties, California; Final Report, CRMR 05-16-4038.	PAR Environmental Services, Inc., for PG & E
TO-02587	1994	Hamm-Hasloe Reforestation Project; Hamm-Hasloe Reforestation and 1992 Mechanical Site Report 05-16-559, Tuolumne and Mariposa Counties.	Groveland Ranger District, for Stanislaus National Forest, USFS
TO-06617	2007	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Project Certification, Long Shanahan Fuels Reduction and Forest Health, CRMR 05-16-	Groveland Ranger District, Stanislaus National Forest, USFS

		4274.	
TO-06622	2007	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Project Certification PG&E Hazard Trees Project Cultural Resource Management Report 05-16-4279.	Groveland Ranger District, Stanislaus National Forest, USFS
TO-07165	2009	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Project Certification: FY09 Pacific Gas & Electric Power Line Hazard Trees, Cultural Resource Management Report 05-16-4313.	Groveland Ranger District, Stanislaus National Forest, USFS
TO-07897	2011	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Project Certification: Big Creek Hazard Oak CRMR 05-16-4362.	Groveland Ranger District, for Stanislaus National Forest, USFS
TO-07912	2011	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Project Certification: Shanahan Flat Fuelwood Sale, CRMR 05-16-4355.	Groveland Ranger District, for Stanislaus National Forest, USFS
TO-07923	2013	Stanislaus National Forest, Heritage Resources 2013 Sierra Nevada Programmatic Agreement Project Certification, FY2013 Pacific Gas & Electric Company Power Line Hazard Trees, Cultural Resourcce Management Report 05-16-4389	Groveland Ranger District, Stanislaus National Forest, USFS
TO-09085	2018	Stanislaus National Forest, Heritage Resources, 2013 Regional Programmatic Agreement Project Certification, Ferretti Trail Development Addendum, CRMR 05-16-4506 [Tuolumne County]	Stanislaus National Forest

Location information

County: Tuolumne
USGS quad(s): Groveland
Address:
PLSS: T1S R17E NE of SE of Sec. 30 MDBM
T1S R17E NW¼ of SE¼ of Sec. 30 MDBM
UTMs: Zone 10 751350mE 4189930mN NAD27 (5/1993 record)
Zone 10 751266mE 4190194mN NAD83 (wood utility pole datum)

Management status

Database record metadata

	Date	*User*	
Entered:	5/9/2011	jay	
Last modified:	3/4/2022	egreathouse	
IC actions:	*Date*	*User*	*Action taken*
	5/9/2011	jay	Appended records from old OHP database.
	3/4/2022	egreathouse	eg
Record status:			

Resource Detail: P-55-002994

Identifying information

Primary No.: P-55-002994

Trinomial: CA-TUO-002016H

Name: San Joaquin Pipelines 1 & 2, a portion of Hetch Hetchy Aqueduct; FS #05-16-54-0500

Other IDs:

Type	*Name*
USFS	05-16-54-0500
Resource Name	San Joaquin Pipelines 1 & 2, a portion of Hetch Hetchy Aqueduct
Resource Name	FS 05-16-54-0500
Resource Name	South Fork Adit Portals & Concrete Piers
Resource Name	Mountain Tunnel

Cross-refs: Extends into another county as 39-004860
Extends into another county as 50-000074
Physically overlaps or intersects 55-002739

Attributes

Resource type: Structure

Age: Historic

Information base: Survey

Attribute codes: HP11 (Engineering structure); HP20 (Canal/aqueduct)

Disclosure: Unrestricted

Collections: No

Accession no(s):

Facility:

General notes

Please note that the San Joaquin Pipelines No. 1, 2, (& 3) only extend as far east as the Oakdale Portal of the Hetch Hetchy system, which is just east of the Tuo. Co. / Sta. Co. line on the Keystone quad. Quad list may not be correct. **Features MT2-8 from 2014 record not mapped; lack UTM info & location maps are aerial photos.

Recording events

Date	*Recorder(s)*	*Affiliation*	*Notes*
8/13/2007	N/A	Carey & Co.	
8/25/2008	Bailey	William Self Associates, Inc.	
1/26/1981	Karsash, Gibbs	INFOTEC	
5/3/2018	Miller	AECOM	South Fork Adit Portals and Concrete Peiers
5/2/2018	Redmond & Taylor	AECOM	Feature C
9/24/2014	Norby, Heather; Root, Garret	JRP Historical Consulting, LLC	Multiple features, many not mapped because of poor location maps/lacking UTM's

Associated reports

Report No.	*Year*	*Title*	*Affiliation*
MP-01193	1981	Mid-Sierran Archaeology: A Survey of 14 Compartments in the Stanislaus National Forest, California; Appendix 13, Cultural Resource Inventory Data, Ferretti	ESCA-Tech Corporation, for SNF, USFS
SJ-06758	2008	Final Cultural Resources Inventory and Evaluation Report for the Tesla Portal Disinfection Station and Thomas Shaft Site for the San Joaquin Regional Water Quality Improvement Project, San Francisco Public Utilities Commission, San Francsico, California, CS-809 Task Order No. 1	Garcia and Associates
SJ-06886	2008	San Francisco Public Utilities Commission San Joaquin Regional Water Quality Improvement Project, Draft Environmental Impact Report, San Francisco Planning Department Case No.	SFPUC

		2007.0427E State Clearinghouse No. 2007052109	
SJ-07527	2009	San Joaquin Pipeline System Project, Historic Resources Inventory and Evaluation Report.	Carey & Co., Inc.
ST-07527	2009	San Joaquin Pipeline System Project, Historic Resources Inventory and Evaluation Report.	Carey & Co., Inc., for USACE and SFPUC
TO-00199	1981	Mid-Sierran Archaeology: A Survey of 14 Compartments in the Stanislaus National Forest, California	Stanislaus National Forest; ESCA-Tech Corporation
TO-01193	1981	Mid-Sierran Archaeology: A Survey of 14 Compartments in the Stanislaus National Forest, California; Appendix 13, Cultural Resource Inventory Data, Ferretti	ESCA-Tech Corporation; for SNF, USFS
TO-06758	2008	Final Cultural Resources Inventory and Evaluation Report for the Tesla Portal Disinfection Station and Thomas Shaft Site for the San Joaquin Regional Water Quality Improvement Project, San Francisco Public Utilities Commission, San Francsico, California, CS-809 Task Order No. 1	Garcia and Associates; prepared for SFPUC
TO-06801	2008	Final Archaeological Resources Assessment, Mountain Tunnel Rehabilitation Project Tuolumne County, CA	William Self Associates, Inc.
TO-06886	2008	San Francisco Public Utilities Commission San Joaquin Regional Water Quality Improvement Project, Draft Environmental Impact Report.	SFPUC
TO-06935	2007	Hetch Hetchy Water and Power Water Tunnel Maintenance Project Cultural Resource Management Report 05-16-4294. Novermber-30-2007	Groveland District
TO-06938	2007	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Project Certification: Middle Fork #20 Fuels Reduction Project and Forest Health, Cultural Resource Management Report 05-16-4267	Groveland Ranger District, Stanislaus National Forest, USFS
TO-07527	2009	San Joaquin Pipeline System Project, Historic Resources Inventory and Evaluation Report	Carey & Co., Inc., for USACE
TO-07528	2010	San Joaquin Pipeline No. 4 - Eastern Segment Project, Archaeological Survey Report and Finding of Effects, and Historic Resources Inventory and Evaluation Report and Finding of Effects.	URS Corp. & Carey & Co., Inc., for USACE and SFPUC
TO-07914	2010	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Project Certification, Groveland HHWP Road Maintenance, Cultural Resource Management Report 05-16-4344	Stanislaus National Forest
TO-07920	2011	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Project Certification, FY11 Pacific Gas & Electric Power Line Hazard Trees, Cultural Resource Management Report 05-16-4361	Groveland Ranger District, Stanislaus National Forest, USFS
TO-08943	2018	Final Archaeological Resources Survey Report for the Valley Area ROW and Culvert Locations of the Reliable Power Project, Tuolumne and Stanislaus Counties, California; Technical Report 18-566	PaleoWest Archaeology for San Francisco Planning Department
TO-09085	2018	Stanislaus National Forest, Heritage Resources, 2013 Regional Programmatic Agreement Project Certification, Ferretti Trail Development Addendum, CRMR 05-16-4506 [Tuolumne County]	Stanislaus National Forest
TO-09138	2017	Intake Switchyard Slope Hazard Mitigation Project, Tuolumne County, Historic Resources	JRP Historical Consulting, LLC; for San Francisco Public Utilities Commission, Bureau

Resource Detail: P-55-002994

Evaluation of Environmental Management

Location information

County: Tuolumne

USGS quad(s): Ascension Mountain, Cherry Lake South, Groveland, Jawbone Ridge, Moccasin

Address:

PLSS: T1S R18E Sec. 0 MDBM
T1S R18E SE¼ of NW¼ of Sec. 29 MDBM

UTMs: Zone 10 762675mE 4191075mN NAD27
Zone 10 762159mE 4190782mN NAD83 (South Fork Adit Portals/Piers)
Zone 11 239913mE 4196188mN NAD83 (2014 - Intake Valve House)
Zone 10 762159mE 4190782mN NAD83 (2014 - South Fork Crossing)
Zone 10 740762mE 4187507mN NAD83 (2014 - Priest Portal)

Management status

Database record metadata

	Date	*User*	
Entered:	5/9/2011	jay	
Last modified:	12/16/2019	swilliams29	
IC actions:	*Date*	*User*	*Action taken*
	5/9/2011	jay	Appended records from old OHP database.
	2/9/2016	Anthro	EAK
	11/9/2016	Anthro	as
	12/16/2019	swilliams29	SW - Update

Record status:

Resource Detail: P-55-009021

Identifying information

Primary No.: P-55-009021
Trinomial:
Name: Big Creek Shaft Road; FS # 05-16-54-876
Other IDs:

Type	*Name*
USFS	05-16-54-876
Resource Name	Big Creek Shaft Road; FS # 05-16-54-876

Cross-refs:

Attributes

Resource type: Site
Age: Historic
Information base: Survey
Attribute codes: AH07 (Roads/trails/railroad grades) - Historic road segment
Disclosure: Not for publication
Collections: No
Accession no(s):
Facility:

General notes

Recording events

Date	*Recorder(s)*	*Affiliation*	*Notes*
6/11/2013	A. Estes, T. Young, et al.	William Self Associates, Inc.	FS report #05-16-4386; CCaIC report #TO-08068

Associated reports

Report No.	*Year*	*Title*	*Affiliation*
TO-08068	2013	Archaeological Survey Report, HHWP Reliable Power Project, Tuolumne County, California; USFS Report No. 05-16-4386.	William Self Associates, Inc.; prepared for RMC Water and Environment, San Francisco, CA

Location information

County: Tuolumne
USGS quad(s): Groveland
Address:
PLSS: T1S R17E SW¼ of NE¼ of Sec. 30 MDBM
UTMs: Zone 10 751034mE 4190486mN NAD83

Management status

Database record metadata

	Date	*User*	
Entered:	2/4/2015	Anthro	
Last modified:	9/4/2015	Anthro	
IC actions:	*Date*	*User*	*Action taken*
	2/4/2015	Anthro	entry by RH

Record status:

Resource Detail: P-55-009022

Identifying information

Primary No.: P-55-009022
Trinomial: CA-TUO-005659H
Name: 05-16-54-877
Other IDs:

Type	*Name*
USFS	05-16-54-877
Resource Name	05-16-54-877

Cross-refs:

Attributes

Resource type: Site
Age: Historic
Information base: Survey
Attribute codes: AH04 (Privies/dumps/trash scatters) - Can dump; AH06 (Water conveyance system) - Two ditches; AH09 (Mines/quarries/tailings) - 2 shafts, 3 pits
Disclosure: Not for publication
Collections: No
Accession no(s):
Facility:

General notes

Recording events

Date	*Recorder(s)*	*Affiliation*	*Notes*
6/11/2013	A. Estes, T. Young, et al.	William Self Associates, Inc.	FS report #05-16-4386; CCaIC report #TO-08068

Associated reports

Report No.	*Year*	*Title*	*Affiliation*
TO-08068	2013	Archaeological Survey Report, HHWP Reliable Power Project, Tuolumne County, California; USFS Report No. 05-16-4386.	William Self Associates, Inc.; prepared for RMC Water and Environment, San Francisco, CA

Location information

County: Tuolumne
USGS quad(s): Groveland
Address:
PLSS: T1S R17E SW¼ of NE¼ of Sec. 30 MDBM
UTMs: Zone 10 751000mE 4190439mN NAD83

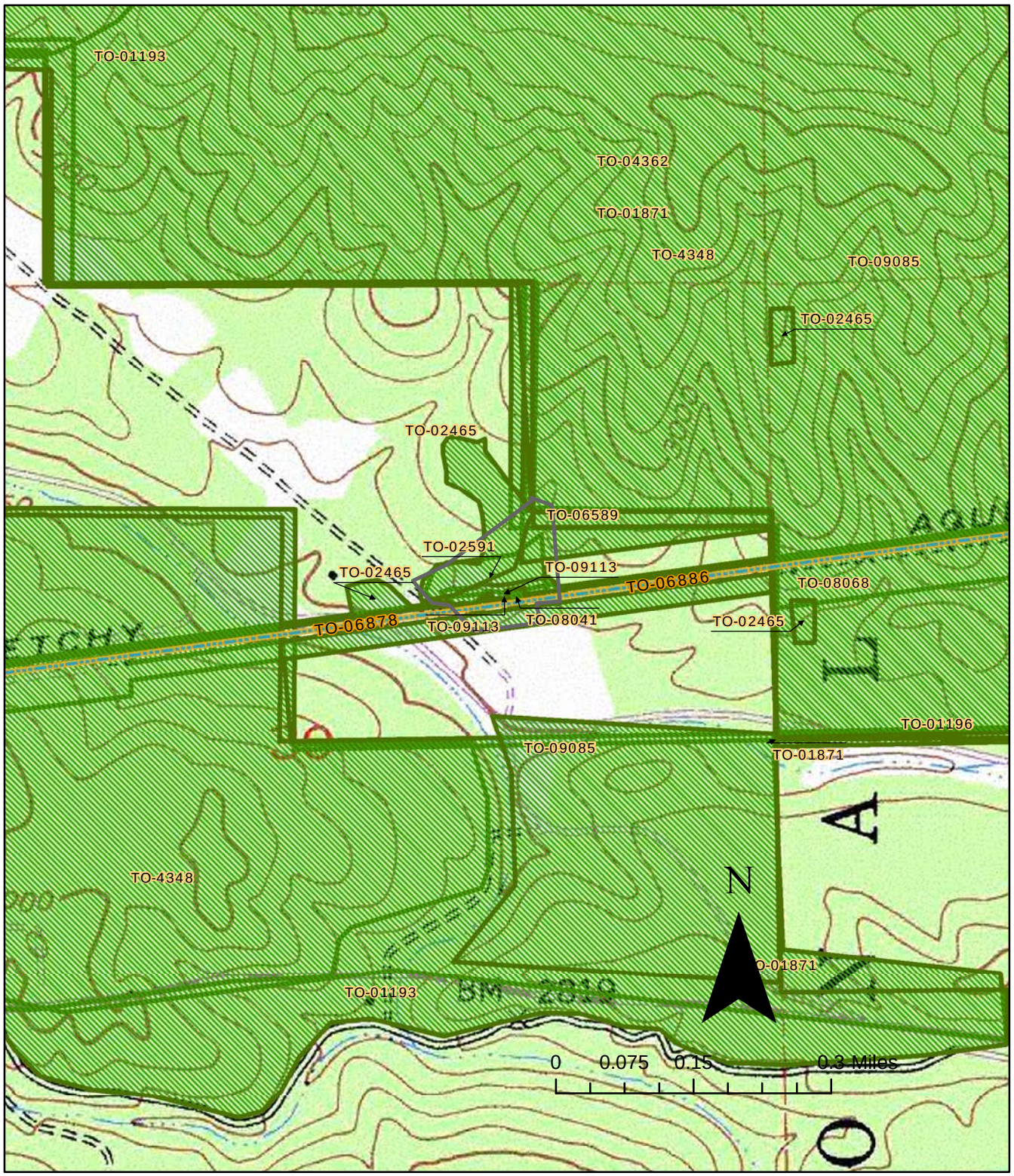
Management status

Database record metadata

	Date	*User*	
Entered:	2/4/2015	Anthro	
Last modified:	2/4/2015	Anthro	
IC actions:	*Date*	*User*	*Action taken*
	2/4/2015	Anthro	entry by RH

Record status:

CCaIC 12292O Groveland Community Services District Fuelbreaks II
Reports on Project 1:10,000-scale Groveland USGS 7.5' Quadrangle



Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
TO-01193	NADB-R - 1362575	1981	Moratto, M. J. and S. Salzman	Mid-Sierran Archaeology: A Survey of 14 Compartments in the Stanislaus National Forest, California; Appendix 13, Cultural Resource Inventory Data, Ferretti Compartment.	ESCA-Tech Corporation; for SNF, USFS	22-001159, 55-000058, 55-000088, 55-000110, 55-002700, 55-002739, 55-002965, 55-002966, 55-002967, 55-002968, 55-002969, 55-002970, 55-002971, 55-002972, 55-002973, 55-002974, 55-002975, 55-002976, 55-002977, 55-002978, 55-002979, 55-002980, 55-002981, 55-002982, 55-002983, 55-002984, 55-002985, 55-002986, 55-002987, 55-002988, 55-002989, 55-002990, 55-002991, 55-002992, 55-002993, 55-002994, 55-002995, 55-002996, 55-002997, 55-002998, 55-002999, 55-003000, 55-003001, 55-003002, 55-003003, 55-003004, 55-003005, 55-003006, 55-003534, 55-007272
TO-01196	NADB-R - 1363022	1989	Moriarty, James E. IV	1989 Insect/Drought Salvage, Cultural Resource Inventory Report 05-16-311, Sugar A Insect Salvage, Tuolumne County.	Moriarty, James E. IV	
TO-01425	NADB-R - 1361885	1989	Buttery, C. E.	Cultural Resource Report for Kassabaum Property Fenceline	Cynthia Buttery	22-001159, 55-000058, 55-000110, 55-002981, 55-002982, 55-002984, 55-002985, 55-002986
TO-01871	NADB-R - 1360402	1993	Asquith, H. E.	Cultural Resource Survey of the Proposed Shaft Insect Salvage Timber Sale; Cultural Resource Management Report 05-16-0568 in Tuolumne County, California.	Groveland Ranger District, for Stanislaus National Forest, USFS	55-000214, 55-002984, 55-004157, 55-004158
TO-02341	NADB-R - 1361275	1994	Werner, R. H. and D. Davis	An Archaeological Survey of Proposed Groveland Community Services District Water Improvement at Big Creek, Tuolumne County, California.	Roger Werner and David Davis	
TO-02448	NADB-R - 1361161; USFS - 05-16-4038	1994	Maniery, James Gary	Archaeological Investigation and Management Plan of the Proposed Hazard Tree Removal Project, Tuolumne and Mariposa Counties, California; Final Report, CRMR 05-16-4038.	PAR Environmental Services, Inc., for PG & E	22-000002, 22-001155, 22-001161, 22-001192, 55-000110, 55-000378, 55-000379, 55-000522, 55-002946, 55-003002, 55-004157, 55-004781
TO-02465	NADB-R - 1361276	1994	Werner, R. and E. Teixeira	An Archaeological Survey of Proposed Groveland Community Services District Water Improvements Big Creek Alternatives, Tuolumne County, California.	ASI Cartography and Geographic Information Systems; prepared for Dennis Dickman & Associates	55-000441, 55-000442, 55-000443

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
TO-02591	NADB-R - 1361992	1995	Francis, Charla Meacham and Thornton,	Archaeological and Historical Evaluation of CA-TUO-3525H, CA-TUO-3526H, P-55-441, and P-55-442; Big Creek and Second Garrote Shafts, Hetch Hetchy Water and Power.	Sierra Heritage Services; prepared for Groveland Community Services District	55-000315, 55-000316, 55-000441, 55-000442
TO-02865	NADB-R - 1362189	1996	Bevan, M. (RPF)	Archaeological and Historical Resources Survey and Impact Assessment; A Supplemental Report for a Timber Harvesting Plan: Hansen THP, 4-96-146/TUO.	M. Bevan; prepared for CDF	
TO-02938	NADB-R - 1362514	1997	Tolmie, Craig A.(RPF)	Archaeological and Historical Resources Survey and Impact Assessment: A Supplemental Report for a Timber Harvesting Plan; Schuster Modified THP (4-97-6/TUO-2).	Sierra Resources Consultants; prepared for CDF	55-000110
TO-04348	NADB-R - 1364259; USFS - 05-16-4126	1999	Marsh, Steve	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Certification, Project Name: Wagner Shred Project, Repor t#: 05-16-4126	Groveland Ranger District, Stanislaus National Forest, USDA Forest Service	55-000058, 55-000378, 55-000527, 55-000564, 55-002739, 55-002973, 55-002974, 55-002980, 55-002981, 55-002984, 55-002988, 55-002989, 55-003002, 55-003703, 55-003719, 55-004073, 55-004157, 55-004661, 55-007272
TO-04362	NADB-R - 1364268; USFS - 05-16-4144	2000	Marsh, Steve	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Certification, Wagner Shred II Cultural Resource Management Report 05-16-4144.	Stanislaus National Forest, Groveland Ranger District	55-000058, 55-000562, 55-002643, 55-002739, 55-002938, 55-002942, 55-002944, 55-002945, 55-002946, 55-002956, 55-002957, 55-002960, 55-002961, 55-002973, 55-002980, 55-002981, 55-002984, 55-002987, 55-002989, 55-003002, 55-004032, 55-004069, 55-004070, 55-004071, 55-004073, 55-004661
TO-04372	NADB-R - 1364286	1998	Marsh, Steve	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Project Certification: Ever 120 Hazard Tree Sale, CRMR #05-16-4116.	Groveland Ranger District, Stanislaus National Forest, USFS	

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
TO-06589	NADB-R - 1366875; USFS - 05-16-4285	2007	Riefkohl Guzman, Priscilla, Carl Sjostrand, and Kay Shelnutt	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Project Certification, Gravel, Little Crane, and Meyer-Ferretti Grazing Allotments, Cultural Resource Management Report 05-16-4285	Groveland Ranger District, Stanislaus National Forest, USDA Forest Service	22-000003, 22-000004, 22-000007, 22-000008, 22-000010, 22-000033, 22-000035, 22-001019, 22-001158, 22-001161, 22-001209, 22-001211, 22-001218, 22-001221, 22-001304, 22-001305, 22-001306, 22-001312, 22-001314, 22-001315, 22-001316, 22-001317, 22-001405, 22-001406, 22-001407, 22-001408, 22-001771, 22-002195, 22-002952, 22-002953, 22-002954, 22-002955, 22-002956, 22-003194, 55-000058, 55-000110, 55-000527, 55-000561, 55-000564, 55-002739, 55-002974, 55-002982, 55-002984, 55-002985, 55-003461, 55-003703, 55-003779, 55-007272, 55-007736, 55-008159
TO-06617	NADB-R - 1366910	2007	Guzman, Priscilla M. Riefkohl	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Project Certification, Long Shanahan Fuels Reduction and Forest Health, CRMR 05-16-4274.	Groveland Ranger District, Stanislaus National Forest, USFS	55-000058, 55-000110, 55-000522, 55-000524, 55-000525, 55-000562, 55-000564, 55-001161, 55-002643, 55-002739, 55-002938, 55-002940, 55-002942, 55-002944, 55-002945, 55-002946, 55-002951, 55-002956, 55-002961, 55-002962, 55-002979, 55-002980, 55-002981, 55-002988, 55-002989, 55-003002, 55-003477, 55-004068, 55-004069, 55-004070, 55-004071, 55-004073, 55-004074, 55-004075, 55-004140, 55-004157, 55-004158, 55-004171, 55-007738, 55-007739, 55-007740, 55-007741, 55-007742, 55-007743, 55-007744
TO-06878	NADB-R - 1367163	2008	Wycko, B.	San Joaquin Pipeline System Project, Draft EIR, San Francisco Planning Department Case No. 2007.0118E, State Clearinghouse No. 2007032138	San Francisco Planning Department	39-000002, 39-000089, 39-000090, 39-004859, 39-004860, 39-004883, 50-000001, 50-000074, 50-000364, 50-000546, 50-001898, 50-002000, 50-002001, 50-002002, 50-002003, 50-002004, 55-007834, 55-007835, 55-007836, 55-007847
TO-06878		2010	San Francisco Planning Department	Preliminary Mitigated Negative Declaration, Rehabilitation of the Existing San Joaquin Pipelines, Portions of Tuolumne, Stanislaus and San Joaquin Counties, and the Cities of Riverbank and Modesto	San Francisco Planning Department/Public Uitilities Commission	

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
TO-06886		2008	San Francisco Public Utilities Commission	San Francisco Public Utilities Commission San Joaquin Regional Water Quality Improvement Project, Draft Environmental Impact Report.	SFPUC	55-002994
TO-07219	NADB-R - 1367533	2009	Riefkohl-Guzman, P.	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Project Certification: Powerline Hazard Tree Removal, CRMR 05-16-4323.	Stanislaus National Forest, Groveland Ranger District	55-000110
TO-07912		2011	Riefkohl-Guzman, P.	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Project Certification: Shanahan Flat Fuelwood Sale, CRMR 05-16-4355.	Groveland Ranger District, for Stanislaus National Forest, USFS	55-000522, 55-003002, 55-004157
TO-07921	USFS - 05-16-4338	2010	Riefkohl Guzman, Priscilla M. and Strain, Kathy	Stanislaus National Forest, Heritage Resources 1996 Sierra Nevada Programmatic Agreement Project Certification, FY10 Pacific Gas & Electric Power Line Hazard Trees, Cultural Resource Management Report 05-16-4338	Groveland Ranger District, Stanislaus National Forest, USFS	55-000309, 55-000583, 55-002036, 55-002583, 55-002964, 55-002965, 55-003002, 55-003327, 55-003725, 55-003726, 55-004354, 55-004356, 55-006291
TO-08041		2013	Estes, Allen, Young, Thomas, and Fino, Nazih	Final Archaeological Survey Report Mountain Tunnel Geotechnical Project, Tuolumne County, California.	William Self Associates, Inc. (WSA) for RMC Water and Environment	55-000110, 55-000316, 55-002980, 55-002982, 55-002985, 55-002987, 55-007428, 55-008545
TO-08068	Other - WSA Project 2012-99; Other - WSA Report 2013-38; USFS - Report No. 05-16-4386	2013	Estes, A., Young, T., and Fino, N.	Archaeological Survey Report, HHWP Reliable Power Project, Tuolumne County, California; USFS Report No. 05-16-4386.	William Self Associates, Inc.; prepared for RMC Water and Environment, San Francisco, CA	55-000058, 55-000110, 55-000316, 55-000901, 55-002739, 55-002966, 55-002980, 55-002982, 55-002985, 55-002987, 55-002988, 55-003002, 55-003419, 55-003704, 55-004140, 55-004158, 55-004661, 55-007272, 55-007426, 55-007428, 55-008541, 55-009016, 55-009017, 55-009018, 55-009019, 55-009020, 55-009021, 55-009022, 55-009023, 55-009024, 55-009025, 55-009026, 55-009027, 55-009028, 55-009029, 55-009030, 55-009053

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
TO-08560	Caltrans - Federal Aid No. BRLO 5932(074)	2017	Francis, C. M.	Big Creek Shaft Road Bridge [Br. No. 32C-0066) Replacement, Federal Aid No. BRLO 5932(074), Historic Propert Survey Report (and Archaeological Survey Report, Big Creek Shaft Road crossing Big Creek Bridge Replacement Project), Tuolumne County, California	Francis Heritage LLC, for Tuolumne Co. Community Resources Agency & Caltrans	55-000110
TO-09085	USFS - CRMR 05-16-4506	2018	Rosenberg, S. and K. Strain	Stanislaus National Forest, Heritage Resources, 2013 Regional Programmatic Agreement Project Certification, Ferretti Trail Development Addendum, CRMR 05-16-4506 [Tuolumne County]	Stanislaus National Forest	55-000110, 55-000522, 55-002973, 55-002980, 55-002981, 55-002984, 55-002988, 55-002989, 55-002994, 55-004661, 55-007741, 55-009024, 55-009025, 55-009053
TO-09113		2019	AECOM	Historic Context and Archaeological Survey Report for Mountain Tunnel Improvements Project, Tuolumne County, California (CASE No. 2017-014249ENV)	AECOM for The San Francisco Public Utilities Commission	55-000110, 55-000316, 55-000441, 55-000575, 55-002327, 55-002966, 55-002971, 55-003704, 55-004524, 55-004763, 55-004764, 55-005983, 55-005991, 55-005992, 55-007426, 55-007740, 55-009027, 55-009407, 55-009823, 55-009824, 55-009825, 55-009826, 55-009827, 55-009828, 55-009829, 55-009830, 55-009831, 55-009832, 55-009833, 55-009834, 55-009867
TO-09113		2019	AECOM	Historical Resources Evaluation Addendum, Mountain Tunnel Improvements Project	AECOM	
TO-09113		2015	Norby, H. and C. McMorris	Mountain Tunnel Access & Adit Improvement Project, Tuolumne County; Historic Resources Evaluation	JRP Historical Consulting, LLC for San Francisco Public Utilities Commission	

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-55-002994
HRI #
Trinomial CA-TUO-002016H
NRHP Status Code 3S
Other Listings
Review Code Reviewer Date

***Resource Name or #** (Assigned by recorder) Mountain Tunnel

12/19

P1. Other Identifier: Mountain Tunnel

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Tuolumne
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Ascension Mountain, Jawbone Ridge, Groveland, Moccasin **Date** 1992, 2001, 2001, 2012

c. Address _____ City _____ Zip _____

d. UTM: (give more than one for large and/or linear resources) Intake Valve House: Zone 11S, 239913mE/ 4196118mN; South Fork Crossing: Zone 10S, 762159mE/ 4190782mN; Priest Portal: Zone 10S, 740762mE/ 4187507mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

Mountain Tunnel is located in Tuolumne County from a point of diversion at Early Intake Reservoir terminating approximately 18 miles west at Priest Reservoir.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Mountain Tunnel is a roughly 18.3-mile tunnel composed of an intake valve house, adits, tunnels, and shafts. The City and County of San Francisco (CCSF) completed construction of the tunnel in 1925 to convey water impounded by Early Intake Dam to Priest Reservoir, for power generation at Moccasin Powerhouse and for the main Hetch Hetchy water supply system. A series of adits and portals facilitated access to the tunnel during construction and subsequent inspections. Additionally two shafts built to aid in the tunnel's construction were then retrofitted with pump infrastructure to provide municipal water supply for the Groveland water agency. Segments and points recorded in the form are designated MT (Mountain Tunnel) 1—9. Survey of this resource was from the surface and did not include access to the interior of the tunnel because the structure is currently in operation delivering water for San Francisco's municipal water supply. Please see linear Feature Records for descriptions of individual segments of Mountain Tunnel. Also see Continuation Sheet.

***P3b. Resource Attributes:** (List attributes and codes) HP20 – Canal/aqueduct

***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)

P5b. Description of Photo: (View, date, accession #) **Photograph 1:** MT-1, Mountain Tunnel intake valve house, September 24, 2014, camera facing south.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both

***P7. Owner and Address:**
San Francisco Public Utilities Commission
525 Golden Gate Avenue
San Francisco, CA 94102

***P8. Recorded by:** (Name, affiliation, address)
Heather Norby & Garret Root
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95618

***P9. Date Recorded:** September 24, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") JRP Historical Consulting, LLC "Historic Resources Evaluation: Mountain Tunnel Access & Adit Improvement Project, Tuolumne County," 2015.

***Attachments:** ☐ None ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☒ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) _____

***NRHP Status Code** 3S

***Resource Name or #** (Assigned by recorder) Mountain Tunnel

B1. Historic Name: Mountain Division Aqueduct Tunnels
B2. Common Name: Mountain Tunnel
B3. Original Use: Water conveyance B4. Present Use: Water conveyance
***B5. Architectural Style:** Utilitarian
***B6. Construction History:** (Construction date, alteration, and date of alterations) Mountain Tunnel was constructed from 1917-1925. A pipeline was installed from the Early Intake Powerhouse to Mountain Tunnel via Early Intake Adit in 1933 and then capped in 1997; in 1964 the intake to Mountain Tunnel was functionally moved from the original intake valve house to a point where a bypass tunnel from Kirkwood Powerhouse joins Mountain Tunnel; in 1969 the South Fork pipeline crossing was demolished and a siphon installed; in 1997 alterations were made to Early Intake Adit, Adit 5-6, and Adit 8-9; in 2002 the downstream end of Mountain Tunnel was modified by construction of an optional bypass pipeline at Priest Portal. Modern pump houses are present at Big Creek Shaft and Second Garrotte Shaft.

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown** **Date:** _____ **Original Location:** _____
***B8. Related Features:**

B9. Architect: San Francisco Department of Public Works b. Builder: City and County of Francisco; Construction Company of North America; Webb & Cox of the Universal Concrete Gun Company
***B10. Significance: Theme** Hydropower/water supply **Area** Tuolumne County
Period of Significance 1917-1934 **Property Type** water conveyance **Applicable Criteria** NRHP/CRHR Criterion A/1
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Mountain Tunnel appears to meet the criteria for listing in the National Register of Historic Places (NRHP) under Criterion A and the California Register of Historical Resources (CRHR) under Criterion 1 because of the crucial role it played in the Hetch Hetchy system, a municipal water system that has great importance supplying the City and County of San Francisco. The property also retains sufficient historic integrity to convey its significance.

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

13. Remarks:

***B14. Evaluator:** Heather Norby
***Date of Evaluation:** October 2014
(This space reserved for official comments.)

See Continuation Sheet.

L1. Historic and/or Common Name: Mountain Tunnel Intake Valve House

L2a. Portion Described: ☐ Entire Resource ☐ Segment ☒ Point Observation **Designation:** MT-1

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

MT-1 (see **Site Map**) records the Intake Valve House of Mountain Tunnel, located at Early Intake Dam.

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

The Mountain Tunnel intake valve house is located upstream of Early Intake Dam on the left bank (**Photographs 1** and **2**). The board-formed concrete structure constructed into the hillside measures roughly 30-foot tall from the base to the roofline. A concrete frame and metal grate walkway connects Early Intake Dam with the valve house. The valve house is roughly 10-feet wide by 35-feet long. The building has a flat concrete roof supported by concrete buttressing and three 6-pane steel sash windows on the northern wall (**Photograph 14**). Access into the building is via a steel door with one fixed, central glass pane located on the western wall. Water into the portal is regulated by two sets of gates. Gates can be installed in the first set of three gates located just behind steel grizzlies. Behind these gates is a semi-circular concrete structure with five iron head gates operated from above by individual mechanically operated screws (**Photograph 15, 16**). (See Continuation Sheet.)

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

a. **Top Width** n/a
b. Bottom Width n/a
c. Height or Depth n/a
d. **Length of Segment** approx. 35 feet

L5. Associated Resources: O'Shaughnessy Dam, Bypass Tunnel, Priest Dam

L4e. Sketch of Cross-Section (include scale) **Facing:**

n/a

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural and mountainous, characterized by steep canyons and burned vegetation.

L8a. Photograph, Map, or Drawing.

L7. Integrity Considerations:
In 1964, CCSF bypassed the intake valve house in conjunction with construction of Kirkwood Powerhouse. Since then the intake valve house has only served as an alternative intake for Mountain Tunnel.

L8b. Description of Photo, Map, or Drawing:
Photograph 2: Intake valve house, camera facing southeast, September 24, 2014.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address) Heather Norby & Garret Root
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95616

L11. Date: September 24, 2014

L1. Historic and/or Common Name: Early Intake Portal

L2a. Portion Described: ☐ Entire Resource ☐ Segment ☒ Point Observation **Designation:** MT-2

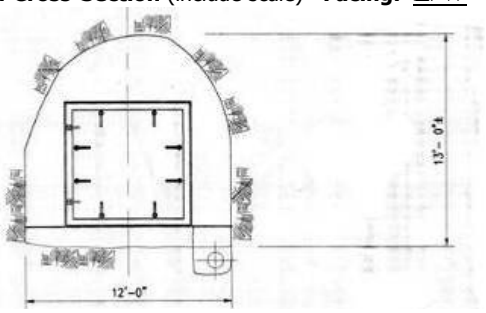
***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

MT-2 (see **Site Map**) records the Early Intake Portal located approximately four-tenths of a mile downstream from the intake valve house (MT-1).

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

Early Intake Portal is an unlined, horseshoe-shaped adit approximately twelve feet wide drifted into the granite hillside (**Photograph 3**). Access into the adit is first provided through a chain-link gate attached to a concrete bulkhead. A concrete bulkhead with a steel, watertight door secured by 10 individual latches is located just beyond the chain link gate (**Photograph 18**). After passing through the watertight door, the roughly 70-foot long adit terminates at the sealed connection with the tunnel. The concrete seal features a riveted steel, rectangular manhole door and a capped pipe puncturing the concrete seal (See Continuation Sheet).

L4e. Sketch of Cross-Section (include scale) **Facing:** E/W



L4. Dimensions: (in feet for historic features and meters for prehistoric features)

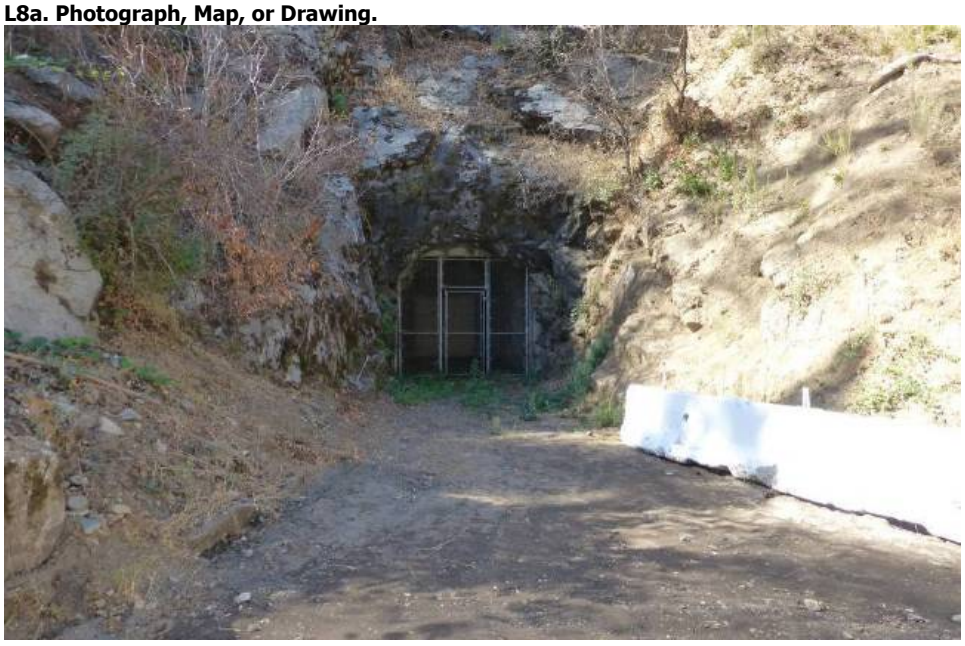
a. **Top Width** n/a
b. Bottom Width 12 feet
c. Height or Depth 13 feet
d. Length of Segment n/a

L5. Associated Resources:
Bypass Tunnel, Priest Dam,
Early Intake Power House (removed 1967)

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural and mountainous, characterized by steep canyons, covered with both live and burned vegetation.

L7. Integrity Considerations: This unlined adit was drifted in 1917. In 1933, water from the tailrace of Early Intake Powerhouse was piped to Mountain Tunnel through this portal to provide auxiliary water into Mountain Tunnel. The powerhouse was removed in 1967. In 1997, the original concrete bulkhead at the adit entrance, chain link fence, and Early Intake pipe and piers were removed. A concrete bulkhead and watertight door was added and the 60" pipe capped.

L8a. Photograph, Map, or Drawing.



L8b. Description of Photo, Map, or Drawing:
Photograph 3: Early Intake Portal, camera facing south, September 24, 2014.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address) Heather Norby & Garret Root
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95616

L11. Date: September 24, 2014

L1. Historic and/or Common Name: Mountain Tunnel Adit 3/4

L2a. Portion Described: ☐ Entire Resource ☐ Segment ☒ Point Observation **Designation:** MT-3

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

MT-3 (see **Site Map**) records Adit 3-4 located approximately 5.6 miles southwest (downstream) of the Intake Valve House.

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

Mountain Tunnel Adit 3-4 is unlined and partially collapsed (**Photograph 4**). Several large boulders prevent access into the unlined adit and mud and debris prevented measurement of the adit. A metal fence and gate are located approximately 15 feet into the adit (**Photograph 19**). This adit connects with an unlined portion of Mountain Tunnel measuring roughly 14 feet tall by 13 feet wide with rough granite walls and a hard packed floor.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

a. **Top Width** n/a
b. **Bottom Width** approximately 7 feet
c. **Height or Depth** n/a
d. **Length of Segment** n/a

L5. Associated Resources: O'Shaughnessy Dam, Bypass Tunnel, Priest Dam

L4e. Sketch of Cross-Section (include scale) **Facing:**

Not to scale

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural and mountainous, characterized by steep hillsides, with living and burned vegetation.

L7. Integrity Considerations: This unlined adit was bored in 1917. In 1972 water topped the concrete plug and flooded the adit (**Photograph 20**). Research did not reveal the date of collapse.

L8a. Photograph, Map, or Drawing.

L8b. Description of Photo, Map, or Drawing:
Photograph 4: Adit 3-4 portal, camera facing south, September 24, 2014.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address)
Heather Norby & Garret Root
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95616

L11. Date: September 24, 2014

L1. Historic and/or Common Name: Mountain Tunnel Adit 4-5

L2a. Portion Described: ☐ Entire Resource ☐ Segment ☒ Point Observation **Designation:** MT-4

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

MT-4 (see **Site Map**) records Adit 4-5 located approximately 1,600-feet west (downstream) of Adit 3-4.

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

Mountain Tunnel Adit 4-5 is collapsed and unlined (**Photograph 5**). A concrete bulkhead with a metal gate frames the small adit portal. The adit ceiling has collapsed behind the concrete bulkhead, preventing access and interior recordation. This adit connects with a concrete lined, horseshoe-shaped portion of Mountain Tunnel measuring roughly 13 feet tall by 13 feet wide.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

a. **Top Width** n/a
b. **Bottom Width** 7 feet
c. **Height or Depth** n/a
d. **Length of Segment** n/a

L5. Associated Resources: O'Shaughnessy Dam, Bypass Tunnel, Priest Dam

L4e. Sketch of Cross-Section (include scale) **Facing:** E/W

Not to scale

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is rural and mountainous, characterized by steep hillsides, with live and burned vegetation.

L7. Integrity Considerations: This unlined adit was bored in 1917. Research did not reveal the date of collapse.

L8a. Photograph, Map, or Drawing.

L8b. Description of Photo, Map, or Drawing:
Photograph 5: Adit 4/5 portal, camera facing southwest, September 24, 2014.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address)
Heather Norby & Garret Root
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95616

L11. Date: September 24, 2014

L1. Historic and/or Common Name: Mountain Tunnel Adit 5-6

L2a. Portion Described: ☐ Entire Resource ☐ Segment ☒ Point Observation **Designation:** MT-5

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

MT-5 (see **Site Map**) records Adit 5-6 located approximately 2,600 feet west (downstream) of Adit 4-5.

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

Mountain Tunnel Adit 5-6 is a lined and unlined adit drifted into the granite hillside. A series of concrete foundations that previously supported compressors used during construction sit just outside the adit portal (**Photograph 6**). A camp and shop buildings were sited near this adit because it was one of the primary access points into the tunnel during construction. During construction, the remnant compressor foundations present were housed in a temporary wood-frame and corrugated metal building (**Photograph 21**). Access into the adit is first provided through a metal fence attached to a large concrete bulkhead (**Photograph 22**). A steel, watertight door secured by 10 individual latches is located just beyond the metal gate. The adit is concrete-lined from the metal gate to the watertight door. Beyond the watertight door the tunnel is unlined but the floor is a concrete slab (**Photograph 23**). The adit seal beyond the watertight door is a board-formed concrete plug that holds back Mountain Tunnel water. Passage through the concrete plug is provided by a 60-inch, round, cast-iron watertight door secured with bolts. A metal beam supported by an A-frame extends over the round watertight door (See Continuation Sheet).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

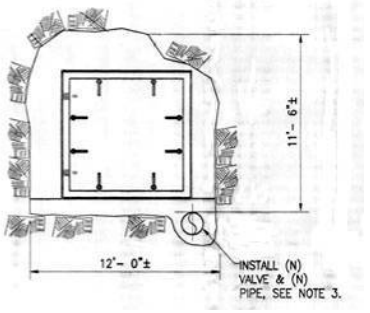
- **a. Top Width**
- **b. Bottom Width** approx. 12 feet
- **c. Height or Depth** approx. 11 feet, 6 inches
- **d. Length of Segment**

L5. Associated Resources: O'Shaughnessy Dam, Bypass Tunnel, Priest Dam

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

The setting is rural, characterized by steep hillsides, with live and burned vegetation.

L4e. Sketch of Cross-Section (include scale) **Facing:** NE/SW



L8a. Photograph, Map, or Drawing.

L7. Integrity Considerations: This adit was drifted in 1917 and enlarged in 1920. After construction the compressors, associated machinery and buildings were removed. In 1997, concrete bulkhead and watertight door were added to the interior of the adit.

L8b. Description of Photo, Map, or Drawing: **Photograph 6:** Adit 5/6 portal and compressor foundations, camera facing south, September 24, 2014.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address) Heather Norby & Garret Root
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95616

L11. Date: September 24, 2014

L1. Historic and/or Common Name: Mountain Tunnel Adit 8-9

L2a. Portion Described: ☐ Entire Resource ☐ Segment ☒ Point Observation **Designation:** MT-6

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

MT-6 (see **Site Map**) records Adit 8-9 located approximately 2.9-miles west of Adit 5-6.

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

Mountain Tunnel Adit 8-9 is a lined and unlined adit drifted into the granite hillside. A series of concrete foundations that previously supported compressors used during construction sit just outside the adit portal (**Photograph 7**). A camp and shop buildings were sited near this adit because it was one of the primary access points into the tunnel during construction. During construction, the remnant compressor foundations present were housed in a temporary wood-frame and corrugated metal building (**Photograph 24**). Access into the adit is first through a metal fence attached to a large concrete bulkhead and wing wall (**Photograph 25**). The adit is concrete lined with a crushed rock between the metal fence and a concrete bulkhead with a watertight door. Between the watertight door and the adit seal, the adit floor is a concrete slab (**Photograph 26**). The steel, watertight door is secured by 10 individual latches. The adit terminates at a board-formed concrete plug that holds back Mountain Tunnel water. Passage through the concrete plug is provided through a 60-inch, round, cast-iron watertight door secured with bolts (See Continuation Sheet).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

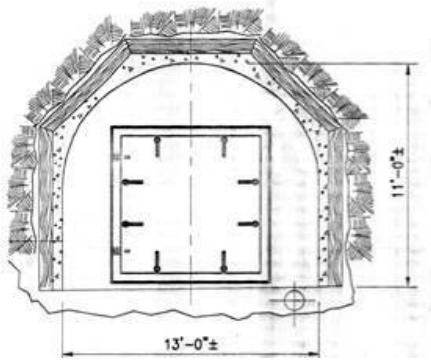
a. **Top Width** n/a
b. Bottom Width 13 feet
c. Height or Depth 11 feet
d. Length of Segment n/a

L5. Associated Resources: O'Shaughnessy Dam, Bypass Tunnel, Priest Dam

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

The setting is rural, characterized by steep hillsides, with live and burned vegetation

L4e. Sketch of Cross-Section (include scale) **Facing:** NW/SE



L8a. Photograph, Map, or Drawing.

L7. Integrity Considerations: This adit was drifted in 1917 and enlarged in 1920. After construction of Mountain Tunnel was completed, the compressor, associated machinery and buildings were removed. In 1997, the concrete bulkhead, and watertight door were added.

L8b. Description of Photo, Map, or Drawing: **Photograph 7:** Adit 8/9 portal and compressor foundations, camera facing south, September 24, 2014.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address) Heather Norby & Garret Root
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95616

L11. Date: September 24, 2014

L1. Historic and/or Common Name: Big Creek Shaft

L2a. Portion Described: ☐ Entire Resource ☐ Segment ☒ Point Observation **Designation:** MT-7

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

MT-7 (see **Site Map**) records the Big Creek Shaft located approximately 2.3-miles west of Adit 8/9 along Big Creek Shaft Road.

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

Big Creek Shaft is a 646 feet deep, 4-foot diameter, concrete lined shaft that connects with Mountain Tunnel 575 feet below the surface (**Photograph 8**). The only visible features of Big Creek Shaft are a modern square, pump house building constructed on a concrete foundation with metal seam walls and flat roof. A solid metal door provides access on the northern wall to the water pump inside the building. Big Creek Shaft is currently used to supply Mountain Tunnel water to Groveland Community Service District, a local water district (**Photograph 29**, **30**). A barbwire topped chain link fence and gate surrounds the building.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** n/a
- **b. Bottom Width** n/a
- **c. Height or Depth** 575 feet
- **d. Length of Segment** n/a

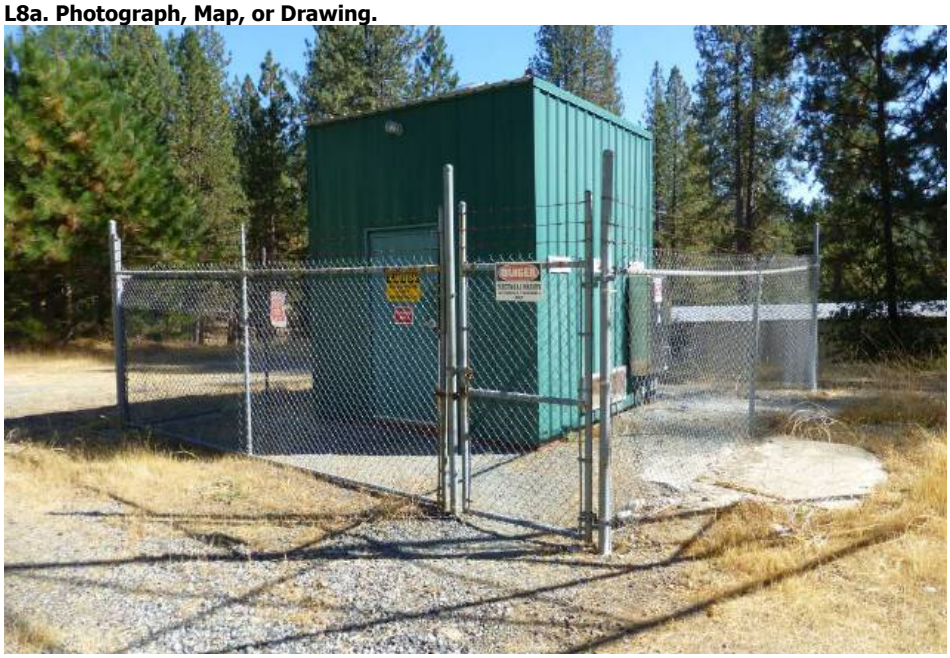
L5. Associated Resources: O'Shaughnessy Dam, Bypass Tunnel, Priest Dam; Groveland CSD water tank.

L4e. Sketch of Cross-Section (include scale) **Facing:** NE/SW

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)
The setting is characterized by scattered buildings, transmission lines, and a large water tank.

L7. Integrity Considerations: This shaft was drilled between 1917 and 1920 to provide access to driving faces for construction of Mountain Tunnel. Today, it serves as a water supply for a local water district. Research did not reveal the date of the construction of the modern pumphouse building that sits atop the shaft.

L8a. Photograph, Map, or Drawing.



L8b. Description of Photo, Map, or Drawing:
Photograph 8: Big Creek Shaft, camera facing southeast, September 24, 2014.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address)
Heather Norby & Garret Root
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95616

L11. Date: September 24, 2014

L1. Historic and/or Common Name: Second Garrotte Shaft

L2a. Portion Described: ☐ Entire Resource ☐ Segment ☒ Point Observation **Designation:** MT-8

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

MT-8 (see **Site Map**) records the Second Garrotte Shaft located approximately 3-miles west of the Big Creek Shaft.

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

Second Garrotte Shaft is a 756 feet deep, 4-foot diameter, concrete lined shaft that connects with Mountain Tunnel below the surface (**Photograph 9**). Second Garrotte Shaft is currently used to supply Mountain Tunnel water to Groveland Community Services District, a local water district. The only visible features of Second Garrotte Shaft are a square concrete foundation covered with metal plates and a pump mounted on a concrete foundation. The water pump pipe punctures the concrete foundation on the northern wall and travels down 756-feet into Mountain Tunnel. A barbwire topped chain link fence and gate surrounds the two structures in addition to two modern buildings not associated with the shaft. Second Garrotte Shaft was one of the primary access points into the tunnel. Remnants of three concrete compressor foundations used during original construction remain near the shaft (**Photograph 31, 32**).

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** n/a
- b. **Bottom Width** n/a
- c. **Height or Depth** n/a
- **d. Length of Segment** approximately 775 feet

L5. Associated Resources: O'Shaughnessy Dam, Bypass Tunnel, Priest Dam

L4e. Sketch of Cross-Section (include scale) **Facing:** NE/SW

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

The setting is rural, characterized by steep hillsides, with live and burned vegetation.

L7. Integrity Considerations: This shaft was drilled between 1917 and 1925. After construction the compressor, associated machinery and buildings were removed. Research did not reveal the date that the local water district installed the current pump in the shaft.

L8a. Photograph, Map, or Drawing.

L8b. Description of Photo, Map, or Drawing:
Photograph 9: Second Garrotte Shaft, camera facing southwest, September 24, 2014.

L9. Remarks:

L10. Form prepared by: (Name, affiliation, address)
Heather Norby & Garret Root
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95616

L11. Date: September 24, 2014

L1. Historic and/or Common Name: Priest Portal

L2a. Portion Described: ☐ Entire Resource ☐ Segment ☒ Point Observation **Designation:** MT-9

***b. Location of point or segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

MT-9 (see **Site Map**) records Priest Portal, the Mountain Tunnel outfall at Priest Reservoir, located approximately 3.8-miles southeast of the Second Garrotte Shaft and 19 miles southeast of Mountain Tunnel Intake Valve House.

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

Priest Portal is the Mountain Tunnel outfall located underwater in Priest Reservoir (**Photograph 10**). A concrete headwall and two wing walls frame the tunnel outfall portal (**Photograph 33**). A steel vent pipe extends from the portal headwall up the shoreline. This portal connects with a concrete lined, horseshoe-shaped portion of Mountain Tunnel measuring roughly 13 feet tall by 13 feet wide. Since 2002, the outfall pipe has been connected to a bypass pipeline that can deliver water directly into the Moccasin intake or release into Priest Reservoir.

L4. Dimensions: (in feet for historic features and meters for prehistoric features)

- **a. Top Width** n/a
- **b. Bottom Width** 13 feet
- **c. Height or Depth** n/a
- **d. Length of Segment** n/a

L5. Associated Resources: O'Shaughnessy Dam, Bypass Tunnel, Priest Dam

L4e. Sketch of Cross-Section (include scale) **Facing:** NE/SW

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.)

The setting is rural, characterized by steep hillsides, covered in low vegetation and grasses. Priest Dam is located east of the portal.

L7. Integrity Considerations: This portal was drifted between 1917 and 1920. After construction the compressor, associated machinery, and camp buildings were removed. In 2002, a bypass which required modifications to the headwall and wing wall to accommodate a new steel pipe that connects the portal directly to the Moccasin intake across the reservoir. A vent pipe was added above the portal (**Photograph 10**).

L8a. Photograph, Map, or Drawing.

L8b. Description of Photo, Map, or Drawing:
Photograph 10: Priest Portal, camera facing north, September 24, 2014.

L9. Remarks:

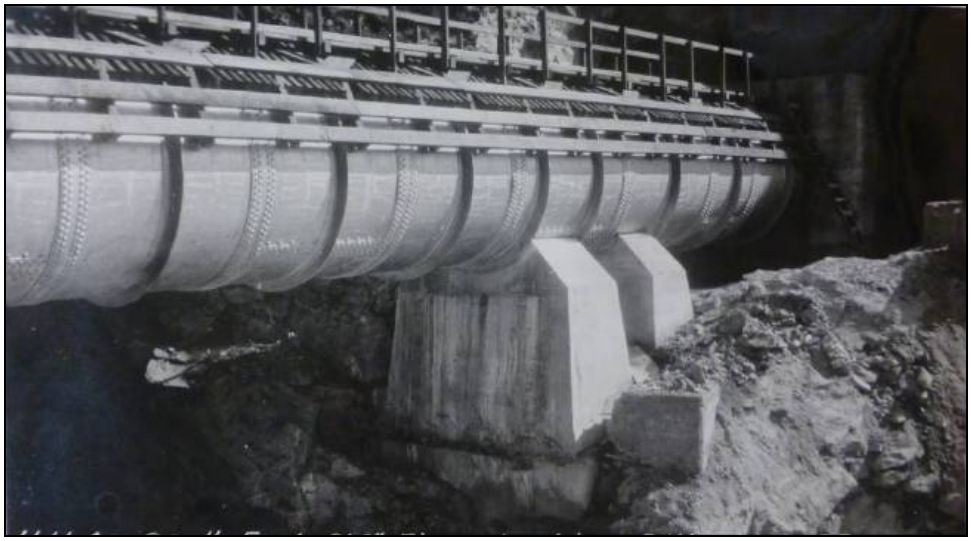
L10. Form prepared by: (Name, affiliation, address) Heather Norby & Garret Root
JRP Historical Consulting, LLC
2850 Spafford Street
Davis, CA 95616

L11. Date: September 24, 2014

P3a. Description

12/19

The South Fork crossing could not be recorded on this form because a recent rockslide made the area inaccessible at the time of fieldwork. The photographs provided below were obtained from the Moccasin Archives and from a 2008 report prepared by William Self Associates, Inc. for RMC Water and Environment. As originally constructed, the South Fork crossing was a pipeline supported on concrete piers crossing the South Fork of the Tuolumne River between the two South Fork portals. In 1969 CCSF replaced the original steel pipe across the South Fork of the Tuolumne River (**Photograph 11**) with an approximately 375-foot unlined tunnel siphon extending beneath the Tuolumne River. The tunnel was lined at the connections with the existing Mountain Tunnel.[1] The original piers supporting the pipeline were left in place (**Photograph 12**). In 1990, CCSF crews performed lining work in the South Fork crossing of Mountain Tunnel (**Photograph 13**).



Photograph 11: As originally constructed, this riveted steel pipe across the South Fork of the Tuolumne River was the only piped segment of Mountain Tunnel. It was demolished in 1969 and replaced with a siphon. Photograph from May 1925.

[1] City and County of San Francisco Public Utilities Commission, "Contract No. 394 Relocation of South Fork Aqueduct Crossing," April 1969;

Photograph 12: South Fork crossing in 2008. Note remnant concrete piers at bottom right and left that supported the original pipeline crossing the river. Photo credit William Self Associates, Inc.[2]

Photograph 13: Crews lining Mountain Tunnel at the South Fork crossing in 1990.[3]

[2] William Self Associates, Inc., "Final Cultural Resource Assessment Mountain Tunnel Rehabilitation Project, Tuolumne County, California," prepared for RMC Water and Environment, September 2008, Photograph 3.
[3] Moccasin Archives, Historic Photograph File RO11904, "MTNL Tunnel Lining @ S.F. Xing," 1990.

L3. Description (continued):

MT-1 Continued: Beyond the gates, in the hillside, is the Mountain Tunnel portal, an opening blasted into the granite, with a concrete headwall located above.

MT-2 Continued: A metal beam supported by an A-frame extends over the manhole door. The ground in this adit is a mixture of mud, rock, and concrete. Historic records indicate that the Mountain Tunnel is unlined in both directions from its junction with Early Intake Adit.

MT-5 Continued: Extending outward from the tunnel seal, the adit portal has a concrete-lined drain channel located in the floor on the western side of the adit. This weeper drain allows water to pass safely from the tunnel through a metal pipe that extends through the plug to a valve within the adit where water then flows through the channel out of the adit (**Photograph 23**). This adit connects with a concrete lined, horseshoe-shaped portion of Mountain Tunnel measuring roughly 14.5 feet tall by 13 feet wide.

MT-6 Continued: A metal beam supported by an A-frame extends over the round watertight door. Extending from the tunnel plug wall out the adit portal is a concrete lined drain channel located in the floor on the western side of the adit (**Photograph 27**). This weeper drain allows water to pass safely from the tunnel through a metal pipe that extends through the plug to a valve within the adit, where water then flows through the channel out of the adit. This adit connects with a unlined, round-shaped portion of Mountain Tunnel (**Photograph 28**).

B10. Significance (continued):

Historic Context

Mountain Tunnel is a component of the Hetch Hetchy Water and Power system that carries water from the Tuolumne River watershed to the City and County of San Francisco (CCSF) and generates electrical power via a system of dams, tunnels, pipelines, canals, powerhouses, and transmission lines. Constructed between 1917 and 1925, Mountain Tunnel was among the first structures completed for the Hetch Hetchy project because it was essential to generating power at Moccasin Powerhouse.

The approximately 18.3-mile long tunnel was originally the link between Early Intake Dam and Priest Reservoir above the Moccasin Powerhouse penstocks. Construction of the tunnel in remote, rugged terrain was arduous and required installation of work camps and machine shops at five of the boring faces. Men lost their lives during the course of constructing the tunnel, and the workers organized more than one strike during the construction period. Since it was first put into service in 1925, San Francisco Public Utilities Commission / Hetch Hetchy Water & Power (SFPUC / HHWP) has made very few changes to the tunnel itself, however both the upstream and downstream ends have been modified, the South Fork crossing was demolished and reconfigured, and changes have been made to many of the adits, portals, and shafts that were originally driving faces during the tunnel's construction.[4]

The following historic context will orient Mountain Tunnel within the context of the Hetch Hetchy project, provide a history of the construction of the tunnel, and document changes and modifications that have been made to the tunnel since it was completed in 1925. The development of Hetch Hetchy is well documented and the following historic overview is not intended to be exhaustive, but is intended to provide context for evaluation of Mountain Tunnel.[5] Mountain Tunnel consists

[4] Adits, portals, and shafts all served as driving faces during construction of Mountain Tunnel. Adits are horizontal tunnels bored perpendicularly to the tunnel alignment; portals are bores made from the surface directly into the tunnel alignment; shafts are vertical bores made down to the tunnel alignment.

[5] Portions of this historic context are derived from JRP's 2010 inventory and evaluation report on Lake Eleanor Dam which shares a very similar context with Lower Cherry Aqueduct. Like the 2010 report, portions of this section are summarized from the historic overview presented in the SFPUC's Water System Improvement Program, Programmatic Environmental Impact Report cultural resources chapter. See City and County of San Francisco Planning Department, "Program Environmental Impact Report for the San Francisco Public Utilities Commission's Water System Improvement Program," Section 4-7, Planning Department File Number 2005.0159, Final PEIR

of the intake at Early Intake Dam, approximately six miles of concrete lined tunnel, and approximately twelve miles of unlined tunnel, along with adits, portals, shafts, a siphon, remnant concrete foundations used during construction, and the outlet at Priest Reservoir.

The Hetch Hetchy Project

During the latter half of the nineteenth century and early twentieth century San Francisco depended on the Spring Valley Water Company (SVWC), a private water company, for its municipal water. SVWC's water supply came from reservoirs it owned on the San Francisco Peninsula and across the bay on Alameda Creek. By the turn of the twentieth century, however, the SVWC system and its sources were becoming unreliable and inadequate to serve the growing city's needs. In addition, dissatisfaction with SVWC increased following the 1906 earthquake and the resulting devastating fires, which were largely blamed on the failures of the SVWC system. These conditions led to a desire by San Franciscans to break from a reliance on private water companies and move toward a publicly owned water system that would supply the city with adequate, reliable, and high quality, clean water. After evaluating several sites in the Sierra Nevada, CCSF ultimately chose the Tuolumne River and its tributary watersheds in Yosemite National Park and Stanislaus National Forest as the catchment area for its municipal water supply and the sites for its three main reservoirs. The municipal water system developed by CCSF became known as Hetch Hetchy after the valley within Yosemite National Park through which the Tuolumne River flows.[6]

Following the 1906 earthquake, CCSF requested the Department of the Interior to issue a permit to build a municipal water system in Yosemite National Park. In 1908, Secretary James Garfield issued limited permits for rights of way and construction of reservoirs, dams, and aqueducts, with a primary right to develop Lake Eleanor to its capacity and a secondary right to develop the dam site at Hetch Hetchy when needed. City residents approved a bond issue to purchase land in and around Lake Eleanor and Hetch Hetchy in June 1908, and two years later voters approved a $45 million bond to start construction.

Opposition developed to the inclusion of Hetch Hetchy in the Garfield permit. When the new Interior Secretary, Richard Ballinger, took office in Washington in 1910, he issued an order to show cause why the section of the Garfield Permit applying to Hetch Hetchy should not be revoked. These hearings led to appointment of a Board of Army Engineers to evaluate the Hetch Hetchy proposal and compare the proposed project to various alternatives. During this period, the City hired consulting engineer John Freeman to prepare a preliminary design for the Hetch Hetchy system. Ultimately, the report of the Board of Army Engineers, published in February 1913, supported the Freeman Plan. However, rather than pursuing a final permit from the Secretary of the Interior, the City sought an outright grant from Congress to build the Hetch Hetchy Project, based upon the design developed by Freeman.[7]

Following congressional authorization through the Raker Act in 1913, San Francisco secured the necessary federal grants for rights of way, construction, and public land use privileges to enable initial construction of what became O'Shaughnessy Dam across the narrow gorge at the outlet of Hetch Hetchy Valley. As part of the overall project, the City constructed a series of tunnels, pipelines, and related features to develop hydro-electric power and to deliver its stored water to the San Francisco peninsula, integrating it with the existing municipal water facilities built by SVWC. Development of hydropower was a crucial component of the project that made it economically viable. Water impounded by dams in the High Sierra was released to generate power at the Moccasin Powerhouse, built in 1925, and then traveled through the Foothill Tunnel, constructed in 1928, which conducted water to the Central Valley, releasing it into the San Joaquin Pipelines. In the San Joaquin Valley, Tesla Portal was added in 1928, providing a connection between the San Joaquin Pipelines (the first of which was constructed in 1932) and the Coast Range Tunnel (completed in 1934). In 1934, at the west end of the Coast

---

Certification Date: October 30, 2008; and SFPUC, San Francisco Water and Power: A History of the Municipal Water Department & Hetch Hetchy System, 2005.

[6] San Francisco Public Utilities Commission, "San Francisco Water and Power," SFPUC, [1980], 4-25.

[7] Board of Public Works, Bureau of Engineering of the City and County of San Francisco, *San Francisco Municipal Reports for the Fiscal Year 1913*-14 (San Francisco: Neal Publishing Co., 1916), 411-413; SFPUC, *San Francisco Water and Power: A History of the Municipal Water Department & Hetch Hetchy System*, 2005, 22-27; "A Sierra Water Supply," *San Francisco Chronicle*, February 23, 1909, 6.

Range Tunnel, the City constructed the first Alameda Siphon and Irvington Tunnel to carry water through to the Bay Division Pipelines across the southern end of San Francisco Bay. In 1926, Pulgas Tunnel was constructed to carry water from the Bay Division Pipelines to Upper Crystal Springs Reservoir and the SVWC system that delivered water to San Francisco. The City also added to the existing SVWC system on the San Francisco Peninsula to help ensure sufficient delivery of Hetch Hetchy water. This included construction of Crystal Springs/San Andreas Pipeline, built in 1932, which added a direct connection from Crystal Springs Reservoirs to San Andreas Reservoir. In 1934, Hetch Hetchy water arrived 148 miles from the Sierra Nevada to the San Francisco Peninsula at Crystal Springs Reservoir.[8]

Completion of the Hetch Hetchy project in 1934 brought to fruition San Francisco's municipally-owned water system that brought high-quality water to the city, resolved long-standing water shortage issues in the Bay Area, and generated hydroelectric power for the city. The achievement of a publicly owned and controlled system of this vital public utility was also noteworthy for the independence from the long-standing private, sometimes unreliable, water provider.

Designing and Constructing Mountain Tunnel

John R. Freeman, a prominent East Coast consulting hydraulic engineer, originally designed the project works for the portion of the system of tunnels conveying water from O'Shaughnessy Dam, the main impounding dam on the Tuolumne River in the Hetch Hetchy Valley, to the San Joaquin Valley. Freeman was an 1876 graduate of the Massachusetts Institute of Technology, at that time the premier scientific and engineering university in the nation. After graduation, he was first employed as an engineer by the firm that owned the water power rights of the industrial city of Lawrence, Massachusetts; later, he became a special inspector for a Boston fire insurance company that specialized in insuring large industrial and manufacturing plants. Thereafter, in the 1890s, he became president of Manufacturers Mutual Fire Insurance Company, a position he retained for the remainder of his working career. Around the turn of the century, Freeman established his own engineering consulting firm that specialized in urban water supply and hydroelectric power. Among his clients were the major municipalities of the East Coast – the cities of Boston and New York – and his reputation as a consulting engineer won him the honor of serving as vice-president of the American Society of Civil Engineers. By 1905 when Freeman expanded his consulting practice to the Pacific Coast, he was at the peak of his profession. In California, he advised and consulted with the City of Los Angeles on its massive Los Angeles and Owens Valley Aqueduct and with Great Western Power Company on its progressive North Fork of the Feather River hydro-electric power development. He also assisted with planning of urban water systems for major cities in the Pacific Northwest before turning his attention to San Francisco's Hetch Hetchy Project.[9]

San Francisco hired Freeman as a consulting engineer in 1912 to design its municipal water and hydro-electric power system utilizing the waters of the Tuolumne River watershed. Freeman had a reputation as a conservative an insurance executive and eminent water and power engineer. Taken together with his close ties to the East Coast political and business elite, he was considered to be a good choice to represent the City's interests before the Interior Department and Board of Army Engineers in Washington D.C. Freeman took a broad view of the Hetch Hetchy Project and argued that the water supply system should be sized appropriately to serve not just the long-term future needs of the City of San Francisco, but all of the other municipalities of the San Francisco Bay region and San Mateo County. Collectively, the Tuolumne River sources were to ultimately provide a safe, dependable yield of over 400 million gallons per day. Freeman submitted his report to the City, Interior Department and Army Board of Engineers in July 1912, and won favorable reviews. Major elements of his design for the upper water system were dams at Hetch Hetchy, Eleanor, and Cherry Creek valleys; an aqueduct connecting Cherry Lake, Lake Eleanor, and the main Hetch Hetchy storage reservoir; a diversion dam at Early Intake; a temporary construction power plant near Early Intake to facilitate construction of the system's structures; Moccasin power plant, and a system of

[8] San Francisco Public Utilities Commission, "San Francisco Water and Power," SFPUC, April 1935, 2-7, passim; San Francisco Public Utilities Commission, "San Francisco Water and Power," [1980], 4-25.

[9] John R. Freeman, *On the Proposed Use of a Portion of the Hetch Hetchy, Eleanor, and Cherry Valleys … A Report to James Rolph, Jr., Mayor of San Francisco and Percy V. Long, City Attorney with letter of transmittal to the Honorable Secretary of the Interior and the Advisory Board of Army Engineers*, July 15, 1912, 120-121; "John Ripley Freeman," (obituary) *Transactions of the American Society of Civil Engineers* 93 (1933), 1471.

aqueducts, pipelines, and tunnels to carry water from Hetch Hetchy to the San Joaquin pipelines, including Mountain Tunnel. The 400 million gallons per day ultimate yield the system was designed to produce was far greater than the demand at the time. In later years the ability to expand the system proved to be an invaluable element of the project allowing it to expand to meet growing demand.[10]

In September 1912, shortly after the release of Freeman's report, Michael Maurice O'Shaughnessy was appointed City Engineer for San Francisco and from that point, he closely oversaw the Hetch Hetchy project and was directly involved in the engineering of many of its components, including Mountain Tunnel. O'Shaughnessy completed his education at the Royal University in Dublin before immigrating to the United States in 1885. Shortly after arriving, he took a job as a construction engineer for Southern Pacific Railroad. From the 1890s until his appointment as San Francisco City Engineer in 1912, he served as a civil engineer and consulting engineer on a numerous jobs related to town sites and water projects. He served as the chief engineer for Mountain Copper Company, as a consulting and hydraulic engineer for sugar plantations in Hawaii, and was chief engineer for Southern California Mountain Water Company. During his tenure as City Engineer he designed and oversaw construction of several street tunnels, streets and boulevards, expansion of San Francisco Municipal Railways, and many aspects of the San Francisco's water system. His engineering expertise was widely recognized throughout California and the West Coast and many cities retained him as a consulting engineer during his career. The American Society of Civil Engineers awarded him the James Laurie prize for his design of the Morena Dam in San Diego. He published many articles in engineering journals throughout his long and productive career.[11] O'Shaughnessy oversaw the engineering design team for Mountain Tunnel, with his name appearing on the engineering drawings that were used for construction, and he was involved with all aspects of construction of Mountain Tunnel.

Given the remote and rugged terrain where the Hetch Hetchy project was located, structures had to be built to support construction activities and provide access to project components. The Hetch Hetchy Railroad, two saw mills, and a tramway were all built during the initial phase of construction to support the project. The Hetch Hetchy Railroad, completed in 1917, was 68 miles long from Hetch Hetchy junction, 26 miles east of Oakdale, to Hetch Hetchy Valley. It was used to haul machinery, building materials, supplies and people to the new dam site. It is no longer is in existence and only portions of the railroad bed remains. The larger of the two sawmills was located at Canyon Ranch in Yosemite National Park, four and a half miles from the O'Shaughnessy Dam site and began operating in 1915. The mill later moved to the location of present-day Mather. This mill was in addition to the smaller mill at Lake Eleanor.[12]

Completing Mountain Tunnel was important to the success of the larger Hetch Hetchy project because it was necessary before power could be generated at Moccasin (referred to as Power House No. 1 in the Freeman plan), which in turn was central to funding the entire project. Before O'Shaughnessy Dam was completed in 1934, Mountain Tunnel only carried water impounded by Early Intake Dam on the Tuolumne River. As the system was built out, it also began receiving water released downstream from Hetch Hetchy Reservoir and later, in the 1960s, through Mountain Canyon Tunnel that delivered water to Kirkwood Powerhouse built at the same time.[13]

In December 1917 when O'Shaughnessy transmitted the annual report of the Bureau of Engineering to the Board of Public Works, he noted that the costs of materials and labor had risen as a result of the world war. He also pointed out the difficulty of disposing of bonds during wartime and remarked that this "must necessarily mean the curtailment of extensive operations in the immediate future."[14] Immediately on the heels of this warning, he emphasized the importance of completing the

---

[10] Freeman, *On the Proposed Use of a Portion of the Hetch Hetchy, Eleanor, and Cherry Valleys …,"* 4-30, 160r, 289; Frederick Hall Fowler, *Hydroelectric Power Systems of California and Their Extensions Into Oregon and Nevada*, United States Geological Survey, Water-Supply Paper 493 (Washington: Government Printing Office, 1923), 440-447; San Francisco Water and Power, *A History of the Municipal Water Department & Hetch Hetchy System,* (SFPCU Communications, 2005) 30, 34.

[11] Lewis Francis Byington, ed. *The History of San Francisco*, vol. III, (San Francisco: S.J. Clarke Publishing, 1931), 153-155; and "O'Shaughnessy, the Engineer and the Man," *Water Works Engineering*, Vol. LXXXI, No. 12, 6 June 1928, 774.

[12] San Francisco Water and Power, "A History of the Municipal Water Department and Hetch Hetchy System," 2005, 34.

[13] Freeman, *On the Proposed Use of a Portion of the Hetch Hetchy, Eleanor, and Cherry Valleys …,"* 4-30.

[14] City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1916-1917," 150.

O'Shaughnessy Dam and Mountain Tunnel in order to generate income from Moccasin Power Plant. At that time, O'Shaughnessy was envisioning the main dam and reservoir being complete at a much earlier date than they were actually completed in 1934. He recognized; however, that O'Shaughnessy Dam did not have to be complete in order to start generating power. The Tuolumne River itself could serve as the conduit between Hetch Hetchy Reservoir as it was being constructed and Early Intake Dam where the Mountain Tunnel intake was sited.[15]

CCSF advertised bids for the "Mountain Division of the Hetch Hetchy Aqueduct," also referred to simply as "Mountain Tunnel," in August 1917. The advertisement divided the approximately 18.3-mile long project into three aqueduct segments for separate bids: Early Intake to the South Fork of the Tuolumne River; South Fork of the Tuolumne River about 4.7 miles west to an adit; and from the end of the middle section approximately 9.1 miles to a forebay reservoir for the Moccasin power plant that came to be called Priest Reservoir. For the purposes of actual construction the contract and specifications further divided the tunnel into 11 segments.[16] During the year, CCSF employees drove seven adits in between the tunnel segments in the mid section of the tunnel to gain knowledge about the rock formations and provide construction access through a particularly difficult portion of the terrain. As designed, the tunnel was to have a horseshoe-shaped section with dimensions 10 feet, 3 inches high and wide inside the lining (**Figure 1**) with sufficient grading to effectively generate hydroelectric power at Moccasin. Engineers expected that portions of the tunnel along the downstream half could need to be bored with a circular cross-section with a slightly larger diameter than the width and height of the horseshoe segments. At the outset, it was planned to line portions of the tunnel with concrete depending on the characteristics of the natural material.[17]

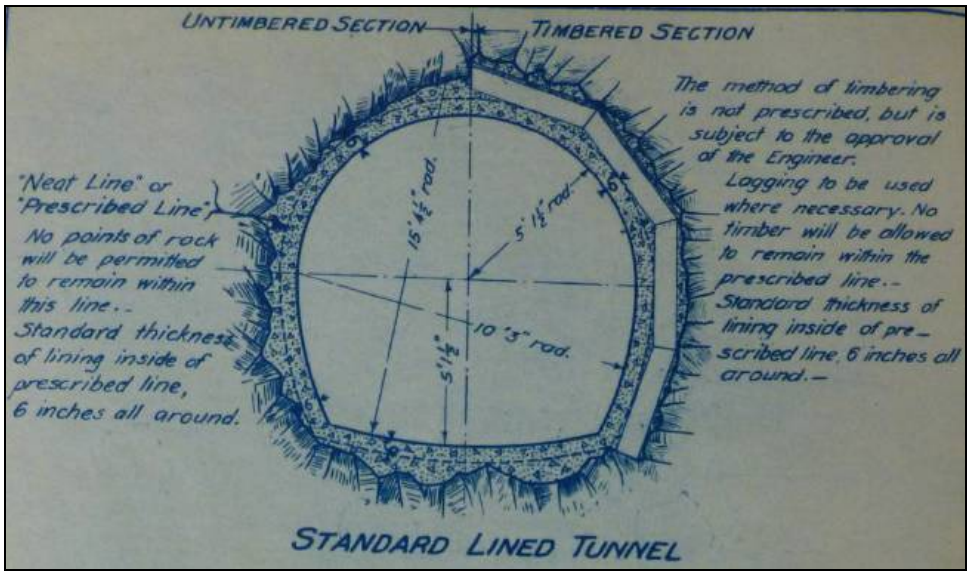


Figure 1: Standard cross section planned for Mountain Tunnel. Plan dated June 16, 1917 and signed by M.M. O'Shaughnessy.

Only one contractor submitted a bid in response to the August 1917 advertisement for the Mountain Tunnel contract. That bid was much higher than what CCSF had estimated so it was rejected and CCSF undertook the work using day labor and under direct supervision of O'Shaughnessy and a construction engineer. The machinery required to bore the tunnel was contracted. The annual report on the project noted that the general plan was to use standard equipment and keep spare parts

[15] City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1916-1917," 150-151.
[16] Department of Public Works, M.M. O'Shaughnessy, City Engineer, "Contract No. 25, Specifications for Construction of Tunnel Aqueduct in the Mountain Division of the Hetch Hetchy Project," June 1917.
[17] City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1917-1918," 152.

and extra equipment available to avoid lengthy stoppages when machinery inevitably broke down. During the 1917-18 construction season, crews worked from four portals. The Hetch Hetchy Railroad ran parallel to or close to all of the driving faces (adits, portals, and shafts) used to bore Mountain Tunnel so that at most, short wagon hauls were required to transport materials between the rail and the driving faces.[18]

The remote location of the worksites for Mountain Tunnel required CCSF to build camps for crews. The 1917 contract for Mountain Tunnel indicated that camp cottages would be constructed by the contractor; however, because a contractor was not initially hired, CCSF crews built the camps.[19] By mid-1919 CCSF had built five camps located at Early Intake Portal, South Fork Portal, Big Creek Shaft, Second Garrotte Shaft, and Priest Portal. Tunnel plants had also been installed at the working faces where the camps were located. These plants included compressor plants that consisted of wood-frame buildings sheathed in corrugated metal. The compressors were anchored to concrete foundations, most of which were not demolished and are still present just outside the driving faces (**Figures 2 - 5**).[20]

Each of the tunnel plants installed to support construction of Mountain Tunnel was equipped with mining machinery that was contemporary mining equipment of the time. Equipment included motor driven Laidlaw feather-valve compressors, Root rotary blowers, storage battery locomotives with charging apparatus, side dump roller bearing tunnel cares, improved Water-Leyner, Sullivan and Waugh rock drills, and air-driven drill sharpeners with grinders, punches, etc. Tracks laid in the tunnels were 24-inch gauge. Crews installed a Meyers-Whaley mucking machine at the Priest Portal to load rock cars. Material was delivered to the tunnel on the Hetch Hetchy Railroad and conveyed by an electric motor hoist installed at the Early Intake Tramway and a counterbalanced tramway at Priest Portal. These tramways allowed material to be delivered from the railroad directly to these two tunnel portals, Early Intake at the upstream end, and Priest Portal at the downstream end.[21]

By mid-1919 crews were driving the tunnel from Early Intake, South Fork, and Priest portals. In part, this was because CCSF only had enough labor and funds at their disposal to work from three faces. Big Creek shaft was also completed to full depth of 646 feet that year. By February 1920 work was advancing from Big Creek Shaft and progress was being made sinking Second Garrotte Shaft, which was hampered by substantial water flows into the shaft that required a heavy investment in pumping equipment. Work was particularly difficult at the upstream end between Early Intake and the South Fork Portal. This approximately 4.5-mile segment could only be bored from these two portals because the alignment of Mountain Tunnel through the mountain did not allow for other adits or shafts to be bored through this stretch. Adding to the difficulty, the rock encountered through this segment was particularly hard and progress was slow. Rock removed from the Priest heading was placed near the planned site of Priest earth fill dam where it would be used as part of the downstream toe. The Second Garrotte shaft was also sunk; however, large quantities of water entering the shaft considerably slowed the projected progress of this boring face.[22]

---

[18] City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1917-1918," 100-105.

[19] Correspondence between M.M. O'Shaughnessy and Construction Engineer at Groveland regarding rent and utility charges for South Fork cottages, September 25, 1918 to October 2, 1918, Folder R-2 Camps-General, Box 1179, Moccasin Archives, Moccasin, CA.

[20] City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1918-1919," 65.

[21] City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1918-1919," 66-67.

[22] City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1918-1919," 68; City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1919-1920," 68; Nelson A. Eckart and Leslie W. Stocker, "San Francisco's Hetch Hetchy Water Supply Part IV Details of the Aqueduct Tunnels and of the Mechanical Facilities Employed in Their Construction" *Compressed Air Magazine* 27 (November 1922): 315-319; Frederick Hamilton,. "Progress of the Hetch Hetchy Tunnel Aqueduct." *The Architect and Engineer* 61 (June 1920): 88.

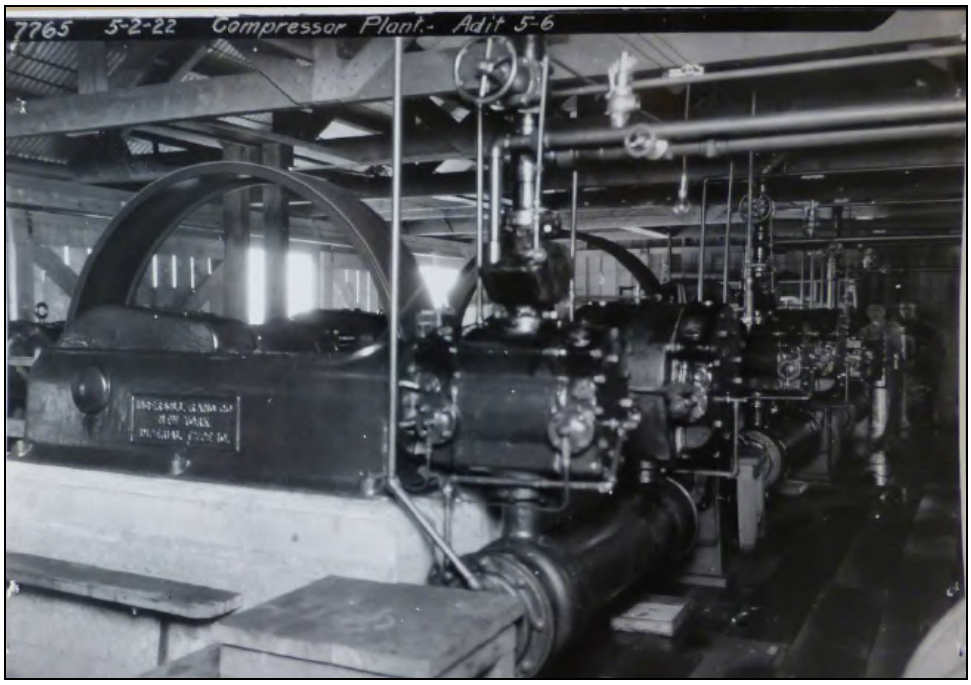


Figure 2: Compressor plant at Adit 5-6, May 2, 1922.

Figure 3: Foundations for compressors shown in Figure 2 remain outside of Adit 5-6. September 25, 2014.

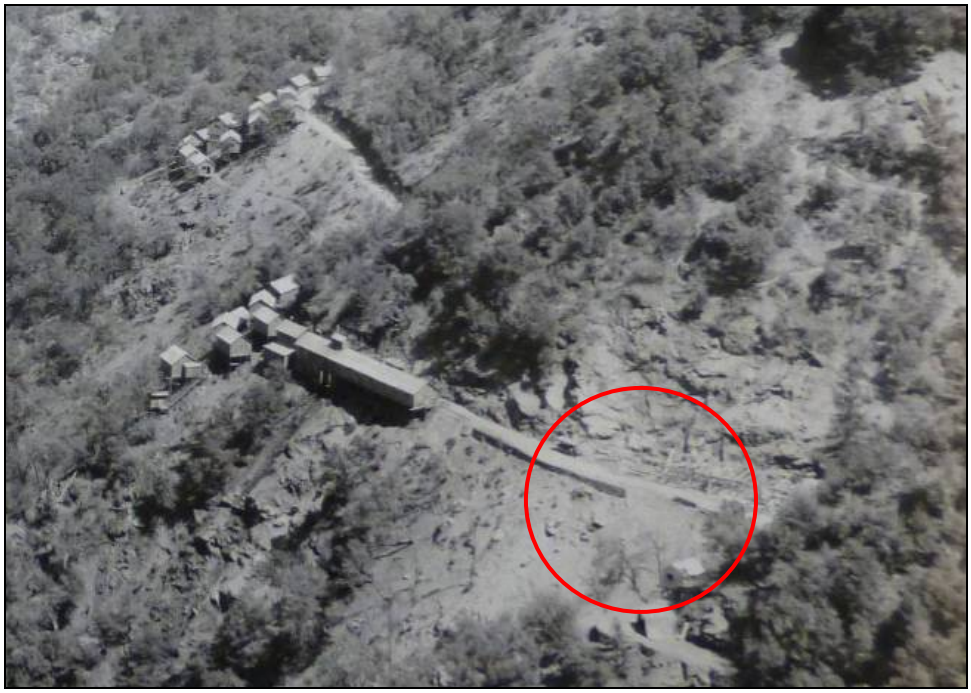


Figure 4: Adit 8-9 and compressor house under construction circled in red, August 17, 1921. Camp and machinery buildings at left.

Figure 5: Adit 8-9 in background with compressor foundations in foreground. September 25, 2014.

By mid-1919 crews were driving the tunnel from Early Intake, South Fork, and Priest portals. In part, this was because CCSF only had enough labor and funds at their disposal to work from three faces. Big Creek shaft was also completed to full

After working the tunnel with a relatively small crew and demonstrating the economy with which the tunnel could be constructed, CCSF put the remainder of the job up for contract again in 1920. They awarded the job to Construction Company of North America in May 1920, of which Charles C. Tinkler was president and A.J. Cleary consulting engineer. Legal challenge to the type of contract awarded delayed the start of work until August when a judge and jury settled the conflict in favor of CCSF and the Hetch Hetchy Project. Once the legal dispute was settled, work progressed from four boring faces, Priest Portal, Big Creek Shaft, South Fork Portal, and Early Intake Portal. Crews continued work boring Second Garrotte Shaft. During the first year that Construction Company of North America worked on Mountain Tunnel, they made significant progress advancing the tunnel. In July 1920, the tunnel was being worked from five headings. That year, they also begun constructing three more headings, South Fork West (the first South Fork tunnel was being worked upstream toward Early Intake), and Adit 5-6 East and West. They anticipated the completion of Second Garrotte Shaft in Spring 1922 which would bring the total of working faces to twelve.[23]

In August 1920 progress on the tunnel was halted for two-and-a-half months because the Hetch Hetchy Miners and Tunnel Workers' Union, a local of the International Union of Mine, Mill and Smelter Workers, called a strike to demand higher wages. The tunnel workers called the strike against the advice of their officers and in November the contractor began to assemble a new workforce and resumed work from four headings.[24]

Once work resumed, Mountain Tunnel was functionally divided into three segments as laid out in the original contract for Mountain Tunnel. Work between Early Intake Adit and the South Fork Portal was slow and laborious because the rock was very hard granodiorite and difficult to bore. For 4.7 miles west from the South Fork crossing, the tunnel ran nearly parallel with the west canyon wall of the South Fork of the Tuolumne River. In 1917, CCSF had let a contract to drive seven adits along this stretch to test the composition of the rock along the projected alignment of Mountain Tunnel. CCSF also planned to make use of these adits as driving faces for tunnel construction. They were originally driven by hand methods to an approximately seven foot by seven foot cross section. A combination of factors, access being the most important, led project managers to the decision to only use Adit 5-6 and Adit 8-9 as driving faces. Roads and footpaths had to be constructed to these adits and crews enlarged both adits to accommodate the equipment necessary for boring the tunnel. The tunnel was lined with concrete from the headings at Adit 8-9 (**Figures 6** and **7**). The other adits were used for ventilation and at times for dumping excavated rock. The last segment of tunnel – the downstream segment – was bored from Priest Portal, and the two shafts, Big Creek and Second Garrotte. The heading from Priest Portal was in slate formation which enabled rapid forward progress, but also necessitated concrete lining. In August 1921 crews boring from Priest Portal set an American hard-rock tunneling record of 776 feet of bored tunnel in one month.[25]

[23] City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1919-1920," 2, 70-73; City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1920-1921," 62; Nelson A. Eckart and Leslie W. Stocker, "San Francisco's Hetch Hetchy Water Supply Part IV Details of the Aqueduct Tunnels and of the Mechanical Facilities Employed in Their Construction" *Compressed Air Magazine* 27 (November 1922): 315-319.

[24] City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1920-1921," 62.

[25] City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1920-1921," 67; City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1921-1922," 77.

Figure 6: Concrete gun applying lining to tunnel at Adit 8-9. March 1923.

Figure 7: Concrete lined segment of tunnel at Adit 8-9. March 1923.

Despite rapid progress made from Priest Heading, it was also one of the deadliest points on Mountain Tunnel for crews. Two accidents, both explosions at the face of the heading, claimed the lives of miners in 1921 and 1922, including in January 1922 when three men that were killed and two others seriously injured. Neither the contractor nor CCSF were found liable for the accidents by the Industrial Accident Company of North America.[26]

The South Fork crossing was one of the most difficult sites of construction of Mountain Tunnel. This site was in a steep canyon that was subject to rockslides and washouts. It was the only place where the original design of Mountain Tunnel called for a short piped section across the river between portals. The location of the first work camp at the South Fork Crossing became untenable because of its precarious location and it was moved and rebuilt during the 1920-21 fiscal year. The new camp had the advantage of being located closer to the working portals, but most of the buildings clung precariously to steep slopes. Because of the rugged site and lack of flat space for the camp, the cookhouse was built on trusses that spanned the river. In February 1922, not long after the new camp was constructed, a rock slide seriously damaged a boarding house and killed two men. Later that year, crews went on strike again, seeking increased wages and improved living conditions (**Figures 8** and **9**).[27]

Excavation of the entire alignment of Mountain Tunnel was completed during the 1923-24 fiscal year and work continued on concrete lining the lined portions of the tunnel. Lining operations were carried out under subcontract by Webb and Cox of the Universal Concrete Gun Company using collapsible forms, concrete guns, and portable concrete mixers. W.F. Webb, the contracting engineer for the Mountain Tunnel concrete lining job wrote an article for *Engineering News-Record* in 1925 recounting the methods used to place concrete in Mountain Tunnel. During the course of excavating the tunnel, crushing plants were installed to process the much coming from the tunnels into concrete material suitable for tunnel lining. Sufficient material was stockpiled outside of Priest Portal to both form the downstream toe of the dam and to line the tunnel from that point to Second Garrotte shaft. The plant at Priest Portal assembled the sand, rock, and cement for delivery into the tunnel. Crews brought the lining material into the tunnel at Priest Portal and Big Creek Shaft. To accommodate the long delivery distances into the tunnel from these two entry points, the subcontractor developed a self-contained unit that could be moved along the track laid in the tunnel. The unit features a concrete mixer mounted on the rear of a concrete gun that traveled along the track and shot concrete into the forms placed along the tunnel.[28]

Also during the 1924-25 work season, the contractor closed all of the adits in the middle section of the tunnel and installed the pipe crossing at the South Fork. The steel pipe at the South Fork crossing was placed atop poured-in-place concrete piers. Crews completed on work on Mountain Tunnel during this construction season and Moccasin Power Plant first went on line in August 1925, receiving water delivered to Priest Reservoir through Mountain Tunnel. When O'Shaughnessy Dam was completed in 1934, CCSF had the ability to regulate the water flowing down Tuolumne River below the dam. Also in 1934, the original system was complete for CCSF to begin delivering water impounded by O'Shaughnessy Dam to San Francisco. At this point, the project was successful in both of its goals, delivering water and power to San Francisco.[29]

---

[26] City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1921-1922," 78; *San Francisco Chronicle*, "Three Dead in Hetch Hetchy Tunnel Blast," (January 11, 1022): 3.

[27] City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1920-1921," 64; *Mariposa Gazette*, "Hetch Hetchy Employees Out On Strike," (October 21, 1922). Please note, the South Fork crossing was not accessible at the time of field recordation for this HRE because of a recent rock slide in the canyon.

[28] City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1923-1924," 56; W.F. Webb, "Placing Concrete Lining in the Hetch Hetchy Tunnels," *Engineering News-Record* 94, n. 9 (February 1925): 350-353.

[29] City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1923-1924," 60-61; City and County of San Francisco, Department of Public Works, Bureau of Engineering, "Annual Report of the Department of Engineers for the Fiscal Year 1924-1925," 89.

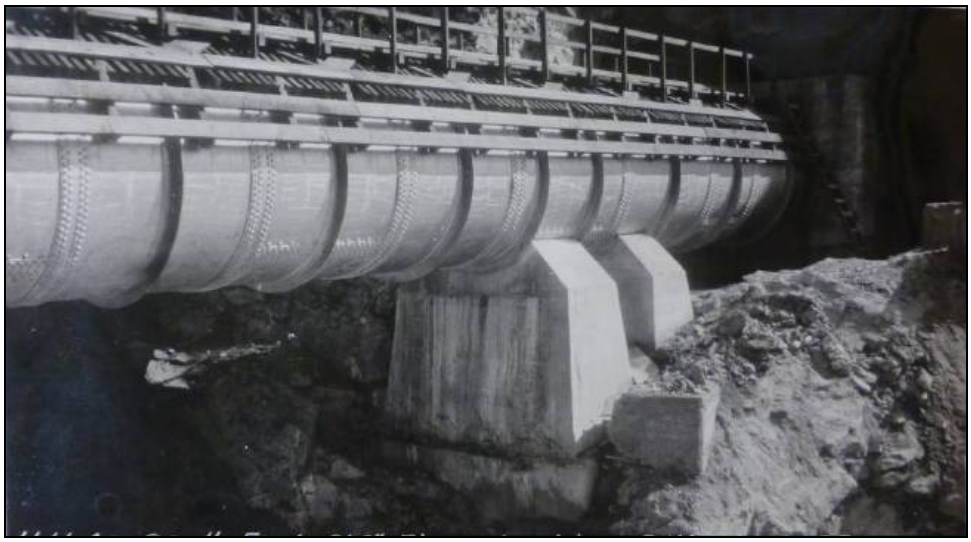


Figure 8: As originally constructed, this riveted steel pipe across the South Fork of the Tuolumne River was the only piped segment of Mountain Tunnel. It was demolished in 1969 and replaced with a siphon. May 1925.

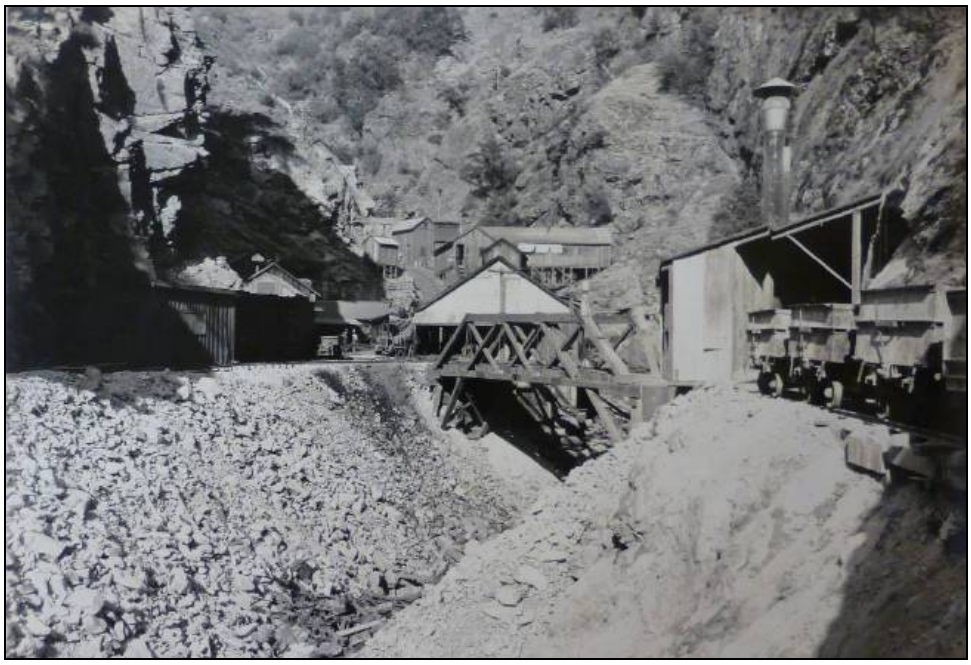


Figure 9: South Fork camp after it was reconstructed closer to the portals during the 1920-1921 fiscal year. August 1921.

Post Construction Modifications to Mountain Tunnel

The Tuolumne River continued to serve as the conduit between O'Shaughnessy Dam and Mountain Tunnel until the mid-1960s when Kirkwood Powerhouse and Mountain Canyon Tunnel were constructed. From as early as the 1912 Freeman plan, one of the goals of the project was to build a system that could be expanded as demand grew for water and power.

Construction of Kirkwood Powerhouse and Mountain Canyon Tunnel expanded the amount of power the Hetch Hetchy Project is capable of generating.

Few changes have been made to the tunnel itself since Mountain Tunnel was completed in 1925; however, modifications have been made to the upstream and downstream ends, some of the adits, and the South Fork crossing. In 1933, CCSF made some modifications to Lower Cherry Aqueduct, the aqueduct designed to deliver water to Early Intake Powerhouse, the powerhouse built to provide electricity for construction of the Hetch Hetchy Project, and later used as an operational bypass for water from the reservoir at the Lower Cherry Diversion Dam to the Early Intake Reservoir. Part of the modifications included installing a tail race pipeline from Early Intake Powerhouse to Mountain Tunnel, which facilitated the aqueduct's bypass function. CCSF routed the pipeline through Early Intake adit where it joined with the main flow of Mountain Tunnel. Early Intake Powerhouse was decommissioned in the 1960s and the pipe was capped in the adit in 1997 (**Figure 10**).[30]

In the mid-1960s, CCSF reconfigured the intake to Mountain Tunnel as part of the major project to construct Kirkwood Powerhouse just upstream from Early Intake Dam. This project required construction of a bypass tunnel and pipe from the Kirkwood tail race to Mountain Tunnel. CCSF maintains the original intake gates in Early Intake Reservoir as a backup, but they have not been the functional intake to Mountain Tunnel since the 1960s (**Figures 11** and **12**).[31]

In 1969 CCSF replaced the original steel pipe across the South Fork of the Tuolumne River (see **Figure 8**) with an approximately 375-foot unlined tunnel (siphon) extending beneath the Tuolumne River. The tunnel was lined at the connections with the existing Mountain Tunnel.[32] The original piers supporting the pipeline were left in place (**Figure 13**). In 1990, CCSF crews performed lining work in the South Fork crossing of Mountain Tunnel (**Figure 14**).

In 1997, CCSF altered the adits and bulkheads at Early Intake Adit, Adit 5-6, and Adit 8-9. They installed eight-foot by eight-foot watertight doors and new concrete bulkheads inside each of these adits. They also paved the floor of the adits from the new bulkheads and watertight doors to the watertight plugs deeper into the adits to improve drainage (**Figure 15**).[33]

In the early 2000s, the function of Mountain Tunnel was also altered at the downstream end when CCSF installed a bypass at Priest Reservoir that allows water to be delivered directly into the Power Tunnel above the Moccasin Penstocks or released into Priest Reservoir, a regulating reservoir.[34]

Mountain Tunnel continues to serve as a crucial link between the waters impound by O'Shaughnessy Dam as well as Eleanor Dam and Cherry Dam, and Moccasin Powerhouse and San Francisco. It also serves to supply water to two local water districts via pumps installed at Big Creek Shaft and Second Garrotte Shaft where modern pump houses and tanks have been installed at the surface in recent decades.

[30] San Francisco Public Utilities Commission, Drawing C-1385, "General Map and Profile Detail of Tunnel Connections: Lower Cherry Aqueduct Early Intake Tail Race Pipeline," August 1933; City and County of San Francisco Public Utilities Commission, Drawing C-7070, "Mountain Tunnel Adit Repairs: Early Intake Adit Improvements," April 1997.
[31] City and County of San Francisco, Public Utilities Commission, "Hetch Hetchy Water Supply Contract No. 376, Canyon-Cherry Power Development, Canyon Powerhouse Project," August 1964.
[32] City and County of San Francisco Public Utilities Commission, "Contract No. 394 Relocation of South Fork Aqueduct Crossing," April 1969;
[33] City and County of San Francisco Public Utilities Commission, Drawing C-7070, "Mountain Tunnel Adit Repairs: Early Intake Adit Improvements," April 1997; City and County of San Francisco Public Utilities Commission, Drawing C-7071, "Mountain Tunnel Adit Repairs: Adit 5-6 Improvements," April 1997; City and County of San Francisco Public Utilities Commission, Drawing C-7072, "Mountain Tunnel Adit Repairs: Adit 8-9 Improvements," April 1997.
[34] San Francisco Public Utilities Commission, "Hetch Hetchy Water and Power Contract No. HH-903 Priest Reservoir Bypass – Pipeline," June 2002.

Figure 10: Early Intake adit bulkhead. Capped pipe at right conveyed auxiliary water from the tail race of Early Intake Powerhouse into Mountain Tunnel beginning in 1933. The pipe was capped in 1997.

Figure 11: Mountain Tunnel intake valve house. After CCSF constructed the Kirkwood Bypass in the mid-1960s, these gates no longer serve as the intake to Mountain Tunnel. September 24, 2014.

Figure 12: Bypass tunnel across the Tuolumne River is one segment of a bypass tunnel constructed in the mid-1960s to convey water from the Kirkwood Powerhouse tail race into Mountain Tunnel. This is currently the functional intake to Mountain Tunnel. September 24, 2014.

Figure 13: South Fork crossing in 2008. Note remnant concrete piers at bottom right and left that supported the original pipeline crossing the river. Photo credit William Self Associates, Inc.[35]

[35] William Self Associates, Inc., "Final Cultural Resource Assessment Mountain Tunnel Rehabilitation Project, Tuolumne County, California," prepared for RMC Water and Environment, September 2008, Photograph 3.

Figure 14: Crews re-lining Mountain Tunnel's siphon at the South Fork crossing in 1990.

Figure 15: Early Intake Adit. Concrete bulkhead and watertight door installed in 1997. September 24, 2014.

Evaluation

Mountain Tunnel is a major component of the Hetch Hetchy portion of the San Francisco water system and appears to have significance under NRHP Criterion A and CRHR Criterion 1 at the state level because of its important association with the development of the municipally-owned water system for the City and County of San Francisco, with a period of significance that corresponds with the start of the tunnel's construction in 1917 until 1934 when the structure first succeeded in serving as a crucial link in the delivery system of water to San Francisco. As part of the Hetch Hetchy system, Mountain Tunnel appears historically significant because it was a key facility that achieved several important objectives of the water system: a) it ensured high water quality by removing pristine Sierra Nevada water from the river system at a high elevation; b) it conveyed water over a long distance at a gradient necessary to effectively generate hydroelectric power at Moccasin which was central to making the project economically feasible; and c) it was built with foresight to meet the full build-out requirements of the system that were far greater than any projected initial demand. Mountain Tunnel also contributed to the municipal water system resolving long standing water shortage issues in the Bay Area and facilitated San Francisco's achievement of public ownership and control of a vital public utility, becoming independent from their long-standing private, sometimes unreliable, water provider.

There is no evidence in the historic record that the labor unrest associated with constructing Mountain Tunnel is historically significant within the context of labor history to a degree that would merit eligibility under NRHP Criterion A or CRHR Criterion 1. It does not appear the strikes that occurred during Mountain Tunnel's construction had broader implications for labor history or represented any kind of turning point in organized labor. Rather, the unrest was in temporary bursts that delayed construction progress for relatively short periods of time.

There is no indication in the historic record that Mountain Tunnel has any direct and important associations with any individual or individuals that would warrant eligibility under NRHP Criterion B / CRHR Criterion 2. Any association with engineers or builders is considered under NRHP Criterion C / CRHR Criterion 3.

Mountain Tunnel is not eligible for listing in the NRHP under Criterion C or CRHR Criterion 3 because it is not an important example of a type, period, or method of construction, nor does is it an important example of any master engineer or builder's work. While the terrain that CCSF and contracted crews had to perform their work in presented challenges for tunneling operations, there is no indication of engineering or technological advances or innovations made that warrant significance under these criteria. Rather, the tunnel was designed and built according to common tunneling and excavating practices of the day, many of which had been adapted to California's mountainous regions during the early twentieth century flurry of hydropower project construction. The record that crews working from Priest Portal set for tunneling progress in one month does not merit eligibility under these criteria. They made fast progress because the material they were boring from that downstream end was softer and easier to work. Also by comparison within the Hetch Hetchy Project, the Coast Range Tunnel was longer and more difficult to construct. Built between 1927 and 1934, the Coast Range Tunnel was recognized by the American Society of Civil Engineers recognizes as a Historic Civil Engineering Landmark.[36] The design and construction of Mountain Tunnel occurred in stages, initially as part of the 1912 Freeman plan, then to the CCSF construction years from 1917 to 1920, and to the final construction phase performed by Construction Company of North America from 1920-1925 under contract with CCSF.

There is no one person or group of persons who rise in the historical record as being uniquely or distinctly associated with the vision or success of Mountain Tunnel that warrants significance under NRHP Criterion C or CRHR Criterion 3 for work of a master. During the CCSF construction phase, 1917-1920, M.M. O'Shaughnessy, A.J. Cleary, and other engineers and project managers collaboratively oversaw construction. Charles Tinkler, who headed Construction Company of North America while contracted to CCSF for construction of Mountain Tunnel contributed to completing the job in a timely and efficient manner under challenging conditions. Tunnel excavation was difficult with the methods available when Mountain Tunnel was constructed and successful completion of this project does not warrant eligibility under these criteria for

[36] William A. Myers, ed., "Historic Civil Engineering Landmarks of San Francisco and Northern California," prepared by the History and Heritage Committee, American Society of Civil Engineers, Published as a community service by Pacific Gas and Electric Company, 1977.

association with the contractor. Further, research did not reveal any evidence that Tinkler had a construction career that would warrant considering him a master builder. Because the tunnel was essentially constructed in two phases, the City-led phase, and the contracted phase, it would not be a good example of the work of a master builder because no builder can be singularly identified with its construction and none can claim the project from start to finish. Similarly, the engineering of the tunnel was handled in stages, beginning with John Freeman developing the conceptual plan for the aqueducts of the Mountain Division of the Hetch Hetchy Project followed by city engineers perfecting the engineering plans for the system. This collective effort does not merit significance under this criterion as an example of the work of a master engineer. Furthermore, with the varying collection of engineers and project managers, no group of individuals can be sufficiently identified for its collective quality that would rise to the level of significance of a master designer and/or builder.

In rare instances, engineering structure like tunnels can serve as sources of important information about historic construction materials or technologies; however, textual records including specifications, progress reports, engineering articles, plans, drawings, and historic photographs are available for Mountain Tunnel and provide a comprehensive record of this structure. Therefore, this structure is not significant under NRHP Criterion D / CRHR Criterion 4.

For a resource to be eligible for listing in the NRHP or CRHR it must meet one of the criteria of significance, and it must possess sufficient historic integrity to convey that significance. It can be difficult to determine if a resource like a tunnel, the majority of which is underground and not visible to a casual observer, can in fact convey its historic associations and significance. Assessment of this kind of resource takes into account the limited features visible at the surface, as well as documentary evidence regarding alterations made to portions of the structure that are underground.

In this case, the documentary record reveals that the tunnel itself has had very few changes made to it since it was originally constructed and features that are visible from the surface retain enough integrity to allow an observer to understand how the resource functioned during its period of significance. The changes that have been made to the structure do not impede this ability.

For example, the bypass construction in the mid-1960s from Kirkwood Powerhouse to Mountain Tunnel changed the functional intake from the intake valve house at Early Intake Reservoir to the point where a tunnel segment of the new bypass joins Mountain Tunnel. When CCSF modified this part of the system, they retained the original intake gates at the intake valve house and preserved the function as an alternative that can be used if need arises. The upstream end of the structure retains good integrity in all seven aspects of integrity because they preserved the original intake, even though it has seldom, if ever, been in use since the installation of the bypass. Similarly, the modification made at Priest Portal in the early 2000s is not visible to a casual observer and the system retains the ability to function as it did during the period of significance, discharging water directly into Priest Reservoir. Installation of new bulkheads, watertight doors, and concrete pads in three of the main adits used for construction does represent a modest loss of integrity of original design; however, the adits retain in their original location, the setting of which remains rugged and remote, and the adits retain their size and shape, both important characteristics of their original design, materials, workmanship, feeling, and association. The South Fork crossing suffered a loss of integrity of design, materials, workmanship, and feeling, because in 1969 when CCSF demolished the original pipeline crossing and installed a siphon under the river. This is a very short segment in the overall 18.3-mile length of the resource and only represents a modest loss of integrity.

Therefore, based on analysis of both the documentary record and physical features at the surface, Mountain Tunnel retains a sufficient historic integrity in all seven integrity considerations, i.e. location, setting, design, materials, workmanship, feeling, and association. Overall, the structure as it exists today has the ability to convey how and where it is integrated with the Hetch Hetchy system.

To date, no historic district has been identified that encompasses components of the Mountain Division of the Hetch Hetchy Project to which Mountain Tunnel could possibly contribute. A thorough discussion of potential historic districts was presented in the Water System Improvement Program, Programmatic Environmental Impact Report (WSIP PEIR) prepared in 2007, including a discussion of the standards that potential historic districts generally conform. The WSIP PEIR provides a framework for assessing potential for the presence of discrete historic districts within an interrelated group of facilities and resources, united by a historic plan and function, like the Hetch Hetchy System. The framework presented calls for

considering potential historic districts that are subsets of larger very expansive systems that would be difficult to justify as an historic district in terms of geographic distance between resources, and the very low likelihood that an extensive, multi-component system will retain sufficient historic integrity to be considered one historic district. In such analysis Mountain Tunnel would be assessed within the Mountain Tunnel Division subset of the Hetch Hetchy System because it has functional and physical linkage with other components of that division, including O'Shaughnessy Dam and Priest Reservoir. Assessing Mountain Tunnel as part of a discrete historic district is outside the scope of this study.[37]

The character-defining features of Mountain Tunnel as an individual historic property / historical resource are the length, alignment, and shape of excavation of the tunnel, adits, and shafts; along with the concrete portals at Adits 4-5, 5-6, and 8-9, and the intake valve house, including its concrete construction, building footprint and form, steel sash windows, steel personnel door, gates and their control system, grizzlies, exterior pipe railing, telephone box, and exterior hanging light fixture on the north side. Features of Mountain Tunnel that are not character defining are the concrete bulkheads and watertight doors added to Early Intake Adit, Adit 5-6, and Adit 8-9 in 1997, the South Fork siphon, the Priest Bypass, and the modern pump houses and tanks located at Big Creek Shaft and Second Garrote Shaft. The remnants of the compressor foundations outside Adits 5-6, 8-9, as well as at Second Garrotte Shaft are not character-defining features of the historic property / historical resource. While they are prominent remnants of the tunnel's construction, they do not contribute to the historic character of the water conveyance structure's significance.

The boundary of this historic property / historical resource is the alignment of the tunnel, adits, and shafts and the footprint of the intake valve house.

[37] City and County of San Francisco, San Francisco Planning Department, *Final Program Environmental Impact Report, Volume 2 of 8 for the San Francisco Public Utilities Commission's Water System Improvement Program*, San Francisco Planning Department File No. 2005.0159E, October 30, 2008, 4.7-69-4.7-70.

B12. References:

City and County of San Francisco. *San Francisco Municipal Reports Fiscal Year 1913-1914*. San Francisco: Neal Publishing, 1916.

City and County of San Francisco. *San Francisco Municipal Reports Fiscal Year 1916-1917, Ending June 30, 1917*. San Francisco: Neal Publishing, 1919.

City and County of San Francisco. Department of Public Works. Bureau of Engineering. "Annual Report of the Department of Engineers for the Fiscal Year 1916-1917."

--------. "Annual Report of the Department of Engineers for the Fiscal Year 1917-1918."

--------. "Annual Report of the Department of Engineers for the Fiscal Year 1918-1919."

--------. "Annual Report of the Department of Engineers for the Fiscal Year 1919-1920."

--------. "Annual Report of the Department of Engineers for the Fiscal Year 1921-1922."

--------. "Annual Report of the Department of Engineers for the Fiscal Year 1922-1923."

--------. "Annual Report of the Department of Engineers for the Fiscal Year 1923-1924."

--------. "Annual Report of the Department of Engineers for the Fiscal Year 1924-1925."

--------. M.M. O'Shaughnessy, City Engineer. "Contract No. 11, Specifications for Making Core Borings Hetch Hetchy Aqueduct." July 1916.

--------. M.M. O'Shaughnessy, City Engineer. "Contract No. 25, Specifications for Construction of Tunnel Aqueduct in the Mountain Division of the Hetch Hetchy Project." June 1917.

--------. M.M. O'Shaughnessy, City Engineer. "Contract No. 32, Specifications for Furnishing and Delivering Air Compressors for Mountain Division Hetch Hetchy Aqueduct." January 1918.

--------. M.M. O'Shaughnessy, City Engineer. "Contract No. 71, Specifications No. 13990 for Furnishing and Delivering Station Pump for Second Garrotte Shaft," 1919.

--------. M.M. O'Shaughnessy, City Engineer. "Contract No. 77, Specifications No. 14156 for Construction of Aqueduct Tunnels in the Mountain Division of the Hetch Hetchy Project," 1920.

City and County of San Francisco. Hetch Hetchy Water and Power. O.L. Moore, General Manager. "Hetch Hetchy Water and Power Contract no. 565 (Emergency) Lower Cherry Aqueduct Rehabilitation." August 1976.

City and County of San Francisco. Public Utilities Commission. "Hetch Hetchy Water Supply Contract No. 376 for Canyon-Cherry Powerhouse Project," August 1964.

--------. O.L. Moore, General Manager. "Hetch Hetchy Water Supply Contract No. 394, Relocation of South Fork Aqueduct Crossing." April 1969.

--------. Lawrence T. Klein, General Manager. "Hetch Hetchy Water and Power Contract No. HH-861, Mountain Tunnel Adit Repairs," June 1997.

--------. Don Larramendy, Acting General Manager of Operations. "Hetch Hetchy Water and Power Contact No. HH-903, Priest Reservoir Bypass-Pipeline," June 2002.

--------. "Report of the San Francisco Public Utilities Commission, 1933-1934," SFPUC, 1934.

--------. "San Francisco Water and Power." SFPUC, April 1935.

--------. "Report of the San Francisco Public Utilities Commission. 1935-1936." SFPUC, 1937.

B12. References (Continued):

City and County of San Francisco Planning Department. *Program Environmental Impact Report for the San Francisco Public Utilities Commission's Water System Improvement Program.* Planning Department File Number 2005.0159, Final PEIR Certification Date: October 30, 2008.

Cleary, A.J. "Notes on California Rock Tunneling Practice." *Engineering News-Record* 86, n. 25 (June 1921): 1082-1085.

Fowler, Frederick Hall. *Hydroelectric Power Systems of California and Their Extensions Into Oregon and Nevada*. United States Geological Survey, Water-Supply Paper 493. Washington: Government Printing Office, 1923.

Freeman, John R. "On the Proposed Use of a Portion of the Hetch Hetchy, Eleanor, and Cherry Valleys Within and Near to the Boundaries of the Stanislaus U.S. National Forest Reserve and the Yosemite National Park as Reservoirs for Impounding Tuolumne River Flood Waters and Appurtenant Works for the Water Supply of San Francisco, California, and Neighboring Cities." A Report to Mayor James Rolph, Jr. and Percy V. Long, July 15, 1912.

Hamilton, Frederick. "Progress of the Hetch Hetchy Tunnel Aqueduct." *The Architect and Engineer* 61. (June 1920).

Hammond, Rolt. *Tunnel Engineering.* New York: The MacMillan Company, 1959.

Historic photographs, plans, drawings, and documents. San Francisco Public Utilities Commission Hetch Hetchy Archives, Moccasin, California.

San Francisco Chronicle. Various articles.

San Francisco Public Utilities Commission. "Report of the San Francisco Public Utilities Commission, 1931-1932, 1932-1933." SFPUC, 1933.

San Francisco Public Utilities Commission. "San Francisco Water and Power." SFPUC, [1980].

San Francisco Water and Power. "A History of the Municipal Water Department and Hetch Hetchy System." City and County of San Francisco, [1985].

San Francisco Water and Power. "A History of the Municipal Water Department and Hetch Hetchy System." City and County of San Francisco, 2005.

Transactions of the American Society of Civil Engineers. "John Ripley Freeman. (obituary)" *Transactions of the American Society of Civil Engineers* 93 (1933).

Webb, W.F. "Placing Concrete Lining in the Hetch Hetchy Tunnels." *Engineering News-Record* 94, n. 9 (Feb. 1925): 350-353.

Wurm, Ted. *Hetch Hetchy and its Dam Railroad*. Glendale: Trans-Anglo Books, 1990.

Photographs (continued):

Photograph 14: Mountain Tunnel intake valve house (MT-1) showing window details. Camera facing south, September 24, 2014.

Photograph 15: Mountain Tunnel intake valve house (MT-1) showing outer and inner set of gates. September 24, 2014.

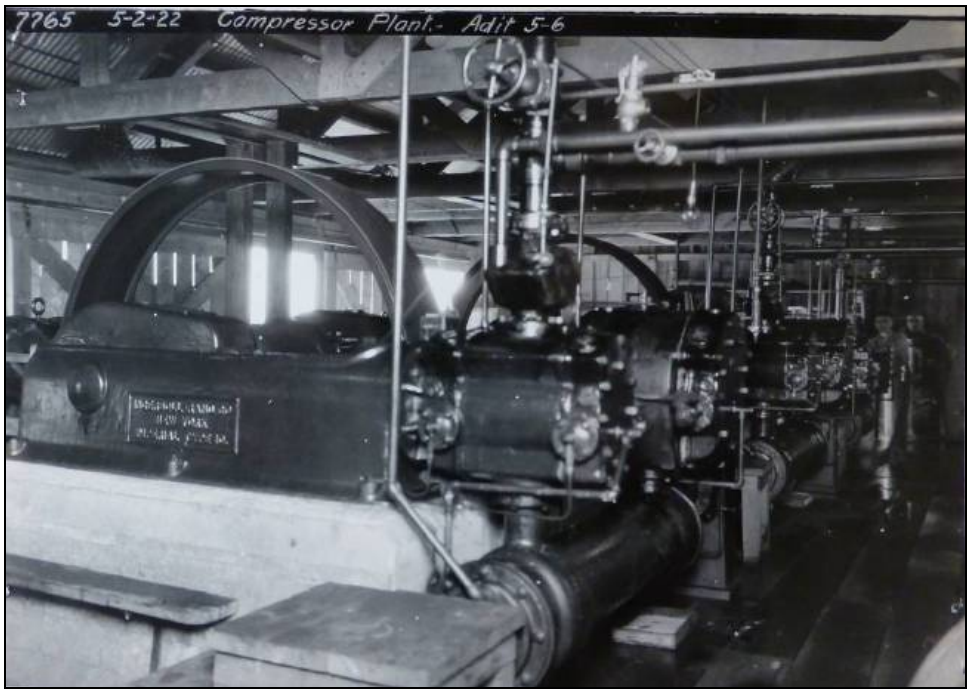
Photograph 16: Interior details of Mountain Tunnel intake valve house (MT-1). Camera facing northeast, September 24, 2014.

Photograph 17: Early Intake Adit (MT-2), concrete bulkhead and watertight door installed in 1997. Camera facing south, September 24, 2014.

Photograph 18: Early Intake Adit (MT-2) concrete seal with manhole and capped pipe connection from Early Intake Powerhouse tailrace. Camera facing south, September 24, 2014.

Photograph 19: Adit 3-4 (MT-3) collapsed and partially flooded. Camera facing south, September 24, 2014.

Photograph 20: 1972 photograph of Adit 3-4 (MT-3) showing water breach. Photograph courtesy of Moccasin Archives.



Photograph 21: 1922 photograph of interior of compressor house at Adit 5-6 (MT-5). Compressors are mounted to concrete foundations, the remnants of which remain at the site. Photography courtesy of Moccasin Archives.

Photograph 22: Adit 5-6 (MT-5) portal. Camera facing south, September 24, 2014.

Photograph 23: Adit 5-6 (MT-5), showing open watertight door at left and concrete seal with 60-inch watertight cover, and an orange valve weeper. Note the drainage channel at right. Camera facing south, September 24, 2014.

Photograph 24: Historic photograph, circa 1920, showing construction of compressor house outside Adit 8-9 (MT-6). Photograph courtesy of Moccasin Archives.

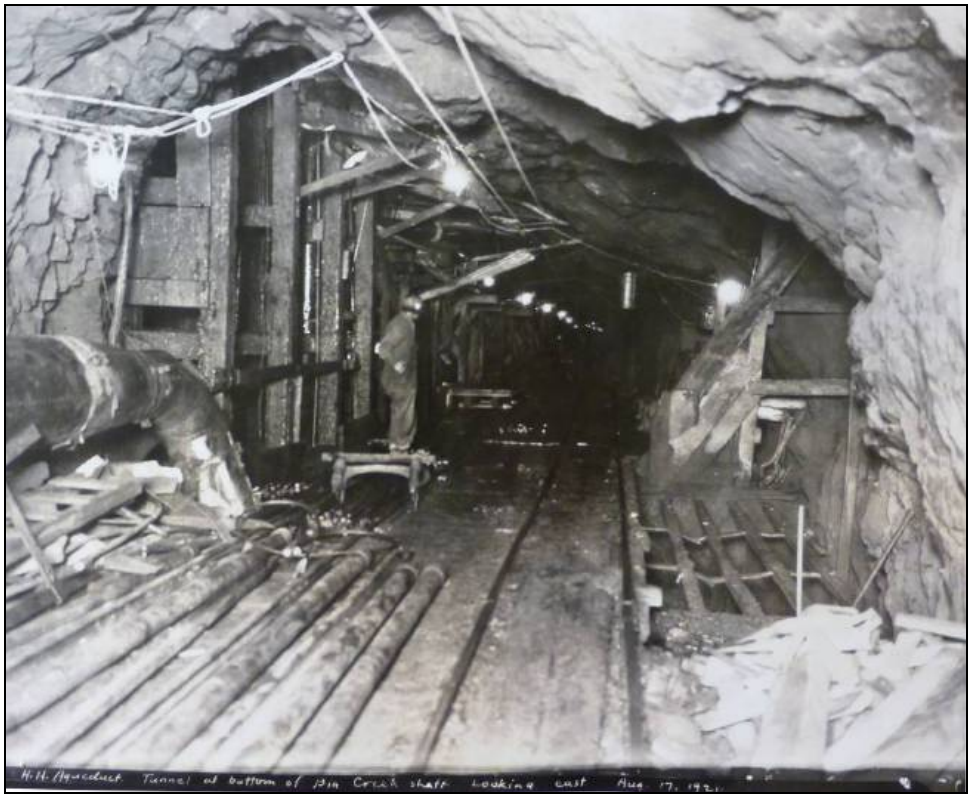
Photograph 25: Adit 8-9 (MT-6) portal. Camera facing south, September 24, 2014.

Photograph 26: Adit 8-9 (MT-6), from the watertight door looking toward the portal. Camera facing north, September 24, 2014.

Photograph 27: Adit 8-9 (MT-6) looking towards concrete seal with 60-inch watertight cover, and an orange valve weeper. Note the drainage channel at right. Camera facing south, September 24, 2014.

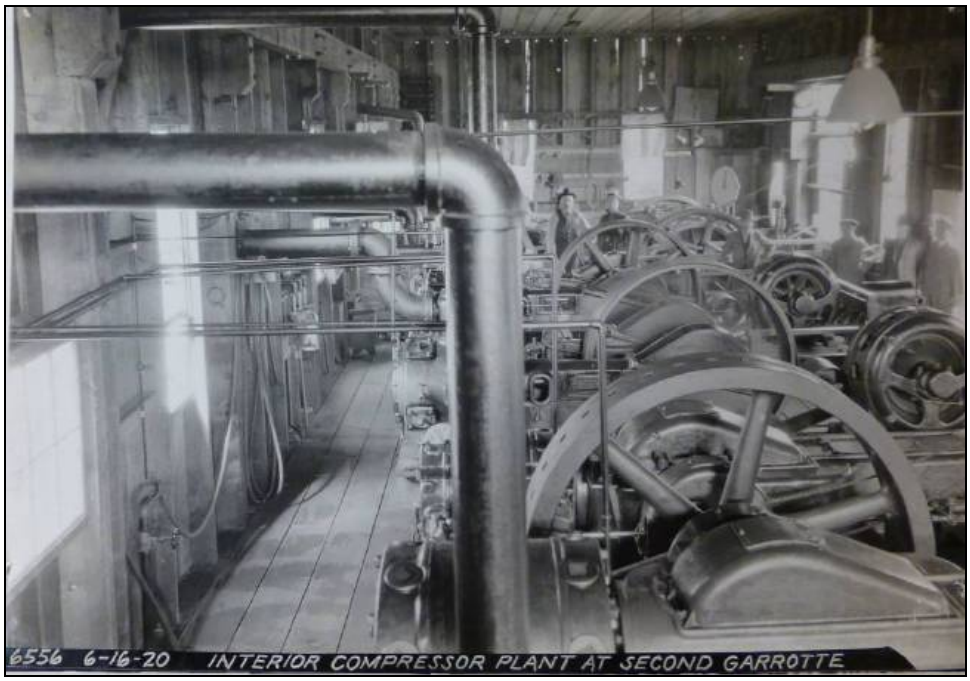
Photograph 28: 1923 photograph of Mountain Tunnel at Adit 8-9 (MT-6). Photograph courtesy of Moccasin Archives.

Photograph 29: Big Creek Shaft (MT-7) pumphouse. This shaft, used to access driving faces during construction of Mountain Tunnel now supplies water to a local district. Camera facing north, September 24, 2014.



Photograph 30: 1921 photograph showing the junction of Big Creek Shaft (MT-7) with Mountain Tunnel. Photograph courtesy of Moccasin Archives.

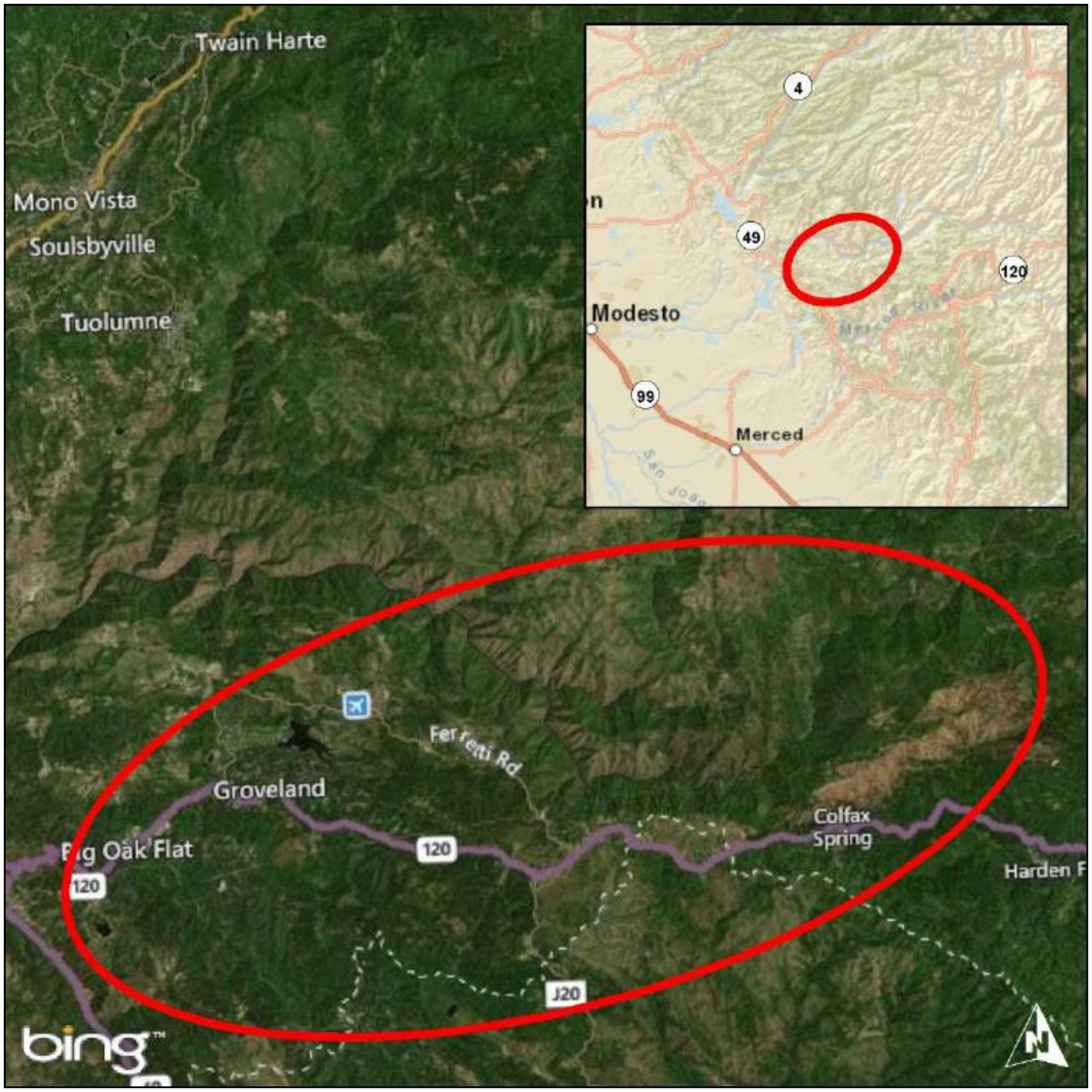
Photograph 31: Compressor foundation remnants near Second Garrotte Shaft (MT-8). Camera facing southeast, September 24, 2013.



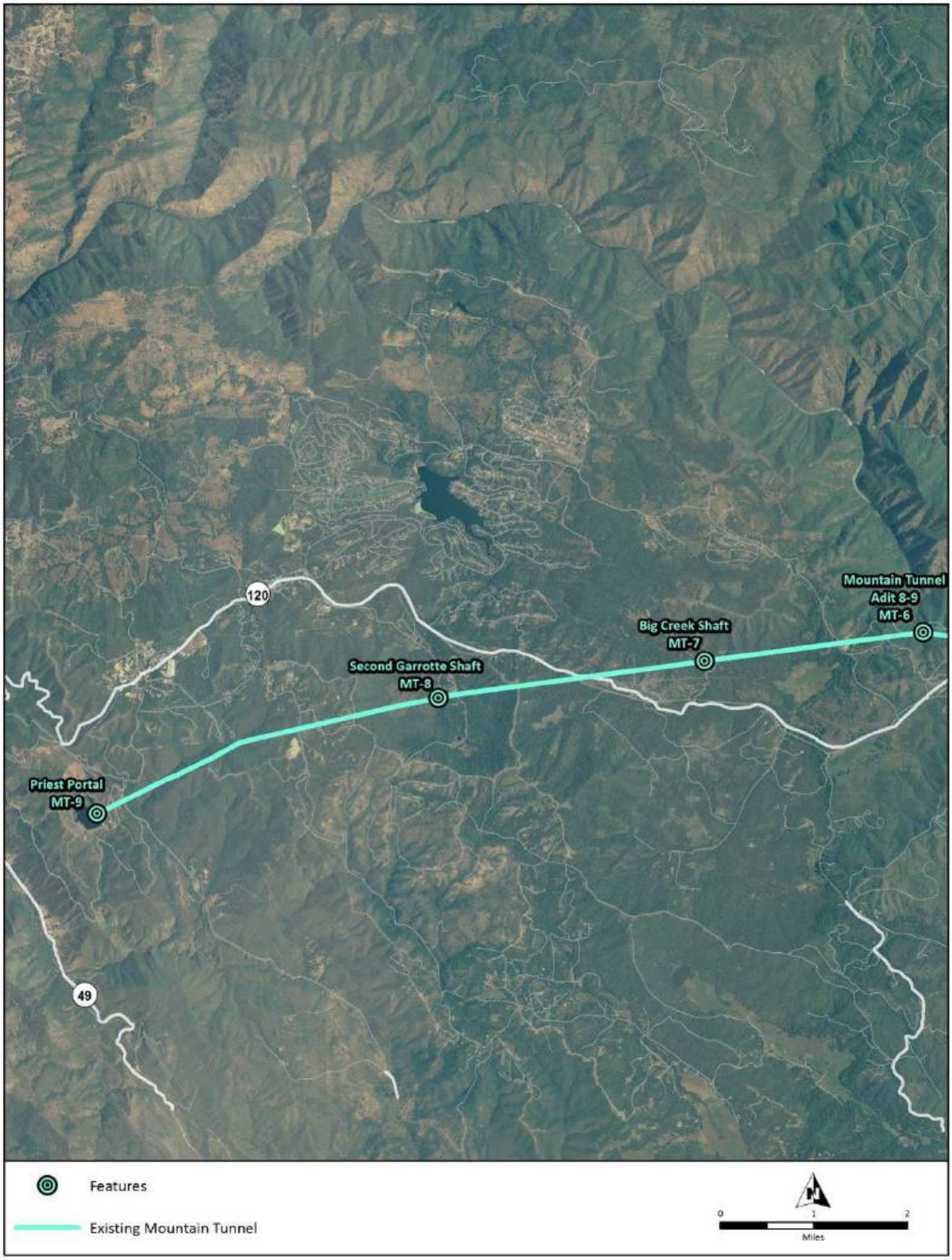
Photograph 32: 1920 photograph of compressor plant at Second Garrotte Shaft (MT-8). Photograph courtesy of Moccasin Archives..

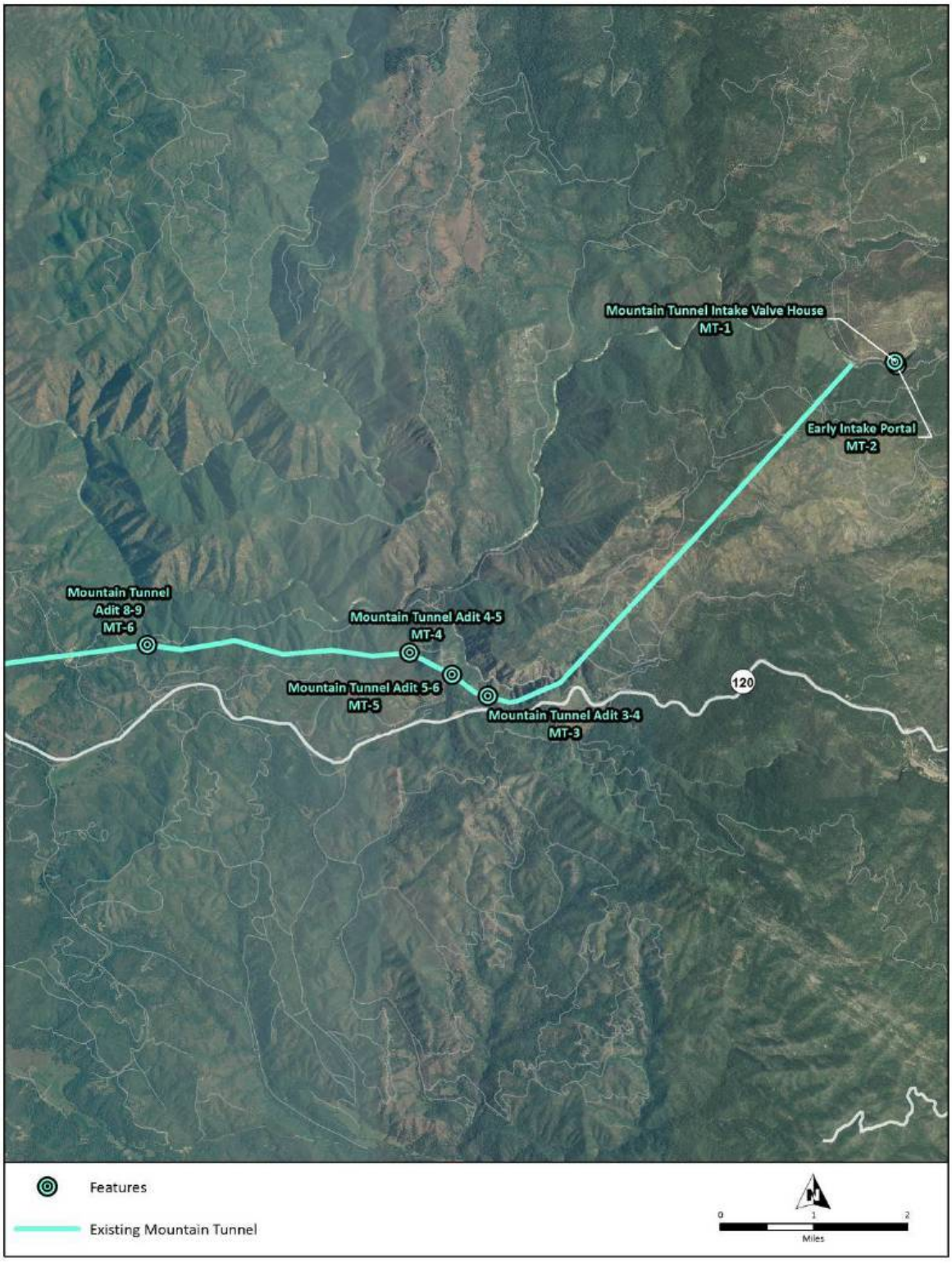
Photograph 33: 1965 photograph of Priest Portal (MT-9) facing upstream. Photograph courtesy of Moccasin Archives.

Location Map:



Site Maps:


120
Mountain Tunnel
Adit 8-9
MT-6
Big Creek Shaft
MT-7
Second Garrotte Shaft
MT-8
Priest Portal
MT-9
49
Features
Existing Mountain Tunnel
0
1
2
Miles


Mountain Tunnel Intake Valve House
MT-1
Early Intake Portal
MT-2
Mountain Tunnel
Adit 8-9
MT-6
Mountain Tunnel Adit 4-5
MT-4
Mountain Tunnel Adit 5-6
MT-5
Mountain Tunnel Adit 3-4
MT-3
120
Features
Existing Mountain Tunnel
0
1
2
Miles

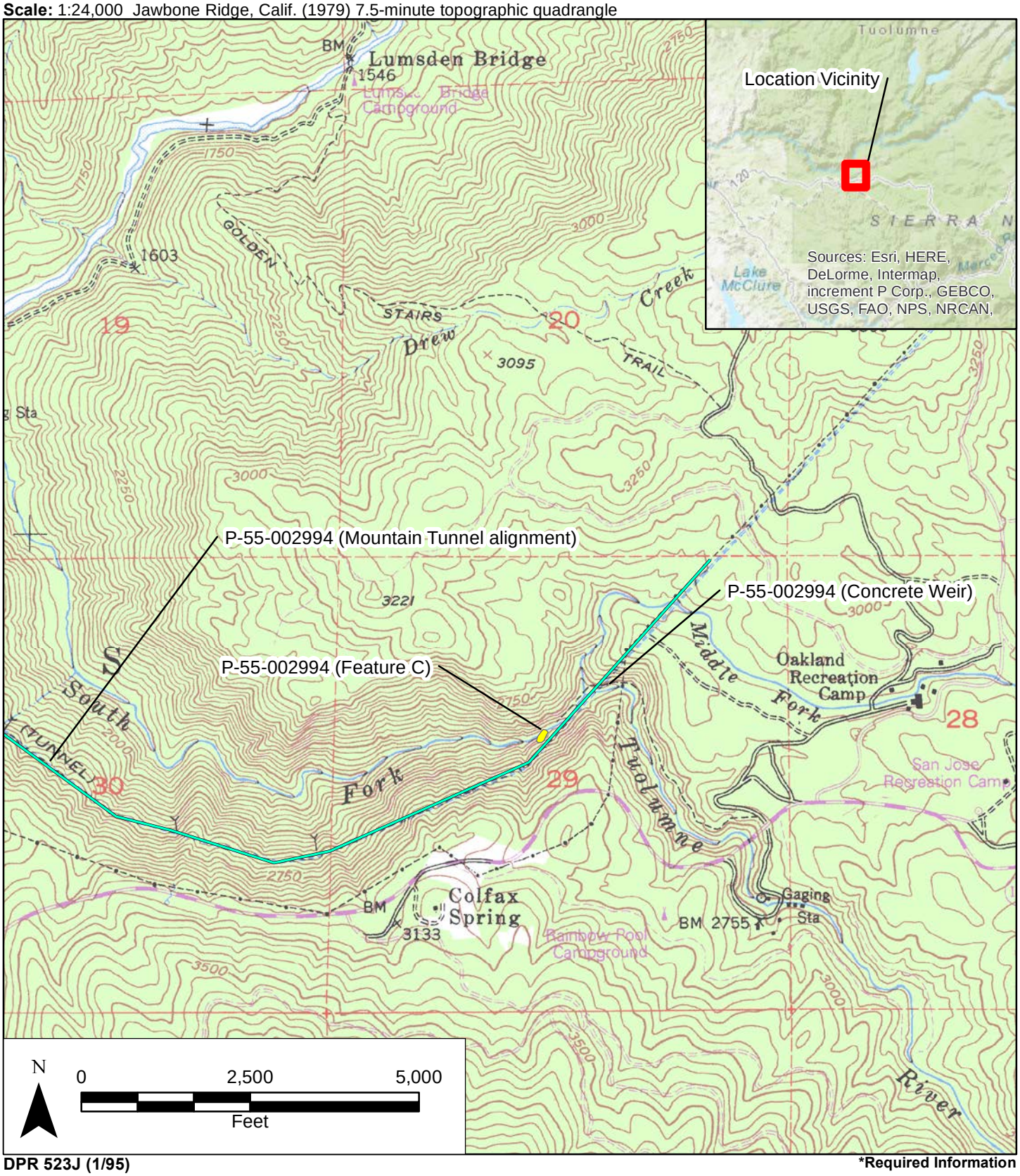
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # P-55-002994
HRI #
Trinomial CA-TUO-2016H

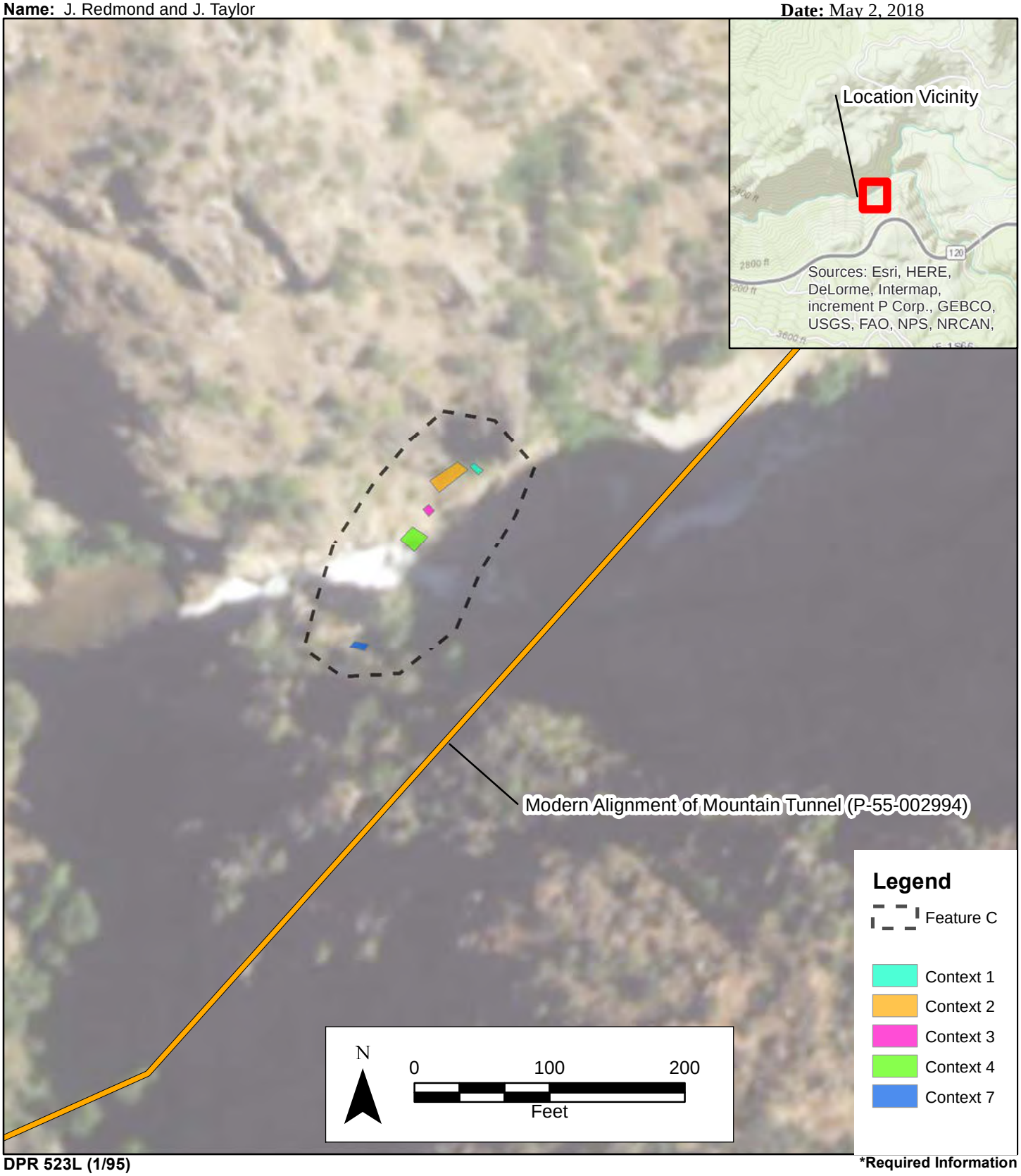
***Resource Name or #:** P-55-002994 (Feature C and Concrete Weir)

Scale: 1:24,000 Jawbone Ridge, Calif. (1979) 7.5-minute topographic quadrangle



*Required Information

Name: J. Redmond and J. Taylor **Date:** May 2, 2018



***Recorded by:** J. Redmond and J. Taylor ***Date:** May 2, 2018 ☐ Continuation ☒ Update

P-55-002994 is the Mountain Tunnel, which was originally recorded in 1981 (Kardash and Gibbs). During AECOM's 2018 survey near the South Fork Siphon (see **Location Map**), Feature C of P-55-002994 was re-identified (AECOM 2019). In addition, one new feature associated with the construction of Mountain Tunnel – a concrete weir in the river – was identified and recorded (**Location Map**).

Feature C

When the Mountain Tunnel was originally recorded, the portion of the Mountain Tunnel at South Fork was recorded as "Feature C: A siphon tunnel which allows water to cross below (70') the S. Fork Tuolumne River. Prior to the siphon's construction (unknown date) water flowed through a pipe installed on the ground surface or on trestles (Feature C not visited)" (Kardash and Gibbs 1981). Feature C was completed in the 1924-1925 work season when the riveted pipeline was placed atop poured-in-place concrete piers (JRP 2015) (**Plate 1**). The pipeline was in use until 1969 when it was removed and a siphon was installed at South Fork. The piers were left in place; the pier at the north side has since been modified and the pier nearest the river has collapsed.

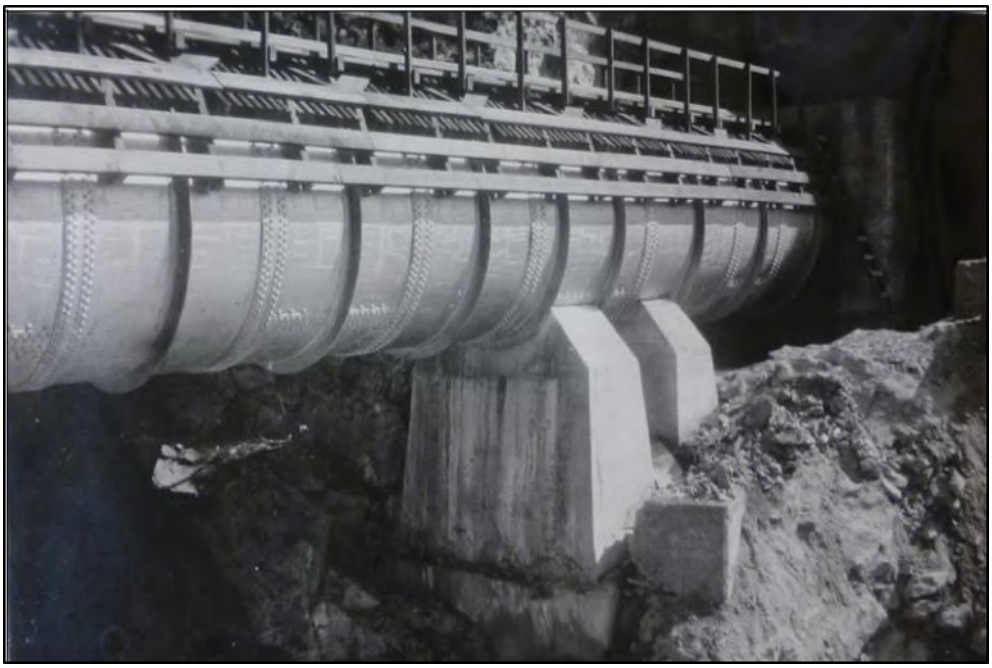


Plate 1: May 1925 riveted pipe segment of Mountain Tunnel and poured-in-place concrete piers at South Fork (JRP 2015).

An update to the site record was prepared in 2008 (Bailey) prior to repairs and improvements at South Fork Siphon. Bailey updated the description of Feature C to include measurements of the concrete pier on the northern side of the river and photographs of the two remaining piers and a third collapsed pier. Bailey also noted that "[m]uch of the original foundation of the support pier is overgrown but has clearly been heavily disturbed either during the original construction of the South Fork Crossing, or during its modification in the 1960s. The area southwest of the north pipe entrance has been reinforced with shotcrete likely to prevent erosion that would result when the river is inundated by snow-melt in the spring" (Bailey 2008:1).

Based on photos included in the 2008 site record update to P-55-002994, visibility during the 2018 AECOM survey was lower than it was during the 2008 survey due to vegetation growth in the canyon and higher water levels. However, AECOM was able to re-identify each component of Feature C recorded by Bailey (2008). Each of these features appeared as described in the 2008 site record update.

These features were given field designations during the 2018 survey for the purposes of note-taking:

- Context 1 (north pier) (**Photograph 1**);
- Context 2 (shotcrete foundation) (**Photograph 2** and **Plate 2** and **Plate 3**);
- Context 3 and 4 (collapsed center pier) (**Photograph 3**); and
- Context 7 (south pier) (**Photograph 4**).

***Recorded by:** J. Redmond and J. Taylor ***Date:** May 2, 2018 ☐ Continuation ☒ Update

Feature C (continued)

Photograph 1: Feature C, concrete pier on north side of river, view north. Field-designated Context 1.

Contexts 1 and 2 were measured by Bailey (2008) and appeared as originally documented (**Photograph 1**).

The shotcrete-covered area appears to be a foundation-like pad (**Photograph 2**). The area has a rubble base and a stacked rock retaining wall. The area measures 18 feet (5.5 meters) wide (east-west) and 29 feet (8.8 meters) long (north-south). It is unknown when the pad was constructed. Based on the historical photographs (**Plate 2** and **Plate 3**), it appears that the South Fork Camp No. 2 buildings in this area were built directly onto the ground. The shotcreted pad may have been applied directly to spoils from the tunnel by Hetch Hetchy Water and Power at a later date. Bailey (2008:1) suggests that the shotcrete may have been applied to prevent erosion; however, it is also possible that the material was applied to rubble base to provide the SFPUC with a stable work surface. This feature was noted by Bailey (2008), but not documented.

The collapsed center pier (Contexts 3 and 4), was not measured during the 2008 recordation (**Photograph 3**). This pier had been poured in place on the bedrock and was roughly pyramidal in shape. The base measured 10 feet (3 meters) by 15 feet (4.6 meters), was 6 feet (1.8 meters) high at its highest point. Context 4 appeared to be a part of Context 3 that had been dislodged and washed upstream.

Context 7 was inaccessible for direct measurement (**Photograph 4**).

Feature C (continued)

Photograph 2: Shotcrete surface and rubble base. View southwest. Field-designated Context 2.

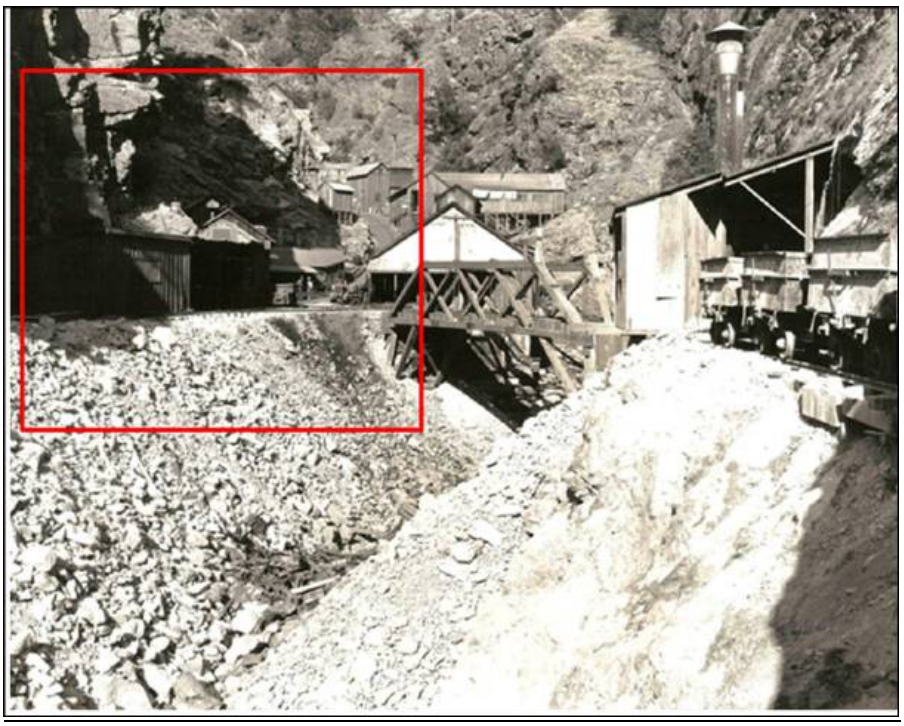


Plate 2: Approximate location of Context 2 (red box) prior to construction of the piped section of the Mountain Tunnel, c. 1921 1924. View looking upstream.

Feature C (continued)

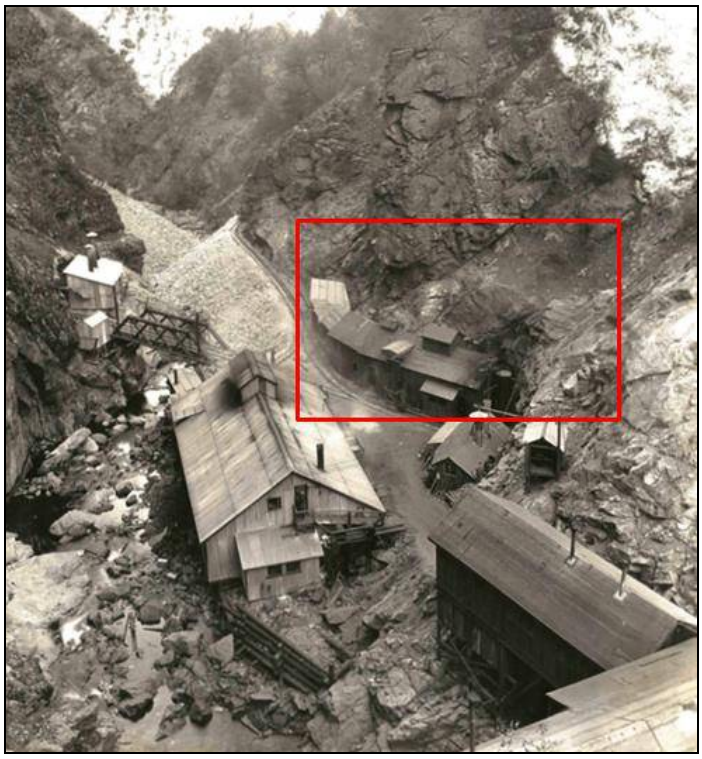


Plate 3: Overview of Feature C area prior to construction of the piped section of the Mountain Tunnel, c. 1921-1924. Approximate location of Context 2 in red box.

Photograph 3. Feature C, collapsed concrete pier on north side of river, view west. Possible dislodged chunk of pier upslope and downstream (background of photograph). Field-designated Contexts 3 and 4.

Feature C (continued)

Photograph 4: Tunnel on south side of Tuolumne River. Photo taken from north side of the South Fork of the Tuolumne River, view southwest. Note location of concrete pier (Context 7) for piped section of Mountain Tunnel.

Concrete Weir

One historic-period feature that was not previously recorded as part of P-55-002994, was identified below the South Fork road (P-55-006313) on the north bank of the South Fork of the Tuolumne River just upstream of the confluence and the bridge over the Middle Fork. This feature could not be accessed due to its location in the river, but it was photographed and described by AECOM from the road. This feature was given the field designation 050218_05.

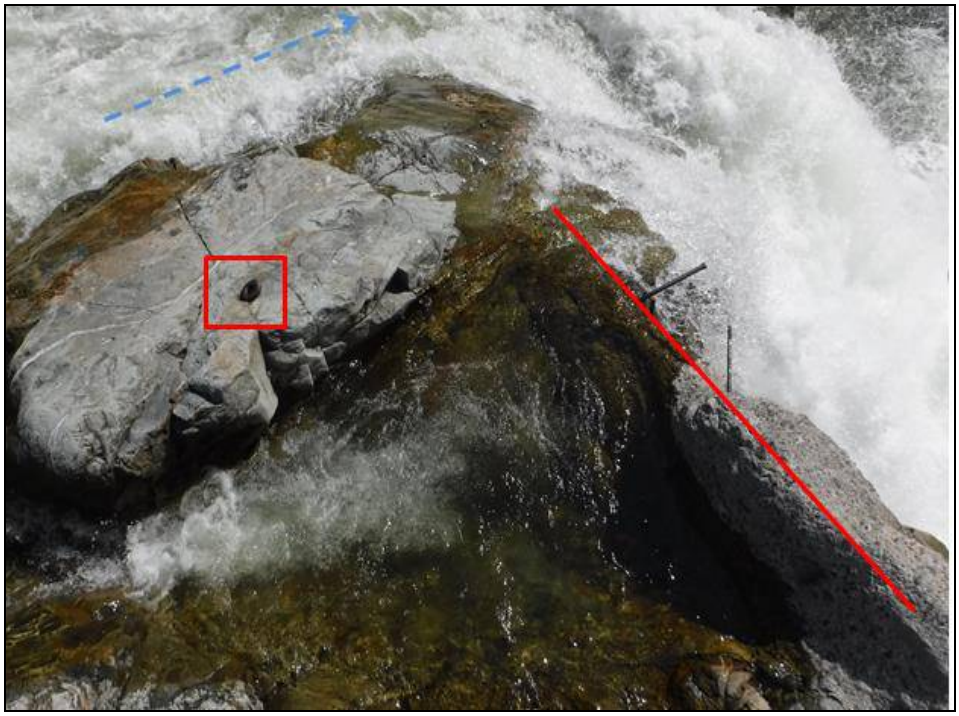
The feature is a board-formed concrete weir with baling wire on the upstream face and rebar on the crest and upstream face. The weir is angled toward the river's flow, partially creating a pool next to the north bank of the river (**Photograph 5**). The feature is adjacent to a waterfall. It appears that a natural rock outcrop was incorporated to form the pond, with a large eye hook driven into the top of the outcrop. The weir appeared to be approximately 10 feet (3 meters) in height and 10 to 12 feet (3 to 3.7 meters) long, with a crest width of about 2 feet (0.6 meters) (**Photograph 6**).

The date of construction of this feature is unknown. It is not depicted on the 1921 map of South Fork Camp No. 2, although the waterfall that is directly adjacent to it is depicted on the map (**Plate 4**). It may have been used to create a water pool, or it may have been used to anchor a cantilevered work camp building that was not shown on the 1921 map.

South Fork Camp No. 2, a Mountain Tunnel work camp constructed in 1920-1921. This camp was built to house workers constructing the Mountain Tunnel. South Fork Camp No. 2 was the second built for work at South Fork. A 2015 description (JRP 2015) states: "The location of the first work camp at the South Fork Crossing became untenable because of its precarious location and it was moved and rebuilt during the 1920-21 fiscal year. The new camp had the advantage of being located closer to the working portals, but most of the buildings clung precariously to steep slopes." Although the weir cannot be linked to a known feature at South Fork Camp No. 2, the only development that has occurred in the canyon is associated with the camp and the Mountain Tunnel and is therefore included in this update.

Concrete Weir (Continued)

Photograph 5. Weir forming pool during high flows of the river. View upstream (east). Crest shown in center of red box.



Photograph 6. Plan view of weir. Crest (red line), eye hook in outcrop (red box), and river flow (blue arrow) highlighted.

Concrete Weir (Continued)

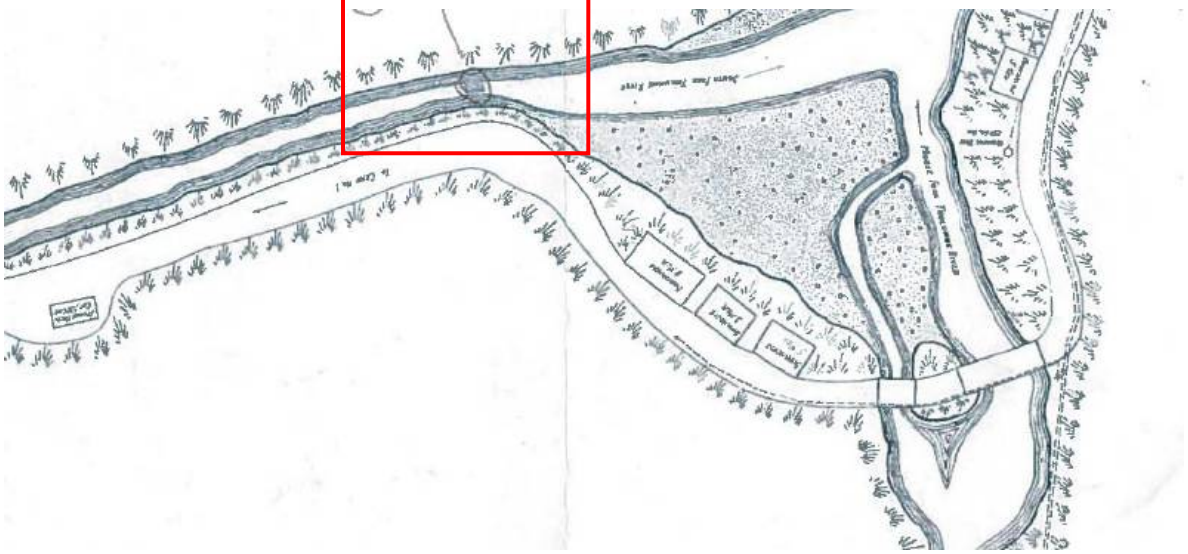


Plate 4. 1921 South Fork Camp No. 2 map showing area of weir (south at top).

References:

AECOM, 2019. Historic Context and Archeological Survey Report: Mountain Tunnel Improvements Project, Tuolumne County, California. Report prepared for San Francisco Public Utilities Commission. Report prepared by AECOM, San Francisco, California.

Bailey, Drew M., 2008. Update for P 55 002994/CA-TUO-2016H. On file at the Central California Information Center, California Historical Resources Information System, California State University, Stanislaus, Turlock, California.

JRP (JRP Historical Consulting, LLC), 2015. Mountain Tunnel Access & Adit Improvement Project Tuolumne County Historic Resources Evaluation. Prepared for San Francisco Public Utilities Commission, Bureau of Environmental Management.

Kardash, Rick, and H.K. Gibbs, 1981. Site record for P 55 002994/CA-TUO-2016H. On file at the Central California Information Center, California Historical Resources Information System, California State University, Stanislaus, Turlock,

State of California – The Resources Agency DEPARTMENT OF PARKS AND RECREATION **UPDATE SHEET**	Primary # P-55-002994 HRI # Trinomial CA-TUO-2016H NRHP Status Code 6Z

*Resource Name or # (Assigned by recorder) South Fork Adit Portals and Concrete Piers

☐ Continuation ☒ Update

P1. Other Identifier: Forest Service Number 05-16-54-500: Feature C; South Fork crossing of the Mountain Tunnel

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Tuolumne

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Jawbone Ridge, Calif. **Date** 2001 **T** 1S; **R** 18E; **Sec** 29; M.D. **B.M.**

10/2019

d. UTM: Zone 10S; 762159mE/ 4190782mN;

***P3a. Description:** This section of the Mountain Tunnel spanning the South Fork of the Tuolumne River was completed in the 1924-1925 work season when the riveted pipeline was placed atop poured-in-place concrete piers. The pipeline was in use until 1969, when it was removed and a siphon was installed beneath the river. When the original riveted pipeline was removed in 1969, exposing the portal openings, it was necessary to install non-original bulkhead doors and security gates. The concrete piers were left in place. Since then, the pier at the north side has since been modified, the pier nearest the river has collapsed, and one of the piers on the south side may have collapsed. The South Fork Adit Portals and Concrete Piers have been field-checked and appear to be unaltered since their last recordation in 2008 (**Photographs 1 through 4**).

***P3b. Resource Attributes:** (HP20) – Canal/Aqueduct; (HP11) – Engineering Structure

***P8. Recorded by:** Jennifer Redmond and Joshua Taylor, AECOM, 300 Lakeside Drive, Suite 400, Oakland, CA 94612

***P11. Report Citation:** AECOM, "Historic Resources Evaluation Addendum: Mountain Tunnel Improvements Project, Tuolumne County, California," 2019.

***B10. Significance:** This form provides updated photographs of the South Fork Adit Portals and Concrete Piers since their last photographic documentation in 2008, includes historic photographs of the construction of the South Fork Adit Portals and Concrete Piers, and provides historic evaluations of the resources.[1]

Portions of the Mountain Tunnel (P-55-002994) were recorded and/or mapped in 1981 by archaeologists Rick Kardash and H.K. Gibbs (see attached form). At that time, the portion of the Mountain Tunnel at South Fork (sometimes referred to as "South Fork crossing") was recorded as "Feature C" and included the subsurface siphon (South Fork Siphon) currently in use, but also the aboveground remnant concrete piers that supported an earlier but no longer extant pipeline that crossed the river. The 1981 recordation did not include any photographs of the two South Fork Adit portals or any concrete piers at this location "due to extreme slopes and time constraints."[2] Neither the Mountain Tunnel nor any of the recorded features on the 1981 site record were evaluated for the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR) at that time.

An update to the 1981 site record was prepared in 2008 by archaeologist Drew M. Bailey of William Self Associates, Inc., prior to repairs and improvements at South Fork Siphon (see attached form). Bailey updated the description of Feature C to include measurements of the concrete pier on the northern side of the river, photographs of two remaining piers, photographs of a third collapsed pier, and photographs of the South Fork Adit portals. Bailey also noted that "[m]uch of the original foundation of the support pier is overgrown but has clearly been heavily disturbed either during the original construction of the South Fork Crossing, or during its modification in the 1960s. The area southwest of the north pipe entrance has been reinforced with shotcrete likely to prevent erosion that would result when the river is inundated by snow-melt in the spring."[3] None of features recorded on the 2008 site record were evaluated for the NRHP or the CRHR.

---

[1] Note: A shotcrete-covered area, a collapsed center pier, and a portion of the same collapsed pier that has been dislodged and washed upstream, all of which are located in the South Fork crossing area, were not recorded on this Update form. AECOM archaeological staff recorded the resources as part of the archaeological Update for P-55-002994 reported in *Historic Context and Archaeological Survey Report for Mountain Tunnel Improvements Project, Tuolumne County, California,* 2019.

[2] Rick Kardash and H.K. Gibbs, site record for P-55-002994/CA-TUO-2016H, 1981, 3 and 14. On file at the Central California Information Center, California Historical Resources Information System, California State University, Stanislaus, Turlock, California.

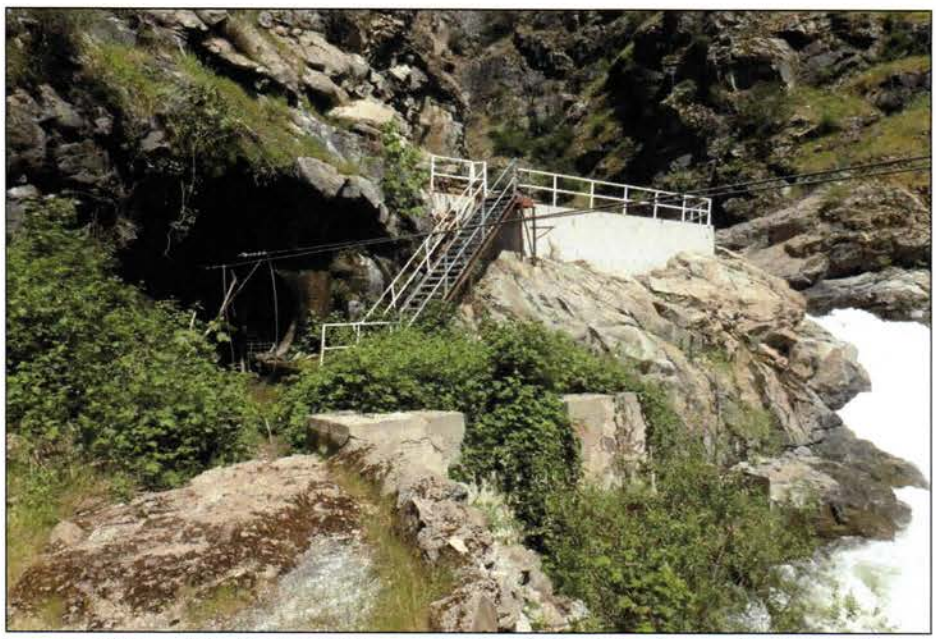
[3] Drew M. Bailey, Update for P-55-002994/CA-TUO-2016H, 2008, 1. On file at the Central California Information Center, California Historical Resources Information System, California State University, Stanislaus, Turlock, California.

Architectural historians Heather Norby and Garret Root of JRP Historical Consulting, LLC (JRP) attempted to record the South Fork crossing section of the Mountain Tunnel in 2015 for the *Mountain Tunnel Access & Adit Improvement Project*, but were prevented from a field visit by a rockslide. The crossing was described on a Linear Feature form that was part of the larger recordation of the entire alignment of the Mountain Tunnel. The Linear Feature form used photographs from the 2008 recordation, showing the southern portal opening and two concrete piers; and also included photographs from the San Francisco Public Utilities Commission Moccasin Archives (see attached form).[4] JRP provided a comprehensive historic context of the construction of the Mountain Tunnel, including initial construction at the South Fork crossing and its later modifications, and recommended the Mountain Tunnel for listing in the NRHP and the CRHR. As part of the recommendation, JRP identified character-defining and non-character-defining features of the Mountain Tunnel. The belowground South Fork siphon that replaced the 1920s aboveground piped section of the Mountain Tunnel in 1969 (after the period of significance of 1917 through 1934), was identified as a non-character-defining feature. The South Fork Adit portals and the remnant concrete piers were not identified as character-defining nor as non-character-defining features of the Mountain Tunnel in 2015, so their historic status was unclear.

Photographs 1 through 4 are updated photographs of the South Fork Adit portals and the remnant concrete piers that were recorded by AECOM in 2018. Plates 1 through 5 are historic photographs of the construction of the South Fork Adit portals and concrete piers.

Photograph 1: View of South Fork Adit on south side of river in background with concrete pier below and another concrete pier below in foreground at far right. Access to the adit on the south side of the river requires crossing in a pulley cart suspended from the cable strung across river. View facing southwest, May 3, 2018 (AECOM).

[4] JRP Historical Consulting, LLC, Mountain Tunnel Linear Feature Record, in *Historic Resources Evaluation, Mountain Tunnel Access and Adit Improvement Project, Tuolumne County, California* (July 2015).



Photograph 2: View of South Fork Adit on north side of river in background, at left, with concrete pier in foreground and terminus of South Fork Access Road and access stairs in background. Note the cable. View facing northeast, May 3, 2018 (AECOM).

Photograph 3: Detail of South Fork Adit north portal on north side of river with circa 1969 bulkhead door installed after pipeline removal, view facing north, May 3, 2018 (AECOM).

Photograph 4: Detail of concrete pier outside the South Fork Adit on north side of river, view facing northeast, May 3, 2018 (AECOM).

Evaluation

In its 2015 evaluation, JRP recommended listing the Mountain Tunnel in the NRHP under Criterion A and the CRHR under Criterion 1 at the state level of significance. The recommendation was based on the Mountain Tunnel's important association with the development of the municipally owned water system of the City and County of San Francisco, with a period of significance that corresponds to the start of construction in 1917 through 1934, when the tunnel first succeeded in serving as a crucial link in the delivery system of water to San Francisco. JRP concluded that the Mountain Tunnel retained sufficient integrity to its period of significance, 1917 to 1934, to convey its significance.

Although the Mountain Tunnel is considered a historical resource and the South Fork crossing was an original component of the Mountain Tunnel, the extant resources at the South Fork crossing are not individually eligible for listing in either register, or as character-defining features of the Mountain Tunnel under NRHP Criterion A or CRHR Criterion 1. This is because the extant resources do not retain historic integrity to the Mountain Tunnel's period of significance, 1917 through 1934. The section of the Mountain Tunnel spanning the South Fork of the Tuolumne River was completed in the 1924-1925 work season, when the riveted pipeline was placed atop poured-in-place concrete piers. The pipeline was in use until 1969, when it was removed and a siphon was installed beneath the river. The concrete piers were left in place. Since then, the pier at the north side has been modified, the pier nearest the river has collapsed, and one of the piers on the south side may have collapsed. Additionally, when the riveted pipeline was removed in 1969, exposing the portal openings, it was necessary to install non-original bulkhead doors and security gates.

The South Fork Adit Portals and remnant concrete piers do not appear to be significant under NRHP Criterion B or CRHR Criterion 2 for their association with persons important in local, state, or national history. Association with engineers or builders is considered under NRHP Criterion C and CRHR Criterion 3.

The South Fork Adit Portals and Concrete Piers are not eligible for listing in the NRHP under Criterion C or CRHR Criterion 3, because they are not important examples of a type, period, or method of construction, nor are they important examples of

any master engineer or builder's work. The adit portals were created using common tunneling and excavating practices of the day, and the concrete piers were constructed using common building practices. The South Fork Adit Portals and Concrete Piers are also not significant as the important work of a master designer. Although prominent City Engineer Michael Maurice O'Shaughnessy, A.J. Cleary, and other engineers oversaw the design and construction of components of the Mountain Tunnel, these remnant piers and modified adit portals would not be an important example of any prominent engineer or contractor's portfolio of work.

In rare instances, engineering structures can serve as sources of important information regarding historic construction materials or technologies (NRHP Criterion D/CRHR Criterion 4); however, these remnant piers and modified adit portals would not appear to be a principal source of important information.

As discussed above, the South Fork Adit Portals and Concrete Piers also lack historic integrity of design, materials, workmanship, feeling, and association to the period of significance (1917 through 1934) of the Mountain Tunnel. The pipeline was removed in 1969, a siphon was installed beneath the river, and bulkhead doors and security gates were built in the adit portals. Without the aboveground pipe, the remnant piers no longer physically convey their historic use and function of supporting the pipeline, and they lack feeling and association as circa 1920s elements of the Mountain Tunnel.

The South Fork Adit Portals and Concrete Piers do not meet the criteria for listing in the NRHP or the CRHR, because they lack historic integrity and are not character-defining features of the NRHP/CRHR-eligible Mountain Tunnel. The South Fork Adit Portals and remnant concrete piers have been evaluated in accordance with Section 106 of the National Historic Preservation Act of 1966 (as amended) (54 United States Code 306108) and its implementing regulations (36 Code of Federal Regulations Part 800), and Section 15064.5(a)(2)-(3) of the California Environmental Quality Act (CEQA) Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code (see Continuation Sheet). In addition to lacking historical significance, the South Fork Adit Portals and Concrete Piers also lack historic integrity. The South Fork Adit Portals and remnant concrete piers are therefore not historical resources for the purposes of CEQA.

***B14. Evaluator:** Heather Miller, AECOM ***Date of Evaluation:** May 2019

Historic Photographs:

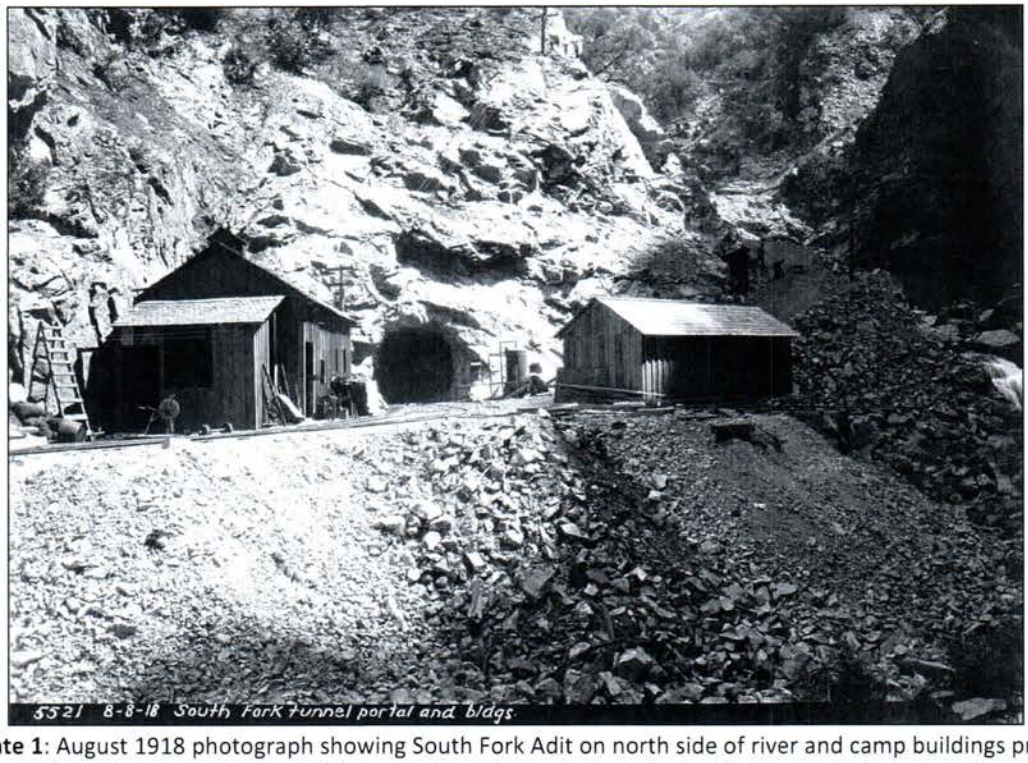


Plate 1: August 1918 photograph showing South Fork Adit on north side of river and camp buildings prior to construction of the piped section of the Mountain Tunnel (c. 1921-1924). Note the old South Fork Access Road alignment at far right and the railroad track and ballast at center.
(Courtesy of Hetch Hetchy Water and Power Records and Archives, HHWP #246304.)

Plate 2: August 1921 photograph showing South Fork Adit on south side of river, temporary bridge, and camp buildings prior to construction of the piped section of the Mountain Tunnel (c. 1921-1924). (Courtesy of Hetch Hetchy Water and Power Records and Archives, HHWP #246306.)

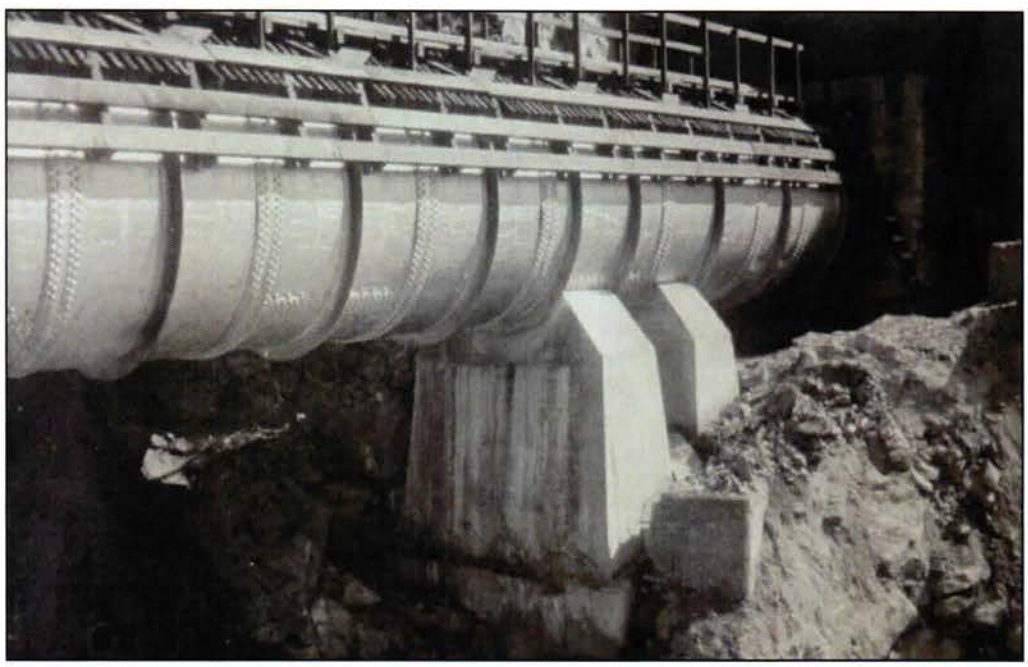


Plate 3: May 1925 photograph of riveted pipe segment of the Mountain Tunnel entering south portal adit and concrete piers on south side of river. It is unclear if both piers are still extant. (From JRP's 2015 Mountain Tunnel DPR 523 form.)

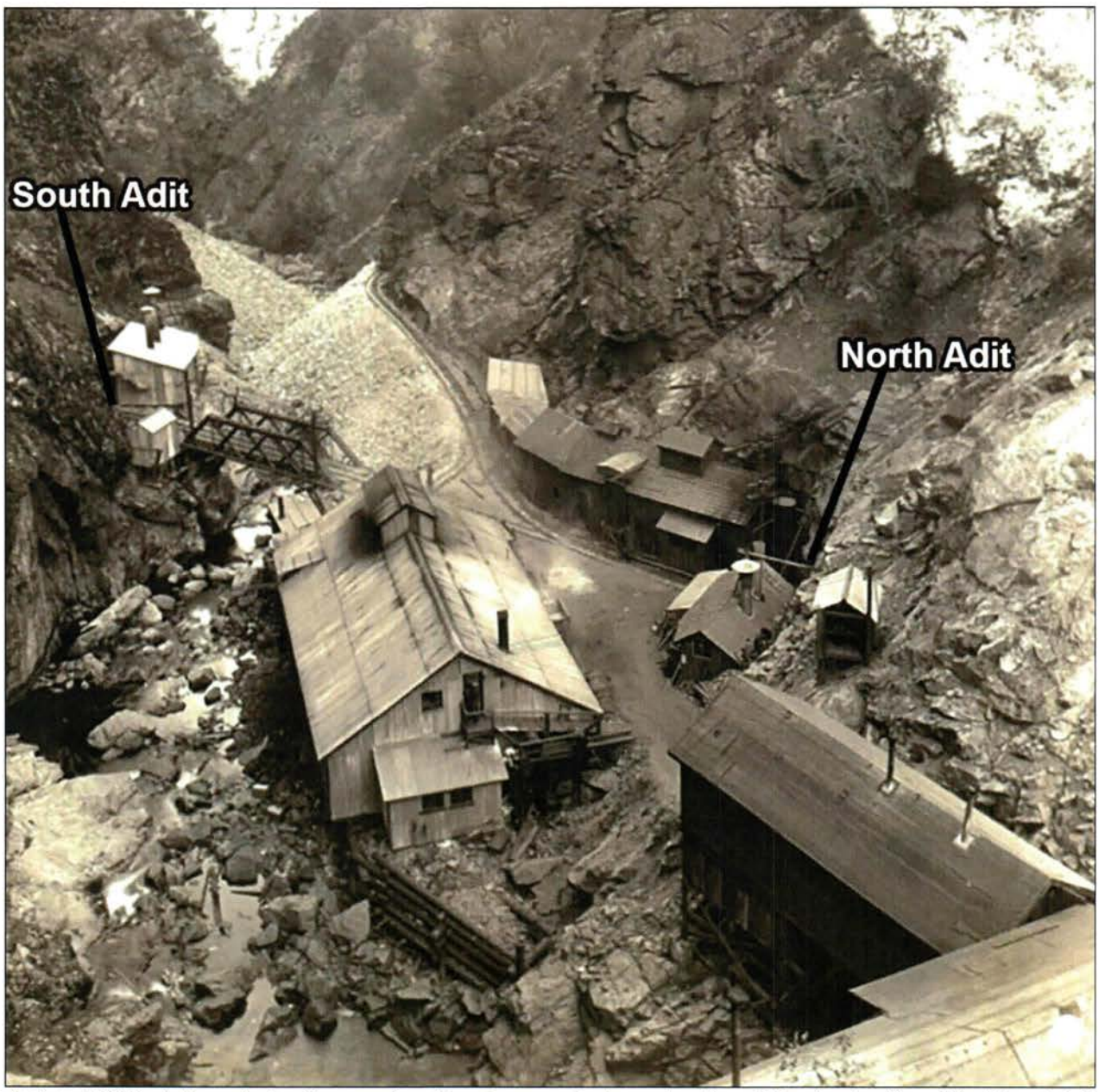
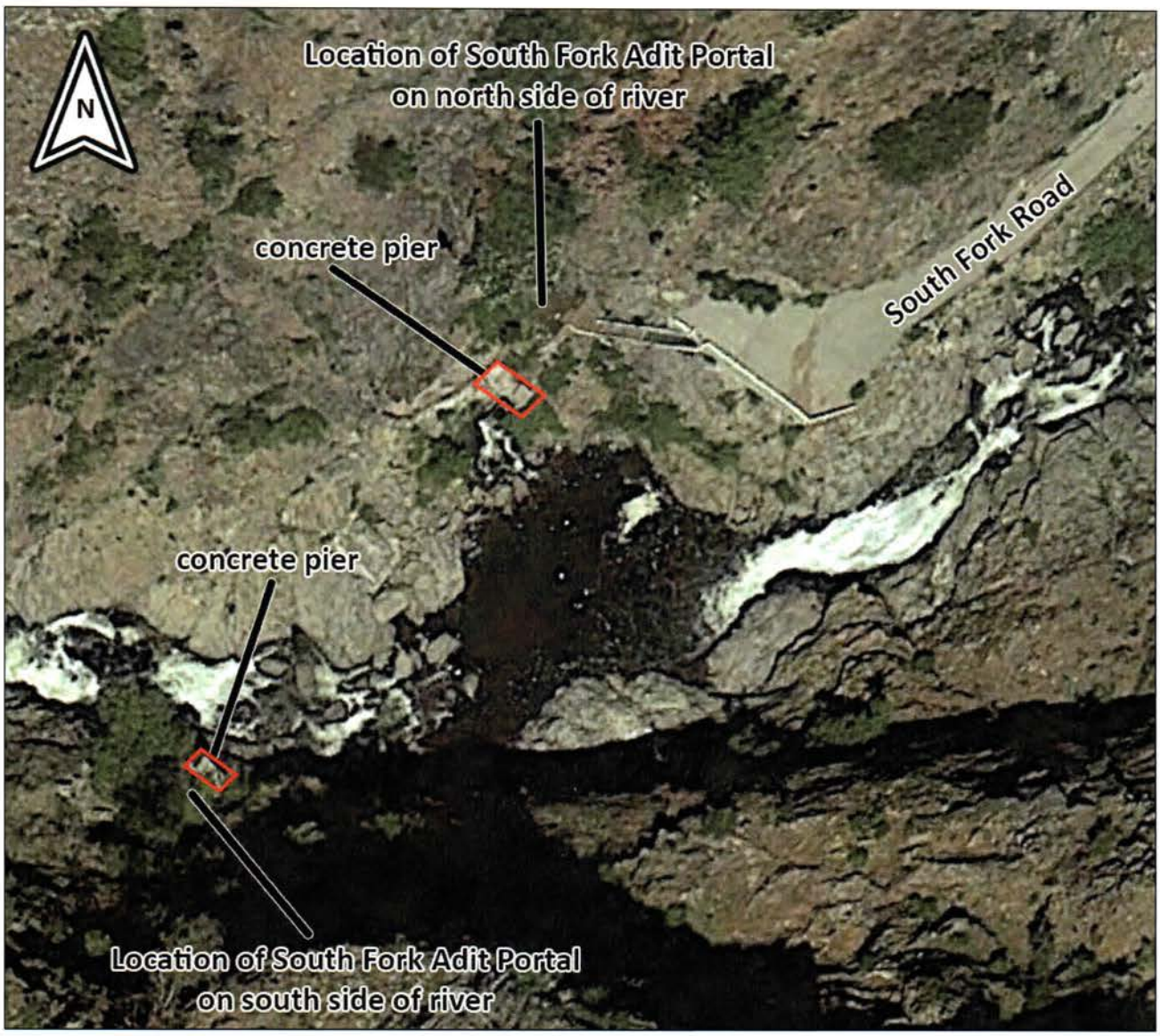


Plate 4: August 1921 photograph showing overview of work camp prior to construction of the piped section of the Mountain Tunnel into the north and south adit openings (c. 1921-1924). Labels added by AECOM.
(Courtesy of Hetch Hetchy Water and Power Records and Archives, HHWP #246307.)

Sketch Map:



Location of South Fork Adit Portals and Concrete Piers. Labels added by AECOM. (Source: Google Earth Pro Historical Imagery, May 2014.)

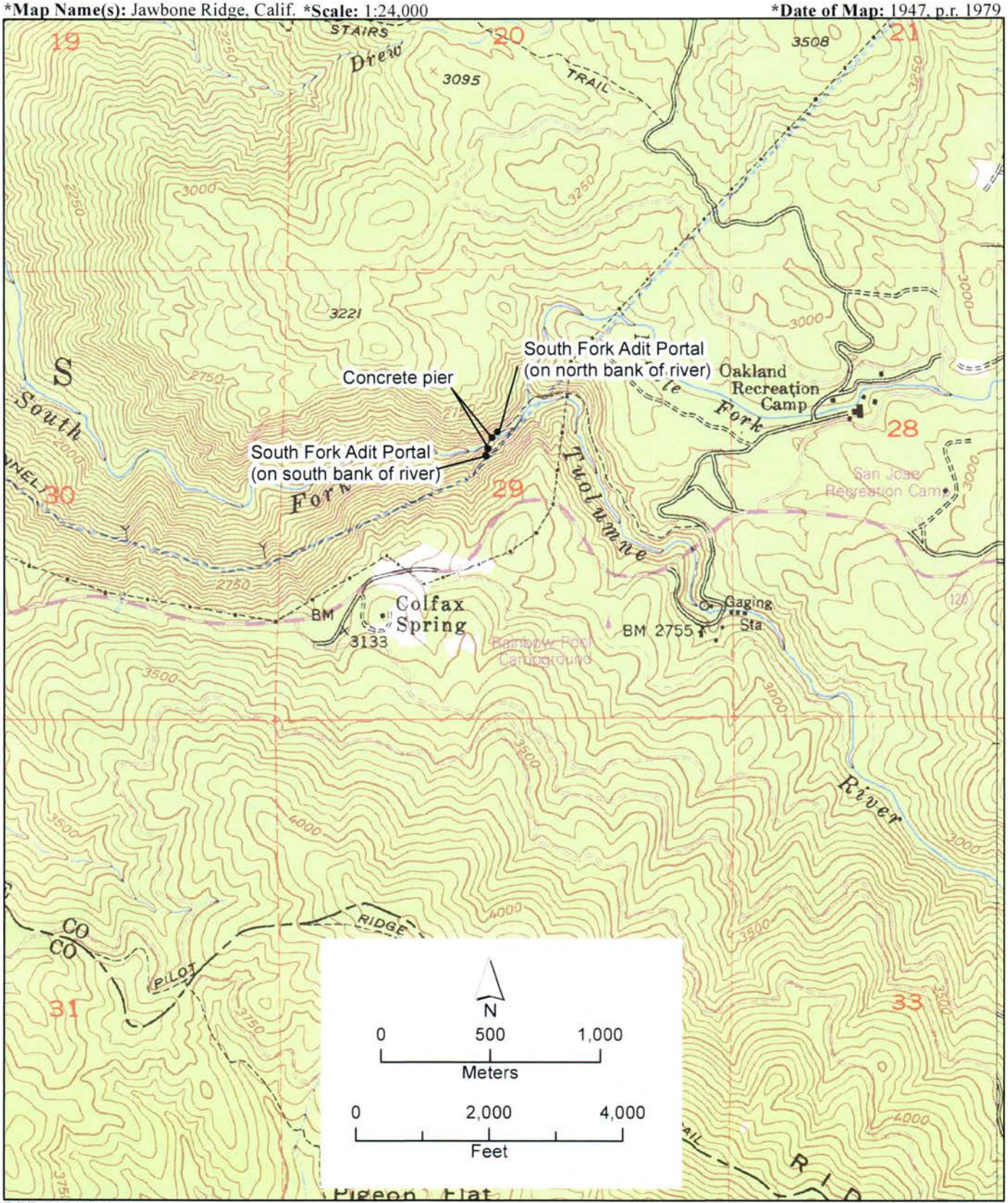
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI #
Trinomial

*Resource Name or #: South Fork Adit Portals and Concrete Piers

*Map Name(s): Jawbone Ridge, Calif. *Scale: 1:24,000 *Date of Map: 1947, p.r. 1979



*Required Information

Lawrence Ridge 7.5'

The San Francisco Public Utilities Commission (SFPUC) is proposing to seal the lining of the Hetch Hetchy Aqueduct Mountain Tunnel at its crossing on the South Fork of the Tuolumne River to prevent water inflows from the surrounding soil. An energy dissipater and overflow weir box will be constructed within the project area along the northern bank of the river.

This portion of the Hetch Hetchy water system was originally recorded in 1981 by Rick Kardash and H.K. Gibbs, and the project area of the Mountain Tunnel Rehabilitation Project was recorded as "Feature C: A siphon tunnel which allows water to cross below (70') the S. Fork Tuolumne River. Prior to the siphon's construction (unknown date) water flowed through a pipe installed on the ground surface or on trestles (Feature C not visited) (Kardash and Gibbs 1981)."

Construction on the 19-mi. long Mountain Tunnel began in 1917, and by 1925 would connect the Hetch Hetchy Reservoir to the Priest Reservoir, two mi. east of Moccasin. The tunnel is unlined for all but 11 mi. of its length. The lined portions are constructed of a horseshoe shaped concrete of the tunnel are ten ft. in diameter, while the unlined portions measure 13.5 ft. in diameter. The Mountain tunnel averages at a depth of 1,000 ft. below the surface, and carries over 400 million gallons of water a day (Wurm 1973:105).

At the South Fork of the Tuolumne River, near Colfax Spring the tunnel emerged from the mountain side in the form of a 9.5 ft. diameter pipe, crossed the narrow ravine, and reentered the ground on the other side. On both sides of the river, portals used for the excavation of the tunnel existed, and would later be used as the connections for the South Fork Crossing pipe (Wurm 1973:105-108). In the 1960s the South Fork Crossing was updated, and the pipe that spanned the South Fork of the Tuolumne River was removed in favor of an underground siphon similar to the lined portions of the Mountain Tunnel (SFPUC 2005:35).

Feature C:

Feature C consists of a subsurface siphon that redirects the flow of the Hetch Hetchy Mountain Tunnel approximately 70 ft. beneath the South Fork of the Tuolumne River (Kardash and Gibbs 1981), and the surface remnants of the old 9.5 ft. diameter pipe that previously crossed over the river. On the north and south banks, the existing ends of the old South Fork Crossing pipe are still intact (Photographs 1 and 2), between which there are two intact concrete support piers, and one collapsed pier (Photograph 3). Only the north bank of the river was accessible. The pier located at this end of the tunnel measured 13.5 ft. long and 4.3 ft. wide, but had been maintained, and may not have been in its original form. The pier at the southern end could not be measured. Between these two intact supports there was a collapsed pier that was also inaccessible (Photograph 4). The north end of the tunnel opened up to a concrete slab which was accessible by a metal staircase that leads to the recently constructed concrete access road (Marsh and Gruych 2000) (Photograph 5).

Much of the original foundation of the support pier is overgrown but has clearly been heavily disturbed either during the original construction of the South Fork Crossing, or during its modification in the 1960s. The area southwest of the north pipe entrance has been reinforced with shotcrete likely to prevent erosion that would result when the river is inundated by snow-melt in the spring.

A cable has been connected to both sides of the existing pipe so that the south bank can be accessed for maintenance via a suspended cart (Photograph 6).

References

Kardash, Richard, and H.K. Gibbs
1981 Archaeological Site Record for P-55-2994/CA-TUO-2016H. On file at the Central California Information Center, California State University, Stanislaus, Turlock, CA.

Marsh, Steven, and S. Gruych
2000 Archaeological Site Record for P-55-6313/CA-TUO-4483H. On file at the Central California Information Center, California State University, Stanislaus, Turlock, CA.

San Francisco Public Utilities Commission (SFPUC)
2005 *San Francisco Water and Power: A History of the Municipal Water Department & Hetch Hetchy System.* SFPUC Communications, San Francisco, CA.

Wurm, Ted
1973 *Hetch Hetchy and its Dam Railroad.* Howell-North Books, Berkeley, CA.

Photograph 1. View northeast showing north entrance of existing South Fork Crossing pipe.

Photograph 2. View southwest showing south entrance to existing South Fork Crossing pipe.

Photograph 3. View southwest showing intact support piers.

Photograph 4. View southwest showing collapsed support pier.

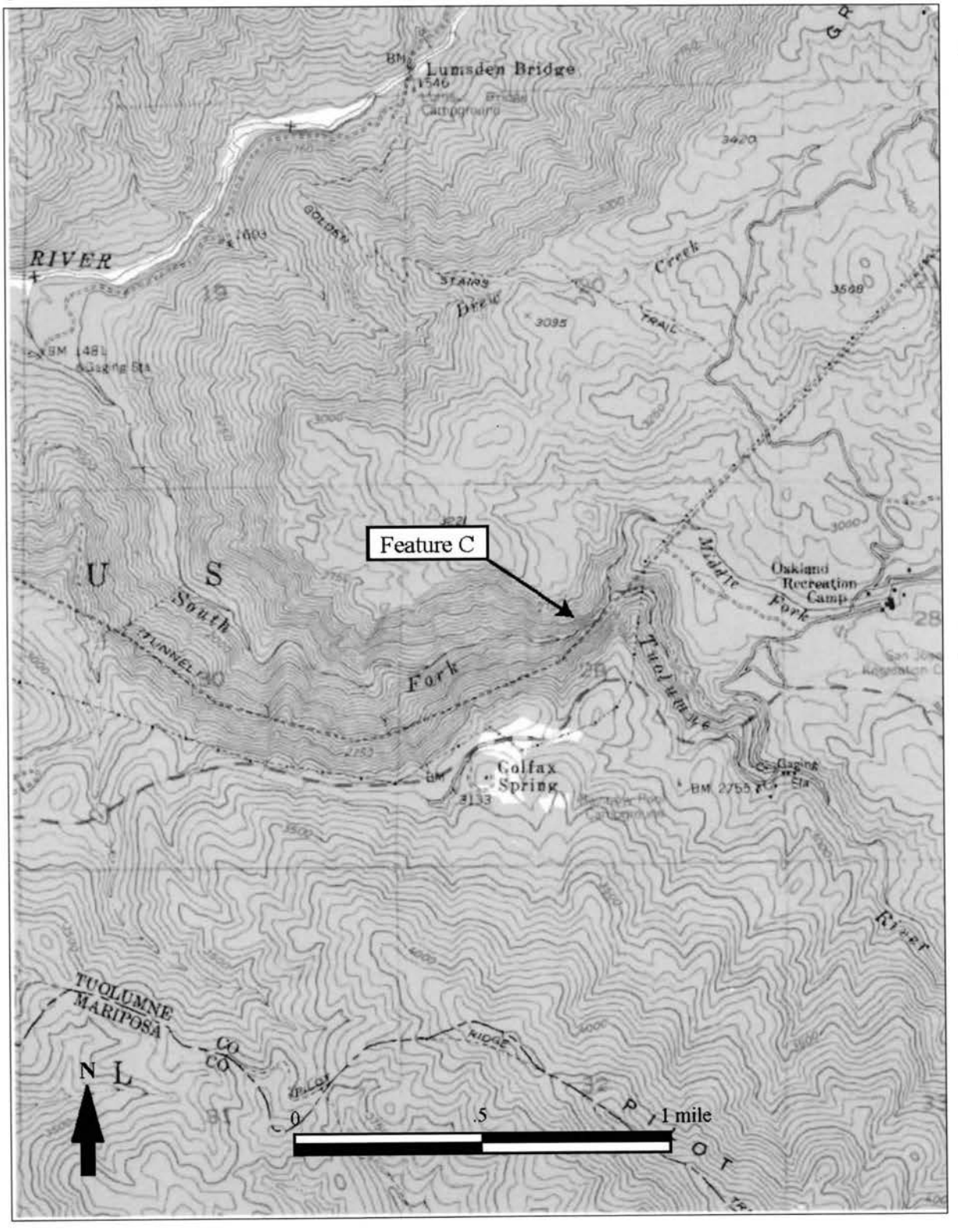
Photograph 5. View east showing north pipe entrance and stairs to access road.

Photograph 6. View west from access road showing shotcrete reinforcement (above pier), and access cable.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary# P-55-002994
HRI#
Trinomial CA-TUO-2016H

Page 6 **of** 7 ***Resource Name or #** (Assigned by recorder): CA-TUO-2016H/Hetch Hetchy Aqueduct and Mountain Tunnel
***Map Name** Jawbone Ridge ***Scale:** 1:24,000 ***Date of Map:** 1947 (photorevised 1979)

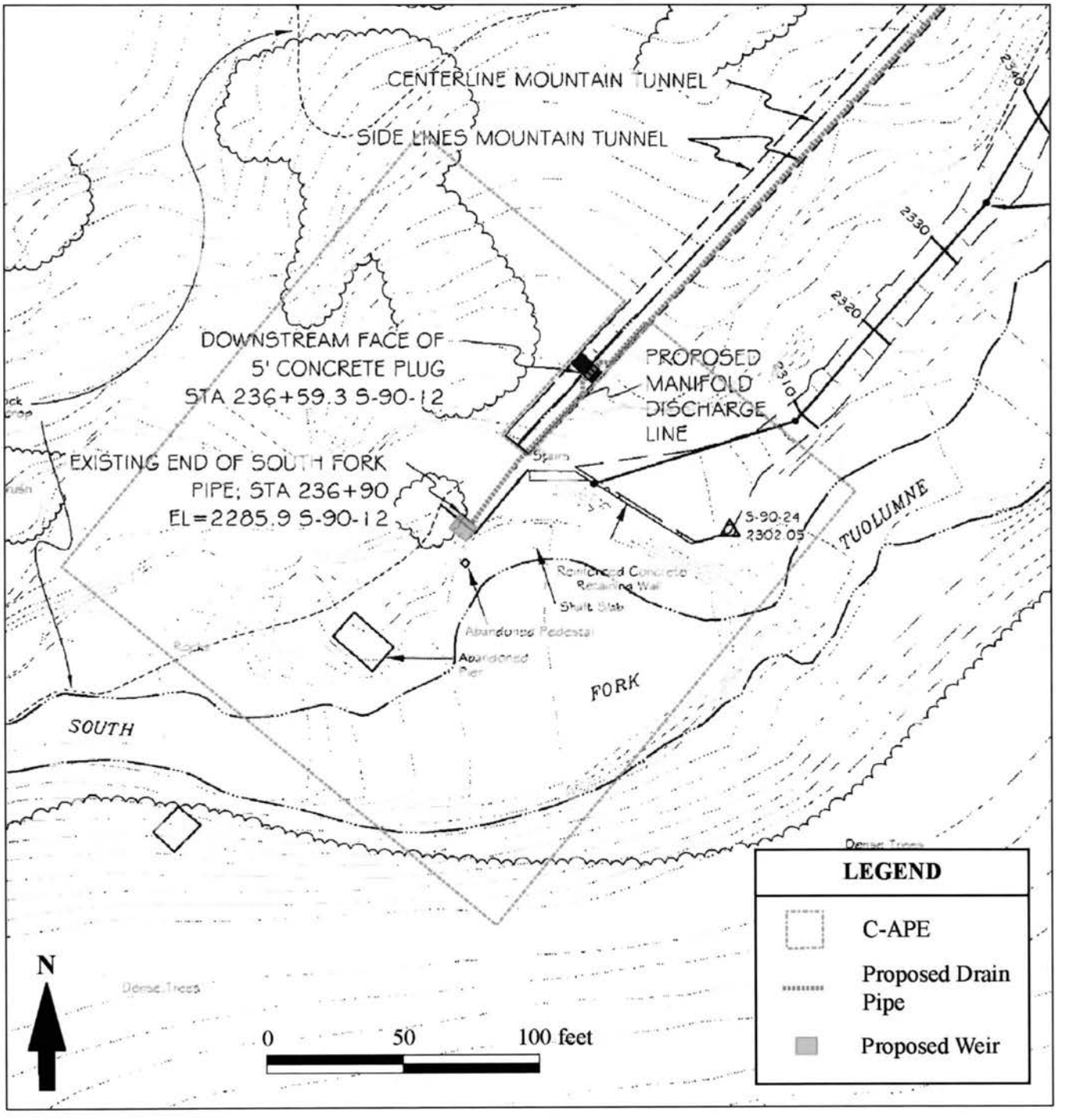


*Required Information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary# P-55-002994
HRI#
Trinomial CA-TUO-2016H

 ***Resource Name or #** (Assigned by recorder): CA-TUO-2016H/Hetch Hetchy Aqueduct and Mountain Tunnel
***Drawn by:** Drew Bailey ***Date:** 10/22/08



*Required Information

State of California The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-55-002994
HRI #
Trinomial CA-TUO-2016H
NRHP Status Code 3S
Other Listings
Review Code _____ Reviewer _____ Date _____

Page 1 of 6 *Resource Name or #: (Assigned by recorder) San Joaquin Pipelines No. 1 & 2 9/08
P1. Other Identifier: numerous maps filed in Redstone
*P2. Location: Not for Publication ✓ Unrestricted
*a. County Tuolumne, Stanislaus, San Joaquin and (P2c, P2e, and P2b or P2d. Attach a Location Map as necessary.)
*b. USGS 7.5' Quad (multiple) Date T ; R ; of of Sec ; B.M.
c. Address City Zip
d. UTM: (Give more than one for large and/or linear resources) Zone 10, mE/ mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
Stretches from the Oakdale Portal to the Tesla Portal between MP 49.84 to MP 97.26.

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

San Joaquin Pipelines No. 1-3 (SJPLs) run east-west, connecting the Foothill Tunnel at the Oakdale Portal to the east with the Coast Range Tunnel at the Tesla Portal to the west and conveying water across 47.5 miles of the San Joaquin Valley. When located underground, they are buried on average 9 feet underneath fields and orchards in the valley (Simpson, 2005). Short stretches of the pipe are aboveground and supported on concrete piers.

San Joaquin Pipeline No. 1 was constructed in 1932 as part of the original plan for the San Francisco regional water system. San Joaquin Pipeline No. 2 was added in 1953, , as the fulfillment of Joseph Freeman's 1912 plan for two pipelines. San Joaquin Pipeline No. 3 is a modern structure built in 1968 (SFPUC, 2004). (See continuation sheet.)

*P3b. Resource Attributes: (List attributes and codes) HP11 -- engineering structure
*P4. Resources Present: ___ Building ✓ Structure ___ Object ___ Site ___ District ___ Element of District ___ Other (Isolates, etc.)

P5b. Description of Photo: (view, date, accession #) San Joaquin Pipelines, looking south, 7/27/06
*P6. Date Constructed/Age and Source: ✓ Historic ___ Prehistoric ___ Both
1932, 1953; SFPUC Regional Water System Facility Data Sheets
*P7. Owner and Address:
San Francisco Public Utilities Commission, 1155 Market Street
San Francisco, CA. 94103
*P8. Recorded by: (Name, affiliation, and address)
Carey & Co.
460 Bush Street
San Francisco, CA. 94108
*P9. Date Recorded:
8/13/2007
*P10. Survey Type: (Describe)
Intensive Survey

*P11. Report Citation: (Cite survey report and other sources, or enter "none.")
San Francisco Public Utilities Commission, San Joaquin Pipeline Existing Conditions Report, 2007.

*Attachments: ___NONE ___Location Map ✓Continuation Sheet ✓Building, Structure, and Object Record
___Archaeological Record ___District Record ___Linear Feature Record ___Milling Station Record ___Rock Art Record
___Artifact Record ___Photograph Record ___ Other (List):

State of California The Resources Agency Primary # P-55-002994
DEPARTMENT OF PARKS AND RECREATION HRI#
BUILDING, STRUCTURE, AND OBJECT RECORD CA-TUO-2016H

*NRHP Status Code 3S

Page 2 of 6 *Resource Name or # (Assigned by recorder) San Joaquin Pipelines No. 1 & 2

B1. Historic Name: San Joaquin Pipelines
B2. Common Name: San Joaquin Pipelines
B3. Original Use: Water Conveyance B4. Present Use: Water Conveyance
*B5. Architectural Style: N/A
*B6. Construction History: (Construction date, alterations, and date of alterations)

Pipeline No. 1 was constructed in 1932. Pipeline No. 2 was constructed in 1953. Pipeline No. 3 was constructed in 1968.

*B7. Moved? ✓No _Yes _Unknown Date: _____ Original Location: _____
*B8. Related Features:

Oakdale Portal Facility, Tesla Portal Facility

B9a. Architect: SFPUC b. Builder: Youdall, Artukovich, UCPC
*B10. Significance: Theme San Francisco Water System development Area Northern California

Period of Significance 1932-1953 Property Type Pipeline Applicable Criteria A, C

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

SJPLs No. 1 and No. 2 appear to be eligible for the National Register and the CRHR. SJPLs No. 1 and No. 2's period of significance falls between 1932 and 1953. This corresponds with the construction of SJPL No. 1 and associated structures, and continues through the arrival of Hetch Hetchy water into San Francisco in 1934. It also includes a period of expansion and improvement from 1935 to 1953, concluding with the completion of SJPL No. 2 in 1953. The SJPLs' character-defining features include the cylindrical shape throughout its length, the diameter (SJPL No. 1 varies in diameter from 56-72 inches, and the SJPL No. 2's diameter is 61 inches throughout its length), the use to convey water via gravity flow from the Foothill Tunnel to the Coast Range Tunnel, the parallel positioning of the pipelines visible when they run above-ground, the construction materials (SJPL No. 1 is a steel pipe with a cement mortar lining, and SJPL No. 2 is partially a steel pipe with a cement mortar lining and partially a reinforced concrete cylinder pipe). (See continuation sheet.)

B11. Additional Resource Attributes: (List attributes and codes) HP11 -- engineering structure
*B12. References:

(See continuation sheet.)

B13. Remarks:

*B14. Evaluator: E. Schultz & A. Vanderslice, Carey & Co.
*Date of Evaluation: 8/13/2007

(This space reserved for official comments.)

P3a. Description

San Joaquin Pipeline No. 1: San Joaquin Pipeline No. 1 is a steel pipe with a cement mortar lining that varies in diameter from 56 inches at the Oakdale Portal to 72 inches at the Tesla Portal. The thickness of the pipe shell varies from 5/16 inch to 1/2 inch. Its longitudinal seams are welded throughout, and its circumferential joints are welded easterly for 6.25 miles with the remainder riveted. The pipeline has a flow capacity of 70 mgd (SFPUC, 1994).

In 1931, the San Francisco Board of Public Works awarded Contract No. 123 for the pipeline's construction to the Youdall Construction Company located in San Francisco. The SFPUC's *Annual Report* in 1938 states that the construction of the pipeline incorporated a number of uncommon engineering and construction methods. For example, Youdall used an improved trenching machine to excavate the trench at a low cost and fast speed. In addition, "the use of a concrete envelope around the pipe as a protection against corrosive soil waters resulted in development of a highly satisfactory machine for spiral wrapping of mortar around the pipe" by the subcontractor W. A. Kraner of the Cement Wrapped Pipe Company. Lastly, Youdall used pumps placed at regular intervals parallel to the trench in order to drain water from the trench at the areas where it was submerged while crossing the San Joaquin River and Elliots Cut (SFPUC, 1933).

SJPL No. 1 was originally coated on the inside with asphalt and wrapped in asphalt felt (Hatoff et al, 1995). In 1951, the SFPUC determined that the existing lining was badly eroded or worn away and that it should be replaced before the completion of the SJPL No. 2 in 1953 (Olson, 1951). A cement mortar lining was placed in the pipeline between the Tesla Portal and the San Joaquin River in 1952, between the San Joaquin River and Coffee Road in 1953, between Coffee Road and Cashman Creek in 1954, and between Cashman Creek and the Oakdale Portal in 1955. The Pipe Linings, Inc. won the contract in 1955 to reline the pipeline between Cashman Creek and the Oakdale Portal (Helbush, 1955).

San Joaquin Pipeline No. 2: Constructed between 1948 and 1953, the San Joaquin Pipeline No. 2 has a 61-inch diameter. 28.7 miles of the pipeline are constructed of steel with a 3/4 inch cement mortar coating and a 1/2 inch cement mortar lining; the remaining 18.7 miles are constructed of a reinforced concrete cylinder pipe (SFPUC, 1994). It has a flow capacity of 80 mgd.

Although SJPL No 2. was constructed over two decades later in 1953, it was deemed a necessary addition to the water system as soon as SJPL No. 1 was completed in 1932, and as noted above, two pipelines were always considered part of Freeman's original system plan. According to the SFPUC, SJPL No. 1 was viewed as a limiting factor in the overall amount of water the system could transmit from Hetch Hetchy to San Francisco, since it could only deliver 70 mgd. Their Annual Report in 1938 stated, "when greater capacity is required, many years hence, it will only be necessary to build a secondary San Joaquin pipe line, as all other divisions of the aqueduct are already of much greater capacity" (SFPUC, 1938).

The pipeline was divided into five sections that were constructed separately one after the other by two construction companies based in Los Angeles. P J. Artukovich, Inc. constructed two sections using cement mortar lined and coated steel cylinder pipes fabricated by the Western Pipe and Steel Company of South San Francisco. The United Concrete Pipe Corporation (UCPC) constructed the three remaining sections using fabricated precast reinforced concrete pipes fabricated in their Stockton plant (Condon, n. d.). The following chart outlines the location of the pipeline's five sections and the year they were completed:

Year	Contract No.	Contractor	Length of Pipeline	Completed
1948	206-B	Artukovich	Waterford Rd. to the San Joaquin Valve House	1949
1948	206-D	UCPC	San Joaquin River to Tesla Portal	1949
1949	216	UCPC	San Joaquin River to the San Joaquin Valve House	1950
1950	230	Artukovich	Cashman Creek to Waterford Rd.	1952
1950	230	UCPC	Oakdale Portal to Cashman Creek	1952

In addition to the pipeline's installation, manholes with 18-inch diameters were constructed to provide access to the pipeline for maintenance purposes following its completion, and air, vacuum, and blowoff valves were also constructed as a safety measure. The manholes and valves are located in reinforced concrete box structures that extend approximately 1 to 11 feet above the ground (Condon, n. d.).

B10. Significance

The boundary of this resource includes the entire 47.5-mile-long San Joaquin Pipeline (SJPL) right-of-way (ROW) (expanded SJPL ROW), including the lands surrounding both the Oakdale and Tesla Portals.). The SJPL ROW width varies between 200 feet from Oakdale Portal to Emery Road, 110 feet from Emery Road to Tesla Portal, and 135 to 150 feet over sections at the San Joaquin River.

SJPLs No. 1 and No. 2 appear to be significant under National Register Criterion A and CRHR Criterion 1 at the local level due to their association with the development of the San Francisco water system, which is significant for influencing the growth and prosperity of the San Francisco Bay Area. The municipal water system was also an important shift in the delivery of water to San Francisco. The delivery of water from Hetch Hetchy resolved long standing water shortage issues in the city, and other Bay Area communities, and provided higher quality of water.

As stated previously in the historical context, the Hetch Hetchy system was planned as a major part of the movement to wrest control of the water supply from Spring Valley Water Company; while parts of the systems overlap or were temporarily used by the Spring Valley Water Company (like Bay Division Pipeline No. 1), the overwhelming acceptance of the Hetch Hetchy system by the citizens of San Francisco represents a distinct break from the reliance on private water company developments to provide San Francisco with its municipal water supply. The city's municipal water system increased reliability and provided a level of service that the Spring Valley Water Company was unable to achieve.

SJPLs No. 1 and No. 2 were an integral part of the city's design for the municipal water system, and as noted above were designed to be constructed in phases. In anticipation of the Bay Area's growing need for water, O'Shaughnessy created a 100-foot right-of-way that provided sufficient space to build four parallel pipelines during different phases (SFPUC, 2005). SJPLs No. 1 and No. 2 were planned from the project's beginning and were constructed over two decades. As key components of the overall water system, SJPLs No. 1 and No. 2 convey water from the Foothill Tunnel to the Coast Range Tunnel.

*Recorded by: Carey & Co. Inc. *Date: 8/13/2007 ☒ Continuation ☐ Update

Additionally, SJPL No. 1 appears to be eligible at the local level under National Register Criterion C and CRHR Criterion 3 for the innovative engineering techniques used by the Youdall Company during its construction and recognized by the SFPUC.

SJPLs No. 1 and No. 2 do not appear to be eligible for listing in the National Register under Criteria B and/or D or the CRHR under Criteria 2 and/or 4. They do not appear to be directly associated with specific persons that have had a broad-reaching impact on the community at the local, state, or national level. Additionally, the pipelines do not appear to possess the potential to yield information important to the prehistory or history of the local area, state, or the nation. Lastly, SJPL No. 2 does not appear to be eligible for the National Register under Criterion C and the CRHR under Criterion 3. Although it is an integral component of the overall water system, the pipeline does not represent a significant engineering evolution or a design innovation.

SJPLs No. 1 and No. 2 appear to retain good integrity, including their integrity of materials, workmansbip, and design. The relining of SJPL No. 1 occurred during the period of significance and does not diminish its integrity. In addition, routine maintenance such as patching and recoating are not considered to be significant enough to alter integrity. They maintain their integrity of setting and location, having never been moved. Lastly, they retain their integrity of feeling and association by referencing the greater extent of the water system. SJPLs No. 1 and No. 2 appear to be eligible for the National Register and/or the CRHR.

SJPL No. 3 is an improvement to the system that provides additional capacity; however, it does not convey the historic significance of the system in the same way as do SJPLs No. 1 and No. 2. In addition, SJPL No. 3 is less than 45 years old, and does not appear to possess the exceptional importance required to meet Criteria Consideration G for recently constructed resources and therefore does not appear to be eligible for listing in the National Register or the CRHR.

B12. References

City and County of San Francisco, Public Utilities Commission (SFPUC). *Annual Report of the San Francisco Public Utilities Commission, Fiscal Years 1931-1932 and 1932-1933.*

City and County of San Francisco, Public Utilities Commission (SFPUC). *Annual Report of the San Francisco Public Utilities Commission, Fiscal Years 1937-1938.*

City and County of San Francisco, Public Utilities Commission (SFPUC). *Data Book: Data Concerning San Francisco Water Department and Hetch Hetchy Water & Power, Catchments, Storage and Transmission Facilities*, 1994.

City and County of San Francisco, Public Utilities Commission (SFPUC). *Regional Water System Facility Data Sheets*, 2004.

Condon, Thomas. *History of the San Joaquin Pipeline No. 2, 1948-1952.* Archives, Hetch Hetchy Water and Power, City and County of San Francisco Public Utilities Commission, Moccasin, CA (Box 693), n.d.

Hatoff, Brian, Barbara Voss, Sharon Waechter and Steven Wee. *Cultural Resources Inventory Report for the Proposed Majove Northward Expansion Project.* Prepared for the Mojave Pipeline Company. On file at the CCIC, File # 2759, 1995.

Helbush, W. W. Letter to B. W. Grethel, 3 August 1955. Archives, Hetch Hetchy Water and Power, City and County of San Francisco Public Utilities Commission, Moccasin, CA, 1955.

Olson, A.O. Letter to the United Concrete Pipe Corporation, 15 February 1950. Archives, Hetch Hetchy Water and Power, City and County of San Francisco Public Utilities Commission, Moccasin, CA (Box 385), 1951.

Simpson, John Warfield. *Dam! Water, Power, Politics, and Preservation in Hetch Hetchy and Yosemite National Park.* New York: Pantheon Books, 2005.

Quadrangle Maps for 3 County
Hetch Hetchy Aqueduct & Tunnel
San Joaquin Pipelines No. 1 & 2
P-55-002994, P-50-000074, P-39-004860

Lone Tree Creek 7.5'-SJO

Cedar Mountain 7.5'-SJO

Tracy 7.5'-SJO

Vernalis 7.5'-SJO/STA

Solyo 7.5'-SJO/STA

Ripon 7.5'-STA

Salida 7.5'-STA

Riverbank 7.5'-STA

Waterford 7.5'-STA

Paulsell 7.5'-STA

Knights Ferry 7.5'-STA

Keystone 7.5'-STA/TUO

Chinese Camp 7.5'-TUO

Moccasin 7.5'-TUO

Groveland 7.5'-TUO

Jawbone Ridge 7.5'-TUO

Ascension Mountain 7.5'-TUO

SJO PL's No 1 & 2 (& 3)
do not go east past
the Keystone 7.5' Quad
at the Oakdale Portal

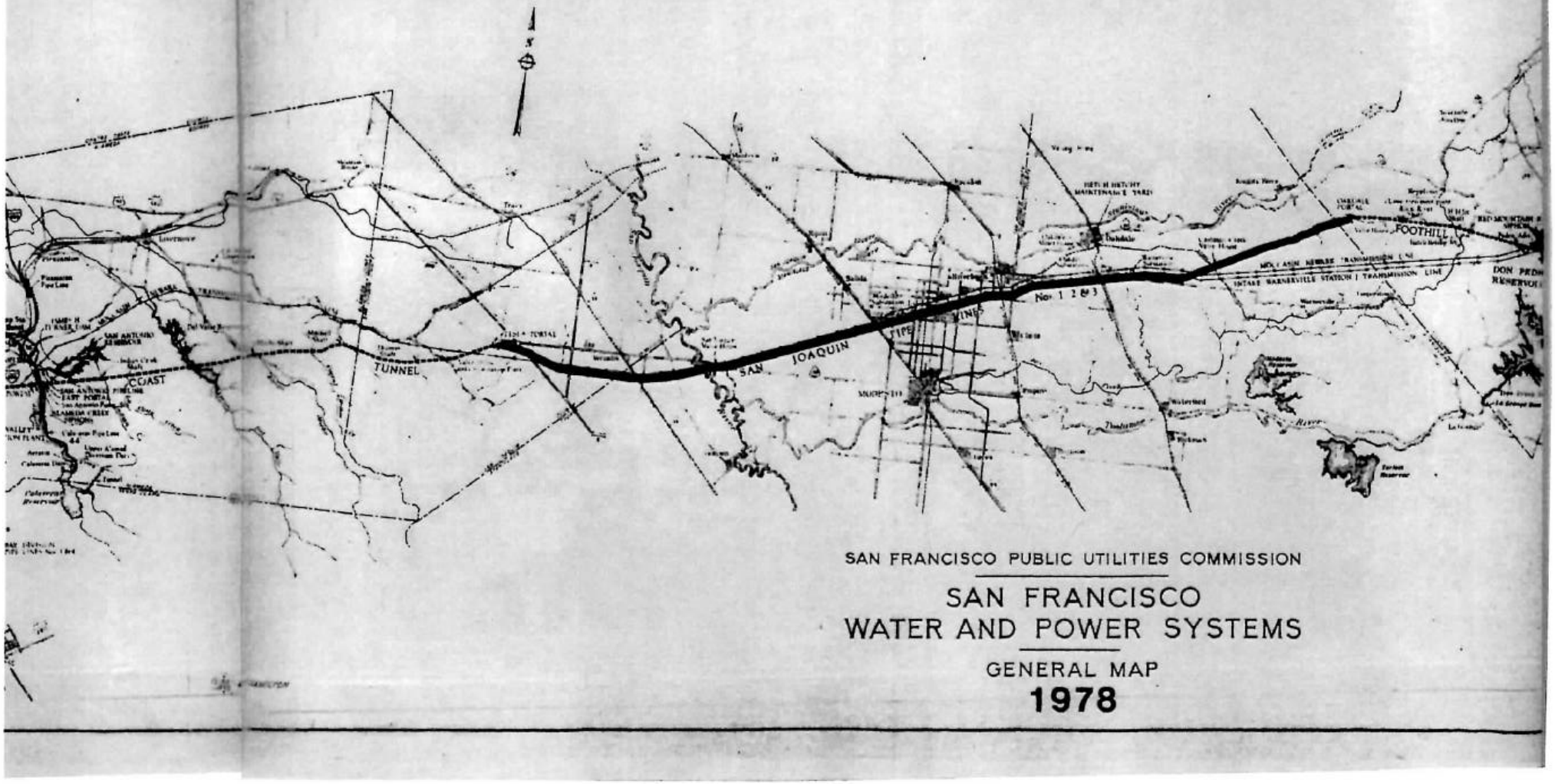
Cherry Lake South-TUO (not plotted, aqueduct and tunnel do not appear on quad map)

S F WATER DEPT STORAGE RESERVOIRS IN BAY AREA		
NAME	Capacity Acre Feet	Capacity Million gallons
CALAVERAS	96,850	31,560
CRYSTAL SPRINGS	69,300	22,580
SAN ANDREAS	19,000	6,190
PILARCITOS	3,100	1,010
SAN ANTONIO	50,500	16,455

ELECTRIC TRANSMISSION LINES					
FROM	TO	MILES	STRUCTURE	CIRCUITS	VOLTS
MOCCASIN P H	NEWARK SUB.	98.6	STEEL TOWER	2	115,000
D R HOLM P H	INTAKE SWYD	1.6	"	2	
RC KIRKWOOD P H	INTAKE SWYD	0.6	"	2	230,000
INTAKE SWYD.	WARNERVILLE SUB.	48.4	"	2	
WARNERVILLE SUB	SUBSTATION J	12.5	"	2	115,000

HYDROELECTRIC POWERHOUSES			
NAME	MOCCASIN	D R HOLM	RC KIRKWOOD
COMMENCED OPERATION	1969	1960	1967
NUMBER OF UNITS	2	2	2
TURBINES TYPE	VERTICAL REVERSIBLE PUMP-TURBINE	VERTICAL REVERSIBLE PUMP-TURBINE	VERTICAL REVERSIBLE PUMP-TURBINE
TURBINES SPEED-RPM	300	400	327
TURBINES DESIGN HEAD-FEET	1147	2,230	1,245
TURBINES RATED PLANT H.P.	143,000	187,000	106,000
GENERATORS RATED PLANT KVA	100,000	150,000	75,000
GENERATORS RATED POWER FACTOR	0.90	0.90	0.90
GENERATORS VOLTAGE - KILOVOLTS	13.8	13.8	13.8

NAME
HETCH HETCHY
LAKE LLOYD
LAKE ELEANOR
INTAKE
PRIEST
MOCCASIN



SAN FRANCISCO PUBLIC UTILITIES COMMISSION

SAN FRANCISCO WATER AND POWER SYSTEMS

GENERAL MAP

1978

CA-TUO-2016H

File #: FS

CULTURAL SITE RECORD

P-55-002994

17 pages

* Jawbone Ridge, Groveland 7.5'

FIELD # (optional): 05-16-54-500 STATE #:
MAP: (Continued), ', 19 AERIAL PHOTO:
COUNTY: Tuolumne CONTOUR: > (continued) feet + Msl
MERIDIAN: Mt. Diablo T (continued) 1/4, Sec.
U.T.M.G.: Zone ; mE/ mN
LAT./LONG. (optional): ° ' " W Long/ ° ' " N Lat.
SITE LOCATION (give bearings and distances wherever possible):
Point where site enters the Ferretti Timber compartment: 146°/580m from knoll (3300'+) in SW¼ of SE¼ of Sec. 20 (T1S, R18E); 328°/300m from knoll (2900' +) in SE¼ of NE¼ of Sec. 29 (T1S R18E); 76°/1080m from knoll (3221') in NW¼ of NW¼ of Sec. 29 (T1S R18E); site extends W through the Ferretti Timber Compartment and the Shanahan Timber Compartment and exists the Shanahan Timber (cont.)
ACCESS: To ACT at Feature B: Hwy 120 (E) from Groveland for approx. 6.0 mi,; left (NW) on Ferretti Rd. for 1.1 mi.; right (N then E) on F.S. Rd. 1S1D for approx. 1.5 mi. to dirt road with locked gate; follow dirt road to tailings (cont.)
SITE DESCRIPTION (Be thorough, explicit and concise; this may be the only record ever made of this resource.): Site is a portion of the Hetch Hetchy Aqueduct, which transports water from Hetch Hetchy Reservoir to the San Francisco Bay Area, producing 325 megawatts of power en-route and delivering an average of 400 million gallons/day. The portion of the aqueduct which is dealt with in this report is a segment of a 19.0 mi. tunnel from Early Intake power-house to Priest Reservoir. The tunnel enters the Ferretti Timber Compartment near the confluence of the south and middle forks of the Tuolumne River and exits the compartment at the W boundary of Sec. 30 (T1S, R17E). The site then passes through isolated portions of the Shanahan Timber Compartment before exiting that compartment in the SW¼ of SW¼ of Sec. 27 (T1S, R16E). This segment of tunnel is approx. 11 1/8 miles in length. The tunnel was constructed (cont.)
SITE TYPE: Water transportation system (tunnel).
DIMENSIONS: 17,800 meters E - W × 300 meters N - S (cf. plan)
ESTIMATED AREA: 400,000 square meters. DESCRIBE THE METHOD USED TO DETERMINE SITE EXTENT AND BOUNDARIES:
U.S.G.S. topographic map to estimate length of recorded segment of tunnel and to locate positions of all features. Metric and standard tape measure used to map features A and B.
DEPTH OF CULTURAL DEPOSIT: Maximum cm; Mean cm.
DESCRIBE METHOD USED TO DETERMINE DEPTH: Site is a tunnel with an approx. depth of 1000' below ground surface; debris piles at adits may have a subsurface component.
BIOTIC SETTING (Life zones, communities and habitats):
Upper Sonoran and transition zone; Digger pine/oak savannah, ponderosa pine forest; riparian habitat.

CA-TUO-2016 H
P-55-002994
(2)

Site #:
Field #: 05-16-54-500

ON-SITE VEGETATION TYPE(S): (At adits) Digger pine/oak savannah, with some ponderosa pine forest and riparian.

Species:				
Digger pine	25%	Poison oak	10	%
Mixed oaks	25%	Toyon/manzanita	10	%
Ponderosa pine	20%	Ferns	10	%

SURROUNDING VEGETATION TYPE(S): Same as above.

Species:			
	%		%
	%		%
	%		%

LOCAL FAUNA: Deer, red-tailed hawks, robins, unidentified small birds, woodpeckers, ground squirrels.

SOIL OF SITE: A very dark gray, medium-grained, rocky, clayey loam; Munsell soil color code: 10YR 3/1 (at adits). Tunnel is excavated through granite and metamorphic bedrock.

ADJACENT SOIL(S): Same as above.

GEOLOGY: Area underlain by granite and metamorphic rock with area of exposed granite and schist bedrock. Soils are granitic and schistose in origin.

LANDFORM: Steep N-facing slopes in E½ of site with ridgeline and flats in the W½.

SLOPE: 0-60° Aspect: N slopes and ridgelines.

INSOLATION: N/A

EXPOSURE TO WIND AND PRECIPITATION: N/A

NEARBY WATER: Distance in-site meters; Direction in-site
Nature of water source/name Hetch Hetchy Aqueduct.
Flow direction W Amount of water 400,000,000 gal/day.

SITE MODIFICATIONS (cultural or natural, including erosion, grading, illicit digging, etc.): Tunnel is experiencing erosion to cement lining from water flow; waste rock and associated debris are being eroded by seasonal rains.

PREVIOUS STUDY (nature of work, date, investigator, reference):
Feature "B" may have previously been recorded by the Forest Service, Stanislaus National Forest, as 05-16-54-138; site record not available.

ARTIFACTS: Collected ___ Left in situ ✓ Describe types, numbers, materials, distribution: All Artifacts are located at adits and consists of various sizes of milled lumber, round nails, misc. metal debris, metal strapping, hole-in-top soldered cans, nuts and bolts, bars, rods, metal benches, corrugated roofing, narrow-gauge (light duty) railroad rails, railroad spikes, (cont.)

CA-TUO-2016 #
P-55-002994

(3)

Site #:
Field #: 05-16-54-500

FEATURES (Describe briefly; attach supplemental data as needed):
Feature A: an adit to provide access to the aqueduct tunnel and, during construction, to remove rock debris; consists of a large waste rock pile, six equipment platforms, a trench associated with an equipment platform, (cont.)

CULTURE HISTORICAL INFERENCES: Site used for transportation of water and hydroelectric power production to and for the San Francisco Bay area, from the mid-1920s to the present.

APPARENT SIGNIFICANCE OF SITE: Site can provide data on hydroelectric engineering technology of the 1920s and water economics of the 20th century.

NATIONAL REGISTER STATUS: Probably eligible.

POTENTIAL IMPACTS TO SITE AND/OR ITS INTEGRITY: Logging and related activities could damage external portions of site; repair, rebuilding, or abandonment of segments could damage integrity.

COMMENTS: Site Features C-H were not visited due to extreme slopes and time constraints. Information on Hetch Hetchy Water System obtained from: the Tues., Dec. 16, 1980 edition of the Daily Union Democrat, Sonora, CA.; Groveland Community Services District; City and County of San Francisco (cont.)

OWNER (Name and address): Hetch Hetchy Water and Power, San Francisco, CA

TENANT: None known.

PHOTOGRAPHS (Number b/w, color, chrome; subjects):
Ten B/W, Plus-X (see photo records).

PHOTO REPOSITORY: Stanislaus National Forest, Sonora, CA.

PHOTO CATALOGUE Nos.: Roll #72: Frames 13-17; Roll 71: frames 9-13.

SITE RECORDER(S): Rick Kardash/H. K. Gibbs.

DATE: 1/26/81

APPENDED DOCUMENTS:

Photographic records (2)
Continuation sheets (3)
Site map additions (7)
Feature map

See attached maps.

PORTION OF U.S.G.S.
(see continuation sheet).
MAP SHOWING SITE LOCATION→

CA-TUO-2016H

P-55-002994

(4)

Site #:

Field #: 05-16-54-500

SKETCH MAP OF SITE

Key to Maps (pages 6-11)

Compartment Boundary

==== Hetch Hetchy Aqueduct Tunnel

Power Transmission Lines

Highway 120 (paved)

Private Property

~2000' Contour

Features A, B, D, E, F, G, H - Adits

Feature C - siphon

0 1/4 1/2

miles

Scale 1" = 1/4 mile

(1) Indicate magnetic north. (2) Show scale, if appropriate. (3) Use conventional U.S.G.S. map symbols to the extent possible. (4) Clearly identify all special symbols. COMMENTS:

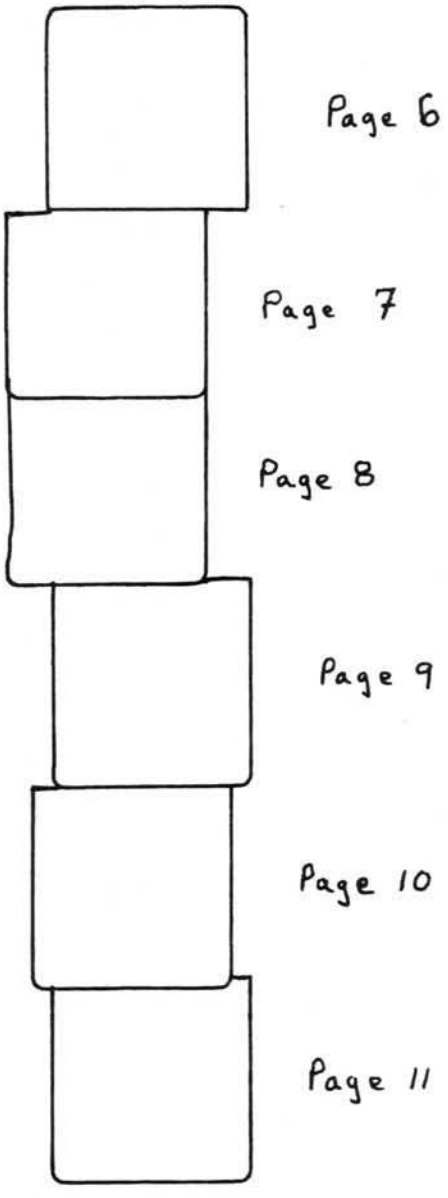
DRAWN BY: H. Gibbs/R. Kardash DATE: 1/26/81

CA-TUO-2010H

P-55-002994

Site #05-16-54-500

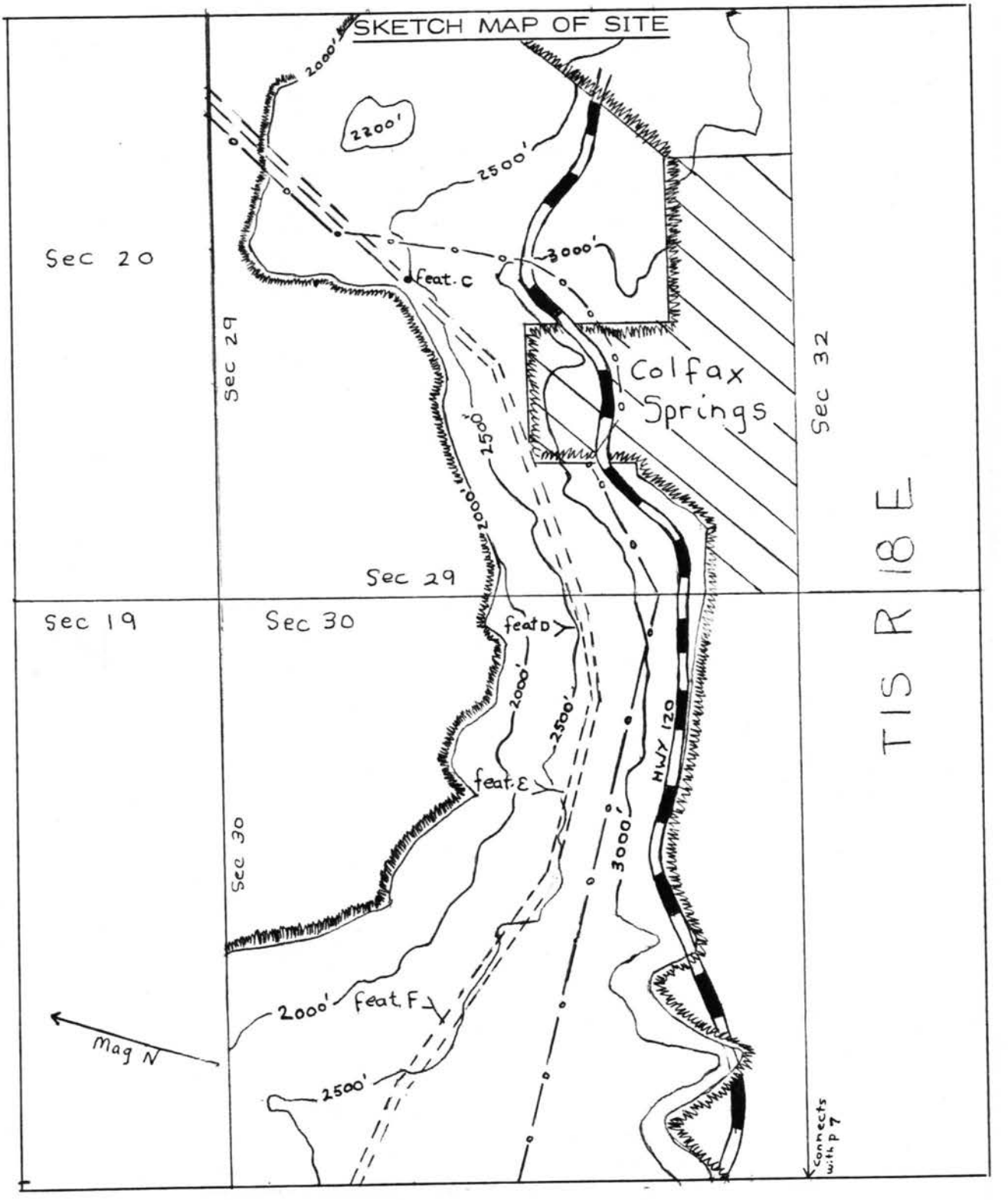
Relative Position of Maps:



CA-TUO-2016 H

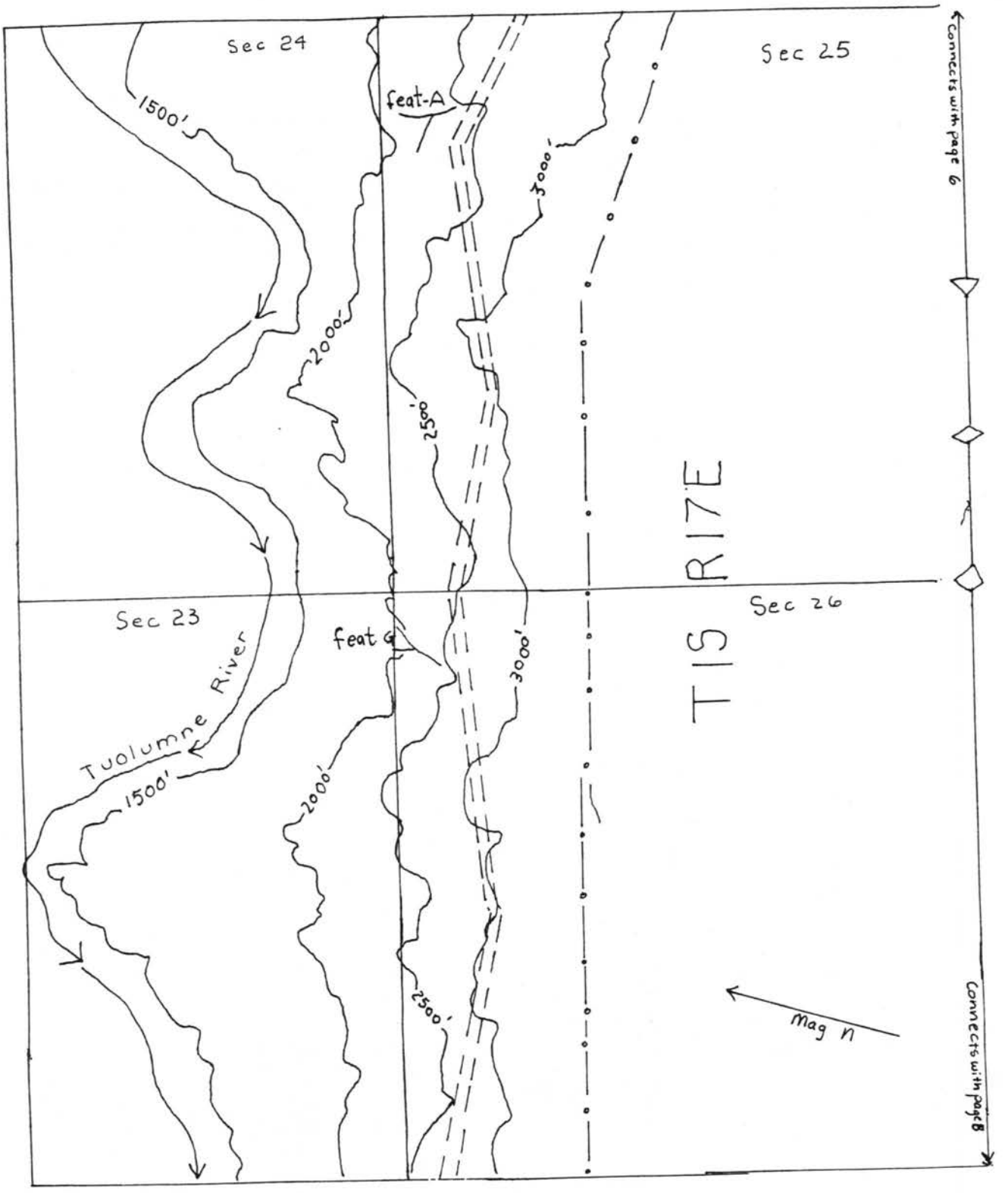
P-55-002994

05-16-54-500



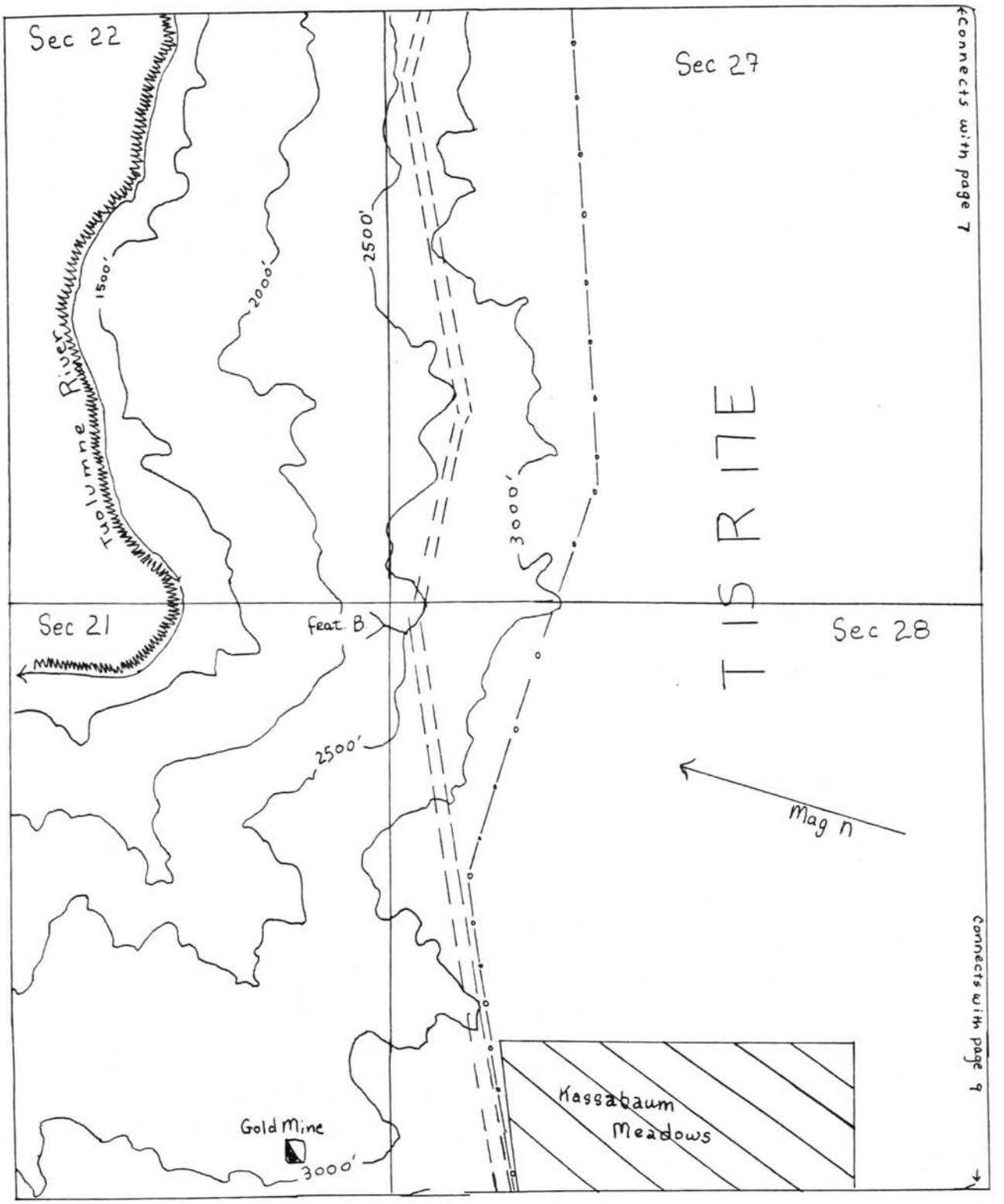
CA-TUO-2016 H

P-55-002994



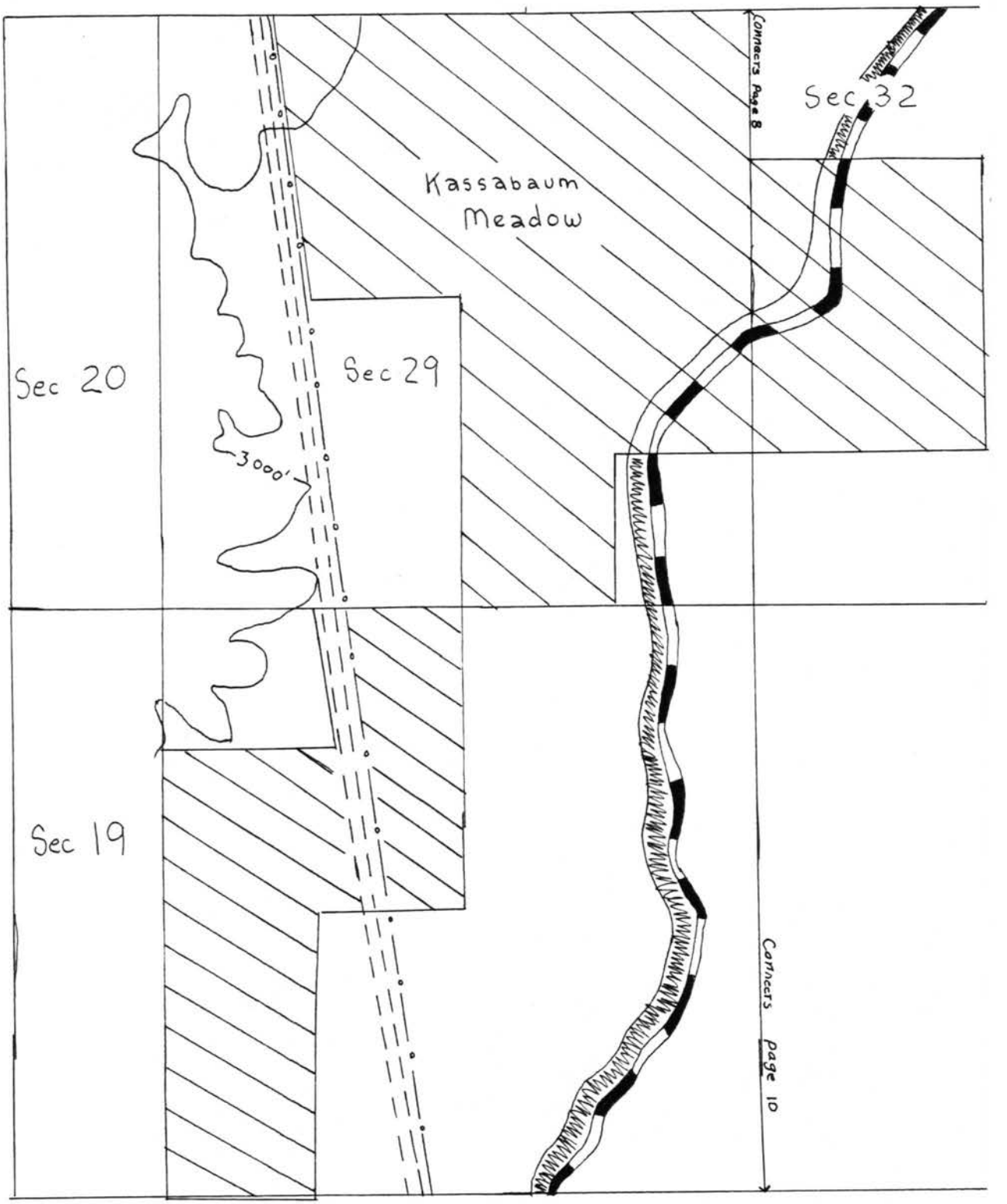
CA-TUO-2010 H

P-55-002994



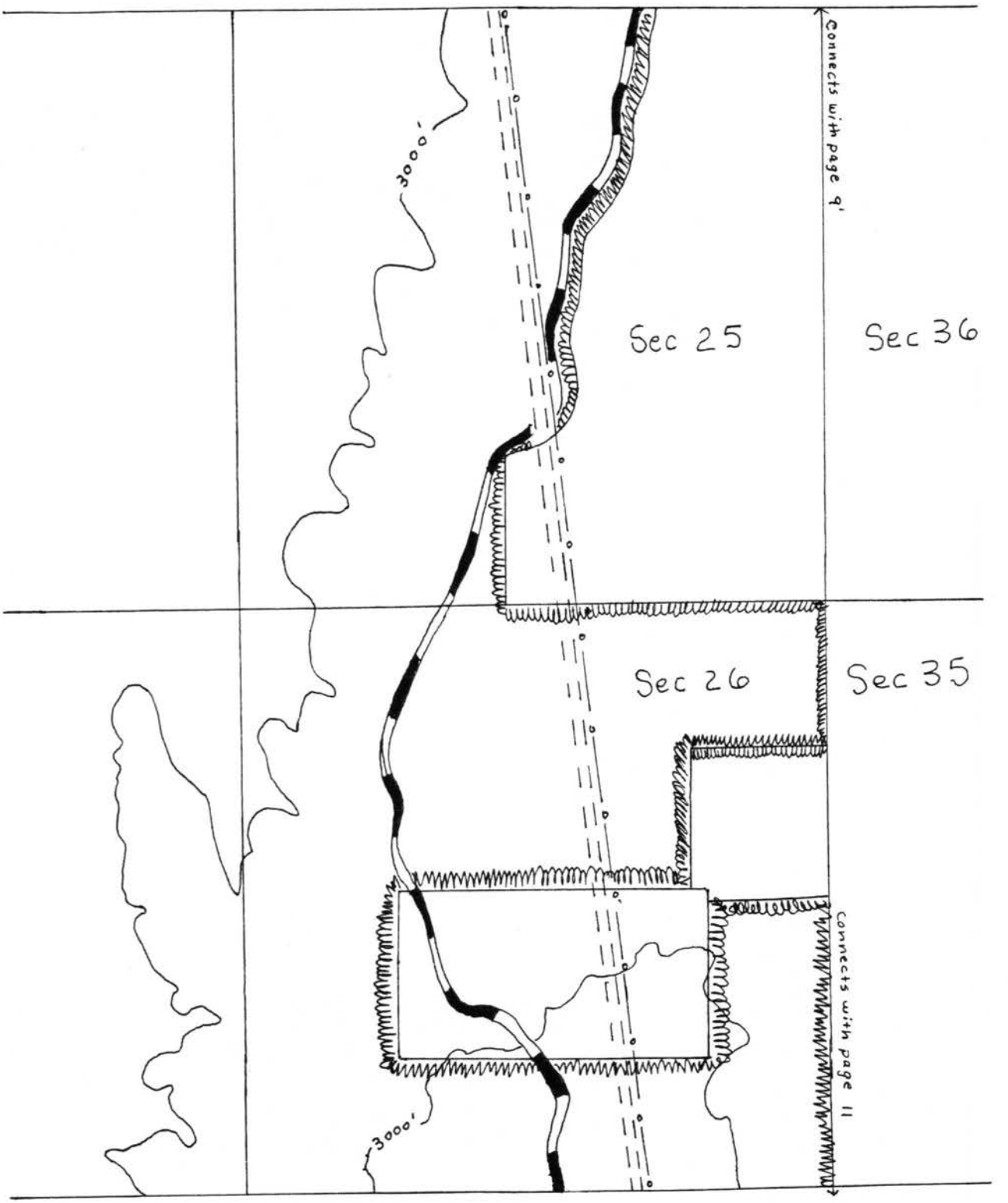
CA-TOO-2016 H

P-55-002994



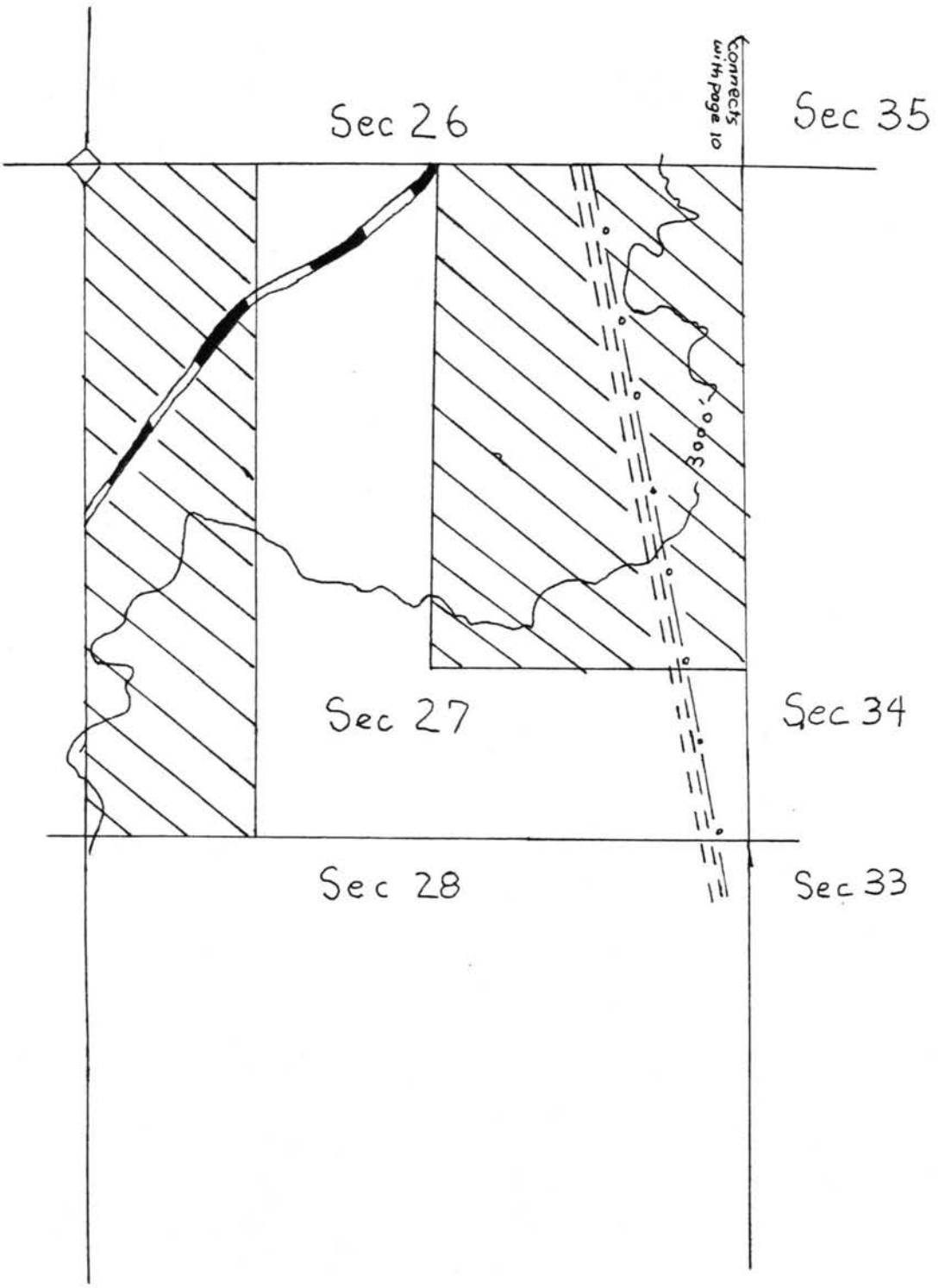
CA-TUO-2016 H

P-55-002994



CA-TUO-2016 H

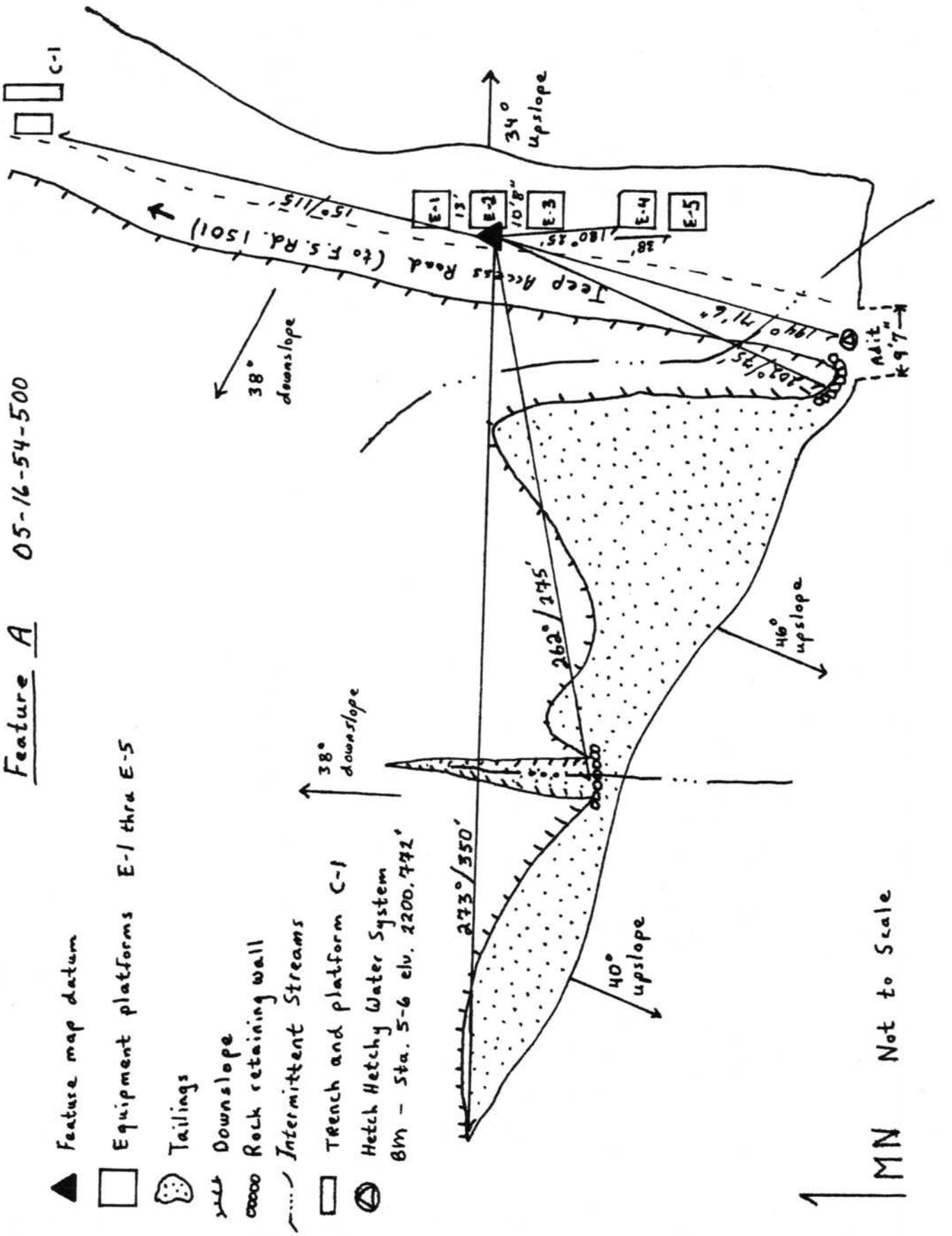
P-55-002994



CA-TUO-2016H

P-55-002994

05-16-54-500



CA -TUO-2016 H

P-55-002994

CULTURAL SITE RECORD

Field #: 05-16-54-500 State #:

Item #	CONTINUED DATA
Map: (page 1)	Jawbone Ridge U.S.G.S. 7.5 (1947, photorevised 1979); Groveland U.S.G.S. 7.5 (1947, photorevised 1973).
Contour: (page 1)	71800' (<2400', approx. 2300'; site is underground an average of 1000' however bench marks at adit entrances give elevations of 2200', 2249' and 2230'.
Township and Range: (page 1)	T1S, R18E: site enter the Ferretti Timber Compartment in the NE¼ ofNE¼ of Sec. 29 and continues SW through Sec. 29 and NW through Sec. 30. T1S, R17E: Sections 25, 26, 27, 28, 29, and 30, where it leaves the Ferretti Timber Compartment. T1S, R16E: site enters the Shanahan Timber Compartment in the N½ of the SW¼ of Sec. 25 for approx. 1/3 mile; leaves the compartment and re-enters in the NE¼ of SW¼ of Sec. 26 for approx. ¼ mi.; leaves the compartment and re-enters in the SW¼ of SW¼ of Sec. 27 for approx. ¼ mi. before leaving the compartment.
U.T.M.G.: (page 1)	Point where site enters the Ferretti Timber Compartment: 762675mE/ 4191075mN; Feature A: 759600mE/4190875mN; Feature B: 755000mE/ 4191000mN; point where site exits the Ferretti Timber Compartment: 750125mE/4190075mN; point where site enters the Shanahan Timber Compartment: 748850mE/418975mN; point where site exits the Shanahan Timber Compartment: 745275mE/4189150mN.
Site Location: (page 1)	Compartment at a point 133°/500m from knoll (3624') in the center of the E½ of Sec. 28 (T1S, R16E); 9°/400m from knoll (3400' +) in the center of the NE¼ of NE¼ of Sec. 33 (T1S, R16E); 141°/120m from knoll (3500' +) in the SE¼ of SE¼ of Sec. 28 (T1S, R16E).
Access: (page 1)	pile at Feature B.
Site Description: (page 1)	in 1925 by Hetch Hetchy Water System employees to supply power and water to the Bay area. The tunnel is approx. 10' in diam. and is lined with cement in areas of soft rock and is bored through rock in areas of granite. Eight features are located along the length of the recorded portion of the site. Features A and B are adits with water rock associated equipment platforms, and metal and wood debris; Feature C is a siphon, which crosses 70' beneath the S. Fork Tuolumne River; Features D through H are also adits which, although not visited due to extreme slopes and time constraints, are believed to be similar to Features A and B (see "Features" page 3, for details
RECORDER(S)	R. Kardash/H. Gibbs DATE: 1/26/81

CA-TUO-2016 H

P-55-002994

CULTURAL SITE RECORD

Field #: 05-16-54-500 State #:

Item #	CONTINUED DATA
Site Description: (cont. p. 13)	of Features N through H). Water is drawn out of the tunnel at Big Creek Shaft (approx. 2 mi. W of Feature B) for local water use. Further W (near Second Garrotte) spring water enters the tunnel through pipes. Information in site description is primarily from an article in the Tues., Dec. 16, 1980 edition of the Daily Union Democrat , Sonora, CA., and from U.S.G.S. topographic maps, which show aqueduct route and adits. Adits were used to remove debris from tunnel during construction. Big Creek shaft provided access to the tunnel during construction.
Artifacts: (page 2)	railroad ties, various diam. steel cable, 3" diam pipe, 10" diam. riveted iron pipe, bottle fragments, flexible hoses, (for access roads), ore cart, 4" diam. pipe, 18" diam. riveted iron pipe, white glazed earthenware (hotel ware).
Features: (page 3)	an access road (once paved with asphalt), rock retaining walls for road, large amounts of wood, metal, and glass debris (see "Artifacts," page 2) and remnants of narrow-gauge railroad (to remove debris from tunnel). The adit has a large metal gate to limit access and, at the point where the adit meets the tunnel, a nine foot diam. plug allows access to the aqueduct (see Feature map A). Feature B: an adit similar to feature A and for the same purpose; consists of an access road, three equipment platforms, a large waste rock pile, large amount of wooden, metal, and glass debris, remnants of a narrow-gauge railroad (ore carts, rails, ties, and spikes); adit is totally cement-lined (Feature A adit is bare rock). Feature C: A siphon tunnel which allows water to cross below (70') the S. Fork Tuolumne River. Prior to the siphon's construction (unknown date) water flowed through pipe installed on the ground surface or on trestles (Feature C not visited). Features D through H: Adits which are presumed to be similar to Features A and B as they were constructed for the same purpose; adits were not visited due to extreme slopes and time constraints; some adits could be seen from F.S. Rd. 1S10 and have waste rock piles similar to Features A and B.
Comments: (page 3)	employees may be able to provide additional information on the Hetch Hetchy water system. Area Controlled Tag is located at Feature B.

RECORDER(S) R. Kardash/ H. Gibbs DATE: 1/26/81

CA-TUO-2016H

P-55-002994

CULTURAL SITE RECORD

Field #: 05-16-54-500 State #:

Item #	CONTINUED DATA
Portion of U.S.G.S. map: (page 3)	Jawbone Ridge 7.5 (1947, photorevised 1979) and Groveland 7.5' (1947, photorevised 1973).

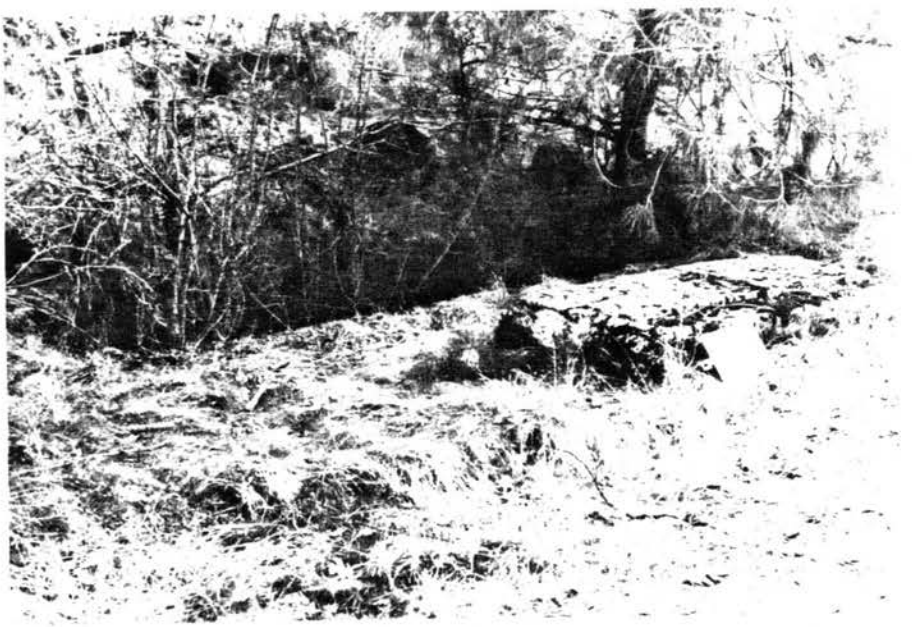
RECORDER(S) R. Kardash/H. Gibbs DATE: 1/26/81

CA-TUO-2016 H

ARCHAEOLOGICAL PHOTOGRAPHS P-55-002994

05-16-54-500

Roll: 72 Frame: 13 Date: 21 Jan.81
Subject: Aqueduct, Feature A: Platforms and adit, facing south.



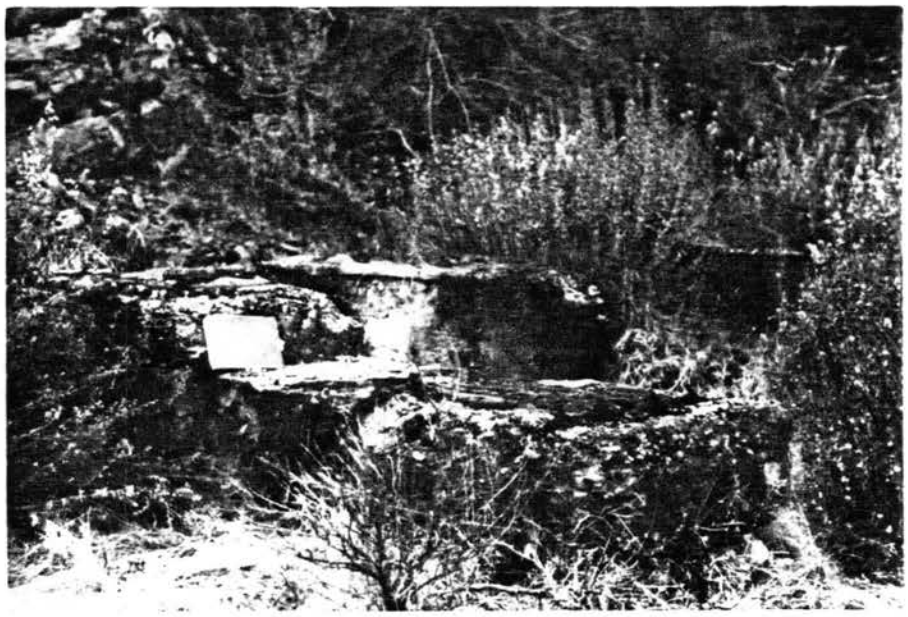
Roll: 72 Frame: 14 Date: 21 Jan.81
Subject: Aqueduct, Feature A: Platform and trench, facing southeast.

CA-TUO-2016H

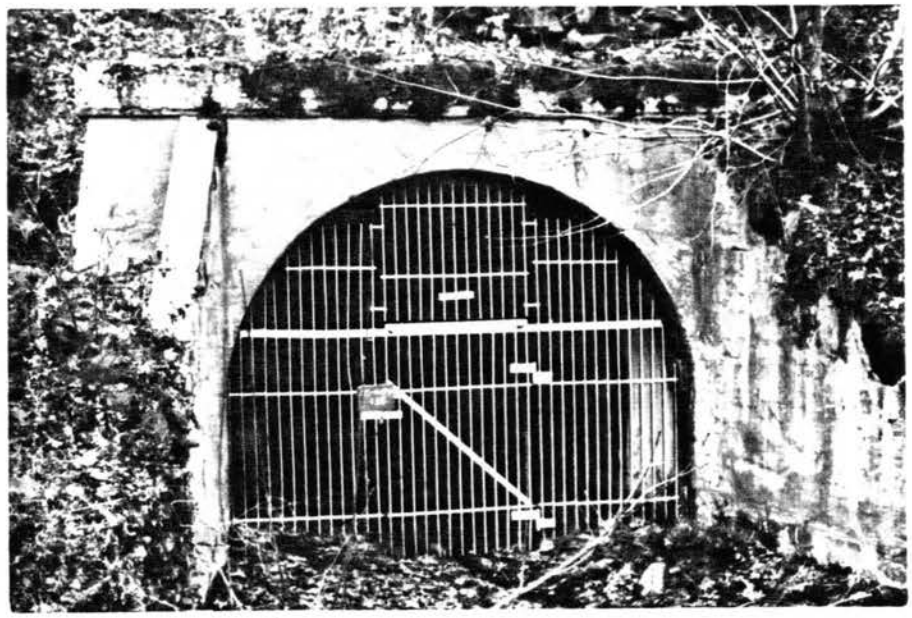
P-55-002994

ARCHAEOLOGICAL PHOTOGRAPHS

05-16-54-500



Roll: 71 Frame: 11 Date: 19 Jan.81
Subject: Feature B: Concrete platform, facing east.



Roll: 71 Frame: 12 Date: 19 Jan.81
Subject: Adit, facing southeast.

PRIMARY RECORD

CALIFORNIA Department of Parks and Recreation
Office of Historic Preservation

Primary # P55-442 Update 11/95
HRI #
Trinomial CA-TUO-3626H
NRHP Status Code 6Z

Page 1 of 5

Other Listings
Review Code ____ Reviewer ____ Date ____

Resource Identifier: Big Creek Shaft Can Dump - H.H.W.P.

P1. Location: a. County Tuolumne and (Address and/or UTM Coordinates. Attach Location Map as required)

b. Address:

City ____ Zip ____

c. **UTM:** USGS Quad Groveland, Calif. (7.5'/15') Date PR 1987; Zone 10, 751360 mE/ 4190300 mN

d. Other Location Data: (Enter parcel #, legal description, directions to resource, and/or other location data if appropriate)

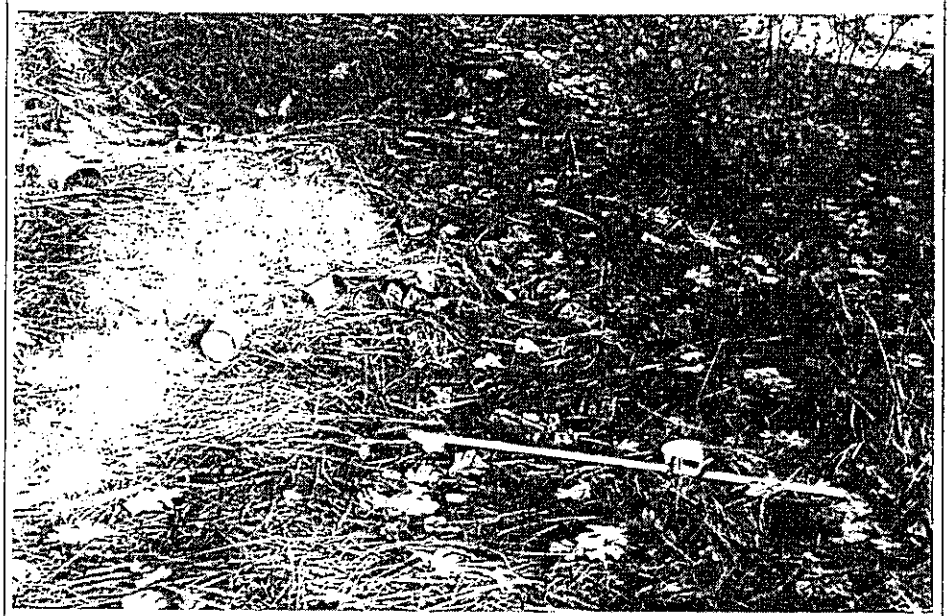
T.1S., R.17E., Section 30, NW¼ of NW¼ of SE¼ of NE¼. From Groveland, drive east on Highway 120 about 4 miles to Big Creek Shaft Road on the left. Turn left and drive north on Big Creek Shaft Road for a distance of .5 mi. Veer right onto a paved road underneath the power transmission line. Park underneath the first tower, about .1 mi. from Big Creek Shaft Road. Site is north (uphill) about 120 meters on a gentle slope with an open overstory of ponderosa pine.

P2. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)

This is an isolated trash concentration primarily composed of cans and one wide mouth jar and one ceramic cup on a slope north of Big Creek Shaft of the Hetch Hetchy Water System. About 30 cans are present in various stages of completeness. The surrounding slope has a fairly young growth of ponderosa pine and a grassy slope with black oak and manzanita.

P3. Resources Present: __ Building __ Structure __ Object X Site __ District __ Element of District

P4. Photograph or Drawing: (Photograph required for buildings, structures, and objects.)



P5. Date Constructed/Age:
__ Prehistoric X Historic __ Both
Shaft drilling began in 1918.

P6. Owner and Address:
City and County of San Francisco and Lew Behlman, Sandean Lane, Groveland, CA 95321

P7. Recorded by: (Name, affiliation, and address) Charla Meacham Francis and Mark V. Thornton, Sierra Heritage Services, 16198 Acorn Drive, Sonora, CA 95370

P8. Date Recorded: Jan. 18, 1995

P9. Type of Survey: X Intensive
__ Reconnaissance __ Other
Describe: to fully record site

P10. Report Citation: (Provide full citation or enter "none") Francis, C.M. and M.V. Thornton, 1995, *Archaeological and Historical Evaluation of CA-TUO-3625H, CA-TUO-3626H, P55-441, and P55-442*, prepared for Groveland Community Services District.

Attachments: __ None X Location Map X Continuation Sheet __ Building, Structure, and Object Record __ Linear Resource Record X Archaeological Record __ District Record __ Milling Station Record __ Rock Art Record __ Artifact Record __ Photograph Record __ Other: (List)

ARCHAEOLOGICAL SITE RECORD (Part 1)

CALIFORNIA Department of Parks and Recreation
Office of Historic Preservation

Primary # P55-442
Trinomial CA-TUO-3626H

Resource Identifier: Big Creek Shaft Can Dump - H.H.W.P.

A1. Resource Attributes: (List attributes and codes) AH4

A2. Dimensions: a. Length: 7 m (N-S) x **b. Width** 7 m (E-W)
Method of measurement: X Paced __ Taped __ Visual estimate __ Other:
Method of determination: (Check any that apply) X Artifacts __ Features __ Soil __ Vegetation __ Topography
__ Cut bank __ Animal burrow __ Excavation __ Property boundary __ Other: (Explain)

Reliability of determination: X High __ Low Explain:

Limitations: (Check any that apply) __ Restricted access __ Paved/built over __ Disturbances __ Site limits incompletely defined
__ Other: (Explain

A3. Depth: Surface __ None __ Unknown Method of determination:

A4. Human Remains: __ Present X Absent __ Possible __ Unknown (Explain):

A5. Features: (Number, briefly describe, indicate size, list associated cultural constituents, and show location of each feature on sketch map)

A6. Cultural Constituents: (Describe and quantify artifacts, ecofacts, cultural residues, etc., not associated with features)

Cans - Of about 30 cans, approximately 50% of them are evaporated milk 3" diameter x 4⅜" high. Other cans included a Hills Bros. 2½ pound coffee tin, an oil-type rectangular can with raised pour spout 7¼" high x 3-11/16" x 2⅝"; two rectangular cans of which one has a soldered hole-in-top 1¼" dia. towards one edge of the can end, these cans are 5¼" tall x 3" x 1⅞". Other sanitary seam cans are 3" dia. x 2-11/16" (1), 2⅝" dia. x 4" high (1), and a fragment of a 4⅝" high can. Other cans are too fragmentary to obtain useful measurements.
Glass - Modern 16 oz. Pepsi clear bottle and a clear jar fully machine made embossed "6" on bottom center.
Ceramic - white cup with curved handle with pink flower and green leaves pattern on 2 sides, no makers mark.

A7. Were Specimens Collected: X No __ Yes (If yes, attach Artifact Record or catalog and identify where specimens are curated)

A8. Site Conditions: __ Good X Fair __ Poor (Describe disturbances): There is a depression within the site boundary which may indicate bottle hunters have visited this site.

ARCHAEOLOGICAL SITE RECORD (Part 2)

CALIFORNIA Department of Parks and Recreation
Office of Historic Preservation

Primary # P55-442
Trinomial CA-TUO-3626H

Resource Identifier: Big Creek Shaft Can Dump - H.H.W.P.

A9. Nearest Water: (List type, distance, and direction.) Seasonal, 400' (122 m), east

A10. Elevation: 2825 feet above mean sea level

A11. Environmental Setting: (Describe vegetation, fauna, soils, geology, landform, slope, aspect, exposure, etc., as appropriate.)
The site lies within an oak woodland/chaparral zone with ponderosa pine, black oak, and manzanita, on a gentle slope with a southern aspect overlooking Big Creek. Native soils are reddish brown sandy loam derived from granitic bedrock.

A12. Historical Information: (Note sources of provide full citations in Field A15 below.)
It is assumed this site relates to the Big Creek Shaft work during the period 1917 to 1925. Big Creek Camp, where workers lived who were employed during digging of the shaft and tunnel work from this location, was located to the west around the Hetch Hetchy railroad grade.

A13. Age: __ Prehistoric __ Pre-Colonial (1500-1769) __ Spanish/Mexican (1769-1848) __ Early American (1848-1880)
__ Turn of Century (1880-1914) X Early 20th Century (1914-1945) __ Post WWII (1945+) __ Undetermined
Factual or estimated dates of occupation (explain):
Big Creek camp was occupied during the period 1917 to 1925.

A14. Remarks and Interpretations: (Discuss scientific, interpretive, ethnic, and other values of site, if known.)
Cans are household size, not company kitchen.

A15. References: (Give full citations including the names and addresses of any persons interviewed, if possible.)

See Item P10.

A16. Photographs: (List subjects, direction of view, and accession numbers or attach a Photograph Record.)
GCSD-1-95
Original media/negatives kept at: Mark V. Thornton, P.O. Box 192, Groveland, CA

A17. Form Prepared By: Charla Meacham Francis & Mark V. Thornton **Date:** Jan. 18, 1995
Affiliation and address: Sierra Heritage Services, 16198 Acorn Drive, Sonora, CA 95370

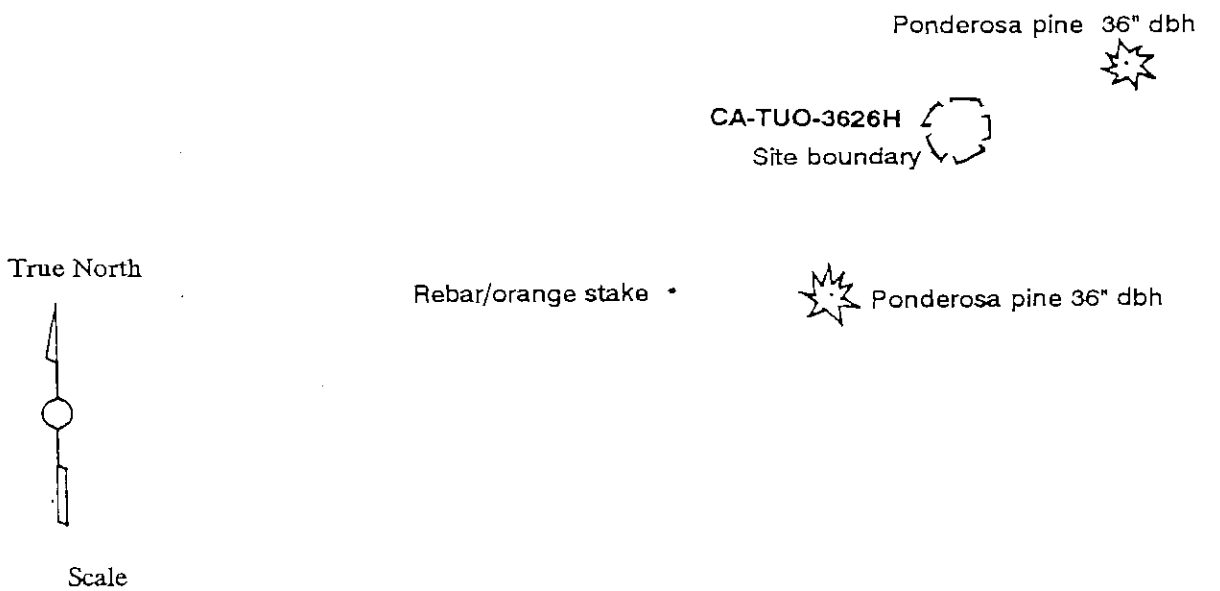
CONTINUATION SHEET

CALIFORNIA Department of Parks and Recreation
Office of Historic Preservation

Primary # P55-442
HRI #/Trinomial CA-TUO-3626H

X Continuation __ Update

Resource Identifier: Big Creek Shaft Can Dump - H.H.W.P.

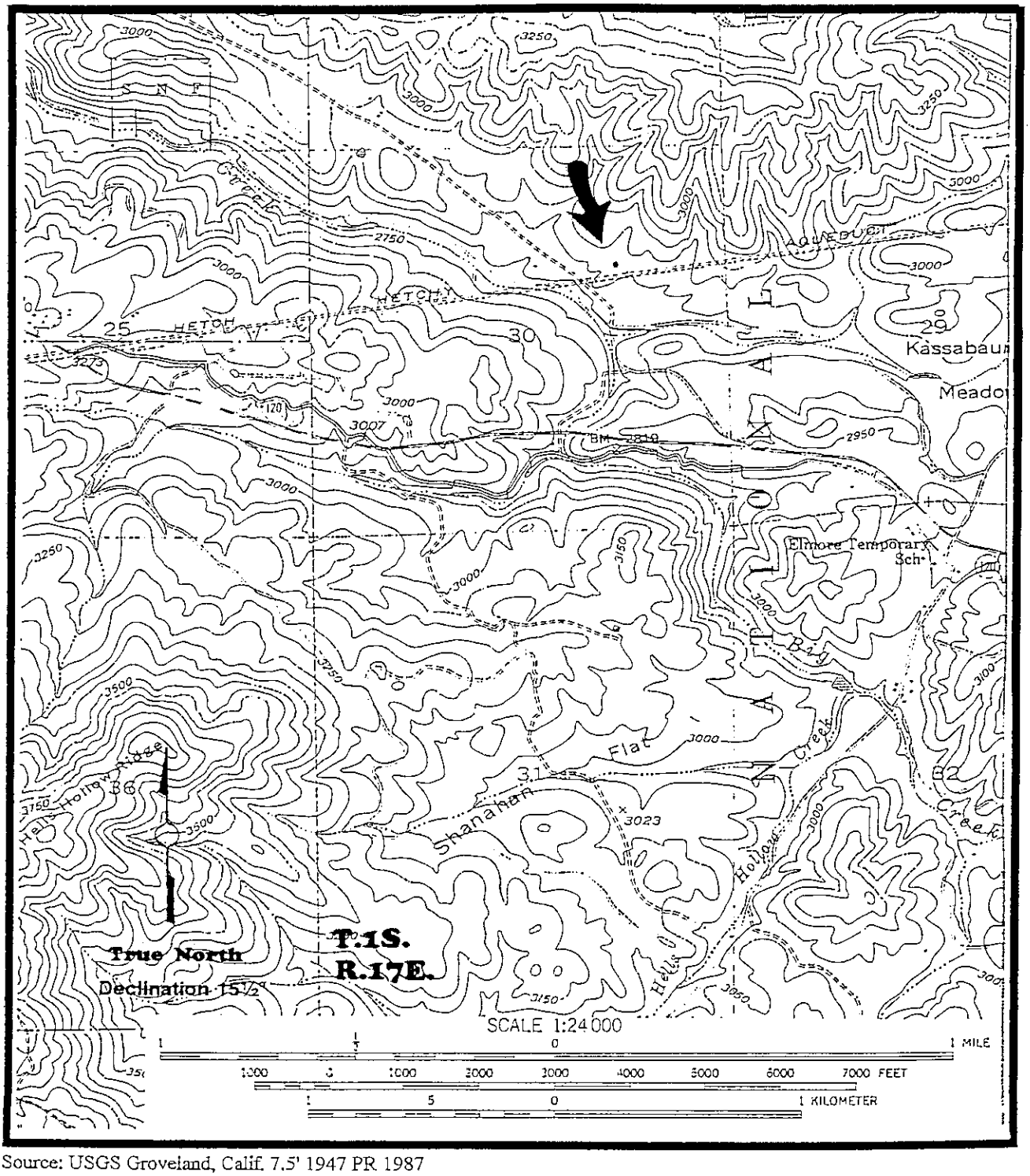


MAP SHEET

CALIFORNIA Department of Parks and Recreation
Office of Historic Preservation

Primary # P55-442
HRI #
Trinomial CA-TUO-3626H

Resource Identifier: Big Creek Shaft Can Dump - H.H.W.P.
Map Name: USGS Groveland, Calif. 7.5' **Scale:** 1:24000 **Date:** 1947 (PR 1987)



Source: USGS Groveland, Calif. 7.5' 1947 PR 1987
Contour interval 50 feet

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
ARCHAEOLOGICAL SITE RECORD
Page 1 of 4 .

Permanent Trinomial: CA-TUO-3624H Supplement ☐
Other Designations: Big Creek Alternatives
ASI -2

P55-442 12/94

1. County: Tuolomne

2. USGS Quad: Groveland (7.5') X (15') Photorevised 1991

3. UTM Coordinates: Zone 10 751160 m Easting 4190320 m Northing

4. Township: 1S Range 17E : NW 1/4 of NE 1/4 of SW 1/4 of NE 1/4 of Section 30 Base Mer. Mt. Diablo

5. Map Coordinates: 216 mmS 379 mmE (from NW corner of map)

6. Elevation: 2800

7. Location: From the intersection of Ferretti Road and Highway 1120, in Groveland, travel east ~4 miles to Big Creek Shaft Road. Site is ~1/3 mile at 10°.

8. Prehistoric_____ Historic X Protohistoric_____

9. Site Description: Tin can dump with 25 to 40 rusted tin cans on surface (sub-surface deposits evident). All appeared to be lipped seam with 1 solder top & 1 hole-in-top can observed.

10. Area 10 m (N/S) x 10 m (E/W) 100 m^2.

Method of Determination: pace / compass

11. Depth: unknown cm Method of Determination:

12. Features:

13. Artifacts: various tin cans and 1 ceramic cup (possible tea or coffee cup).

14. Non-Artifactual Constituents and Faunal Remains:

15. Date Recorded: 9/15/94

16. Recorded By: Emanuel Teixeira

17. Affiliation and Address: Archaeological Services, 8026 Lorraine Ave., Suite #218, Stockton, CA 95210

18. Human Remains: none observed

19. Site Disturbances: Cattle grazing

20. Nearest Water (type, distance and direction): Intermittent drainage, 20 meters, east

Permanent Trinomial: CA-TUO-3626H Supplement ☐
Other Designations: Big Creek Alternatives
ASI -2
P-55-442

21. Vegetation Community (site vicinity): Grasses, shrubs (manzanita), trees (pine)

22. Vegetation (on site): Grasses & trees (pine)

23. Site Soil: organic loam

24. Surrounding Soil: loam

25. Geology: Sierra Nevada Mountain Range.

26. Landform: Geology sloping knoll

27. Slope: 0

28. Exposure: 15%

29. Landowner (s) (and/or tenants) and Address:

30. Remarks: ASI 1 is 80-100 meters at a bearing of 202°. G.C.S.D. pump house is ~150m at 206°.

31. References:

32. Name of Project: Big Creek Alternative Sites [2465]

33. Type of Investigation: Survey

34. Site Accession Number:_____ Curated At:_____

35. Photos: none

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Permanent Trinomial: CA-TUO-3626H
mo. yr.

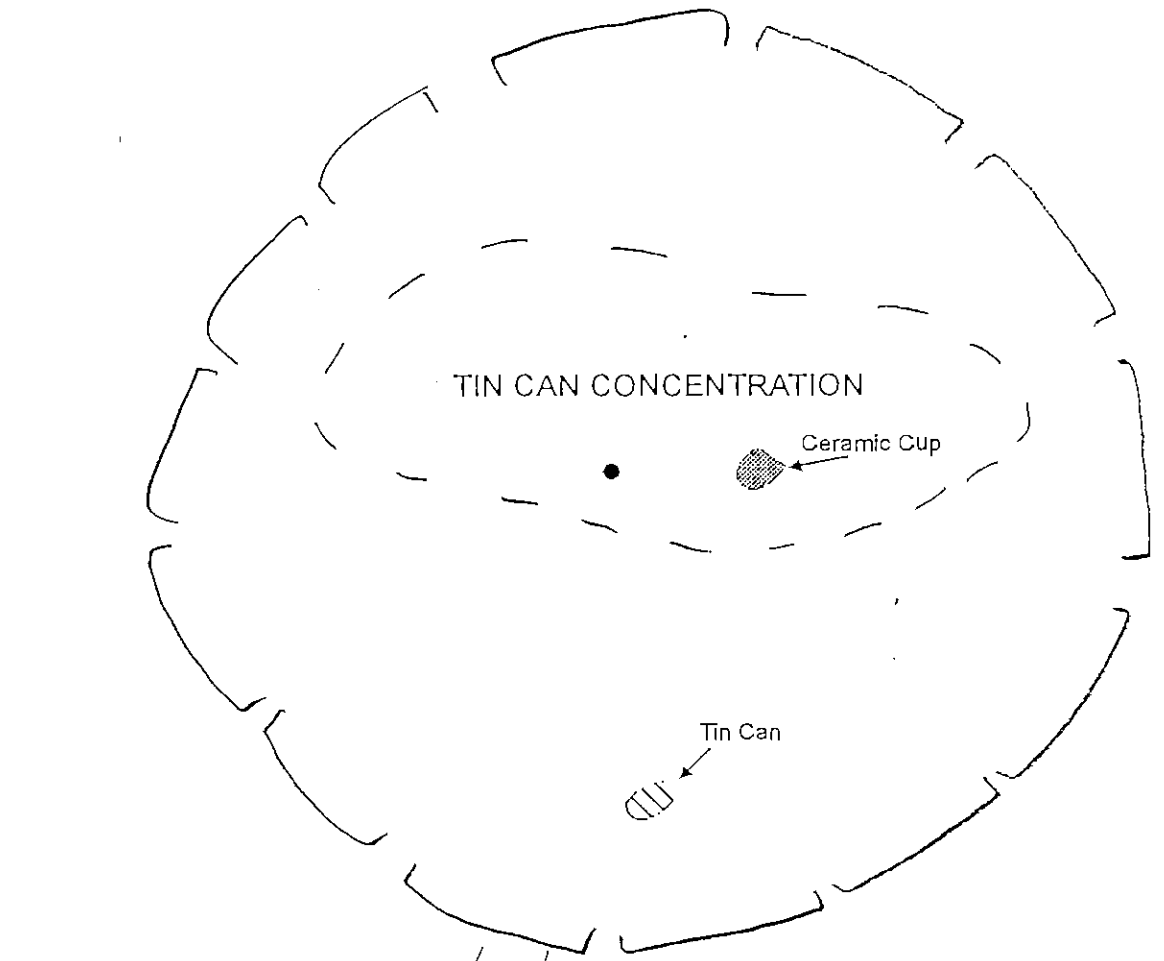
ARCHAEOLOGICAL SITE MAP

Temporary Number: ASI-2

Page 3 of 4.

Agency Designation: P55-442

Type of Feature: Tin Can Dump



N

To Pump House
206 degrees/150m

To ASI 2
202 degrees/80-100m

0 2 4 6
Scale in meters

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

ARCHEOLOGICAL SITE LOCATION MAP

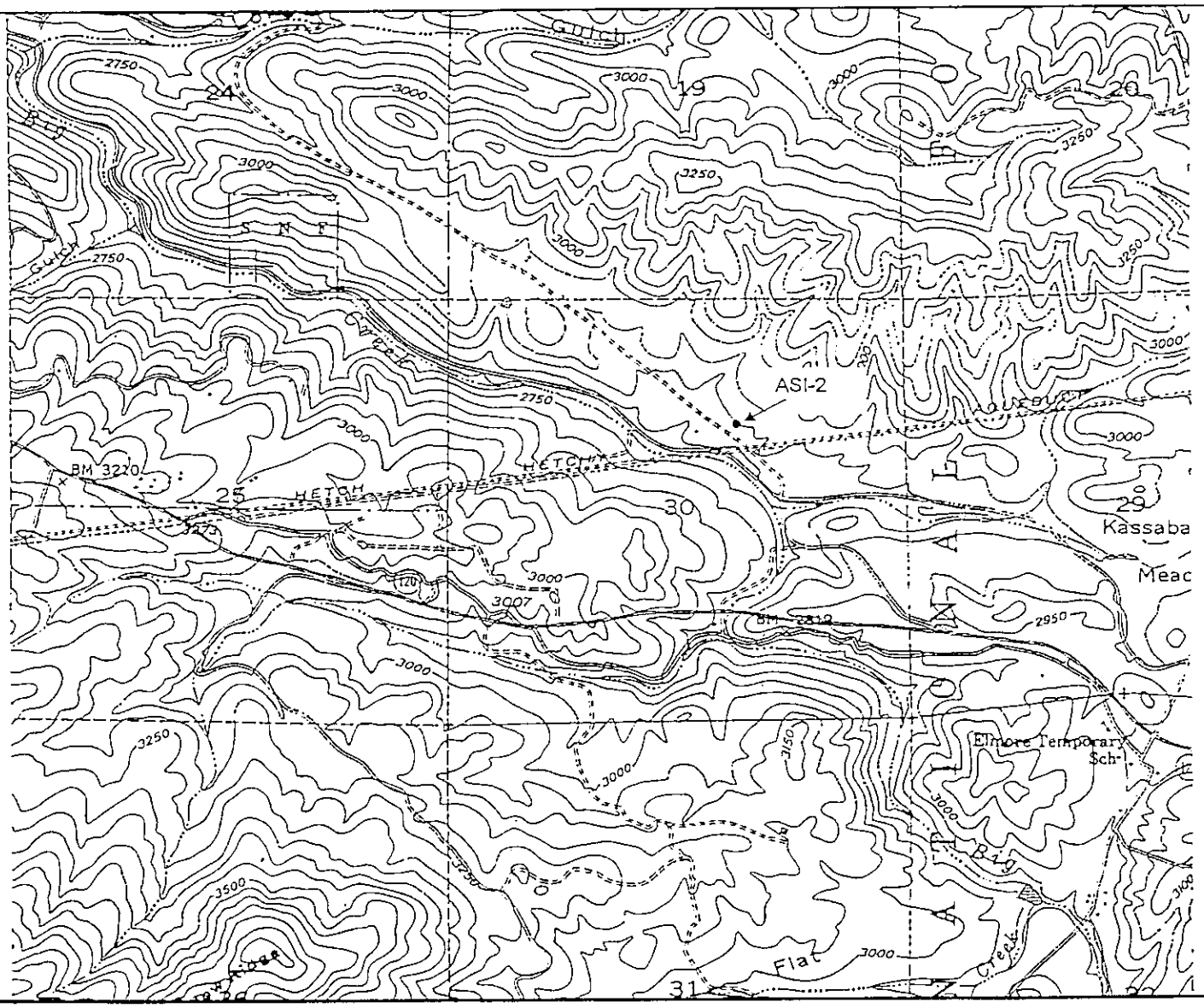
Page __4__ of __4__.

Permanent Trinomial: CA-TUO-3626H
mo. yr.

Temporary Number: _____ ASI-2 _____

Agency Designation: P55-42

Type of Feature:



SCALE 1:24000

1 MILE

7000 FEET

1 KILOMETER

CONTOUR INTERVAL 50 FEET

GN MN

1°43' 31 MILS

15 1/2° 276 MILS

UTM GRID AND 1987 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

QUADRANGLE LOCATION

***Recorded by:** A. Leon Guerrero and C. Simon ***Date:** May 3, 2018 ☐ Continuation ☒ Update

This is an update for P-55-00441, a historic-period resource, originally documented by Teixeira (1994), composed of seven concrete foundations and two metal containers. Francis and Thornton (1995) updated the record and identified the seven concrete foundations as well as two metal trays, tailings from the shaft drilling, a length of water pipe 7/8" outside diameter as well as glass, ceramic, and metal artifacts (see Plate 1). Glass artifacts included: colorless and amber glass vessel fragments; one colorless, oval bottle; one amber bottle with a rectangular base; and one complete green, machine-made bottle. Ceramics included: two insulators, one white cup fragment, one yellowish-brown vessel fragment, and one small fragment with a possible Blue Willow design. Metal included: thick gauge grate wire, wire rope, one round nose shovel blade, various thick metal sheets (some with bolt fasteners), metal straps with fasteners (e.g., long screws), nails ranging in size from 5d to 20d to 7-1/4 inch long, two canning jar seals, one round metal plate with three raised bolts, one galvanized can, one washer, one screw lid, one sanitary seam can, and miscellaneous metal fragments. One fire brick fragment was also noted.

AECOM (2018) re-located P-55-000441; however, most of the resource appeared to have been demolished and removed. The concrete foundations associated with P-55-000441 were not re-located; the features were likely demolished due to the installation of the water storage tank (post-1995) north of transmission tower (see Photograph 1and Continuation Sheet page 3, Figure 1).

However, AECOM re-located the tailings pile identified by Francis and Thornton (1995) and several fragments of ferrous metal hardware fragments (e.g., nuts, bolts, and washers) at the base of the transmission tower. The only other artifacts AECOM identified were a ferrous metal rectangular canister fragment and metal rope and strap, approximately 223 feet east of the site boundary (see Continuation Sheet page 3, Figure 1, and Photographs 2 and 3). These artifacts (the ferrous metal hardware, metal rectangular canister, and metal rope and strap) are industrial items and are consistent with artifact types identified by Francis and Thornton (1995). These artifacts and tailings are likely all that remains of P-55-000441.

Plate 1: Photograph of the concrete foundations and the transmission tower in background from Francis and Thornton (1995) site record.

Photograph 1: Overview of current site conditions at P-55-000441. Note transmission tower in left of frame, and the water storage tank and related infrastructure, in right of frame. The concrete foundations were located, approximately, in the area between the tower and the water storage tank. View west.

References:

AECOM, 2018. Historic Context and Archeological Survey Report for Mountain Tunnel Improvements Project, Tuolumne County, California. Prepared for the San Francisco Public Utilities Commission.

Francis, Charla Meacham and Mark V. Thornton, 1995. Update for P-55-000441. On file at the Central California Information Center, California Historical Resources Information System, California State University, Stanislaus, Turlock, California.

Teixeira, Emanuel, 1994. Site record for P-55-000441. On file at the Central California Information Center, California Historical Resources Information System, California State University, Stanislaus, Turlock, California.

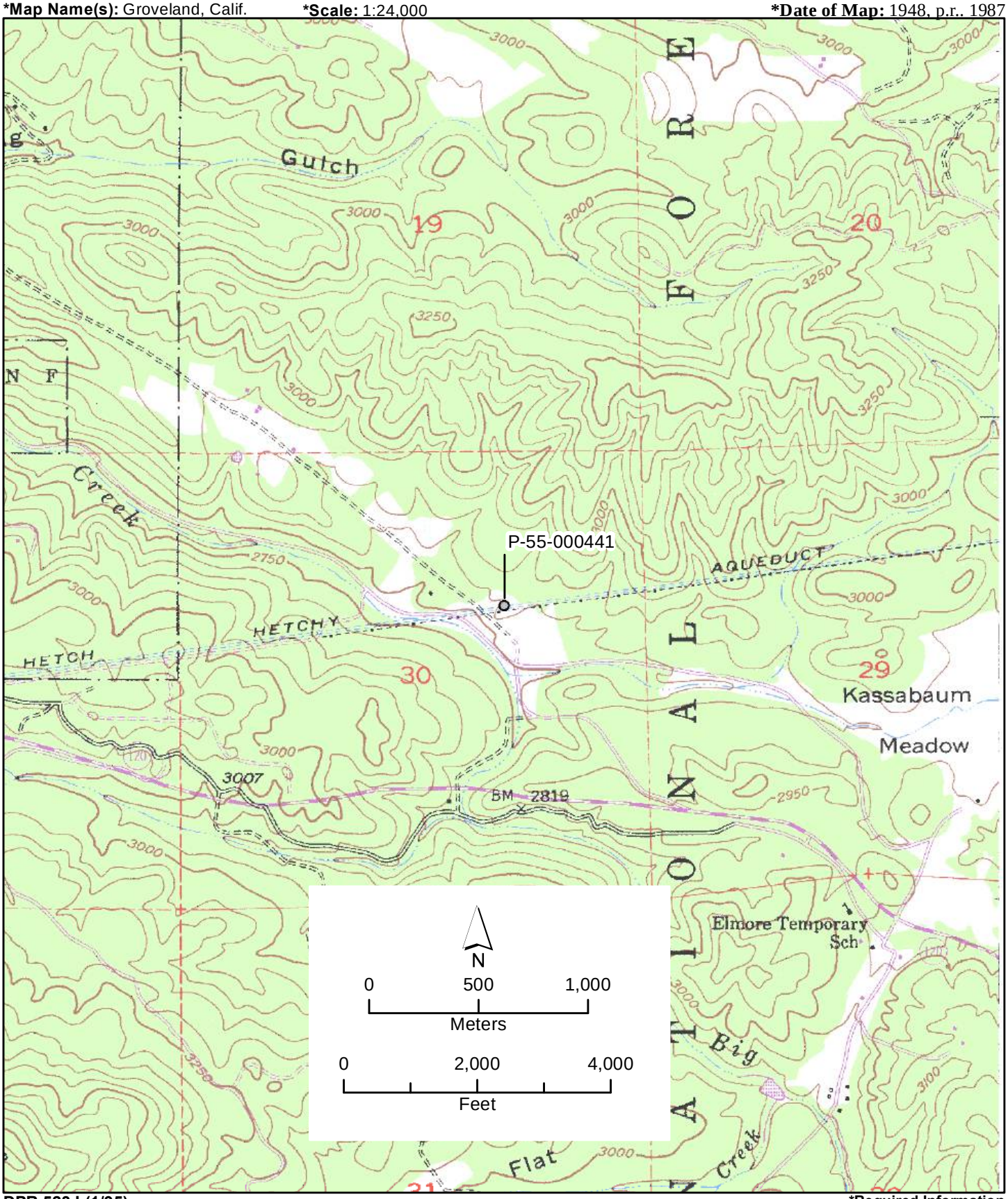
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # _____
HRI # _____
Trinomial _____

***Resource Name or #:** P-55-000441

***Map Name(s):** Groveland, Calif. ***Scale:** 1:24,000 ***Date of Map:** 1948, p.r.. 1987



*Required Information

Figure 1: AECOM's (2018) survey findings for P-55-000441.

Photograph 2: Metal canister located east of the P-55-000441 site boundary (see Figure 1).

Photograph 3: Metal strap located east of the P-55-000441 site boundary (see Figure 1).

PRIMARY RECORD

CALIFORNIA Department of Parks and Recreation
Office of Historic Preservation

Primary # P55-441 update
HRI #
Trinomial CA-TUO-3625H
NRHP Status Code 6Z 4/95

Page 1 of 8

Other Listings
Review Code ____ Reviewer ____ Date ____

Resource Identifier: Big Creek Shaft - H.H.W.P.

P1. Location: a. County Tuolumne and (Address and/or UTM Coordinates. Attach Location Map as required)

b. Address: ____ Zip ____
City ____

c. UTM: USGS Quad Groveland, Calif. (7.5'/15') Date PR 1987; Zone 10, 751340 mE/ 4190260 mN

d. Other Location Data: (Enter parcel #, legal description, directions to resource, and/or other location data if appropriate)
T.1S., R.17E., Section 30, SW¼ of NW¼ of SE¼ of NE¼. From Groveland, drive east on Highway 120 about 4 miles to Big Creek Shaft Road on the left. Turn left and drive north on Big Creek Shaft Road for a distance of .5 mi. Veer right onto a paved road underneath the power transmission line. Park underneath the first tower, about .1 mi from Big Creek Shaft Road. Site is here.

P2. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)
This resource is the remains of the activity associated with the drilling of the Big Creek Shaft of the Hetch Hetchy Water System. It consists of seven concrete foundations, two metal trays, tailings from the shaft drilling, and a length of iron water pipe ⅞" outside diameter. Currently, the Groveland Community Services District maintains a pump station, water treatment building, diesel fuel tank, diesel generator, and underground water lines as part of their distribution system. The shaft is also a ventilation duct for the Hetch Hetchy Aqueduct.

P3. Resources Present: __ Building __ Structure __ Object X Site __ District __ Element of District

P4. Photograph or Drawing: (Photograph required for buildings, structures, and objects.)
View southeast. Note tower in background.

P5. Date Constructed/Age:
__ Prehistoric X Historic __ Both
Shaft drilling began in 1918.

P6. Owner and Address:
City and County of San Francisco and Lew Behlman, Jr., Sandean Lane, Groveland, CA 95371

P7. Recorded by: (Name, affiliation, and address) Charla Meacham Francis and Mark V. Thornton, Sierra Heritage Services, 16198 Acorn Drive, Sonora, CA 95370

P8. Date Recorded: Jan. 18, 1995

P9. Type of Survey: X Intensive
__ Reconnaissance __ Other
Describe: to fully record site

P10. Report Citation: (Provide full citation or enter "none") Francis, C.M. and M.V. Thornton, 1995, *Archaeological and Historical Evaluation of CA-TUO-3625H, CA-TUO-3626H, P55-441, and P55-442*, prepared for Groveland Community Services District.

Attachments: __ None X Location Map X Continuation Sheet __ Building, Structure, and Object Record __ Linear Resource Record X Archaeological Record __ District Record __ Milling Station Record __ Rock Art Record __ Artifact Record __ Photograph Record __ Other: (List)

ARCHAEOLOGICAL SITE RECORD (Part 1)

CALIFORNIA Department of Parks and Recreation
Office of Historic Preservation

Primary # P55-441
Trinomial CA-TUO-3625H

Resource Identifier: Big Creek Shaft - H.H.W.P.

A1. Resource Attributes: (List attributes and codes) AH2

A2. Dimensions: a. Length: 55 m (N-S) x **b. Width** 55 m (E-W)
Method of measurement: X Paced __ Taped __ Visual estimate __ Other:
Method of determination: (Check any that apply) X Artifacts X Features __ Soil __ Vegetation __ Topography
__ Cut bank __ Animal burrow __ Excavation __ Property boundary __ Other: (Explain)

Reliability of determination: X High __ Low Explain:

Limitations: (Check any that apply) __ Restricted access __ Paved/built over __ Disturbances __ Site limits incompletely defined
__ Other: (Explain

A3. Depth: Surface __ None __ Unknown Method of determination:

A4. Human Remains: __ Present X Absent __ Possible __ Unknown (Explain):

A5. Features: (Number, briefly describe, indicate size, list associated cultural constituents, and show location of each feature on sketch map)
Hoist - 7 concrete foundations (see detail map) with threaded bolts. Concrete was poured in board forms. Main part of concrete has a high component of river cobbles less than 2½" in size. The rough concrete is capped by a fine layer ¼" thick. There are four horseshoe shaped foundations, 3 of other shapes. The historic records shows that this same number and arrangement of foundations were originally present.

A6. Cultural Constituents: (Describe and quantify artifacts, ecofacts, cultural residues, etc., not associated with features)
One length of iron water pipe ⅞" outside diameter is located about 20 meters west of the foundations. Two metal trays are in and around the foundations. The following were found during clearing accumulated sediments and duff around the foundations, especially the easternmost foundation: **Glass** Clear glass bottle fragments embossed "Federal law forbids sale or re-use of this bottle," ¼" thick clear plate glass fragments, brown bottle fragment with 3" high body with embossed side design around central area formerly for a long rectangular paper label; green fully machine made bottle 9-15/16" high with base embossed "25S"; clear oval bottle with base embossed 9 or g near end; brown rectangular base bottle with screw cap closure, fully machine made, 3⅞" x 1⅝" x 1" thick; base embossed in cut-off scar "30 S-B/14 0." **Ceramic** Stand-off insulator embossed "Thomas" 3⅜" x ⅝" x 9/16"; brown glazed round insulator; white cup fragment; yellowish brown glazed body fragment with raised ridges on concave side; a small fragment of Blue Willow (?) (dates to sometime between 1929 and 1942). **Metal** thick gauge grate 15½" x 9½", ⅛" thick wire; wire rope fragment 3" long, ⅜" dia.; 2 round nose shovel blade 12" long x 9¾"; various thick metal sheets ranging from 1/32" to 5/16" thick, some with bolt fasteners; other metal straps with fasteners (e.g., 5½" long x 1" wide with ¾" long screws; nails ranging in size 5d to 20d to 7¼" long; 2 canning jar seals 2¾" dia; round metal plat 4-7/16" dia. with 3 raised bolts; galvanized can (for wood stove?) with round lip on base and a handle, embossed on bottom "PAT'D DEC 3 - 1912;" washer 2¼" x 2⅝" with ¾ dia interior hole; screw lid 3½" dia; sanitary seam can with central raised opening approx. 3½" dia, 7⅞" high, galvanized bales on sides of opening; other heavy metal fragments. **Other** fire brick fragment 4½" x 2⅜" x ?.

A7. Were Specimens Collected: X No __ Yes (If yes, attach Artifact Record or catalog and identify where specimens are curated)

A8. Site Conditions: __ Good X Fair __ Poor (Describe disturbances): Superstructures were removed in 1930s. The shaft itself was backfilled around the ventilation duct.

ARCHAEOLOGICAL SITE RECORD (Part 2)

CALIFORNIA Department of Parks and Recreation
Office of Historic Preservation

Primary # P55-441
Trinomial CA-TUO-3625H

Resource Identifier: Big Creek Shaft - H.H.W.P.
A9. Nearest Water: (List type, distance, and direction.) Seasonal, 100' (30 m), east.

A10. Elevation: 2804.378 feet above mean sea level (brass cap on tower footing)
A11. Environmental Setting: (Describe vegetation, fauna, soils, geology, landform, slope, aspect, exposure, etc., as appropriate.)
The site lies within an oak woodland/chaparral zone with ponderosa pine, black oak, and manzanita, on a gentle slope with a southern aspect overlooking Big Creek. Native soils are reddish brown sandy loam derived from granitic bedrock.

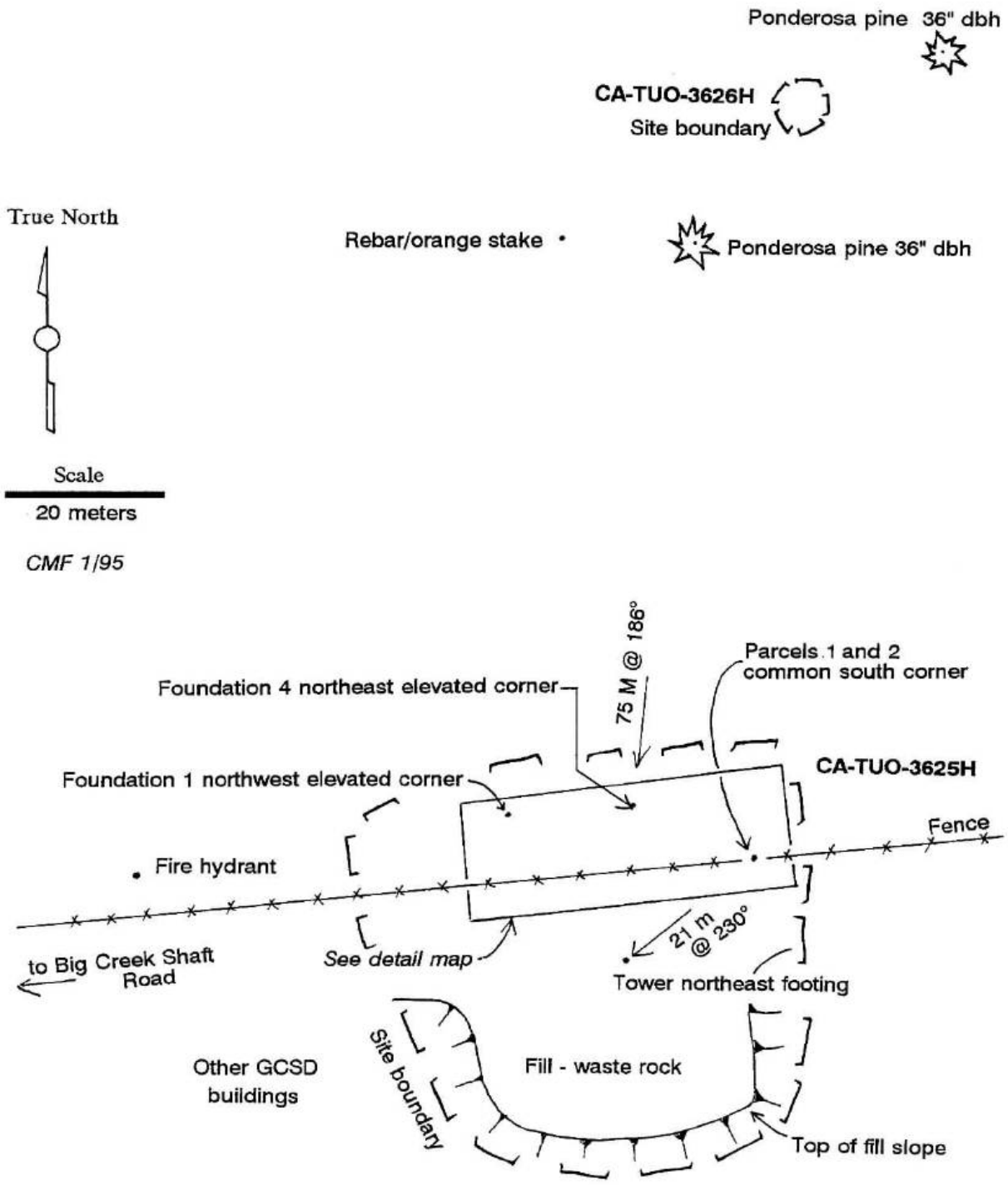
A12. Historical Information: (Note sources and provide full citations in Field A15 below.) Water from the upper Tuolumne River is conveyed to the San Francisco Bay Area via the Hetch Hetchy Water System through tunnels and pipes beginning at Early Intake on the main Tuolumne River and extending to the Bay Area. The tunnel construction involves multiple headings (i.e., starting points for excavation). Headings can be located through vertical entrances ("shafts"), through horizontal entrances ("adits"), and through "portals," which are direct entrances into the main tunnel. Big Creek Shaft was one of these headings. Construction camps were set up at the portals, adits, and shafts. The Big Creek Shaft area itself was the site of electric hoist and air compressor buildings, storage buildings, and the headworks, while the workers stationed at Big Creek lived in the area next to the creek where cottages and a rock crushing plant were located on both sides of the Hetch Hetchy Railroad grade which parallels Big Creek.

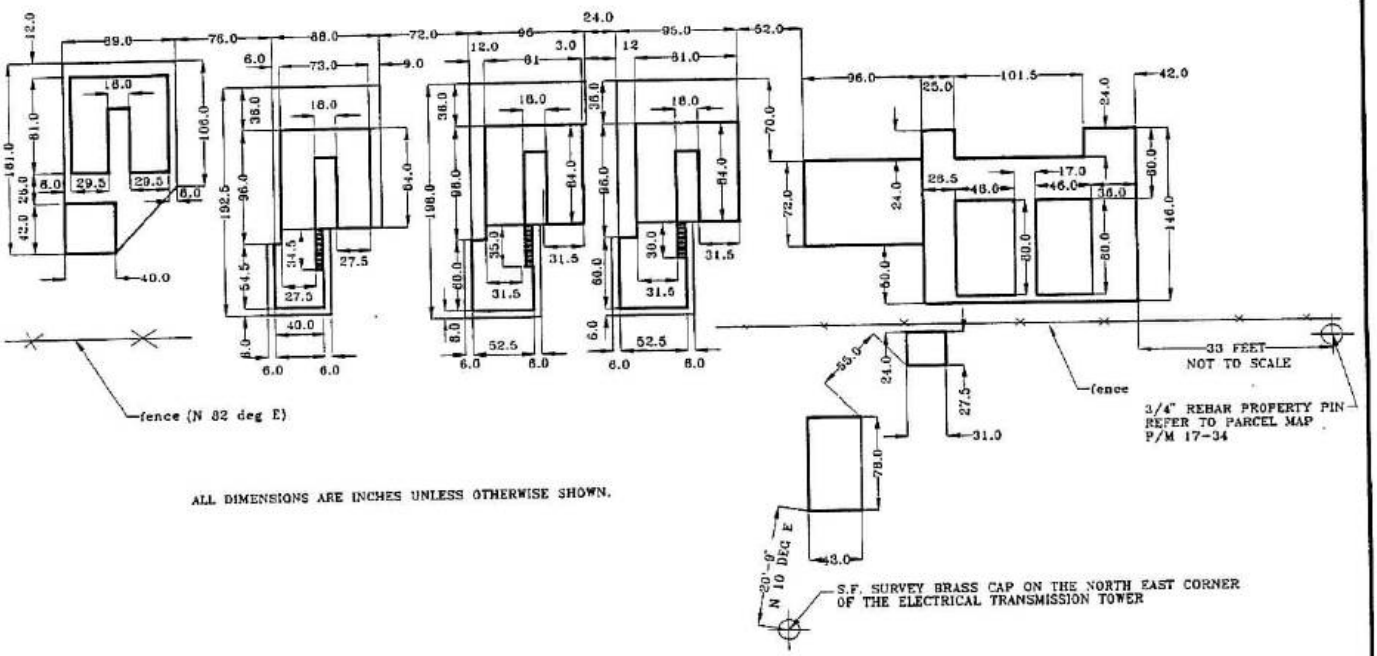
A13. Age: __ Prehistoric __ Pre-Colonial (1500-1769) __ Spanish/Mexican (1769-1848) __ Early American (1848-1880)
__ Turn of Century (1880-1914) X Early 20th Century (1914-1945) __ Post WWII (1945+) __ Undetermined
Factual or estimated dates of occupation (explain): Work on the Mountain Tunnel Division of the Hetch Hetchy Aqueduct started in 1917 and was completed in 1925.

A14. Remarks and Interpretations: (Discuss scientific, interpretive, ethnic, and other values of site, if known.)
The Big Creek Shaft was an integral part of the Hetch Hetchy Water System construction. This site possesses integrity of location, and some elements of setting, association and feeling. Design, workmanship, and materials are substantially lacking. The site is in its original location and can be viewed in its original setting, although newer outbuildings and adjacent rural homes are also visible. However, little remains at the site, other than the concrete foundations, to convey the camp's layout, materials used in the camp's structures and other facilities, and consequently the workmanship of the site's facilities and contents. This is primarily due to the removal of superstructures and equipment in the 1930s.

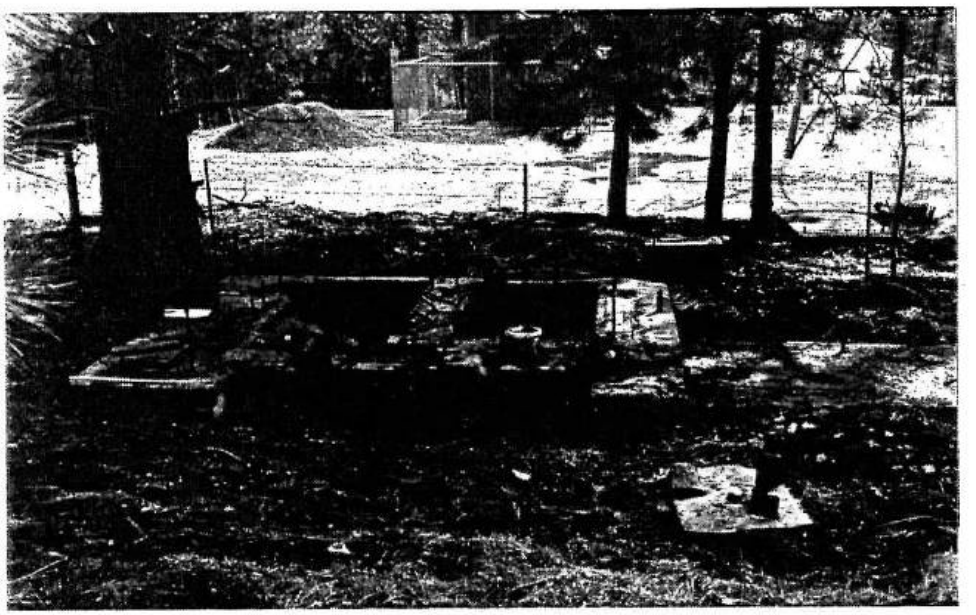
A15. References: (Give full citations including the names and addresses of any persons interviewed, if possible.)
See Item P10.

A16. Photographs: (List subjects, direction of view, and accession numbers or attach a Photograph Record.)
GCSD-1-95, GCSD-4-95
Original media/negatives kept at: Mark V. Thornton, P.O. Box 192, Groveland, CA
A17. Form Prepared By: Charla Meacham Francis & Mark V. Thornton **Date:** Jan. 18, 1995
Affiliation and address: Sierra Heritage Services, 16198 Acorn Drive, Sonora, CA 95370


Ponderosa pine 36" dbh
CA-TUO-3626H
Site boundary
True North
Rebar/orange stake
Ponderosa pine 36" dbh
Scale
20 meters
CMF 1/95
75 M @ 186°
Parcels 1 and 2
common south corner
Foundation 4 northeast elevated corner
Foundation 1 northwest elevated corner
CA-TUO-3625H
Fence
Fire hydrant
21 m
@ 230°
to Big Creek Shaft
Road
See detail map
Tower northeast footing
Other GCSD
buildings
Site boundary
Fill - waste rock
Top of fill slope

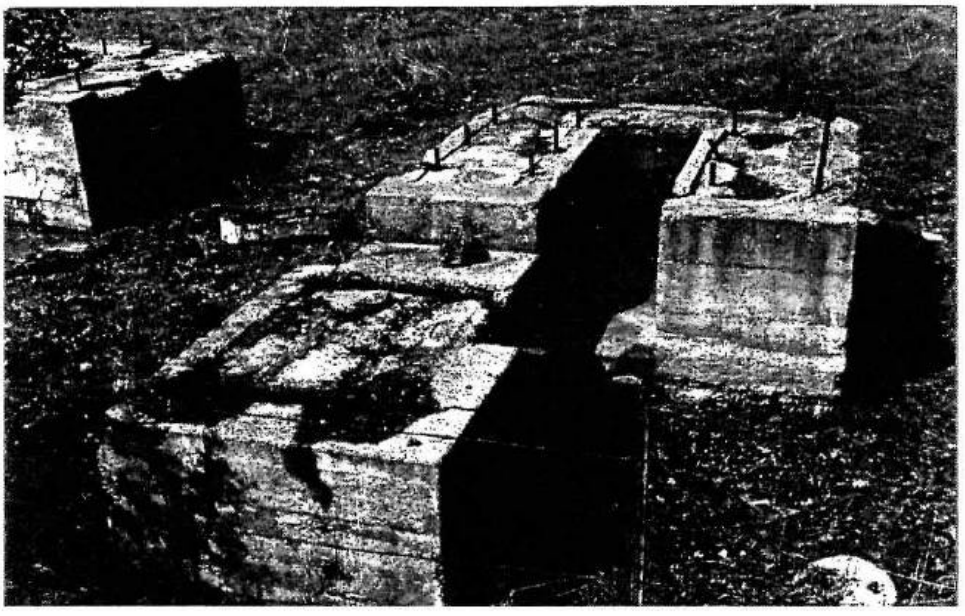


Hetch Hetchy Foundations at Big Creek Water Treatment Facilities

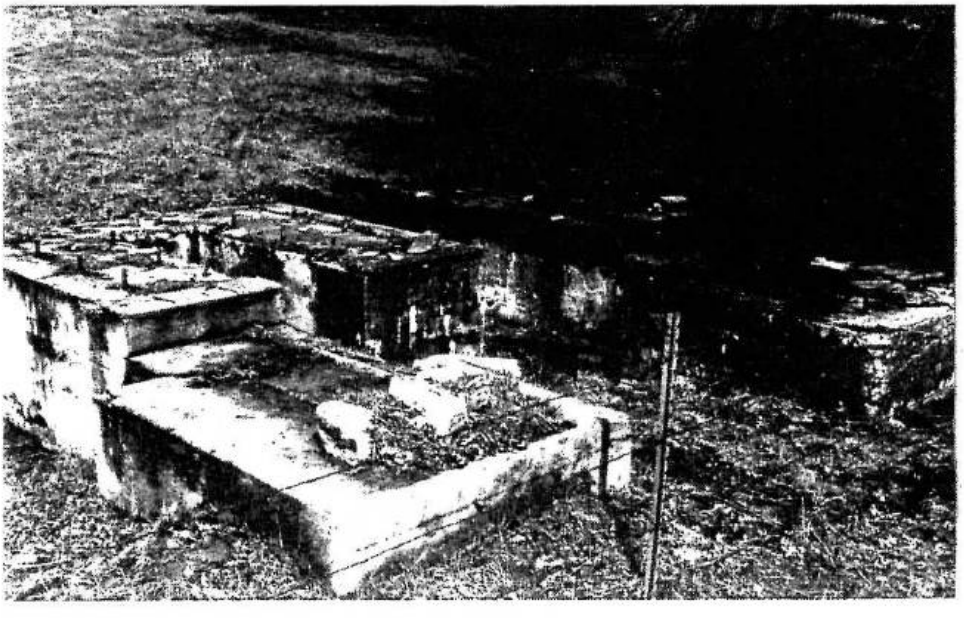


View south showing the hoist foundation after clearing.

View west from hoist foundation.



View north showing one of middle foundations, Note metal tray between foundations.



View northeasterly showing two compressor foundations.

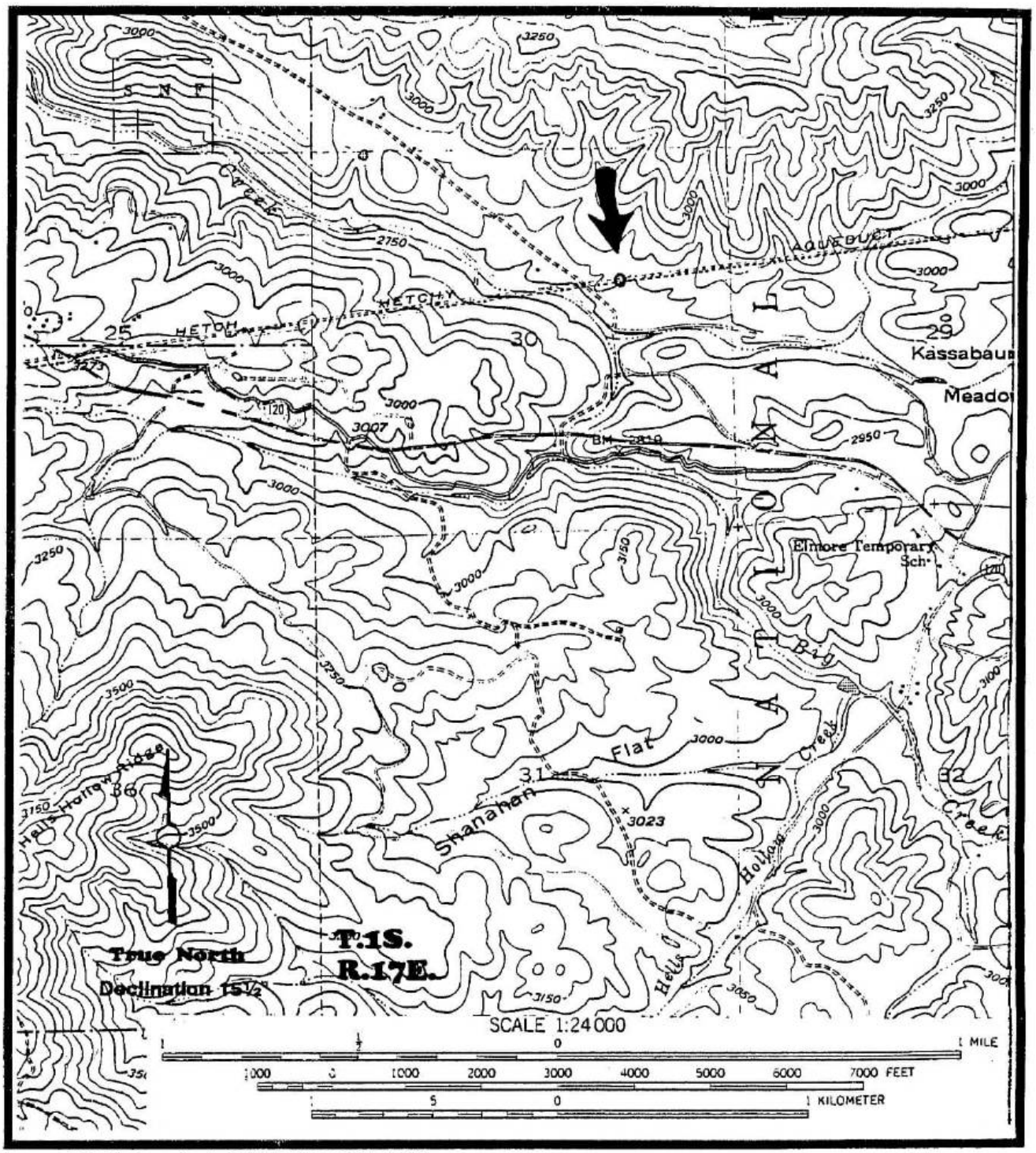
MAP SHEET

CALIFORNIA Department of Parks and Recreation
Office of Historic Preservation

Primary # ~~P55-315~~ P-55-000441
HRI #
Trinomial CA-TUO-3625-H

P-55-000441

Resource Identifier: Big Creek Shaft - H.H.W.P.
Map Name: USGS Groveland, Calif. 7.5' **Scale:** 1:24000 **Date:** 1947 (PR 1987)



Source: USGS Groveland, Calif. 7.5' 1947 PR 1987
Contour interval 50 feet

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
ARCHAEOLOGICAL SITE RECORD
Page ___1___ of ___4___.

Permanent Trinomial: CA-TUO-3625H Supplement ☐
Other Designations: Big Creek Alternatives
ASI -1

P-55-441 12/94

1. County: Tuolomne

2. USGS Quad: Groveland (7.5') X (15') Photorevised 1991

3. UTM Coordinates: Zone 10 75120 m Easting 4190280 m Northing

4. Township: 1S Range 17E:SW 1/4 of NE 1/4 of SW 1/4 of NE 1/4 of Section 30 Base Mer. Mt Diablo

5. Map Coordinates: 220 mmS 380 mmE (from NW corner of map)

6. Elevation: ~2750

7. Location: From the intersection of Ferretti Road and Highway 120, in Groveland. Travel east ~ 4 miles to Big Creek Shaft Road. Site is about ~ 1/3 miles at 10°.

8. Prehistoric _____ Historic _____X_____ Protohistoric _____

9. Site Description: Cement foundation to a hoist mechanism used in the construction of the Hetch Hetchy aqueduct. Hoist was used to raise and lower men and equipment in a shaft ~ 500ft deep. Shaft has since been backfilled and made more narrow and is currently used as a ventilation duct for the Hetch Hetchy Reservoir. Site consists of 4 "U"-shaped cement foundations, 2 1m x1m square cement foundations and 1 square cement foundation at ground level. All foundations have large screws protruding from the top surface. 2 metal containers (of unknown use) were also observed within site boundaries.

10. Area ___9_____ m (N/S) x ___27___ m (E/W) _____243_____ m^2.

Method of Determination: Pace/Compass

11. Depth: unknown cm Method of Determination:

12. Features: 7 foundation pads of various sizes; 4 "U"-shaped, 2 square, 1 square at ground level.

13. Artifacts: 2 metal containers of unknown use measuring approximately 75cm X 25cm X 25cm.

14. Non-Artifactual Constituents and Faunal Remains: none observed.

15. Date Recorded: 9/15/94

16. Recorded By: Emanuel Teixeira.

17. Affiliation and Address Archaeological Services, 8026 Lorraine Ave., Suite #218, Stockton, CA 95210

18. Human Remains: none observed

19. Site Disturbances: Cattle grazing. Site is along G.C.S.D. parking area.

Permanent Trinomial: CA-TUO-3625/H Supplement ☐
Other Designations: Big Creek Alternatives
ASI -1
P-55-441

20. Nearest Water (type, distance and direction): Intermittent drainage, east, 20 meters.

21. Vegetation Community (site vicinity):grasses, shrubs (manzanita), & trees (pine)

22. Vegetation (on site): grasses & trees (pine).

23. Site Soil: organic loam

24. Surrounding Soil: organic loam

25. Geology: Sierra Nevada Mountain Range

26. Landform: Gently sloping knolls

27. Slope: level

28. Exposure: 80%

29. Landowner (s) (and/or tenants) and Address:

30. Remarks: ASI 2 is 80-100 meters at bearing of 22°. Covered shaft is 22 meters at a bearing of 144° from approximate center of foundation.

31. References:

32. Name of Project: Big Creek Alternative Sites.

33. Type of Investigation: Survey

34. Site Accession Number: Curated At:

35. Photos: none.

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Permanent Trinomial: CA-TUO-3625H
mo. yr.

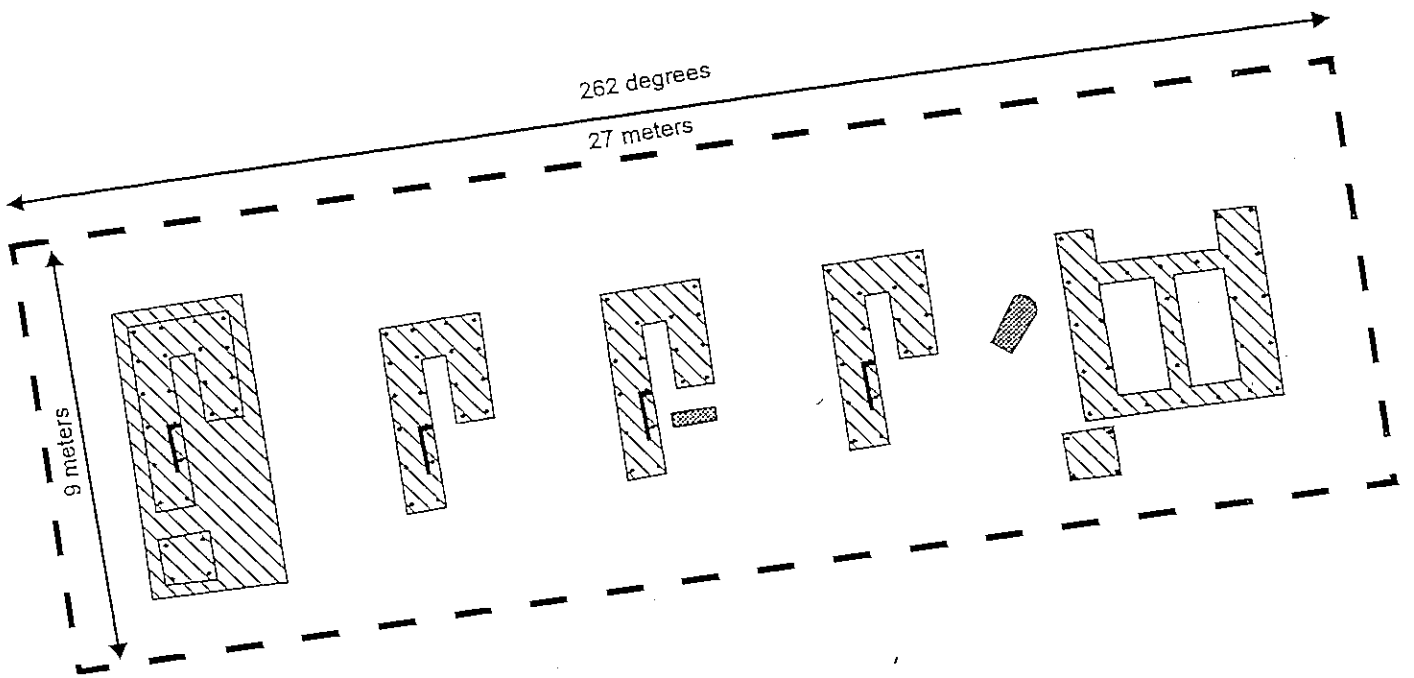
ARCHAEOLOGICAL SITE MAP

Temporary Number: ____-____ ASI-1

Page ____ of ____.

Agency Designation: P-55-441

Type of Feature: HOIST FOUNDATION



LEGEND

- Site Boundary
- Metal Bolts
- Cement
- Metal Containers

N

0 2 4 6

Scale in Meters

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

ARCHEOLOGICAL SITE LOCATION MAP

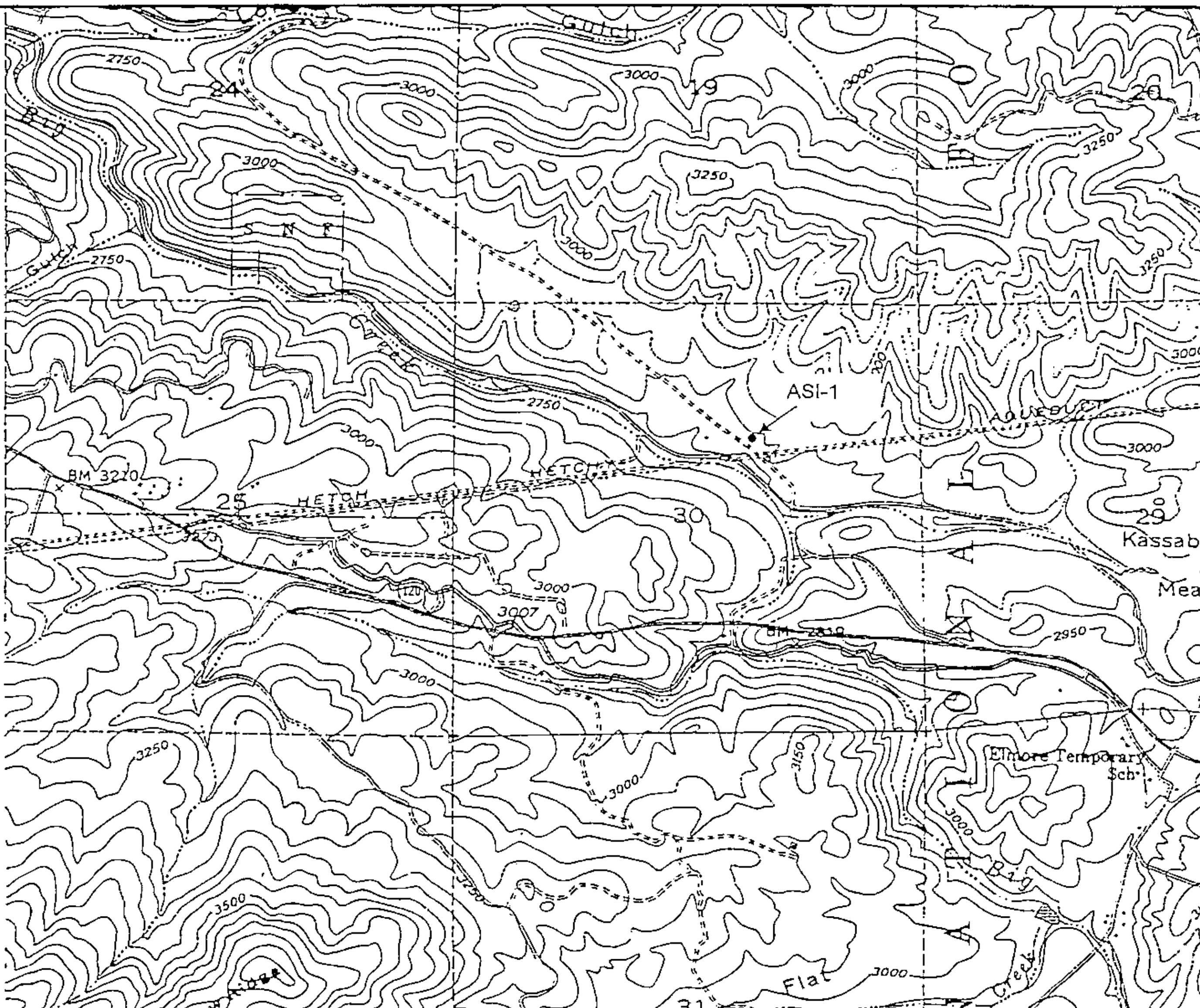
Page 4 of 4

Permanent Trinomial: CA-TUO-3625H
mo. yr.

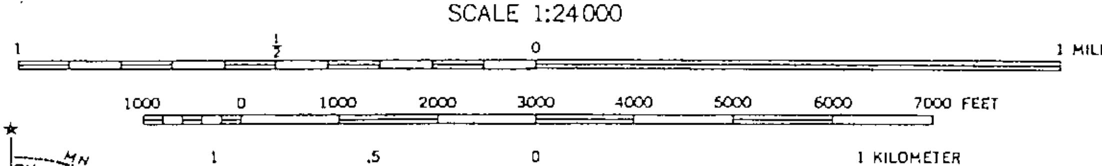
Temporary Number: ASI-1

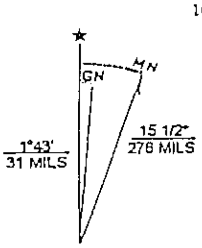
Agency Designation: P-55-441

Type of Feature:



SCALE 1:24 000





UTM GRID AND 1987 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 50 FEET

QUADRANGLE LOCATION

Source of Base Map: USGS Groveland, Calif. 7.5 minute Quadrangle (1947) Photorevised 1987